Deep Lake

Release 3.8.22

Activeloop

Feb 27, 2024

GETTING STARTED

Deep Lake is an open-source database for AI.

CHAPTER

ONE

INSTALLATION

Deep Lake can be installed with pip

```
pip install deeplake
```

Deep Lake has the following extras that you can choose to install according to your needs.

Table 1: Installation commands

Install command	Description	Dependencies installed
`pip install "deeplake[av]"`	Audio and video support via PyAV	av
`pip install "deeplake[visualizer]"`	Visualize Deep Lake datasets within notebooks. This is required for *Dataset.visualize* to work.	IPython, flask
`pip install "deeplake[gcp]"`	GCS support	google-cloud-storage, google-auth, google-auth-oauthlib
`pip install "deeplake[azure]"`	Azure Blob Storage support	azure-storage-blob, azure-cli, azure-identity
`pip install "deeplake[medical]"`	DICOM and NIfTI data support	pydicom, nibabel
`pip install "deeplake[gdrive]"`	Google Drive support	google-api-python-client, oauth2client, google-auth, google-auth-oauthlib
`pip install "deeplake[point_cloud]"`	Support for LiDAR point cloud data	laspy
`pip install "deeplake[all]"`	Installs all of the above	

CHAPTER

TWO

DATASETS

2.1 Creating Datasets

deeplake.dataset	Returns a *Dataset* object referencing either a new or existing dataset.
deeplake.empty	Creates an empty dataset
deeplake.like	Creates a new dataset by copying the `source` dataset's structure to a new location.
deeplake.ingest_classification	Ingest a dataset of images from a local folder to a Deep Lake Dataset.
deeplake.ingest_coco	Ingest images and annotations in COCO format to a Deep Lake Dataset.
deeplake.ingest_yolo	Ingest images and annotations (bounding boxes or polygons) in YOLO format to a Deep Lake Dataset.
deeplake.ingest_kaggle	Download and ingest a kaggle dataset and store it as a structured dataset to destination.
deeplake.ingest_dataframe	Convert pandas dataframe to a Deep Lake Dataset.
deeplake.ingest_huggingface	Converts Hugging Face datasets to Deep Lake format.

2.2 Loading Datasets

deeplake.load	Loads an existing dataset

2.3 Deleting and Renaming Datasets

deeplake.delete	Deletes a dataset at a given path.
deeplake.rename	Renames dataset at `old_path` to `new_path`.

2.4 Copying Datasets

deeplake.copy	Copies dataset at `src` to `dest`.
deeplake.deepcopy	Copies dataset at `src` to `dest` including version control history.

2.5 Dataset Operations

Dataset.summary	Prints a summary of the dataset.
Dataset.append	Append samples to mutliple tensors at once.
Dataset.extend	Appends multiple rows of samples to mutliple tensors at once.
Dataset.update	Update existing samples in the dataset with new values.
Dataset.query	Returns a sliced *Dataset* with given query results.
Dataset.copy	Copies this dataset or dataset view to `dest`.
Dataset.delete	Deletes the entire dataset from the cache layers (if any) and the underlying storage.
Dataset.rename	Renames the dataset to *path*.
Dataset.connect	Connect a Deep Lake cloud dataset through a deeplake path.
Dataset.visualize	Visualizes the dataset in the Jupyter notebook.
Dataset.pop	Removes a sample from all the tensors of the dataset.
Dataset.rechunk	Rewrites the underlying chunks to make their sizes optimal.
Dataset.flush	Necessary operation after writes if caches are being used.
Dataset.clear_cache	• Flushes (see *Dataset.flush()*) the contents of the cache layers (if any) and then deletes contents of all the layers of it.
Dataset.size_approx	Estimates the size in bytes of the dataset.
Dataset.random_split	Splits the dataset into non-overlapping *Dataset* objects of given lengths.

2.6 Dataset Visualization

Dataset.visualize	Visualizes the dataset in the Jupyter notebook.

2.7 Dataset Credentials

Dataset.add_creds_key	Adds a new creds key to the dataset.
Dataset.populate_creds	Populates the creds key added in add_creds_key with the given creds.
Dataset.update_creds_key	Updates the name and/or management status of a creds key.
Dataset.get_creds_keys	Returns the set of creds keys added to the dataset.

2.8 Dataset Properties

Dataset.tensors	All tensors belonging to this group, including those within sub groups.
Dataset.groups	All sub groups in this group
Dataset.num_samples	Returns the length of the smallest tensor.
Dataset.read_only	Returns True if dataset is in read-only mode and False otherwise.
Dataset.info	Returns the information about the dataset.
Dataset.max_len	Return the maximum length of the tensor.
Dataset.min_len	Return the minimum length of the tensor.

2.9 Dataset Version Control

Dataset.commit	Stores a snapshot of the current state of the dataset.
Dataset.diff	Returns/displays the differences between commits/branches.
Dataset.checkout	Checks out to a specific commit_id or branch.
Dataset.merge	Merges the target_id into the current dataset.
Dataset.log	Displays the details of all the past commits.
Dataset.reset	Resets the uncommitted changes present in the branch.
Dataset.get_commit_details	Get details of a particular commit.
Dataset.commit_id	The lasted committed commit id of the dataset.
Dataset.branch	The current branch of the dataset
Dataset.pending_commit_id	The commit_id of the next commit that will be made to the dataset.
Dataset.has_head_changes	Returns True if currently at head node and uncommitted changes are present.
Dataset.commits	Lists all the commits leading to the current dataset state.
Dataset.branches	Lists all the branches of the dataset.

2.10 Dataset Views

A dataset view is a subset of a dataset that points to specific samples (indices) in an existing dataset. Dataset views can be created by indexing a dataset, filtering a dataset with *Dataset.filter()*, querying a dataset with *Dataset.query()* or by sampling a dataset with *Dataset.sample_by()*. Filtering is done with user-defined functions or simplified expressions whereas query can perform SQL-like queries with our Tensor Query Language. See the full TQL spec *here*.

Dataset views can only be saved when a dataset has been committed and has no changes on the HEAD node, in order to preserve data lineage and prevent the underlying data from changing after the query or filter conditions have been evaluated.

Example

```
>>> import deeplake
>>> # load dataset
>>> ds = deeplake.load("hub://activeloop/mnist-train")
>>> # filter dataset
>>> zeros = ds.filter("labels == 0")
>>> # save view
>>> zeros.save_view(id="zeros")
>>> # load_view
>>> zeros = ds.load_view(id="zeros")
>>> len(zeros)
5923
```

Dataset.query	Returns a sliced *Dataset* with given query results.
Dataset.sample_by	Returns a sliced *Dataset* with given weighted sampler applied.
Dataset.filter	Filters the dataset in accordance of filter function `f(x: sample) -> bool`
Dataset.save_view	Saves a dataset view as a virtual dataset (VDS)
Dataset.get_view	Returns the dataset view corresponding to `id`.
Dataset.load_view	Loads the view and returns the *Dataset* by id.
Dataset.delete_view	Deletes the view with given view id.
Dataset.get_views	Returns list of views stored in this Dataset.
Dataset.is_view	Returns `True` if this dataset is a view and `False` otherwise.
Dataset.min_view	Returns a view of the dataset in which all tensors are sliced to have the same length as the shortest tensor.
Dataset.max_view	Returns a view of the dataset in which shorter tensors are padded with `None` s to have the same length as the longest tensor.

CHAPTER

THREE

VECTOR STORE

3.1 Creating a Deep Lake Vector Store

VectorStore.__init__	Creates an empty VectorStore or loads an existing one if it exists at the specified `path`.

3.2 Vector Store Operations

VectorStore.add	Adding elements to deeplake vector store.
VectorStore.search	VectorStore search method that combines embedding search, metadata search, and custom TQL search.
VectorStore.delete	Delete the data in the Vector Store.
VectorStore.delete_by_path	Deleted the Vector Store at the specified path.
VectorStore.update_embedding	Recompute existing embeddings of the VectorStore, that match either query, filter, ids or row_ids.

3.3 Vector Store Properties

VectorStore.summary	Prints a summary of the dataset
VectorStore.tensors	Returns the list of tensors present in the dataset
VectorStore.__len__	Length of the dataset

CHAPTER

FOUR

TENSORS

4.1 Creating Tensors

Dataset.create_tensor	Creates a new tensor in the dataset.
Dataset.create_group	Creates a tensor group.
Dataset.create_tensor_like	Copies the `source` tensor's meta information and creates a new tensor with it.

4.2 Deleting and Renaming Tensors

Dataset.delete_tensor	Delete a tensor from the dataset.
Dataset.delete_group	Delete a tensor group from the dataset.
Dataset.rename_tensor	Renames tensor with name `name` to `new_name`
Dataset.rename_group	Renames group with name `name` to `new_name`

4.3 Adding and deleting samples

Tensor.append	Appends a single sample to the end of the tensor.
Tensor.extend	Extends the end of the tensor by appending multiple elements from a sequence.
Tensor.pop	Removes element(s) at the given index / indices.
Tensor.clear	Deletes all samples from the tensor
Tensor.__setitem__	Update samples with new values.

4.4 Retrieving samples

Tensor.numpy	Computes the contents of the tensor in numpy format.
Tensor.data	Returns data in the tensor in a format based on the tensor's base htype.
Tensor.tobytes	Returns the bytes of the tensor.
Tensor.text	Return text data.
Tensor.dict	Return json data.
Tensor.list	Return list data.
Tensor._linked_sample	Returns the linked sample at the given index.

4.5 Tensor Properties

Tensor.htype	Htype of the tensor.
Tensor.base_htype	Base htype of the tensor.
Tensor.dtype	Dtype of the tensor.
Tensor.shape	Get the shape of this tensor.
Tensor.shape_interval	Returns a *ShapeInterval* object that describes this tensor's shape more accurately.
Tensor.ndim	Number of dimensions of the tensor.
Tensor.num_samples	Returns the length of the primary axis of the tensor.
Tensor.__len__	Returns the length of the primary axis of the tensor.
Tensor.is_dynamic	Will return `True` if samples in this tensor have shapes that are unequal.
Tensor.is_sequence	Whether this tensor is a sequence tensor.
Tensor.is_link	Whether this tensor is a link tensor.
Tensor.verify	Whether linked data will be verified when samples are added.

4.6 Info

Tensor.info	Returns the information about the tensor.
Tensor.sample_info	Returns info about particular samples in a tensor.

4.7 Video features

Tensor.play	Play video sample.
Tensor.timestamps	Returns timestamps (in seconds) for video sample as numpy array.

CHAPTER

FIVE

HTYPES

Htype is the class of a tensor: image, bounding box, generic tensor, etc.

The htype of a tensor can be specified at its creation

```
>>> ds.create_tensor("my_tensor", htype="...")
```

If not specified, the tensor's htype defaults to "generic".

Specifying an htype allows for strict settings and error handling, and it is critical for increasing the performance of Deep Lake datasets containing rich data such as images and videos.

Supported htypes and their respective defaults are:

Table 1: Htype configs

HTYPE	DTYPE	COMPRESSION
generic	None	None
image	uint8	Required arg
image.rgb	uint8	Required arg
image.gray	uint8	Required arg
video	uint8	Required arg
audio	float64	Required arg
class_label	uint32	None
tag	str	None
bbox	float32	None
bbox.3d	float32	None
intrinsics	float32	None
segment_mask	uint32	None
binary_mask	bool	None
keypoints_coco	int32	None
point	int32	None
polygon	float32	None
text	str	None
json	Any	None
list	List	None
dicom	None	dcm
nifti	None	Required arg
point_cloud	None	las
mesh	None	ply
instance_label	uint32	None
embedding	None	None
link	str	None
sequence	None	None

5.1 Image Htype

- Sample dimensions: `(height, width, # channels)` or `(height, width)`.

Images can be stored in Deep Lake as compressed bytes or as raw arrays. Due to the high compression ratio for most image formats, it is highly recommended to store compressed images using the `sample_compression` input to the create_tensor method.

5.1.1 Creating an image tensor

An image tensor can be created using

```
>>> ds.create_tensor("images", htype="image", sample_compression="jpg")
```

OR

```
>>> ds.create_tensor("images", htype="image", chunk_compression="jpg")
```

- **Optional args:**
  - dtype: Defaults to `uint8`.
- Supported compressions:

```
>>> [None, "bmp", "dib", "gif", "ico", "jpeg", "jpeg2000", "pcx", "png", "ppm", "sgi",
↪"tga", "tiff",
... "webp", "wmf", "xbm", "eps", "fli", "im", "msp", "mpo"]
```

5.1.2 Appending image samples

- Image samples can be of type `np.ndarray` or Deep Lake *Sample* which can be created using *deeplake.read()*.

Examples

Appending pixel data with array

```
>>> ds.images.append(np.zeros((5, 5, 3), dtype=np.uint8))
```

Appening Deep Lake image sample

```
>>> ds.images.append(deeplake.read("images/0001.jpg"))
```

You can append multiple samples at the same time using *extend()*.

```
>>> ds.images.extend([deeplake.read(f"images/000{i}.jpg") for i in range(10)])
```

Note: If the compression format of the input sample does not match the `sample_compression` of the tensor, Deep Lake will decompress and recompress the image for storage, which may significantly slow down the upload process. The upload process is fastest when the image compression matches the `sample_compression`.

5.1.3 image.rgb and image.gray htypes

`image.rgb` and `image.gray` htypes can be used to force your samples to be of RGB or grayscale type. i.e., if RGB images are appended to an `image.gray` tensor, Deep Lake will convert them to grayscale and if grayscale images are appended to an `image.rgb` tensor, Deep Lake will convert them to RGB format.

image.rgb and image.gray tensors can be created using

```
>>> ds.create_tensor("rgb_images", htype="image.rgb", sample_compression="...")
```

```
>>> ds.create_tensor("gray_images", htype="image.gray", sample_compression="...")
```

5.2 Video Htype

- Sample dimensions: `(# frames, height, width, # channels)` or `(# frames, height, width)`

5.2.1 Creating a video tensor

A video tensor can be created using

```
>>> ds.create_tensor("videos", htype="video", sample_compression="mp4")
```

- **Optional args:**
  - dtype: Defaults to `uint8`.
- Supported compressions:

```
>>> [None, "mp4", "mkv", "avi"]
```

5.2.2 Appending video samples

- Video samples can be of type `np.ndarray` or *Sample* which is returned by *deeplake.read()*.
- Deep Lake does not support compression of raw video frames. Therefore, array of raw frames can only be appended to tensors with `None` compression.
- Recompression of samples read with *deeplake.read* is also not supported.

Examples

Appending Deep Lake video sample

```
>>> ds.videos.append(deeplake.read("videos/0012.mp4"))
```

Extending with multiple videos

```
>>> ds.videos.extend([deeplake.read(f"videos/00{i}.mp4") for i in range(10)])
```

5.3 Audio Htype

- Sample dimensions: `(# samples in audio, # channels)` or `(# samples in audio,)`

5.3.1 Creating an audio tensor

An audio tensor can be created using

```
>>> ds.create_tensor("audios", htype="audio", sample_compression="mp3")
```

- **Optional args:**
  - dtype: Defaults to `float64`.
- Supported compressions:

```
>>> [None, "mp3", "wav", "flac"]
```

5.3.2 Appending audio samples

- Audio samples can be of type `np.ndarray` or *`Sample`* which is returned by *`deeplake.read()`*.
- Like videos, Deep Lake does not support compression or recompression of input audio samples. Thus, samples of type `np.ndarray` can only be appended to tensors with `None` compression.

Examples

Appending Deep Lake audio sample

```
>>> ds.audios.append(deeplake.read("audios/001.mp3"))
```

Extending with Deep Lake audio samples

```
>>> ds.audios.extend([deeplake.read(f"videos/00{i}.mp3") for i in range(10)])
```

5.4 Class Label Htype

- Sample dimensions: `(# labels,)`

Class labels are stored as numerical values in tensors, which are indices of the list `tensor.info.class_names`.

5.4.1 Creating a class label tensor

A class label tensor can be created using

```
>>> classes = ["airplanes", "cars", "birds", "cats", "deer", "dogs", "frogs", "horses",
↪"ships", "trucks"]
>>> ds.create_tensor("labels", htype="class_label", class_names=classes, chunk_
↪compression="lz4")
```

- **Optional args:**
  - class_names: This must be a **list of strings**. `tensor.info.class_names` will be set to this list.

  - *sample_compression* or *chunk_compression*.
  - dtype: Defaults to `uint32`.

- Supported compressions:

```
>>> ["lz4"]
```

You can also choose to set the class names after tensor creation.

```
>>> ds.labels.info.update(class_names = ["airplanes", "cars", "birds", "cats", "deer",
↪"dogs", "frogs", "horses", "ships", "trucks"])
```

Note: If specifying compression, since the number of labels in one sample will be too low, `chunk_compression` would be the better option to use.

5.4.2 Appending class labels

- Class labels can be appended as `int`, `str`, `np.ndarray` or `list` of `int` or `str`.
- In case of strings, `tensor.info.class_names` is updated automatically.

Examples

Appending index

```
>>> ds.labels.append(0)
>>> ds.labels.append(np.zeros((5,), dtype=np.uint32))
```

Extending with list of indices

```
>>> ds.labels.extend([[0, 1, 2], [1, 3]])
```

Appending text labels

```
>>> ds.labels.append(["cars", "airplanes"])
```

5.5 Tag Htype

- Sample dimensions: `(# tags,)`

This htype can be used to tag samples with one or more string values.

5.5.1 Creating a tag tensor

A tag tensor can be created using

```
>>> ds.create_tensor("tags", htype="tag", chunk_compression="lz4")
```

- **Optional args:**
  - *chunk_compression*.
- Supported compressions:

```
>>> ["lz4"]
```

5.5.2 Appending tag samples

- Tag samples can be appended as `str` or `list` of `str`.

Examples

Appending a tag

```
>>> ds.tags.append("verified")
```

Extending with list of tags

```
>>> ds.tags.extend(["verified", "unverified"])
```

5.6 Bounding Box Htype

- Sample dimensions: `(# bounding boxes, 4)`

Bounding boxes have a variety of conventions such as those used in YOLO, COCO, Pascal-VOC and others. In order for bounding boxes to be correctly displayed by the visualizer, the format of the bounding box must be specified in the coords key in tensor meta information mentioned below.

5.6.1 Creating a bbox tensor

A bbox tensor can be created using

```
>>> ds.create_tensor("boxes", htype="bbox", coords={"type": "fractional", "mode": "CCWH"}
↪)
```

- **Optional args:**
  - **coords: A dictionary with keys "type" and "mode".**
    - **type: Specifies the units of bounding box coordinates.**
      - "pixel": is in unit of pixels.
      - "fractional": is in units relative to the width and height of the image, such as in YOLO format.
    - **mode: Specifies the convention for the 4 coordinates**

        - "LTRB": left_x, top_y, right_x, bottom_y
        - "LTWH": left_x, top_y, width, height
        - "CCWH": center_x, center_y, width, height
    - **dtype**: Defaults to `float32`.
    - *sample_compression* or *chunk_compression*.
- Supported compressions:

```
>>> ["lz4"]
```

You can also choose to set the class names after tensor creation.

```
>>> ds.boxes.info.update(coords = {"type": "pixel", "mode": "LTRB"})
```

Note: If the bounding box format is not specified, the visualizer will assume a YOLO format (`fractional` + `CCWH`) if the box coordinates are < 1 on average. Otherwise, it will assume the COCO format (`pixel` + `LTWH`).

5.6.2 Appending bounding boxes

- Bounding boxes can be appended as `np.ndarrays` or `list` or `lists of arrays`.

Examples

Appending one bounding box

```
>>> box
array([[462, 123, 238,  98]])
>>> ds.boxes.append(box)
```

Appending sample with 3 bounding boxes

```
>>> boxes
array([[965, 110, 262,  77],
       [462, 123, 238,  98],
       [688, 108, 279, 116]])
>>> boxes.shape
(3, 4)
>>> ds.boxes.append(boxes)
```

5.7 3D Bounding Box Htype

In order for 3D bounding boxes to be correctly displayed by the visualizer, the format of the bounding box must be specified in the coords key in tensor meta information mentioned below.

5.7.1 Creating a 3d bbox tensor

Note: In order for 3D bounding boxes to be correctly displayed by the visualizer, the format of the bounding box must be specified in the coords key in tensor meta information mentioned below. In addition, for projecting 3D bounding boxes onto 2D data (such as an image), the *intrinsics* tensor must exist in the dataset, or the intrinsics matrix must be specified in the `ds.img_tensor.info` dictionary, where the key is `"intrinsics"` and the value is the matrix.

A 3d bbox tensor can be created using

```
>>> ds.create_tensor("3d_boxes", htype="bbox.3d", coords={"mode": "center"})
```

- **Optional args:**
  - **coords: A dictionary with key "mode".**
    - **mode: Specifies the convention for the bbox coordinates.**
      - **"center": [center_x, center_y, center_z, size_x, size_y, size_z, rot_x, rot_y, rot_z]**

        Sample dimensions: `(# bounding boxes, 9)`

        `size_x` - is the length of the bounding box along x direction

        `size_y` - is the width of the bounding box along y direction

        `size_z` - is the height of the bounding box along z direction

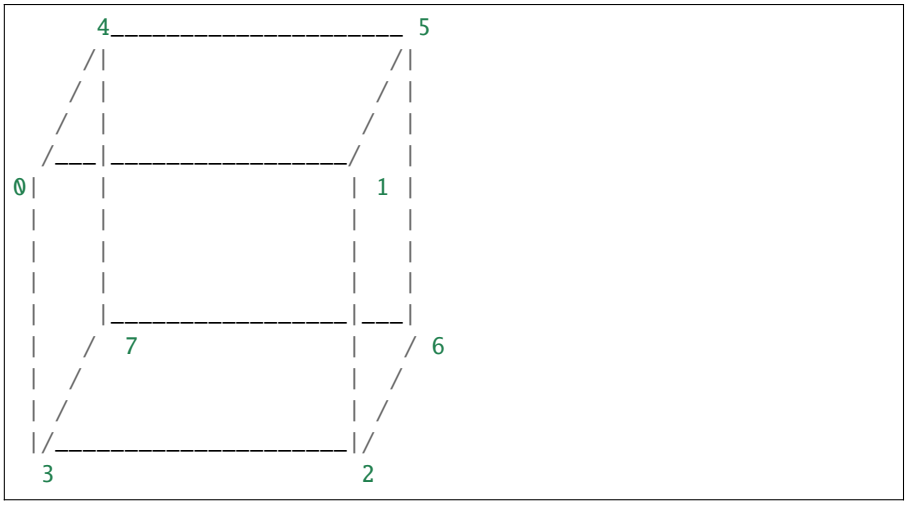
        `rot_x` - rotation angle along x axis, given in degrees

        `rot_y` - rotation angle along y axis, given in degrees

        `rot_z` - rotation angle along z axis, given in degrees
      - **"vertex": 8 3D vertices - [[x0, y0, z0], [x1, y1, z1], [x2, y2, z2], ….., [x7, y7, z7]]**

        Sample dimensions: `(# bounding boxes, 8, 3)`

        The vertex order is of the following form:



  - **dtype**: Defaults to `float32`.
  - *sample_compression* or *chunk_compression*.
- Supported compressions:

```
>>> ["lz4"]
```

Note: rotation angles are specified in degrees, not radians

5.7.2 Appending 3d bounding boxes

- Bounding boxes can be appended as `np.ndarrays` or `list` or `lists of arrays`.

Examples

Appending one bounding box

```
>>> box
array([[462, 123, 238,  98, 22, 36, 44, 18, 0, 36, 0]])
>>> ds.3d_boxes.append(box)
```

Appending sample with 3 bounding boxes

```
>>> boxes
array([[965, 110, 262,  77, 22, 36, 44, 18, 0, 28, 0],
       [462, 123, 238,  98, 26, 34, 24, 19, 0, -50, 0],
       [688, 108, 279, 116, 12, 32, 14, 38, 0, 30, 0]])
>>> boxes.shape
(9, 4)
>>> ds.3d_boxes.append(boxes)
```

5.8 Intrinsics Htype

- Sample dimensions: `(# intrinsics matrices, 3, 3)`

The intrinsic matrix represents a projective transformation from the 3-D camera's coordinates into the 2-D image coordinates. The intrinsic parameters include the focal length, the optical center, also known as the principal point. The camera intrinsic matrix, K, is defined as:

$$\begin{bmatrix} f_x & 0 & c_x \\ 0 & f_y & c_y \\ 0 & 0 & 1 \end{bmatrix}$$

- $[c_x, c_y]$ - Optical center (the principal point), in pixels.
- $[f_x, f_y]$ - Focal length in pixels.
- $f_x = F/p_x$
- $f_y = F/p_y$
- F - Focal length in world units, typically expressed in millimeters.
- (p_x, p_y) - Size of the pixel in world units.

5.8.1 Creating an intrinsics tensor

An intrinsics tensor can be created using

```
>>> ds.create_tensor("intrinsics", htype="intrinsics")
```

- **Optional args:**
  - *sample_compression* or *chunk_compression*.
  - dtype: Defaults to `float32`.
- Supported compressions:

```
>>> ["lz4"]
```

5.8.2 Appending intrinsics matrices

```
>>> intrinsic_params = np.zeros((3, 3))
>>> ds.intrinsics.append(intrinsic_params)
```

5.9 Segmentation Mask Htype

- Sample dimensions: `(height, width)`

Segmentation masks are 2D representations of class labels where the numerical label data is encoded in an array of same shape as the image. The numerical values are indices of the list `tensor.info.class_names`.

5.9.1 Creating a segment_mask tensor

A segment_mask tensor can be created using

```
>>> classes = ["background", "aeroplane", "bicycle", "bird", "boat", "bottle"]
>>> ds.create_tensor("masks", htype="segment_mask", class_names=classes, sample_
↪compression="lz4")
```

- **Optional args:**
  - class_names: This must be a **list of strings**. `tensor.info.class_names` will be set to this list.
  - *sample_compression* or *chunk_compression*
  - dtype: Defaults to `uint32`.
- Supported compressions:

```
>>> ["lz4"]
```

You can also choose to set the class names after tensor creation.

```
>>> ds.labels.info.update(class_names = ["background", "aeroplane", "bicycle", "bird",
↪"boat", "bottle"])
```

Note: Since segmentation masks often contain large amounts of data, it is recommended to compress them using `lz4`.

5.9.2 Appending segmentation masks

- Segmentation masks can be appended as `np.ndarray`.

Examples

```
>>> ds.masks.append(np.zeros((512, 512)))
```

Note: Since each pixel can only be labeled once, segmentation masks are not appropriate for datasets where objects might overlap, or where multiple objects within the same class must be distinguished. For these use cases, please use *htype = "binary_mask"*.

5.10 Binary Mask Htype

- Sample dimensions: `(height, width, # objects in a sample)`

Binary masks are similar to segmentation masks, except that each object is represented by a channel in the mask. Each channel in the mask encodes values for a single object. A pixel in a mask channel should have a value of 1 if the pixel of the image belongs to this object and 0 otherwise. The labels corresponding to the channels should be stored in an adjacent tensor of htype `class_label`, in which the number of labels at a given index is equal to the number of objects (number of channels) in the binary mask.

5.10.1 Creating a binary_mask tensor

A binary_mask tensor can be created using

```
>>> ds.create_tensor("masks", htype="binary_mask", sample_compression="lz4")
```

- **Optional args:**
  - ref:*sample_compression <sample_compression>* or *chunk_compression*
  - dtype: Defaults to `bool`.
- Supported compressions:

```
>>> ["lz4"]
```

Note: Since segmentation masks often contain large amounts of data, it is recommended to compress them using `lz4`.

5.10.2 Appending binary masks

- Binary masks can be appended as `np.ndarray`.

Examples

Appending a binary mask with 5 objects

```
>>> ds.masks.append(np.zeros((512, 512, 5), dtype="bool"))
>>> ds.labels.append(["aeroplane", "aeroplane", "bottle", "bottle", "bird"])
```

5.11 COCO Keypoints Htype

- Sample dimensions: `(3 x # keypoints, # objects in a sample)`

COCO keypoints are a convention for storing points of interest in an image. Each keypoint consists of 3 values: `x - coordinate`, `y - coordinate` and `v - visibility`. A set of K keypoints of an object is represented as:

$[x_1, y_1, v_1, x_2, y_2, v_2, \ldots, x_k, y_k, v_k]$

The visibility v can be one of three values:

0
: keypoint not in image.

1
: keypoint in image but not visible.

2
: keypoint in image and visible.

5.11.1 Creating a keypoints_coco tensor

A keypoints_coco tensor can be created using

```
>>> ds.create_tensor("keypoints", htype="keypoints_coco", keypoints=["knee", "elbow",
↪"head"], connections=[[0, 1], [1, 2]])
```

- **Optional args:**
  - keypoints: List of strings describing the `i` th keypoint. `tensor.info.keypoints` will be set to this list.
  - connections: List of strings describing which points should be connected by lines in the visualizer.
  - *sample_compression* or *chunk_compression*
  - dtype: Defaults to `int32`.
- Supported compressions:

```
>>> ["lz4"]
```

You can also choose to set `keypoints` and / or `connections` after tensor creation.

```
>>> ds.keypoints.info.update(keypoints = ['knee', 'elbow',...])
>>> ds.keypoints.info.update(connections = [[0,1], [2,3], ...])
```

5.11.2 Appending keypoints

- Keypoints can be appended as `np.ndarray` or `list`.

Examples

Appending keypoints sample with 3 keypoints and 4 objects

```
>>> ds.keypoints.update(keypoints = ["left ear", "right ear", "nose"])
>>> ds.keypoints.update(connections = [[0, 2], [1, 2]])
>>> kp_arr
array([[465, 398, 684, 469],
       [178, 363, 177, 177],
       [  2,   2,   2,   1],
       [454, 387, 646, 478],
       [177, 322, 137, 161],
       [  2,   2,   2,   2],
       [407, 379, 536, 492],
       [271, 335, 150, 143],
       [  2,   1,   2,   2]])
>>> kp_arr.shape
(9, 4)
>>> ds.keypoints.append(kp_arr)
```

Warning: In order to correctly use the keypoints and connections metadata, it is critical that all objects in every sample have the same number of K keypoints in the same order. For keypoints that are not present in an image, they can be stored with dummy coordinates of x = 0, y = 0, and v = 0, and the visibility will prevent them from being drawn in the visualizer.

5.12 Point Htype

- Sample dimensions: `(# points, 2)` in case of 2-D (X, Y) co-ordinates or `(# points, 3)` in case of 3-D (X, Y, Z) co-ordinates of the point.

Points does not contain a fixed mapping across samples between the point order and real-world objects (i.e., point 0 is an elbow, point 1 is a knee, etc.). If you require such a mapping, use *COCO Keypoints Htype*.

5.12.1 Creating a point tensor

A point tensor can be created using

```
>>> ds.create_tensor("points", htype="point", sample_compression=None)
```

- **Optional args:**
  - *sample_compression* or *chunk_compression*
  - dtype: Defaults to `int32`.
- Supported compressions:

```
>>> ["lz4"]
```

5.12.2 Appending point samples

- Points can be appended as `np.ndarray` or `list`.

Examples

Appending 2 2-D points

```
>>> ds.points.append([[0, 1], [1, 3]])
```

Appending 2 3-D points

```
>>> ds.points.append(np.zeros((2, 3)))
```

5.13 Polygon Htype

- Sample dimensions: `(# polygons, # points per polygon, # co-ordinates per point)`
- Each sample in a tensor of `polygon` htype is a list of polygons.
- Each polygon is a list / array of points.
- All points in a sample should have the same number of co-ordinates (eg., cannot mix 2-D points with 3-D points).
- Different samples can have different number of polygons.
- Different polygons can have different number of points.

5.13.1 Creating a polygon tensor

A polygon tensor can be created using

```
>>> ds.create_tensor("polygons", htype="polygon", sample_compression=None)
```

- **Optional args:**
  - *sample_compression* or *chunk_compression*
  - dtype: Defaults to `float32`.
- Supported compressions:

```
>>> ["lz4"]
```

5.13.2 Appending polygons

- Polygons can be appended as a `list` of `list of tuples` or `np.ndarray`.

Examples

Appending polygons with 2-D points

```
>>> poly1 = [(1, 2), (2, 3), (3, 4)]
>>> poly2 = [(10, 12), (14, 19)]
>>> poly3 = [(33, 32), (54, 67), (67, 43), (56, 98)]
```

(continues on next page)

(continued from previous page)

```
>>> sample = [poly1, poly2, poly3]
>>> ds.polygons.append(sample)
```

Appending polygons with 3-D points

```
>>> poly1 = [(10, 2, 9), (12, 3, 8), (12, 10, 4)]
>>> poly2 = [(10, 1, 8), (5, 17, 11)]
>>> poly3 = [(33, 33, 31), (45, 76, 13), (60, 24, 17), (67, 87, 83)]
>>> sample = [poly1, poly2, poly3]
>>> ds.polygons.append(sample)
```

Appending polygons with numpy arrays

```
>>> import numpy as np
>>> sample = np.random.randint(0, 10, (5, 7, 2))  # 5 polygons with 7 points
>>> ds.polygons.append(sample)
```

```
>>> import numpy as np
>>> poly1 = np.random.randint(0, 10, (5, 2))
>>> poly2 = np.random.randint(0, 10, (8, 2))
>>> poly3 = np.random.randint(0, 10, (3, 2))
>>> sample = [poly1, poly2, poly3]
>>> ds.polygons.append(sample)
```

5.14 Nifti Htype

- Sample dimensions: `(# height, # width, # slices)` or `(# height, # width, # slices, # time unit)` in case of time-series data.

5.14.1 Creating a nifti tensor

A nifti tensor can be created using

```
>>> ds.create_tensor("patients", htype="nifti", sample_compression="nii.gz")
```

- Supported compressions:

```
>>> ["nii.gz", "nii", None]
```

5.14.2 Appending nifti data

- Nifti samples can be of type `np.ndarray` or *Sample* which is returned by *deeplake.read()*.
- Deep Lake does not support compression of raw nifti data. Therefore, array of raw frames can only be appended to tensors with `None` compression.

Examples

```
>>> ds.patients.append(deeplake.read("data/patient0.nii.gz"))
```

```
>>> ds.patients.extend([deeplake.read(f"data/patient{i}.nii.gz") for i in range(10)])
```

5.15 Point Cloud Htype

- Sample dimensions: `(# num_points, 3)`
- Point cloud samples can be of type `np.ndarray` or *Sample* which is returned by *deeplake.read()*.
- Each point cloud is a list / array of points.
- All points in a sample should have the same number of co-ordinates.
- Different point clouds can have different number of points.

5.15.1 Creating a point cloud tensor

A point cloud tensor can be created using

```
>>> ds.create_tensor("point_clouds", htype="point_cloud", sample_compression="las")
```

- **Optional args:**
  - *sample_compression*
- Supported compressions:

```
>>> [None, "las"]
```

5.15.2 Appending point clouds

- Point clouds can be appended as a `np.ndarray`.

Examples

Appending point clouds with numpy arrays

```
>>> import numpy as np
>>> point_cloud1 = np.random.randint(0, 10, (5, 3))
>>> ds.point_clouds.append(point_cloud1)
>>> point_cloud2 = np.random.randint(0, 10, (15, 3))
>>> ds.point_clouds.append(point_cloud2)
>>> ds.point_clouds.shape
>>> (2, None, 3)
```

Or we can use *deeplake.read()* method to add samples

```
>>> import deeplake as dp
>>> sample = dp.read("example.las") # point cloud with 100 points
>>> ds.point_cloud.append(sample)
>>> ds.point_cloud.shape
>>> (1, 100, 3)
```

5.16 Mesh Htype

- Sample dimensions: `(# num_points, 3)`
- Mesh samples can be of type `np.ndarray` or *Sample* which is returned by *deeplake.read()*.
- Each sample in a tensor of `mesh` htype is a mesh array (3-D object data).
- Each mesh is a list / array of points.
- Different meshes can have different number of points.

5.16.1 Creating a mesh tensor

A mesh tensor can be created using

```
>>> ds.create_tensor("mesh", htype="mesh", sample_compression="ply")
```

- **Optional args:**
  - *sample_compression*
- Supported compressions:

```
>>> ["ply"]
```

5.16.2 Appending meshes

Examples

Appending a ply file containing a mesh data to tensor

```
>>> import deeplake as dp
>>> sample = dp.read("example.ply")  # mesh with 100 points and 200 faces
>>> ds.mesh.append(sample)
```

```
>>> ds.mesh.shape
>>> (1, 100, 3)
```

5.17 Embedding Htype

- Sample dimensions: `(# elements in the embedding,)`

5.17.1 Creating an embedding tensor

An embedding tensor can be created using

```
>>> ds.create_tensor("embedding", htype="embedding")
```

- Supported compressions:

```
>>> ["lz4", None]
```

5.17.2 Appending embedding samples

- Embedding samples can be of type `np.ndarray`.

Examples

Appending Deep Lake embedding sample

```
>>> ds.embedding.append(np.random.uniform(low=-1, high=1, size=(1024)))
```

Extending with Deep Lake embeddding samples

```
>>> ds.embedding.extend([np.random.uniform(low=-1, high=1, size=(1024)) for i in␣
↪range(10)])
```

5.18 Sequence htype

- A special meta htype for tensors where each sample is a sequence. The items in the sequence are samples of another htype.
- It is a wrapper htype that can wrap other htypes like `sequence[image]`, `sequence[video]`, `sequence[text]`, etc.

Examples

```
>>> ds.create_tensor("seq", htype="sequence")
>>> ds.seq.append([1, 2, 3])
>>> ds.seq.append([4, 5, 6])
>>> ds.seq.numpy()
array([[[1],
        [2],
        [3]],
       [[4],
        [5],
        [6]]])
```

```
>>> ds.create_tensor("image_seq", htype="sequence[image]", sample_compression="jpg")
>>> ds.image_seq.append([deeplake.read("img01.jpg"), deeplake.read("img02.jpg")])
```

5.19 Link htype

- Link htype is a special meta htype that allows linking of external data (files) to the dataset, without storing the data in the dataset itself.
- Moreover, there can be variations in this htype, such as `link[image]`, `link[video]`, `link[audio]`, etc. that would enable the activeloop visualizer to correctly display the data.
- No data is actually loaded until you try to read the sample from a dataset.
- **There are a few exceptions to this:-**
  - If `create_shape_tensor=True` was specified during `create_tensor` of the tensor to which this is being added, the shape of the sample is read. This is `True` by default.
  - If `create_sample_info_tensor=True` was specified during `create_tensor` of the tensor to which this is being added, the sample info is read. This is `True` by default.
  - If `verify=True` was specified during `create_tensor` of the tensor to which this is being added, some metadata is read from them to verify the integrity of the link samples. This is `True` by default.
  - If you do not want to verify your links, all three of `verify`, `create_shape_tensor` and `create_sample_info_tensor` have to be set to `False`.

Examples

```
>>> ds = deeplake.dataset("......")
```

Adding credentials to the dataset

You can add the names of the credentials you want to use (not needed for http/local urls)

```
>>> ds.add_creds_key("MY_S3_KEY")
>>> ds.add_creds_key("GCS_KEY")
```

and populate the added names with credentials dictionaries

```
>>> ds.populate_creds("MY_S3_KEY", {})   # add creds here
>>> ds.populate_creds("GCS_KEY", {})    # add creds here
```

These creds are only present temporarily and will have to be repopulated on every reload.

For datasets connected to Activeloop Platform, you can store your credentials on the platform as Managed Credentials and use them just by adding the keys to your dataset. For example if you have managed credentials with names `"my_s3_creds"`, `"my_gcs_creds"`, you can add them to your dataset using *`Dataset.add_creds_key`* without having to populate them.

```
>>> ds.add_creds_key("my_s3_creds", managed=True)
>>> ds.add_creds_key("my_gcs_creds", managed=True)
```

Create a link tensor

```
>>> ds.create_tensor("img", htype="link[image]", sample_compression="jpg")
```

Populate the tensor with links

```
>>> ds.img.append(deeplake.link("s3://abc/def.jpeg", creds_key="my_s3_key"))
>>> ds.img.append(deeplake.link("gcs://ghi/jkl.png", creds_key="GCS_KEY"))
>>> ds.img.append(deeplake.link("https://picsum.photos/200/300")) # http path doesn't␣
```

(continues on next page)

(continued from previous page)

```
↪need creds
>>> ds.img.append(deeplake.link("./path/to/cat.jpeg")) # local path doesn't need creds
>>> ds.img.append(deeplake.link("s3://abc/def.jpeg"))  # this will throw an exception as␣
↪cloud paths always need creds_key
:bluebold:`Accessing the data`
```

```
>>> for i in range(5):
...     ds.img[i].numpy()
...
```

Updating a sample

```
>>> ds.img[0] = deeplake.link("./data/cat.jpeg")
```

CHAPTER

SIX

COMPRESSIONS

Deep Lake can read, compress, decompress and recompress data to different formats. The supported htype-compression configurations are given below.

Sample Type	Htype	Compressions
Image	image	`bmp`, `dib`, `gif`, `ico`, `jpeg`, `jpeg2000`, `pcx`, `png`, `ppm`, `sgi`, `tga`, `tiff`, `webp`, `wmf`, `xbm`, `eps`, `fli`, `im`, `msp`, `mpo`, `apng`
Video	video	`mp4`, `mkv`, `avi`
Audio	audio	`flac`, `mp3`, `wav`
Dicom	dicom	`dcm`
Point Cloud	point_cloud	`las`
Mesh	mesh	`ply`
Other	bbox, text, list, json, generic, etc.	`lz4`

6.1 Sample Compression

If sample compression is specified when *creating tensors*, samples will be compressed to the given format if possible. If given data is already compressed and matches the provided `sample_compression`, it will be stored as is. If left as `None`, given samples are uncompressed.

Note: For audio and video, we don't support compressing raw frames but only reading compressed audio and video data.

Examples:

```
>>> ds.create_tensor("images", htype="image", sample_compression="jpg")

>>> ds.create_tensor("videos", htype="video", sample_compression="mp4")

>>> ds.create_tensor("point_clouds", htype="point_cloud", sample_compression="las")
```

Fig. 1: Structure of sample-wise compressed tensor.

6.2 Chunk Compression

If chunk compression is specified when *creating tensors*, added samples will be clubbed together and compressed to the given format chunk-wise. If given data is already compressed, it will be uncompressed and then recompressed chunk-wise.

Note: Chunk-wise compression is not supported for audio, video and point_cloud htypes.

Examples:

```
>>> ds.create_tensor("images", htype="image", chunk_compression="jpg")

>>> ds.create_tensor("boxes", htype="bbox", chunk_compression="lz4")
```

Fig. 2: Structure of chunk-wise compressed tensor.

Note: See *deeplake.read()* to learn how to read data from files and populate these tensors.

CHAPTER

SEVEN

PYTORCH AND TENSORFLOW SUPPORT

Deep Lake datasets can be easily converted to Torch dataloaders or Tensorflow datasets for training.

Dataset.pytorch	Converts the dataset into a pytorch Dataloader.
Dataset.tensorflow	Converts the dataset into a tensorflow compatible format.

CHAPTER

EIGHT

UTILITY FUNCTIONS

8.1 General Functions

exists	Checks if a dataset exists at the given `path`.

8.2 Making Deep Lake Samples

read	Utility that reads raw data from supported files into Deep Lake format.
link	Utility that stores a link to raw data.
link_tiled	Utility that stores links to multiple images that act as tiles and together form a big image.

8.3 Parallelism

compute	Compute is a decorator for functions.
compose	Takes a list of functions decorated using *deeplake.compute()* and creates a pipeline that can be evaluated using .eval

Transform pipelines returned by *compute()* and *compose()* are evaluated using `eval`:

eval	Evaluates the pipeline on `data_in` to produce an output dataset `ds_out`.

CHAPTER

NINE

WEIGHTS AND BIASES

Deep Lake's Weights and Biases integration allows you to track and improve reproducibility of your machine learning experiments. Deep Lake will automatically push all information required to reproduce the snapshot of the data like your dataset's URI, commit ID, and view IDs of any views that you have used in your training workflow.

Learn more about Weights and Biases here.

9.1 Logging Dataset Creation

If you create a Deep Lake dataset using any of the functions mentioned in *Creating Datasets*, just perform a commit on the dataset to log its creation on W&B.

```
>>> run = wandb.init(project="deeplake_wandb", job_type="dataset_upload")
>>> ds = deeplake.empty("hub://fayazrahman4u/my_dataset") # create dataset
>>> ds.create_tensor("images", htype="image", sample_compression="jpg") # create a tensor
>>> ds.images.append(deeplake.read("files/images/dog.jpg")) # add a sample
>>> ds.commit("creation") # commit -> trigger logging
>>> run.finish()
```

Note: If you created your dataset using *deeplake.deepcopy()*, perform the commit only if you have head changes.

Note: If you make changes to an existing dataset, commit the changes with an active Weights and Biases run to log it's state.

9.2 Logging Dataset Read

A dataset read will be logged if you iterate over a dataset or call *Dataset.pytorch()* or *Tensor.numpy()* on its tensors.

```
>>> run = wandb.init(project="deeplake_wandb", job_type="torch dataloader")
>>> train_loader = ds.pytorch()
>>> run.finish()
```

```
>>> run = wandb.init(project="deeplake_wandb", job_type="iteration")
>>> for sample in ds:
>>>     print(sample["images"].shape)
>>> run.finish()
```

CHAPTER

TEN

MMDETECTION

CHAPTER

ELEVEN

DATALOADER

Train your models using the new high performance C++ dataloader. See the `dataloader` method on how to create dataloaders from your datasets:

Dataset.dataloader	Returns a *DeepLakeDataLoader* object.

11.1 DeepLakeDataLoader

class deeplake.enterprise.**DeepLakeDataLoader**

batch(*batch_size: int*, *drop_last: bool = False*)

Returns a batched *DeepLakeDataLoader* object.

Parameters

- **batch_size** (*int*) – Number of samples in each batch.
- **drop_last** (*bool*) – If True, the last batch will be dropped if its size is less than batch_size. Defaults to False.

Returns

A *DeepLakeDataLoader* object.

Return type

DeepLakeDataLoader

Raises

ValueError – If .batch() has already been called.

close()

Shuts down the workers and releases the resources.

numpy(*num_workers: int = 0*, *tensors: Optional[List[str]] = None*, *num_threads: Optional[int] = None*, *prefetch_factor: int = 2*, *decode_method: Optional[Dict[str, str]] = None*, *persistent_workers: bool = False*)

Returns a *DeepLakeDataLoader* object.

Parameters

- **num_workers** (*int*) – Number of workers to use for transforming and processing the data. Defaults to 0.
- **tensors** (*List[str], Optional*) – List of tensors to load. If None, all tensors are loaded. Defaults to None.
- **num_threads** (*int, Optional*) – Number of threads to use for fetching and decompressing the data. If None, the number of threads is automatically determined. Defaults to None.

- **prefetch_factor** (*int*) – Number of batches to transform and collate in advance per worker. Defaults to 2.
- **persistent_workers** (*bool*) – If `True`, the data loader will not shutdown the worker processes after a dataset has been consumed once. Defaults to `False`.
- **decode_method** (*Dict[str, str], Optional*) – A dictionary of decode methods for each tensor. Defaults to None.
  - Supported decode methods are:-

    'numpy'
    Default behaviour. Returns samples as numpy arrays.

    'tobytes'
    Returns raw bytes of the samples.

    'pil'
    Returns samples as PIL images. Especially useful when transformation use torchvision transforms, that require PIL images as input. Only supported for tensors with sample_compression='jpeg' or 'png'.

Returns
A *DeepLakeDataLoader* object.

Return type
DeepLakeDataLoader

Raises
ValueError – If .pytorch() or .tensorflow() or .numpy() has already been called.

offset(*off: int = 0*)

Returns a shifted *DeepLakeDataLoader* object.

Parameters
off (*int*) – index that the dataloadee will start to iterate.

Returns
A *DeepLakeDataLoader* object.

Return type
DeepLakeDataLoader

Raises
ValueError – If .offset() has already been called.

pytorch(*num_workers: int = 0*, *collate_fn: Optional[Callable] = None*, *tensors: Optional[List[str]] = None*, *num_threads: Optional[int] = None*, *prefetch_factor: int = 2*, *distributed: bool = False*, *return_index: bool = True*, *decode_method: Optional[Dict[str, str]] = None*, *persistent_workers: bool = False*)

Returns a *DeepLakeDataLoader* object.

Parameters

- **num_workers** (*int*) – Number of workers to use for transforming and processing the data. Defaults to 0.
- **collate_fn** (*Callable, Optional*) – merges a list of samples to form a mini-batch of Tensor(s).
- **tensors** (*List[str], Optional*) – List of tensors to load. If None, all tensors are loaded. Defaults to `None`.
- **num_threads** (*int, Optional*) – Number of threads to use for fetching and decompressing the data. If `None`, the number of threads is automatically determined. Defaults to `None`.

- **prefetch_factor** (*int*) – Number of batches to transform and collate in advance per worker. Defaults to 2.
- **distributed** (*bool*) – Used for DDP training. Distributes different sections of the dataset to different ranks. Defaults to `False`.
- **return_index** (*bool*) – Used to idnetify where loader needs to retur sample index or not. Defaults to `True`.
- **persistent_workers** (*bool*) – If `True`, the data loader will not shutdown the worker processes after a dataset has been consumed once. Defaults to `False`.
- **decode_method** (*Dict[str, str], Optional*) – A dictionary of decode methods for each tensor. Defaults to `None`.
  - Supported decode methods are:

    'numpy'
    Default behaviour. Returns samples as numpy arrays.

    'tobytes'
    Returns raw bytes of the samples.

    'pil'
    Returns samples as PIL images. Especially useful when transformation use torchvision transforms, that require PIL images as input. Only supported for tensors with `sample_compression='jpeg'` or `'png'`.

Returns
A *DeepLakeDataLoader* object.

Return type
DeepLakeDataLoader

Raises
ValueError – If .pytorch() or .tensorflow() or .numpy() has already been called.

Examples

```
>>> import deeplake
>>> from torchvision import transforms
>>> ds_train = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> tform = transforms.Compose([
...     transforms.RandomRotation(20), # Image augmentation
...     transforms.ToTensor(), # Must convert to pytorch tensor for subsequent␣
↪operations to run
...     transforms.Normalize([0.5], [0.5]),
... ])
...
>>> batch_size = 32
>>> # create dataloader by chaining with transform function and batch size and␣
↪returns batch of pytorch tensors
>>> train_loader = ds_train.dataloader()\
...     .transform({'images': tform, 'labels': None})\
...     .batch(batch_size)\
...     .shuffle()\
...     .pytorch(decode_method={'images': 'pil'}) # return samples as PIL␣
↪images for transforms
```

(continues on next page)

(continued from previous page)

```
...
>>> # iterate over dataloader
>>> for i, sample in enumerate(train_loader):
...     pass
...
```

query(*query_string: str*)

Returns a sliced *DeepLakeDataLoader* object with given query results. It allows to run SQL like queries on dataset and extract results. See supported keywords and the Tensor Query Language documentation *here*.

Parameters

query_string (*str*) – An SQL string adjusted with new functionalities to run on the dataset object

Returns

A *DeepLakeDataLoader* object.

Return type

DeepLakeDataLoader

Examples

```
>>> import deeplake
>>> ds = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> query_ds_train = ds_train.dataloader().query("select * where labels != 5")
```

```
>>> import deeplake
>>> ds_train = deeplake.load('hub://activeloop/coco-train')
>>> query_ds_train = ds_train.dataloader().query("(select * where␣
↪contains(categories, 'car') limit 1000) union (select * where␣
↪contains(categories, 'motorcycle') limit 1000)")
```

sample_by(*weights: Union[str, list, tuple, ndarray]*, *replace: Optional[bool] = True*, *size: Optional[int] = None*)

Returns a sliced *DeepLakeDataLoader* with given weighted sampler applied

Parameters

- **weights** – (Union[str, list, tuple, np.ndarray]): If it's string then tql will be run to calculate the weights based on the expression. list, tuple and ndarray will be treated as the list of the weights per sample
- **replace** – Optional[bool] If true the samples can be repeated in the result view. (default: `True`).
- **size** – Optional[int] The length of the result view. (default: `len(dataset)`)

Returns

A *DeepLakeDataLoader* object.

Return type

DeepLakeDataLoader

Examples

Sample the dataloader with `labels == 5` twice more than `labels == 6`

```
>>> ds = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> sampled_ds = ds.dataloader().sample_by("max_weight(labels == 5: 10, labels␣
↪== 6: 5)")
```

Sample the dataloader treating *labels* tensor as weights.

```
>>> ds = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> sampled_ds = ds.dataloader().sample_by("labels")
```

Sample the dataloader with the given weights;

```
>>> ds_train = deeplake.load('hub://activeloop/coco-train')
>>> weights = list()
>>> for i in range(0, len(ds_train)):
...     weights.append(i % 5)
...
>>> sampled_ds = ds.dataloader().sample_by(weights, replace=False)
```

shuffle(*shuffle: bool = True*, *buffer_size: int = 2048*)

Returns a shuffled *DeepLakeDataLoader* object.

Parameters

- **shuffle** (*bool*) – shows wheter we need to shuffle elements or not. Defaults to True.
- **buffer_size** (*int*) – The size of the buffer used to shuffle the data in MBs. Defaults to 2048 MB. Increasing the buffer_size will increase the extent of shuffling.

Returns

A *DeepLakeDataLoader* object.

Return type

DeepLakeDataLoader

Raises

- **ValueError** – If .shuffle() has already been called.
- **ValueError** – If dataset is view and shuffle is True

tensorflow(*num_workers: int = 0*, *collate_fn: Optional[Callable] = None*, *tensors: Optional[List[str]] = None*, *num_threads: Optional[int] = None*, *prefetch_factor: int = 2*, *return_index: bool = True*, *decode_method: Optional[Dict[str, str]] = None*, *persistent_workers: bool = False*)

Returns a *DeepLakeDataLoader* object.

Parameters

- **num_workers** (*int*) – Number of workers to use for transforming and processing the data. Defaults to 0.
- **collate_fn** (*Callable, Optional*) – merges a list of samples to form a mini-batch of Tensor(s).
- **tensors** (*List[str], Optional*) – List of tensors to load. If None, all tensors are loaded. Defaults to `None`.
- **num_threads** (*int, Optional*) – Number of threads to use for fetching and decompressing the data. If `None`, the number of threads is automatically determined. Defaults to `None`.

- **prefetch_factor** (*int*) – Number of batches to transform and collate in advance per worker. Defaults to 2.
- **return_index** (*bool*) – Used to idnetify where loader needs to retur sample index or not. Defaults to `True`.
- **persistent_workers** (*bool*) – If `True`, the data loader will not shutdown the worker processes after a dataset has been consumed once. Defaults to `False`.
- **decode_method** (*Dict[str, str], Optional*) – A dictionary of decode methods for each tensor. Defaults to `None`.
  - Supported decode methods are:

    'numpy'
    Default behaviour. Returns samples as numpy arrays.

    'tobytes'
    Returns raw bytes of the samples.

    'pil'
    Returns samples as PIL images. Especially useful when transformation use torchvision transforms, that require PIL images as input. Only supported for tensors with `sample_compression='jpeg'` or `'png'`.

Returns
A *DeepLakeDataLoader* object.

Return type
DeepLakeDataLoader

Raises
ValueError – If .pytorch() or .tensorflow() or .numpy() has already been called.

Examples

```
>>> import deeplake
>>> from torchvision import transforms
>>> ds_train = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> batch_size = 32
>>> # create dataloader by chaining with transform function and batch size and␣
↪returns batch of pytorch tensors
>>> train_loader = ds_train.dataloader()\
...     .batch(batch_size)\
...     .shuffle()\
...     .tensorflow() # return samples as PIL images for transforms
...
>>> # iterate over dataloader
>>> for i, sample in enumerate(train_loader):
...     pass
...
```

transform(*transform: Union[Callable, Dict[str, Optional[Callable]]], **kwargs: Dict*)

Returns a transformed *DeepLakeDataLoader* object.

Parameters

- **transform** (*Callable or Dict[Callable]*) – A function or dictionary of functions to apply to the data.

- **kwargs** – Additional arguments to be passed to *transform*. Only applicable if *transform* is a callable. Ignored if *transform* is a dictionary.

Returns

A *DeepLakeDataLoader* object.

Return type

DeepLakeDataLoader

Raises

ValueError – If .transform() has already been called.

CHAPTER

TWELVE

SAMPLER

The sampler applies weighted sampling on the dataset and returns the sampled view. It creates a discrete distribution with given weights and randomly picks samples based on it. The resulting view is generated in such a way that when creating a dataloader from the view and training on it, the performance impact is minimal. See the `sample_by` method on how to use this feature:

Dataset.sample_by	Returns a sliced *Dataset* with given weighted sampler applied.

CHAPTER

THIRTEEN

TENSOR QUERY LANGUAGE

This page describes the Tensor Query Language (TQL), an SQL-like language used for Querying in Activeloop Platform as well as in `ds.query` in our Python API.

13.1 Syntax

13.1.1 SELECT

TQL supports only **SELECT** statement. Every TQL expression starts with **SELECT** *. TQL supports only * which means to select all tensors. The common syntax for select statement is the following:

```
SELECT * [FROM string] [WHERE expression] [LIMIT number [OFFSET number]] [ORDER BY␣
↪expression [ASC/DESC]]
```

Each part of the **SELECT** statement can be omitted.

FROM expression is allowed, but it does not have any effect on the query, because for now TQL queries are run on a specific dataset, so the **FROM** is known from the context

13.1.2 WHERE

WHERE expression is used to filter the samples in the dataset by conditions. The conditions should be convertible to boolean. Any expression which outputs a number will be converted to boolean with non-zero values taken as `True`. If the expression is not convertible to boolean, such as **strings**, **json** objects and **arrays**, the query will print the corresponding error.

13.1.3 ORDER BY

ORDER BY expression orders the output of the query by the given criteria. The criteria can be any expression output of which can be ordered. The ordered outputs are either scalar numbers or strings. In addition it can also be json, which contains number or string.

ORDER BY statement optionally accepts **ASC**/**DESC** keywords specifying whether the ordering should be ascending or descending. It is ascending by default.

13.1.4 LIMIT OFFSET

LIMIT and **OFFSET** expressions are used to limit the output of the query by index, as in SQL.

13.1.5 Expressions

TQL supports any comparison operator (==, !=, <, <=, >=) where the left side is a tensor and the right side is a known value.

The value can be numeric scalar or array as well as string value.

String literal should be provided within single quotes (') and can be used on `class_label`, `json` and `text` tensors.

For class labels it will get corresponding numeric value from the **class_names** list and do numeric comparison.

For json and text it will do string comparison. The left side of the expression can be indexed (subscripted) if the tensor is multidimensional array or json. Jsons support indexing by string, e.g. `index_meta['id'] == 'some_id'`. Jsons can also be indexed by number if the underlying data is array.

Numeric multidimensional tensors can be indexed by numbers, e.g. `categories[0] == 1` as well as Python style slicing and multidimensional indexing, such as `boxes[:2]`. This last expression returns array containing the third elements of the initial two dimensional array boxes.

TQL supports logical operators - **AND**, **OR** and **NOT**. These operators can be used to combine boolean expressions. For example,

```
labels == 0 OR labels == 1
```

From SQL we also support the following two keywords:

- **BETWEEN**

```
labels BETWEEN 0 and 5
```

- **IN**

```
labels in ARRAY[0, 2, 4, 6, 8]
```

13.1.6 Functions

There are predefined functions which can be used in **WHERE** expression as well as in **ORDER BY** expressions:

- `CONTAINS` - checks if the given tensor contains given value - **CONTAINS**`(categories, 'person')`
- `RANDOM` - returns random number. May be used in **ORDER BY** to shuffle the output - **ORDER BY** `RANDOM()`
- `SHAPE` - returns the shape array of the given tensor - `SHAPE(boxes)`
- `ALL` - takes an array of booleans and returns single boolean, `True` if all elements of the input array are `True`
- `ALL_STRICT` - same as **ALL** with one difference. **ALL** returns `True` on empty array, while `ALL_STRICT` return `False`
- `ANY` - takes an array of booleans and returns single boolean, `True` if any of the elements int the input array is `True`
- `LOGICAL_AND` - takes two boolean arrays, does element wise **logical and**, returns the result array. This will return `False` if the input arrays have different sizes.

- `LOGICAL_OR` - takes two boolean arrays, does element wise **logical or**, returns the result array. This will return `False` if the input arrays have different sizes.

13.1.7 UNION, INTERSECT, EXCEPT

Query can contain multiple **`SELECT`** statements, combined by one of the set operations - **`UNION`**, **`INTERSECT`** and **`EXCEPT`**.

13.2 Examples

Querying for images containing 0 in MNIST Train Dataset with *`ds.query`*.

```
>>> import deeplake
>>> ds = deeplake.load("hub://activeloop/mnist-train")
>>> result = ds.query("select * where labels == 0")
>>> len(result)
5923
```

Querying for samples with `car` or `motorcycle` in `categories` of COCO Train Dataset.

```
>>> import deeplake
>>> ds = deeplake.load("hub://activeloop/coco-train")
>>> result = ds.query("(select * where contains(categories, 'car')) union (select *␣
↪where contains(categories, 'motorcycle'))")
>>> len(result)
14376
```

CHAPTER

FOURTEEN

RANDOM SPLIT

Splits the dataset into non overlapping new datasets of given lengths. The resulting datasets are generated in such a way that when creating a dataloader from the view and training on it, the performance impact is minimal. Using the outputs of this function with .pytorch method of dataset (instead of .dataloader) may result in poor performance. See the `random_split` method on how to use this feature:

Dataset.random_split	Splits the dataset into non-overlapping *Dataset* objects of given lengths.

CHAPTER

FIFTEEN

DEEP MEMORY API

15.1 Creating a Deep Memory

If Deep Memory is available on your plan, it will be automatically initialized when you create a Vector Store.

DeepMemory.__init__	Base Deep Memory class to train and evaluate models on DeepMemory managed service.

15.2 Deep Memory Operations

DeepMemory.train	Train a model on DeepMemory managed service.
DeepMemory.cancel	Cancel a training job on DeepMemory managed service.
DeepMemory.delete	Delete a training job on DeepMemory managed service.

15.3 Deep Memory Properties

DeepMemory.status	Get the status of a training job on DeepMemory managed service.
DeepMemory.list_jobs	List all training jobs on DeepMemory managed service.

15.4 Syntax

This page describes `ds.query`. DeepMemory is a deep learning model that is trained on the dataset to improve the search results, by aligning queries with the corpus dataset. It gives up to +22% of recall improvement on an eval dataset. To use deep_memory, please subscribe to our waitlist.

15.4.1 Training

To start training you should first create a vectostore object, and then preprocess the data and use deep memory with it:

```
>>> from deeplake import VectorStore
>>> db = VectorStore(
...     path="hub://{$ORG_ID}/{$DATASET_ID}",
...     token=token, # or you can be signed in with CLI
...     runtime={"tensor_db": True},
...     embedding_function=embedding_function, # function that takes converts texts into␣
↪embeddings, it is optional and can be provided later
... )
```

To train a deepmemory model you need to preprocess the dataset so that, `corpus`, will become a list of list of tuples, where outer list corresponds to the query and inner list to the relevant documents. Each tuple should contain the document id (`id` tensor from the corpus dataset) and the relevance score (range is 0-1, where 0 represents unrelated document and 1 related). `queries` should be a list of strings.

```
>>> job_id = db.deep_memory.train(
...     corpus: List[List[Tuple[str, float]]] = corpus,
...     queries: List[str] = queries,
...     embedding_function = embedding_function, # function that takes converts texts␣
↪into embeddings, it is optional and can be skipped if provided during initialization
... )
```

15.4.2 Tracking the training progress

`job_id` is string, which can be used to track the training progress. You can use `db.deep_memory.status(job_id)` to get the status of the job.

when the model is still in pending state (not started yet) you will see the following: >>> db.deep_memory.status(job_id) ———————————————————————————— | 6508464cd80cab681bfcfff3 | ———————————————————————————— | status | pending | ———————————————————————————— | progress | None | ———————————————————————————— | results | not available yet | ————————————————————————————

After some time the model will start training and you will see the following:

```
>>> db.deep_memory.status(job_id)
-------------------------------------------------------------
|                 6508464cd80cab681bfcfff3                   |
-------------------------------------------------------------
| status                    | training                       |
-------------------------------------------------------------
| progress                  | eta: 2.5 seconds               |
|                           | recall@10: 0.62% (+0.62%)      |
-------------------------------------------------------------
| results                   | not available yet              |
-------------------------------------------------------------
```

If you want to get all training jobs you can use `db.deep_memory.list_jobs()` which will show all jobs that happened on this dataset.

```
>>> db.deep_memory.list_jobs()
ID                          STATUS     RESULTS                        PROGRESS
65198efcd28df3238c49a849    completed  recall@10: 0.62% (+0.62%)      eta: 2.5 seconds
                                                                      recall@10: 0.62% (+0.
↪62%)
651a4d41d05a21a5a6a15f67    completed  recall@10: 0.62% (+0.62%)      eta: 2.5 seconds
                                                                      recall@10: 0.62% (+0.
↪62%)
```

15.4.3 Deep Memory Evaluation

Once the training is completed, you can use `db.deep_memory.evaluate` to evaluate the model performance on the custom dataset. Once again you would need to preprocess the dataset so that, `corpus`, will become a list of list of tuples, where outer list corresponds to the query and inner list to the relevant documents. Each tuple should contain the document id (`id` tensor from the corpus dataset) and the relevance score (range is 0-1, where 0 represents unrelated document and 1 related). `queries` should be a list of strings.

```
>>> recalls = db.deep_memory.evaluate(
...     corpus: List[List[Tuple[str, float]]] = corpus,
...     queries: List[str] = queries,
...     embedding_function = embedding_function, # function that takes converts texts␣
↪into embeddings, it is optional and can be skipped if provided during initialization
...     qvs_params = {"enbabled": True}
... )
```

`recalls` is a dictionary with the following keys: `with_model` contains a dictionary with recall metrics for the naive vector search on the custom dataset for different k values `without_model` contains a dictionary with recall metrics for the naive vector search on the custom dataset for different k values `qvs_params` when specified creates a separate vectorstore that tracks all evaluation queries and documents, so that you can use it to compare the performance of deep_memory to naive vector search. By default, it is turned off. If enabled the dataset will be created at `hub://{$ORG_ID}/{$DATASET_ID}_eval_queries`

15.4.4 Deep Memory Search

After the model is trained you also can search using it:

```
>>> results = db.search(
...     embedding_data: List[str] = queries,
...     embedding_function = embedding_function, # function that takes converts texts␣
↪into embeddings, it is optional and can be skipped if provided during initialization
...     k = 4, # number of results to return
...     deep_memory = True, # use deep memory model
... )
```

CHAPTER

SIXTEEN

DEEPLAKE

The deeplake package provides a database which stores data as compressed chunked arrays that can be stored anywhere and later streamed to deep learning models.

deeplake.**dataset**(*path: Union[str, Path]*, *runtime: Optional[Dict] = None*, *read_only: Optional[bool] = None*, *overwrite: bool = False*, *public: bool = False*, *memory_cache_size: int = 2000*, *local_cache_size: int = 0*, *creds: Optional[Union[Dict, str]] = None*, *token: Optional[str] = None*, *org_id: Optional[str] = None*, *verbose: bool = True*, *access_method: str = 'stream'*, *unlink: bool = False*, *reset: bool = False*, *check_integrity: Optional[bool] = False*, *lock_enabled: Optional[bool] = True*, *lock_timeout: Optional[int] = 0*, *index_params: Optional[Dict[str, Union[int, str]]] = None*)

Returns a *Dataset* object referencing either a new or existing dataset.

Examples

```
>>> ds = deeplake.dataset("hub://username/dataset")
>>> ds = deeplake.dataset("s3://mybucket/my_dataset")
>>> ds = deeplake.dataset("./datasets/my_dataset", overwrite=True)
```

Loading to a specfic version:

```
>>> ds = deeplake.dataset("hub://username/dataset@new_branch")
>>> ds = deeplake.dataset("hub://username/
↪dataset@3e49cded62b6b335c74ff07e97f8451a37aca7b2)
```

```
>>> my_commit_id = "3e49cded62b6b335c74ff07e97f8451a37aca7b2"
>>> ds = deeplake.dataset(f"hub://username/dataset@{my_commit_id}")
```

Parameters

- **path** (*str, pathlib.Path*) –
  - The full path to the dataset. Can be:
  - a Deep Lake cloud path of the form `hub://username/datasetname`. To write to Deep Lake cloud datasets, ensure that you are authenticated to Deep Lake (pass in a token using the 'token' parameter).
  - an s3 path of the form `s3://bucketname/path/to/dataset`. Credentials are required in either the environment or passed to the creds argument.
  - a local file system path of the form `./path/to/dataset` or `~/path/to/dataset` or `path/to/dataset`.

  - a memory path of the form `mem://path/to/dataset` which doesn't save the dataset but keeps it in memory instead. Should be used only for testing as it does not persist.
  - Loading to a specific version:
    * You can also specify a `commit_id` or `branch` to load the dataset to that version directly by using the `@` symbol.
    * The path will then be of the form `hub://username/dataset@{branch}` or `hub://username/dataset@{commit_id}`.
    * See examples above.
- **runtime** (*dict*) – Parameters for Activeloop DB Engine. Only applicable for hub:// paths.
- **read_only** (*bool, optional*) – Opens dataset in read only mode if this is passed as `True`. Defaults to `False`. Datasets stored on Deep Lake cloud that your account does not have write access to will automatically open in read mode.
- **overwrite** (*bool*) – If set to `True` this overwrites the dataset if it already exists. Defaults to `False`.
- **public** (*bool*) – Defines if the dataset will have public access. Applicable only if Deep Lake cloud storage is used and a new Dataset is being created. Defaults to `True`.
- **memory_cache_size** (*int*) – The size of the memory cache to be used in MB.
- **local_cache_size** (*int*) – The size of the local filesystem cache to be used in MB.
- **creds** (*dict, str, optional*) – The string `ENV` or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials to the dataset at path if it is a Deep Lake dataset. This is optional, tokens are normally autogenerated.
- **org_id** (*str, Optional*) – Organization id to be used for enabling high-performance features. Only applicable for local datasets.
- **verbose** (*bool*) – If `True`, logs will be printed. Defaults to `True`.
- **access_method** (*str*) – The access method to use for the dataset. Can be:
  - 'stream'
    * Streams the data from the dataset i.e. only fetches data when required. This is the default value.
  - 'download'
    * Downloads the data to the local filesystem to the path specified in environment variable `DEEPLAKE_DOWNLOAD_PATH`. This will overwrite `DEEPLAKE_DOWNLOAD_PATH`.
    * Raises an exception if `DEEPLAKE_DOWNLOAD_PATH` environment variable is not set or if the dataset does not exist.
    * The 'download' access method can be modified to specify num_workers and/or scheduler. For example: 'download:2:processed' will use 2 workers and use processed scheduler, while 'download:3' will use 3 workers and

default scheduler (threaded), and 'download:processed' will use a single worker and use processed scheduler.

- 'local'
  - Downloads the dataset if it doesn't already exist, otherwise loads from local storage.
  - Raises an exception if `DEEPLAKE_DOWNLOAD_PATH` environment variable is not set.
  - The 'local' access method can be modified to specify num_workers and/or scheduler to be used in case dataset needs to be downloaded. If dataset needs to be downloaded, 'local:2:processed' will use 2 workers and use processed scheduler, while 'local:3' will use 3 workers and default scheduler (threaded), and 'local:processed' will use a single worker and use processed scheduler.

- **unlink** (*bool*) – Downloads linked samples if set to `True`. Only applicable if `access_method` is `download` or `local`. Defaults to `False`.
- **reset** (*bool*) – If the specified dataset cannot be loaded due to a corrupted HEAD state of the branch being loaded, setting `reset=True` will reset HEAD changes and load the previous version.
- **check_integrity** (*bool, Optional*) – Performs an integrity check by default (None) if the dataset has 20 or fewer tensors. Set to `True` to force integrity check, `False` to skip integrity check.
- **lock_timeout** (*int*) – Number of seconds to wait before throwing a LockException. If None, wait indefinitely
- **lock_enabled** (*bool*) – If true, the dataset manages a write lock. NOTE: Only set to False if you are managing concurrent access externally
- **index_params** – Optional[Dict[str, Union[int, str]]] = None : The index parameters used while creating vector store is passed down to dataset.

Returns

Dataset created using the arguments provided.

Return type

Dataset

Raises

- ***AgreementError*** – When agreement is rejected
- ***UserNotLoggedInException*** – When user is not authenticated
- ***InvalidTokenException*** – If the specified token is invalid
- ***TokenPermissionError*** – When there are permission or other errors related to token
- ***CheckoutError*** – If version address specified in the path cannot be found
- **DatasetCorruptError** – If loading the dataset failed due to corruption and `reset` is not `True`
- **ValueError** – If version is specified in the path when creating a dataset or If the org id is provided but dataset is ot local, or If the org id is provided but dataset is ot local
- ***ReadOnlyModeError*** – If reset is attempted in read-only mode
- ***LockedException*** – When attempting to open a dataset for writing when it is locked by another machine
- ***DatasetHandlerError*** – If overwriting the dataset fails
- **Exception** – Re-raises caught exception if reset cannot fix the issue

Danger: Setting `overwrite` to `True` will delete all of your data if it exists! Be very careful when setting this parameter.

Warning: Setting `access_method` to download will overwrite the local copy of the dataset if it was previously downloaded.

Note: Any changes made to the dataset in download / local mode will only be made to the local copy and will not be reflected in the original dataset.

deeplake.**empty**(*path: Union[str, Path]*, *runtime: Optional[dict] = None*, *overwrite: bool = False*, *public: bool = False*, *memory_cache_size: int = 2000*, *local_cache_size: int = 0*, *creds: Optional[Union[Dict, str]] = None*, *token: Optional[str] = None*, *org_id: Optional[str] = None*, *lock_enabled: Optional[bool] = True*, *lock_timeout: Optional[int] = 0*, *verbose: bool = True*, *index_params: Optional[Dict[str, Union[int, str]]] = None*) → *Dataset*

Creates an empty dataset

Parameters

- **path** (*str, pathlib.Path*) –
  - The full path to the dataset. It can be:
  - a Deep Lake cloud path of the form `hub://org_id/dataset_name`. Requires registration with Deep Lake.
  - an s3 path of the form `s3://bucketname/path/to/dataset`. Credentials are required in either the environment or passed to the creds argument.
  - a local file system path of the form `./path/to/dataset` or `~/path/to/dataset` or `path/to/dataset`.
  - a memory path of the form `mem://path/to/dataset` which doesn't save the dataset but keeps it in memory instead. Should be used only for testing as it does not persist.
- **runtime** (*dict*) – Parameters for creating a dataset in the Deep Lake Tensor Database. Only applicable for paths of the form `hub://org_id/dataset_name` and runtime must be `{"tensor_db": True}`.
- **overwrite** (*bool*) – If set to `True` this overwrites the dataset if it already exists. Defaults to `False`.
- **public** (*bool*) – Defines if the dataset will have public access. Applicable only if Deep Lake cloud storage is used and a new Dataset is being created. Defaults to `False`.
- **memory_cache_size** (*int*) – The size of the memory cache to be used in MB.
- **local_cache_size** (*int*) – The size of the local filesystem cache to be used in MB.
- **creds** (*dict, str, optional*) – The string `ENV` or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials to the dataset at path if it is a Deep Lake dataset. This is optional, tokens are normally autogenerated.
- **org_id** (*str, Optional*) – Organization id to be used for enabling high-performance features. Only applicable for local datasets.
- **verbose** (*bool*) – If True, logs will be printed. Defaults to True.

- **lock_timeout** (*int*) – Number of seconds to wait before throwing a LockException. If None, wait indefinitely
- **lock_enabled** (*bool*) – If true, the dataset manages a write lock. NOTE: Only set to False if you are managing concurrent access externally.
- **index_params** – Optional[Dict[str, Union[int, str]]]: Index parameters used while creating vector store, passed down to dataset.

Returns

Dataset created using the arguments provided.

Return type

Dataset

Raises

- ***DatasetHandlerError*** – If a Dataset already exists at the given path and overwrite is False.
- ***UserNotLoggedInException*** – When user is not authenticated
- ***InvalidTokenException*** – If the specified toke is invalid
- ***TokenPermissionError*** – When there are permission or other errors related to token
- **ValueError** – If version is specified in the path

Danger: Setting `overwrite` to `True` will delete all of your data if it exists! Be very careful when setting this parameter.

deeplake.**like**(*dest: Union[str, Path]*, *src: Union[str,* Dataset*, Path]*, *runtime: Optional[Dict] = None*, *tensors: Optional[List[str]] = None*, *overwrite: bool = False*, *creds: Optional[Union[dict, str]] = None*, *token: Optional[str] = None*, *org_id: Optional[str] = None*, *public: bool = False*, *verbose: bool = True*) → *Dataset*

Creates a new dataset by copying the `source` dataset's structure to a new location. No samples are copied, only the meta/info for the dataset and it's tensors.

Parameters

- **dest** – Empty Dataset or Path where the new dataset will be created.
- **src** (*Union[str, Dataset]*) – Path or dataset object that will be used as the template for the new dataset.
- **runtime** (*dict*) – Parameters for Activeloop DB Engine. Only applicable for hub:// paths.
- **tensors** (*List[str], optional*) – Names of tensors (and groups) to be replicated. If not specified all tensors in source dataset are considered.
- **overwrite** (*bool*) – If True and a dataset exists at *destination*, it will be overwritten. Defaults to False.
- **creds** (*dict, str, optional*) – The string `ENV` or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials to the dataset at path if it is a Deep Lake dataset. This is optional, tokens are normally autogenerated.
- **org_id** (*str, Optional*) – Organization id to be used for enabling high-performance features. Only applicable for local datasets.
- **public** (*bool*) – Defines if the dataset will have public access. Applicable only if Deep Lake cloud storage is used and a new Dataset is being created. Defaults to False.

- **verbose** (*bool*) – If True, logs will be printed. Defaults to `True`.

Returns

New dataset object.

Return type

Dataset

Raises

ValueError – If `org_id` is specified for a non-local dataset.

deeplake.**ingest_classification**(*src: Union[str, Path]*, *dest: Union[str, Path]*, *image_params: Optional[Dict] = None*, *label_params: Optional[Dict] = None*, *dest_creds: Optional[Union[Dict, str]] = None*, *progressbar: bool = True*, *summary: bool = True*, *num_workers: int = 0*, *shuffle: bool = True*, *token: Optional[str] = None*, *connect_kwargs: Optional[Dict] = None*, ***dataset_kwargs*) → *Dataset*

Ingest a dataset of images from a local folder to a Deep Lake Dataset. Images should be stored in subfolders by class name.

Parameters

- **src** (*str, pathlib.Path*) – Local path to where the unstructured dataset of images is stored or path to csv file.
- **dest** (*str, pathlib.Path*) –
  - The full path to the dataset. Can be:
  - a Deep Lake cloud path of the form `hub://org_id/datasetname`. To write to Deep Lake cloud datasets, ensure that you are authenticated to Deep Lake (pass in a token using the 'token' parameter).
  - an s3 path of the form `s3://bucketname/path/to/dataset`. Credentials are required in either the environment or passed to the creds argument.
  - a local file system path of the form `./path/to/dataset` or `~/path/to/dataset` or `path/to/dataset`.
  - a memory path of the form `mem://path/to/dataset` which doesn't save the dataset but keeps it in memory instead. Should be used only for testing as it does not persist.
- **image_params** (*Optional[Dict]*) – A dictionary containing parameters for the images tensor.
- **label_params** (*Optional[Dict]*) – A dictionary containing parameters for the labels tensor.
- **dest_creds** (*Optional[Union[str, Dict]]*) – The string `ENV` or a dictionary containing credentials used to access the destination path of the dataset.
- **progressbar** (*bool*) – Enables or disables ingestion progress bar. Defaults to `True`.
- **summary** (*bool*) – If `True`, a summary of skipped files will be printed after completion. Defaults to `True`.
- **num_workers** (*int*) – The number of workers to use for ingestion. Set to `0` by default.
- **shuffle** (*bool*) – Shuffles the input data prior to ingestion. Since data arranged in folders by class is highly non-random, shuffling is important in order to produce optimal results when training. Defaults to `True`.
- **token** (*Optional[str]*) – The token to use for accessing the dataset.
- **connect_kwargs** (*Optional[Dict]*) – If specified, the dataset will be connected to Deep Lake, and connect_kwargs will be passed to *Dataset.connect*.
- ****dataset_kwargs** – Any arguments passed here will be forwarded to the dataset creator function see *deeplake.empty()*.

Returns

New dataset object with structured dataset.

Return type
Dataset

Raises
- ***InvalidPathException*** – If the source directory does not exist.
- ***SamePathException*** – If the source and destination path are same.
- ***AutoCompressionError*** – If the source director is empty or does not contain a valid extension.
- ***InvalidFileExtension*** – If the most frequent file extension is found to be 'None' during auto-compression.

Note:

- Currently only local source paths and image classification datasets / csv files are supported for automatic ingestion.
- Supported filetypes: png/jpeg/jpg/csv.
- All files and sub-directories with unsupported filetypes are ignored.
- Valid source directory structures for image classification look like:

```
data/
    img0.jpg
    img1.jpg
    ...
```

- or:

```
data/
    class0/
        cat0.jpg
        ...
    class1/
        dog0.jpg
        ...
    ...
```

- or:

```
data/
    train/
        class0/
            img0.jpg
            ...
        ...
    val/
        class0/
            img0.jpg
            ...
        ...
    ...
```

- Classes defined as sub-directories can be accessed at `ds["test/labels"].info.class_names`.
- Support for train and test sub directories is present under `ds["train/images"]`, `ds["train/labels"]` and `ds["test/images"]`, `ds["test/labels"]`.
- Mapping filenames to classes from an external file is currently not supported.

---

deeplake.**ingest_coco**(*images_directory: Union[str, Path]*, *annotation_files: Union[str, Path, List[str]]*, *dest: Union[str, Path]*, *key_to_tensor_mapping: Optional[Dict] = None*, *file_to_group_mapping: Optional[Dict] = None*, *ignore_one_group: bool = True*, *ignore_keys: Optional[List[str]] = None*, *image_params: Optional[Dict] = None*, *image_creds_key: Optional[str] = None*, *src_creds: Optional[Union[Dict, str]] = None*, *dest_creds: Optional[Union[Dict, str]] = None*, *inspect_limit: int = 1000000*, *progressbar: bool = True*, *shuffle: bool = False*, *num_workers: int = 0*, *token: Optional[str] = None*, *connect_kwargs: Optional[Dict] = None*, ***dataset_kwargs*) → *Dataset*

Ingest images and annotations in COCO format to a Deep Lake Dataset. The source data can be stored locally or in the cloud.

Examples

```
>>> # Ingest local data in COCO format to a Deep Lake dataset stored in Deep Lake␣
↪storage.
>>> ds = deeplake.ingest_coco(
>>>     "<path/to/images/directory>",
>>>     ["path/to/annotation/file1.json", "path/to/annotation/file2.json"],
>>>     dest="hub://org_id/dataset",
>>>     key_to_tensor_mapping={"category_id": "labels", "bbox": "boxes"},
>>>     file_to_group_mapping={"file1.json": "group1", "file2.json": "group2"},
>>>     ignore_keys=["area", "image_id", "id"],
>>>     num_workers=4,
>>> )
>>> # Ingest data from your cloud into another Deep Lake dataset in your cloud, and␣
↪connect that dataset to the Deep Lake backend.
>>> ds = deeplake.ingest_coco(
>>>     "s3://bucket/images/directory",
>>>     "s3://bucket/annotation/file1.json",
>>>     dest="s3://bucket/dataset_name",
>>>     ignore_one_group=True,
>>>     ignore_keys=["area", "image_id", "id"],
>>>     image_settings={"name": "images", "htype": "link[image]", "sample_
↪compression": "jpeg"},
>>>     image_creds_key="my_s3_managed_credentials",
>>>     src_creds=aws_creds, # Can also be inferred from environment
>>>     dest_creds=aws_creds, # Can also be inferred from environment
>>>     connect_kwargs={"creds_key": "my_s3_managed_credentials", "org_id": "org_id
↪"},
>>>     num_workers=4,
>>> )
```

Parameters

- **images_directory** (*str, pathlib.Path*) – The path to the directory containing images.
- **annotation_files** (*str, pathlib.Path, List[str]*) – Path to JSON annotation files in COCO format.
- **dest** (*str, pathlib.Path*) –
  - The full path to the dataset. Can be:
  - a Deep Lake cloud path of the form `hub://org_id/datasetname`. To write to Deep Lake cloud datasets, ensure that you are authenticated to Deep Lake (pass

in a token using the 'token' parameter).

- an s3 path of the form `s3://bucketname/path/to/dataset`. Credentials are required in either the environment or passed to the creds argument.
- a local file system path of the form `./path/to/dataset` or `~/path/to/dataset` or `path/to/dataset`.
- a memory path of the form `mem://path/to/dataset` which doesn't save the dataset but keeps it in memory instead. Should be used only for testing as it does not persist.

- **key_to_tensor_mapping** (*Optional[Dict]*) – A one-to-one mapping between COCO keys and Dataset tensor names.
- **file_to_group_mapping** (*Optional[Dict]*) – A one-to-one mapping between COCO annotation file names and Dataset group names.
- **ignore_one_group** (*bool*) – Skip creation of group in case of a single annotation file. Set to `False` by default.
- **ignore_keys** (*List[str]*) – A list of COCO keys to ignore.
- **image_params** (*Optional[Dict]*) – A dictionary containing parameters for the images tensor.
- **image_creds_key** (*Optional[str]*) – The name of the managed credentials to use for accessing the images in the linked tensor (is applicable).
- **src_creds** (*Optional[Union[str, Dict]]*) – Credentials to access the source data. If not provided, will be inferred from the environment.
- **dest_creds** (*Optional[Union[str, Dict]]*) – The string `ENV` or a dictionary containing credentials used to access the destination path of the dataset.
- **inspect_limit** (*int*) – The maximum number of samples to inspect in the annotations json, in order to generate the set of COCO annotation keys. Set to `1000000` by default.
- **progressbar** (*bool*) – Enables or disables ingestion progress bar. Set to `True` by default.
- **shuffle** (*bool*) – Shuffles the input data prior to ingestion. Set to `False` by default.
- **num_workers** (*int*) – The number of workers to use for ingestion. Set to `0` by default.
- **token** (*Optional[str]*) – The token to use for accessing the dataset and/or connecting it to Deep Lake.
- **connect_kwargs** (*Optional[Dict]*) – If specified, the dataset will be connected to Deep Lake, and connect_kwargs will be passed to *Dataset.connect*.
- ****dataset_kwargs** – Any arguments passed here will be forwarded to the dataset creator function. See *deeplake.empty()*.

Returns

The Dataset created from images and COCO annotations.

Return type

Dataset

Raises

IngestionError – If either `key_to_tensor_mapping` or `file_to_group_mapping` are not one-to-one.

deeplake.**ingest_yolo**(*data_directory: Union[str, Path]*, *dest: Union[str, Path]*, *class_names_file: Optional[Union[str, Path]] = None*, *annotations_directory: Optional[Union[str, Path]] = None*, *allow_no_annotation: bool = False*, *image_params: Optional[Dict] = None*, *label_params: Optional[Dict] = None*, *coordinates_params: Optional[Dict] = None*, *src_creds: Optional[Union[Dict, str]] = None*, *dest_creds: Optional[Union[Dict, str]] = None*, *image_creds_key: Optional[str] = None*, *inspect_limit: int = 1000*, *progressbar: bool = True*, *shuffle: bool = False*, *num_workers: int = 0*, *token: Optional[str] = None*, *connect_kwargs: Optional[Dict] = None*, ***dataset_kwargs*) → *Dataset*

Ingest images and annotations (bounding boxes or polygons) in YOLO format to a Deep Lake Dataset. The

source data can be stored locally or in the cloud.

Examples

```
>>> # Ingest local data in YOLO format to a Deep Lake dataset stored in Deep Lake␣
↪storage.
>>> ds = deeplake.ingest_yolo(
>>>     "path/to/data/directory",
>>>     dest="hub://org_id/dataset",
>>>     allow_no_annotation=True,
>>>     token="my_activeloop_token",
>>>     num_workers=4,
>>> )
>>> # Ingest data from your cloud into another Deep Lake dataset in your cloud, and␣
↪connect that dataset to the Deep Lake backend.
>>> ds = deeplake.ingest_yolo(
>>>     "s3://bucket/data_directory",
>>>     dest="s3://bucket/dataset_name",
>>>     image_params={"name": "image_links", "htype": "link[image]"},
>>>     image_creds_key="my_s3_managed_credentials",
>>>     src_creds=aws_creds, # Can also be inferred from environment
>>>     dest_creds=aws_creds, # Can also be inferred from environment
>>>     connect_kwargs={"creds_key": "my_s3_managed_credentials", "org_id": "org_id
↪"},
>>>     num_workers=4,
>>> )
```

Parameters

- **data_directory** (*str, pathlib.Path*) – The path to the directory containing the data (images files and annotation files(see 'annotations_directory' input for specifying annotations in a separate directory).
- **dest** (*str, pathlib.Path*) –
  - The full path to the dataset. Can be:
  - a Deep Lake cloud path of the form `hub://org_id/datasetname`. To write to Deep Lake cloud datasets, ensure that you are authenticated to Deep Lake (pass in a token using the 'token' parameter).
  - an s3 path of the form `s3://bucketname/path/to/dataset`. Credentials are required in either the environment or passed to the creds argument.
  - a local file system path of the form `./path/to/dataset` or `~/path/to/dataset` or `path/to/dataset`.
  - a memory path of the form `mem://path/to/dataset` which doesn't save the dataset but keeps it in memory instead. Should be used only for testing as it does not persist.
- **class_names_file** – Path to the file containing the class names on separate lines. This is typically a file titled classes.names.
- **annotations_directory** (*Optional[Union[str, pathlib.Path]]*) – Path to directory containing the annotations. If specified, the 'data_directory' will not be examined for annotations.
- **allow_no_annotation** (*bool*) – Flag to determine whether missing annotations files corresponding to an image should be treated as empty annoations. Set to `False` by default.

- **image_params** (*Optional[Dict]*) – A dictionary containing parameters for the images tensor.
- **label_params** (*Optional[Dict]*) – A dictionary containing parameters for the labels tensor.
- **coordinates_params** (*Optional[Dict]*) – A dictionary containing parameters for the ccoordinates tensor. This tensor either contains bounding boxes or polygons.
- **src_creds** (*Optional[Union[str, Dict]]*) – Credentials to access the source data. If not provided, will be inferred from the environment.
- **dest_creds** (*Optional[Union[str, Dict]]*) – The string `ENV` or a dictionary containing credentials used to access the destination path of the dataset.
- **image_creds_key** (*Optional[str]*) – creds_key for linked tensors, applicable if the htype for the images tensor is specified as 'link[image]' in the 'image_params' input.
- **inspect_limit** (*int*) – The maximum number of annotations to inspect, in order to infer whether they are bounding boxes of polygons. This in put is ignored if the htype is specfied in the 'coordinates_params'.
- **progressbar** (*bool*) – Enables or disables ingestion progress bar. Set to `True` by default.
- **shuffle** (*bool*) – Shuffles the input data prior to ingestion. Set to `False` by default.
- **num_workers** (*int*) – The number of workers to use for ingestion. Set to `0` by default.
- **token** (*Optional[str]*) – The token to use for accessing the dataset and/or connecting it to Deep Lake.
- **connect_kwargs** (*Optional[Dict]*) – If specified, the dataset will be connected to Deep Lake, and connect_kwargs will be passed to *Dataset.connect*.
- ****dataset_kwargs** – Any arguments passed here will be forwarded to the dataset creator function. See *deeplake.empty()*.

Returns

The Dataset created from the images and YOLO annotations.

Return type

Dataset

Raises

IngestionError – If annotations are not found for all the images and 'allow_no_annotation' is False

deeplake.**ingest_kaggle**(*tag: str*, *src: Union[str, Path]*, *dest: Union[str, Path]*, *exist_ok: bool = False*, *images_compression: str = 'auto'*, *dest_creds: Optional[Union[Dict, str]] = None*, *kaggle_credentials: Optional[dict] = None*, *progressbar: bool = True*, *summary: bool = True*, *shuffle: bool = True*, ***dataset_kwargs*) → *Dataset*

Download and ingest a kaggle dataset and store it as a structured dataset to destination.

Parameters

- **tag** (*str*) – Kaggle dataset tag. Example: `"coloradokb/dandelionimages"` points to https://www.kaggle.com/coloradokb/dandelionimages
- **src** (*str, pathlib.Path*) – Local path to where the raw kaggle dataset will be downlaoded to.
- **dest** (*str, pathlib.Path*) –
  - The full path to the dataset. Can be:
  - a Deep Lake cloud path of the form `hub://username/datasetname`. To write to Deep Lake cloud datasets, ensure that you are authenticated to Deep Lake (pass in a token using the 'token' parameter).
  - an s3 path of the form `s3://bucketname/path/to/dataset`. Credentials are required in either the environment or passed to the creds argument.
  - a local file system path of the form `./path/to/dataset` or `~/path/to/dataset` or `path/to/dataset`.

  - a memory path of the form `mem://path/to/dataset` which doesn't save the dataset but keeps it in memory instead. Should be used only for testing as it does not persist.
- **exist_ok** (*bool*) – If the kaggle dataset was already downloaded and `exist_ok` is `True`, ingestion will proceed without error.
- **images_compression** (*str*) – For image classification datasets, this compression will be used for the `images` tensor. If `images_compression` is "auto", compression will be automatically determined by the most common extension in the directory.
- **dest_creds** (*Optional[Union[str, Dict]]*) – The string `ENV` or a dictionary containing credentials used to access the destination path of the dataset.
- **kaggle_credentials** (*dict*) – A dictionary containing kaggle credentials {"username":"YOUR_USERNAME", "key": "YOUR_KEY"}. If `None`, environment variables/the kaggle.json file will be used if available.
- **progressbar** (*bool*) – Enables or disables ingestion progress bar. Set to `True` by default.
- **summary** (*bool*) – Generates ingestion summary. Set to `True` by default.
- **shuffle** (*bool*) – Shuffles the input data prior to ingestion. Since data arranged in folders by class is highly non-random, shuffling is important in order to produce optimal results when training. Defaults to `True`.
- ****dataset_kwargs** – Any arguments passed here will be forwarded to the dataset creator function. See *deeplake.dataset()*.

Returns

New dataset object with structured dataset.

Return type

Dataset

Raises

SamePathException – If the source and destination path are same.

Note: Currently only local source paths and image classification datasets are supported for automatic ingestion.

---

deeplake.**ingest_dataframe**(*src*, *dest: Union[str, Path]*, *column_params: Optional[Dict] = None*, *src_creds: Optional[Union[Dict, str]] = None*, *dest_creds: Optional[Union[Dict, str]] = None*, *creds_key: Optional[Dict] = None*, *progressbar: bool = True*, *token: Optional[str] = None*, *connect_kwargs: Optional[Dict] = None*, ***dataset_kwargs*)

Convert pandas dataframe to a Deep Lake Dataset. The contents of the dataframe can be parsed literally, or can be treated as links to local or cloud files.

Examples

```
>>> # Ingest local data in COCO format to a Deep Lake dataset stored in Deep Lake␣
↪storage.
```

```
>>> ds = deeplake.ingest_coco(
>>>     "<path/to/images/directory>",
>>>     ["path/to/annotation/file1.json", "path/to/annotation/file2.json"],
>>>     dest="hub://org_id/dataset",
>>>     key_to_tensor_mapping={"category_id": "labels", "bbox": "boxes"},
>>>     file_to_group_mapping={"file1.json": "group1", "file2.json": "group2"},
>>>     ignore_keys=["area", "image_id", "id"],
>>>     num_workers=4,
```

(continues on next page)

(continued from previous page)

```
>>> )
>>> # Ingest data from your cloud into another Deep Lake dataset in your cloud, and␣
↪connect that dataset to the Deep Lake backend.
```

```
>>> # Ingest data from a DataFrame into a Deep Lake dataset stored in Deep Lake␣
↪storage.
>>> ds = deeplake.ingest_dataframe(
>>>     df,
>>>     dest="hub://org_id/dataset",
>>> )
>>> # Ingest data from a DataFrame into a Deep Lake dataset stored in Deep Lake␣
↪storage. The filenames in `df_column_with_cloud_paths` will be used as the␣
↪filenames for loading data into the dataset.
>>> ds = deeplake.ingest_dataframe(
>>>     df,
>>>     dest="hub://org_id/dataset",
>>>     column_params={"df_column_with_cloud_paths": {"name": "images", "htype":
↪"image"}},
>>>     src_creds=aws_creds
>>> )
>>> # Ingest data from a DataFrame into a Deep Lake dataset stored in Deep Lake␣
↪storage. The filenames in `df_column_with_cloud_paths` will be used as the␣
↪filenames for linked data in the dataset.
>>> ds = deeplake.ingest_dataframe(
>>>     df,
>>>     dest="hub://org_id/dataset",
>>>     column_params={"df_column_with_cloud_paths": {"name": "image_links", "htype
↪": "link[image]"}},
>>>     creds_key="my_s3_managed_credentials"
>>> )
>>> # Ingest data from a DataFrame into a Deep Lake dataset stored in your cloud,␣
↪and connect that dataset to the Deep Lake backend. The filenames in `df_column_
↪with_cloud_paths` will be used as the filenames for linked data in the dataset.
>>> ds = deeplake.ingest_dataframe(
>>>     df,
>>>     dest="s3://bucket/dataset_name",
>>>     column_params={"df_column_with_cloud_paths": {"name": "image_links", "htype
↪": "link[image]"}},
>>>     creds_key="my_s3_managed_credentials"
>>>     connect_kwargs={"creds_key": "my_s3_managed_credentials", "org_id": "org_id
↪"},
>>> )
```

Parameters

- **src** (*pd.DataFrame*) – The pandas dataframe to be converted.
- **dest** (*str, pathlib.Path*) –
  - A Dataset or The full path to the dataset. Can be:
  - a Deep Lake cloud path of the form `hub://username/datasetname`. To write to Deep Lake cloud datasets, ensure that you are authenticated to Deep Lake (pass in a token using the 'token' parameter).
  - an s3 path of the form `s3://bucketname/path/to/dataset`. Credentials are

required in either the environment or passed to the creds argument.

- a local file system path of the form `./path/to/dataset` or `~/path/to/dataset` or `path/to/dataset`.
- a memory path of the form `mem://path/to/dataset` which doesn't save the dataset but keeps it in memory instead. Should be used only for testing as it does not persist.

- **column_params** (*Optional[Dict]*) – A dictionary containing parameters for the tensors corresponding to the dataframe columns.
- **src_creds** (*Optional[Union[str, Dict]]*) – Credentials to access the source data. If not provided, will be inferred from the environment.
- **dest_creds** (*Optional[Union[str, Dict]]*) – The string `ENV` or a dictionary containing credentials used to access the destination path of the dataset.
- **creds_key** (*Optional[str]*) – creds_key for linked tensors, applicable if the htype any tensor is specified as 'link[...]' in the 'column_params' input.
- **progressbar** (*bool*) – Enables or disables ingestion progress bar. Set to `True` by default.
- **token** (*Optional[str]*) – The token to use for accessing the dataset.
- **connect_kwargs** (*Optional[Dict]*) – A dictionary containing arguments to be passed to the dataset connect method. See `Dataset.connect()`.
- ****dataset_kwargs** – Any arguments passed here will be forwarded to the dataset creator function. See *deeplake.empty()*.

Returns
New dataset created from the dataframe.

Return type
Dataset

Raises
Exception – If `src` is not a valid pandas dataframe object.

deeplake.**ingest_huggingface**(*src*, *dest*, *use_progressbar=True*, *token: Optional[str] = None*, *connect_kwargs: Optional[Dict] = None*, ***dataset_kwargs*) → *Dataset*

Converts Hugging Face datasets to Deep Lake format.

Parameters
- **src** (*hfDataset, DatasetDict*) – Hugging Face Dataset or DatasetDict to be converted. Data in different splits of a DatasetDict will be stored under respective tensor groups.
- **dest** (*Dataset, str, pathlib.Path*) – Destination dataset or path to it.
- **use_progressbar** (*bool*) – Defines if progress bar should be used to show conversion progress.
- **token** (*Optional[str]*) – The token to use for accessing the dataset and/or connecting it to Deep Lake.
- **connect_kwargs** (*Optional[Dict]*) – If specified, the dataset will be connected to Deep Lake, and connect_kwargs will be passed to *Dataset.connect*.
- ****dataset_kwargs** – Any arguments passed here will be forwarded to the dataset creator function. See *deeplake.empty()*.

Returns
The destination Deep Lake dataset.

Return type
Dataset

Raises
ValueError – If `dest` is not a path or a Deep Lake *Dataset*.

Note:
- if DatasetDict looks like:

```
>>> {
...     train: Dataset({
...         features: ['data']
...     }),
...     validation: Dataset({
...         features: ['data']
...     }),
...     test: Dataset({
...         features: ['data']
...     }),
... }
```

it will be converted to a Deep Lake `Dataset` with tensors `['train/data', 'validation/data', 'test/data']`.

Features of the type `Sequence(feature=Value(dtype='string'))` are not supported. Columns of such type are skipped.

---

deeplake.**load**(*path: Union[str, Path]*, *read_only: Optional[bool] = None*, *memory_cache_size: int = 2000*, *local_cache_size: int = 0*, *creds: Optional[Union[dict, str]] = None*, *token: Optional[str] = None*, *org_id: Optional[str] = None*, *verbose: bool = True*, *access_method: str = 'stream'*, *unlink: bool = False*, *reset: bool = False*, *check_integrity: Optional[bool] = None*, *lock_timeout: Optional[int] = 0*, *lock_enabled: Optional[bool] = True*, *index_params: Optional[Dict[str, Union[int, str]]] = None*) → *Dataset*

Loads an existing dataset

Examples

```
>>> ds = deeplake.load("hub://username/dataset")
>>> ds = deeplake.load("s3://mybucket/my_dataset")
>>> ds = deeplake.load("./datasets/my_dataset", overwrite=True)
```

Loading to a specfic version:

```
>>> ds = deeplake.load("hub://username/dataset@new_branch")
>>> ds = deeplake.load("hub://username/
↪dataset@3e49cded62b6b335c74ff07e97f8451a37aca7b2)
```

```
>>> my_commit_id = "3e49cded62b6b335c74ff07e97f8451a37aca7b2"
>>> ds = deeplake.load(f"hub://username/dataset@{my_commit_id}")
```

Parameters

- **path** (*str, pathlib.Path*) –
  - The full path to the dataset. Can be:
  - a Deep Lake cloud path of the form `hub://username/datasetname`. To write to Deep Lake cloud datasets, ensure that you are authenticated to Deep Lake (pass in a token using the 'token' parameter).
  - an s3 path of the form `s3://bucketname/path/to/dataset`. Credentials are required in either the environment or passed to the creds argument.
  - a local file system path of the form `./path/to/dataset` or `~/path/to/dataset` or `path/to/dataset`.

  - a memory path of the form `mem://path/to/dataset` which doesn't save the dataset but keeps it in memory instead. Should be used only for testing as it does not persist.
  - Loading to a specific version:
    * You can also specify a `commit_id` or `branch` to load the dataset to that version directly by using the `@` symbol.
    * The path will then be of the form `hub://username/dataset@{branch}` or `hub://username/dataset@{commit_id}`.
    * See examples above.
- **read_only** (*bool, optional*) – Opens dataset in read only mode if this is passed as `True`. Defaults to `False`. Datasets stored on Deep Lake cloud that your account does not have write access to will automatically open in read mode.
- **memory_cache_size** (*int*) – The size of the memory cache to be used in MB.
- **local_cache_size** (*int*) – The size of the local filesystem cache to be used in MB.
- **creds** (*dict, str, optional*) – The string `ENV` or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials to the dataset at path if it is a Deep Lake dataset. This is optional, tokens are normally autogenerated.
- **org_id** (*str, Optional*) – Organization id to be used for enabling high-performance features. Only applicable for local datasets.
- **verbose** (*bool*) – If `True`, logs will be printed. Defaults to `True`.
- **access_method** (*str*) – The access method to use for the dataset. Can be:
  - 'stream'
    * Streams the data from the dataset i.e. only fetches data when required. This is the default value.
  - 'download'
    * Downloads the data to the local filesystem to the path specified in environment variable `DEEPLAKE_DOWNLOAD_PATH`. This will overwrite `DEEPLAKE_DOWNLOAD_PATH`.
    * Raises an exception if `DEEPLAKE_DOWNLOAD_PATH` environment variable is not set or if the dataset does not exist.
    * The 'download' access method can be modified to specify num_workers and/or scheduler. For example: 'download:2:processed' will use 2 workers and use processed scheduler, while 'download:3' will use 3 workers and default scheduler (threaded), and 'download:processed' will use a single worker and use processed scheduler.
  - 'local'
    * Downloads the dataset if it doesn't already exist, otherwise loads from local storage.

* Raises an exception if DEEPLAKE_DOWNLOAD_PATH environment variable is not set.
* The 'local' access method can be modified to specify num_workers and/or scheduler to be used in case dataset needs to be downloaded. If dataset needs to be downloaded, 'local:2:processed' will use 2 workers and use processed scheduler, while 'local:3' will use 3 workers and default scheduler (threaded), and 'local:processed' will use a single worker and use processed scheduler.

- **unlink** (*bool*) – Downloads linked samples if set to True. Only applicable if access_method is download or local. Defaults to False.
- **reset** (*bool*) – If the specified dataset cannot be loaded due to a corrupted HEAD state of the branch being loaded, setting reset=True will reset HEAD changes and load the previous version.
- **check_integrity** (*bool, Optional*) – Performs an integrity check by default (None) if the dataset has 20 or fewer tensors. Set to True to force integrity check, False to skip integrity check.

Returns
Dataset loaded using the arguments provided.

Return type
Dataset

Raises
- *DatasetHandlerError* – If a Dataset does not exist at the given path.
- *AgreementError* – When agreement is rejected
- *UserNotLoggedInException* – When user is not authenticated
- *InvalidTokenException* – If the specified toke is invalid
- *TokenPermissionError* – When there are permission or other errors related to token
- *CheckoutError* – If version address specified in the path cannot be found
- **DatasetCorruptError** – If loading the dataset failed due to corruption and reset is not True
- *ReadOnlyModeError* – If reset is attempted in read-only mode
- *LockedException* – When attempting to open a dataset for writing when it is locked by another machine
- **ValueError** – If org_id is specified for a non-local dataset
- **Exception** – Re-raises caught exception if reset cannot fix the issue
- **ValueError** – If the org id is provided but the dataset is not local

Warning: Setting access_method to download will overwrite the local copy of the dataset if it was previously downloaded.

Note: Any changes made to the dataset in download / local mode will only be made to the local copy and will not be reflected in the original dataset.

deeplake.**delete**(*path: Union[str, Path]*, *force: bool = False*, *large_ok: bool = False*, *creds: Optional[Union[dict, str]] = None*, *token: Optional[str] = None*, *verbose: bool = False*) → None

Deletes a dataset at a given path.

Parameters
- **path** (*str, pathlib.Path*) – The path to the dataset to be deleted.
- **force** (*bool*) – Delete data regardless of whether it looks like a deeplake dataset. All data at the path will be removed if set to True.
- **large_ok** (*bool*) – Delete datasets larger than 1GB. Disabled by default.

- **creds** (*dict, str, optional*) – The string ENV or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials to the dataset at path if it is a Deep Lake dataset. This is optional, tokens are normally autogenerated.
- **verbose** (*bool*) – If True, logs will be printed. Defaults to True.

Raises

- *DatasetHandlerError* – If a Dataset does not exist at the given path and force = False.
- *UserNotLoggedInException* – When user is not authenticated.
- **NotImplementedError** – When attempting to delete a managed view.
- **ValueError** – If version is specified in the path

> **Warning:** This is an irreversible operation. Data once deleted cannot be recovered.

deeplake.**rename**(*old_path: Union[str, Path]*, *new_path: Union[str, Path]*, *creds: Optional[Union[dict, str]] = None*, *token: Optional[str] = None*) → *Dataset*

Renames dataset at old_path to new_path.

Examples

```
>>> deeplake.rename("hub://username/image_ds", "hub://username/new_ds")
>>> deeplake.rename("s3://mybucket/my_ds", "s3://mybucket/renamed_ds")
```

Parameters

- **old_path** (*str, pathlib.Path*) – The path to the dataset to be renamed.
- **new_path** (*str, pathlib.Path*) – Path to the dataset after renaming.
- **creds** (*dict, str, optional*) – The string ENV or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials to the dataset at path if it is a Deep Lake dataset. This is optional, tokens are normally autogenerated.

Returns

The renamed Dataset.

Return type

Dataset

Raises

DatasetHandlerError – If a Dataset does not exist at the given path or if new path is to a

different directory.

deeplake.**copy**(*src: Union[str, Path, Dataset]*, *dest: Union[str, Path]*, *runtime: Optional[dict] = None*, *tensors: Optional[List[str]] = None*, *overwrite: bool = False*, *src_creds=None*, *dest_creds=None*, *token=None*, *num_workers: int = 0*, *scheduler='threaded'*, *progressbar=True*, ***kwargs*)

Copies dataset at `src` to `dest`. Version control history is not included.

Parameters

- **src** (*str, Dataset, pathlib.Path*) – The Dataset or the path to the dataset to be copied.
- **dest** (*str, pathlib.Path*) – Destination path to copy to.
- **runtime** (*dict*) – Parameters for Activeloop DB Engine. Only applicable for hub:// paths.
- **tensors** (*List[str], optional*) – Names of tensors (and groups) to be copied. If not specified all tensors are copied.
- **overwrite** (*bool*) – If True and a dataset exists at `dest`, it will be overwritten. Defaults to `False`.
- **src_creds** (*dict, str, optional*) – The string `ENV` or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **dest_creds** (*dict, optional*) – creds required to create / overwrite datasets at `dest`.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials to the dataset at path if it is a Deep Lake dataset. This is optional, tokens are normally autogenerated.
- **num_workers** (*int*) – The number of workers to use for copying. Defaults to 0. When set to 0, it will always use serial processing, irrespective of the scheduler.
- **scheduler** (*str*) – The scheduler to be used for copying. Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Defaults to 'threaded'.
- **progressbar** (*bool*) – Displays a progress bar if True (default).
- ****kwargs** (*dict*) – Additional keyword arguments

Returns

New dataset object.

Return type

Dataset

Raises

- ***DatasetHandlerError*** – If a dataset already exists at destination path and overwrite is False.
- **UnsupportedParameterException** – If a parameter that is no longer supported is specified.
- **DatasetCorruptError** – If loading source dataset fails with DatasetCorruptedError.

deeplake.**deepcopy**(*src: Union[str, Path, Dataset]*, *dest: Union[str, Path]*, *runtime: Optional[Dict] = None*, *tensors: Optional[List[str]] = None*, *overwrite: bool = False*, *src_creds=None*, *dest_creds=None*, *token=None*, *num_workers: int = 0*, *scheduler='threaded'*, *progressbar=True*, *public: bool = False*, *verbose: bool = True*, ***kwargs*)

Copies dataset at `src` to `dest` including version control history.

Parameters

- **src** (*str, pathlib.Path, Dataset*) – The Dataset or the path to the dataset to be

copied.
- **dest** (*str, pathlib.Path*) – Destination path to copy to.
- **runtime** (*dict*) – Parameters for Activeloop DB Engine. Only applicable for hub:// paths.
- **tensors** (*List[str], optional*) – Names of tensors (and groups) to be copied. If not specified all tensors are copied.
- **overwrite** (*bool*) – If True and a dataset exists at *destination*, it will be overwritten. Defaults to False.
- **src_creds** (*dict, str, optional*) – The string ENV or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **dest_creds** (*dict, optional*) – creds required to create / overwrite datasets at dest.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials to the dataset at path if it is a Deep Lake dataset. This is optional, tokens are normally autogenerated.
- **num_workers** (*int*) – The number of workers to use for copying. Defaults to 0. When set to 0, it will always use serial processing, irrespective of the scheduler.
- **scheduler** (*str*) – The scheduler to be used for copying. Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Defaults to 'threaded'.
- **progressbar** (*bool*) – Displays a progress bar if True (default).
- **public** (*bool*) – Defines if the dataset will have public access. Applicable only if Deep Lake cloud storage is used and a new Dataset is being created. Defaults to False.
- **verbose** (*bool*) – If True, logs will be printed. Defaults to True.
- ****kwargs** – Additional keyword arguments

Returns

New dataset object.

Return type

Dataset

Raises

- *DatasetHandlerError* – If a dataset already exists at destination path and overwrite is False.
- **TypeError** – If source is not a dataset.
- **UnsupportedParameterException** – If parameter that is no longer supported is beeing called.
- **DatasetCorruptError** – If loading source dataset fails with DatasetCorruptedError

deeplake.**connect**(*src_path: str*, *creds_key: str*, *dest_path: Optional[str] = None*, *org_id: Optional[str] = None*, *ds_name: Optional[str] = None*, *token: Optional[str] = None*) → *Dataset*

Connects dataset at src_path to Deep Lake via the provided path.

Examples

```
>>> # Connect an s3 dataset
>>> ds = deeplake.connect(src_path="s3://bucket/dataset", dest_path="hub://my_org/
↪dataset", creds_key="my_managed_credentials_key", token="my_activeloop_token")
>>> # or
>>> ds = deeplake.connect(src_path="s3://bucket/dataset", org_id="my_org", creds_
↪key="my_managed_credentials_key", token="my_activeloop_token")
```

Parameters

- **src_path** (*str*) – Cloud path to the source dataset. Can be: an s3 path like `s3://bucket/path/to/dataset`. a gcs path like `gcs://bucket/path/to/dataset`. an azure path like `az://account_name/container/path/to/dataset`.
- **creds_key** (*str*) – The managed credentials to be used for accessing the source path.
- **dest_path** (*str, optional*) – The full path to where the connected Deep Lake dataset will reside. Can be: a Deep Lake path like `hub://organization/dataset`
- **org_id** (*str, optional*) – The organization to where the connected Deep Lake dataset will be added.
- **ds_name** (*str, optional*) – The name of the connected Deep Lake dataset. Will be infered from `dest_path` or `src_path` if not provided.
- **token** (*str, optional*) – Activeloop token used to fetch the managed credentials.

Returns

The connected Deep Lake dataset.

Return type

Dataset

Raises

- **InvalidSourcePathError** – If the `src_path` is not a valid s3, gcs or azure path.
- **InvalidDestinationPathError** – If `dest_path`, or `org_id` and `ds_name` do not form a valid Deep Lake path.
- ***TokenPermissionError*** – If the user does not have permission to create a dataset in the specified organization.

deeplake.**exists**(*path: Union[str, Path]*, *creds: Optional[Union[Dict, str]] = None*, *token: Optional[str] = None*) → bool

Checks if a dataset exists at the given `path`.

Parameters

- **path** (*str, pathlib.Path*) – the path which needs to be checked.
- **creds** (*dict, str, optional*) – The string `ENV` or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials to the dataset at path if it is a Deep Lake dataset. This is optional, tokens are normally autogenerated.

Returns

A boolean confirming whether the dataset exists or not at the given path.

Raises

ValueError – If version is specified in the path

deeplake.**read**(*path: Union[str, Path]*, *verify: bool = False*, *creds: Optional[Dict] = None*, *compression: Optional[str] = None*, *storage: Optional[StorageProvider] = None*, *timeout: Optional[float] = None*) → *Sample*

Utility that reads raw data from supported files into Deep Lake format.

- Recompresses data into format required by the tensor if permitted by the tensor htype.
- Simply copies the data in the file if file format matches sample_compression of the tensor, thus maximizing upload speeds.

Examples

```
>>> ds.create_tensor("images", htype="image", sample_compression="jpeg")
>>> ds.images.append(deeplake.read("path/to/cat.jpg"))
>>> ds.images.shape
(1, 399, 640, 3)
```

```
>>> ds.create_tensor("videos", htype="video", sample_compression="mp4")
>>> ds.videos.append(deeplake.read("path/to/video.mp4"))
>>> ds.videos.shape
(1, 136, 720, 1080, 3)
```

```
>>> ds.create_tensor("images", htype="image", sample_compression="jpeg")
>>> ds.images.append(deeplake.read("https://picsum.photos/200/300"))
>>> ds.images[0].shape
(300, 200, 3)
```

Supported file types:

```
Image: "bmp", "dib", "gif", "ico", "jpeg", "jpeg2000", "pcx", "png", "ppm", "sgi",
↪"tga", "tiff", "webp", "wmf", "xbm"
Audio: "flac", "mp3", "wav"
Video: "mp4", "mkv", "avi"
Dicom: "dcm"
Nifti: "nii", "nii.gz"
```

Parameters

- **path** (*str*) – Path to a supported file.
- **verify** (*bool*) – If True, contents of the file are verified.
- **creds** (*optional, Dict*) – Credentials for s3, gcp and http urls.
- **compression** (*optional, str*) – Format of the file. Only required if path does not have an extension.
- **storage** (*optional, StorageProvider*) – Storage provider to use to retrieve remote files. Useful if multiple files are being read from same storage to minimize overhead of creating a new provider.
- **timeout** (*optional, float*) – Timeout in seconds for reading the file. Applicable only for http(s) urls.

Returns

Sample object. Call `sample.array` to get the `np.ndarray`.

Return type

Sample

Note: No data is actually loaded until you try to get a property of the returned `Sample`. This is useful for passing

along to *Tensor.append* and *Tensor.extend*.

---

deeplake.**link**(*path: str*, *creds_key: Optional[str] = None*) → *LinkedSample*

Utility that stores a link to raw data. Used to add data to a Deep Lake Dataset without copying it. See *Link htype*.

Supported file types:

```
Image: "bmp", "dib", "gif", "ico", "jpeg", "jpeg2000", "pcx", "png", "ppm", "sgi",
↪"tga", "tiff", "webp", "wmf", "xbm"
Audio: "flac", "mp3", "wav"
Video: "mp4", "mkv", "avi"
Dicom: "dcm"
Nifti: "nii", "nii.gz"
```

Parameters

- **path** (*str*) – Path to a supported file.
- **creds_key** (*optional, str*) – The credential key to use to read data for this sample. The actual credentials are fetched from the dataset.

Returns

LinkedSample object that stores path and creds.

Return type

LinkedSample

Examples

```
>>> ds = deeplake.dataset("test/test_ds")
>>> ds.create_tensor("images", htype="link[image]", sample_compression="jpeg")
>>> ds.images.append(deeplake.link("https://picsum.photos/200/300"))
```

See more examples *here*.

deeplake.**link_tiled**(*path_array: ndarray*, *creds_key: Optional[str] = None*) → *LinkedTiledSample*

Utility that stores links to multiple images that act as tiles and together form a big image. These images must all have the exact same dimensions. Used to add data to a Deep Lake Dataset without copying it. See *Link htype*.

Supported file types:

```
Image: "bmp", "dib", "gif", "ico", "jpeg", "jpeg2000", "pcx", "png", "ppm", "sgi",
↪"tga", "tiff", "webp", "wmf", "xbm"
```

Parameters

- **path_array** (*np.ndarray*) – N dimensional array of paths to the data, with paths corresponding to respective tiles. The array must have dtype=object and have string values. Each string must point to an image file with the same dimensions.
- **creds_key** (*optional, str*) – The credential key to use to read data for this sample. The actual credentials are fetched from the dataset.

Returns

LinkedTiledSample object that stores path_array and creds.

Return type

LinkedTiledSample

Examples

```
>>> ds = deeplake.dataset("test/test_ds")
>>> ds.create_tensor("images", htype="link[image]", sample_compression="jpeg")
>>> arr = np.empty((10, 10), dtype=object)
>>> for j, i in itertools.product(range(10), range(10)):
...     arr[j, i] = f"s3://my_bucket/my_image_{j}_{i}.jpeg"
...
>>> ds.images.append(deeplake.link_tiled(arr, creds_key="my_s3_key"))
>>> # If all images are 1000x1200x3, we now have a 10000x12000x3 image in our␣
↪dataset.
```

deeplake.**tiled**(*sample_shape: Tuple[int, ...]*, *tile_shape: Optional[Tuple[int, ...]] = None*, *dtype: Union[str, dtype] = dtype('uint8')*)

Allocates an empty sample of shape `sample_shape`, broken into tiles of shape `tile_shape` (except for edge tiles).

Example

```
>>> with ds:
...     ds.create_tensor("image", htype="image", sample_compression="png")
...     ds.image.append(deeplake.tiled(sample_shape=(1003, 1103, 3), tile_shape=(10,␣
↪10, 3)))
...     ds.image[0][-217:, :212, 1:] = np.random.randint(0, 256, (217, 212, 2),␣
↪dtype=np.uint8)
```

Parameters

- **sample_shape** (*Tuple[int, ...]*) – Full shape of the sample.
- **tile_shape** (*Optional, Tuple[int, ...]*) – The sample will be will stored as tiles where each tile will have this shape (except edge tiles). If not specified, it will be computed such that each tile is close to half of the tensor's *max_chunk_size* (after compression).
- **dtype** (*Union[str, np.dtype]*) – Dtype for the sample array. Default uint8.

Returns

A PartialSample instance which can be appended to a Tensor.

Return type

PartialSample

deeplake.**compute**(*fn*, *name: Optional[str] = None*) → Callable[[...], ComputeFunction]

Compute is a decorator for functions.

The functions should have atleast 2 argument, the first two will correspond to `sample_in` and `samples_out`.

There can be as many other arguments as required.

The output should be appended/extended to the second argument in a deeplake like syntax.

Any value returned by the fn will be ignored.

Example:

```
@deeplake.compute
def my_fn(sample_in: Any, samples_out, my_arg0, my_arg1=0):
    samples_out.my_tensor.append(my_arg0 * my_arg1)
```

(continues on next page)

(continued from previous page)

```
# This transform can be used using the eval method in one of these 2 ways:-

# Directly evaluating the method
# here arg0 and arg1 correspond to the 3rd and 4th argument in my_fn
my_fn(arg0, arg1).eval(data_in, ds_out, scheduler="threaded", num_workers=5)

# As a part of a Transform pipeline containing other functions
pipeline = deeplake.compose([my_fn(a, b), another_function(x=2)])
pipeline.eval(data_in, ds_out, scheduler="processed", num_workers=2)
```

The `eval` method evaluates the pipeline/transform function.

It has the following arguments:

- `data_in`: Input passed to the transform to generate output dataset.
  - It should support `__getitem__` and `__len__`. This can be a Deep Lake dataset.
- `ds_out (Dataset, optional)`: The dataset object to which the transform will get written.
  - If this is not provided, data_in will be overwritten if it is a Deep Lake dataset, otherwise error will be raised.
  - It should have all keys being generated in output already present as tensors.
  - It's initial state should be either:
    - Empty i.e. all tensors have no samples. In this case all samples are added to the dataset.
    - All tensors are populated and have same length. In this case new samples are appended to the dataset.
- `num_workers (int)`: The number of workers to use for performing the transform.
  - Defaults to 0. When set to 0, it will always use serial processing, irrespective of the scheduler.
- `scheduler (str)`: The scheduler to be used to compute the transformation.
  - Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Defaults to 'threaded'.
- `progressbar (bool)`: Displays a progress bar if `True` (default).
- `skip_ok (bool)`: If `True`, skips the check for output tensors generated.
  - This allows the user to skip certain tensors in the function definition.
  - This is especially useful for inplace transformations in which certain tensors are not modified. Defaults to `False`.
- `check_lengths (bool)`: If `True`, checks whether `ds_out` has tensors of same lengths initially.
- `pad_data_in (bool)`: If `True`, pads tensors of `data_in` to match the length of the largest tensor in `data_in`. Defaults to `False`.
- `ignore_errors (bool)`: If `True`, input samples that causes transform to fail will be skipped and the errors will be ignored **if possible**.

Note: `pad_data_in` is only applicable if `data_in` is a Deep Lake dataset.

It raises the following errors:

- `InvalidInputDataError`: If `data_in` passed to transform is invalid. It should support `__getitem__` and `__len__` operations. Using scheduler other than "threaded" with deeplake dataset having base storage as memory as `data_in` will also raise this.
- `InvalidOutputDatasetError`: If all the tensors of `ds_out` passed to transform don't have the same length. Using scheduler other than "threaded" with deeplake dataset having base storage as memory as `ds_out` will also raise this.
- `TensorMismatchError`: If one or more of the outputs generated during transform contain different tensors than the ones present in `ds_out` provided to transform.
- `UnsupportedSchedulerError`: If the scheduler passed is not recognized. Supported values include: 'serial', 'threaded', 'processed' and 'ray'.
- `TransformError`: All other exceptions raised if there are problems while running the pipeline.

deeplake.**compose**(*functions: List[ComputeFunction]*)

Takes a list of functions decorated using *deeplake.compute()* and creates a pipeline that can be evaluated using .eval

Example:

```
pipeline = deeplake.compose([my_fn(a=3), another_function(b=2)])
pipeline.eval(data_in, ds_out, scheduler="processed", num_workers=2)
```

The `eval` method evaluates the pipeline/transform function.

It has the following arguments:

- `data_in`: Input passed to the transform to generate output dataset.
  - It should support `__getitem__` and `__len__`. This can be a Deep Lake dataset.
- `ds_out (Dataset, optional)`: The dataset object to which the transform will get written.
  - If this is not provided, data_in will be overwritten if it is a Deep Lake dataset, otherwise error will be raised.
  - It should have all keys being generated in output already present as tensors.
  - It's initial state should be either:
    - Empty i.e. all tensors have no samples. In this case all samples are added to the dataset.
    - All tensors are populated and have same length. In this case new samples are appended to the dataset.
- `num_workers (int)`: The number of workers to use for performing the transform.
  - Defaults to 0. When set to 0, it will always use serial processing, irrespective of the scheduler.
- `scheduler (str)`: The scheduler to be used to compute the transformation.
  - Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Defaults to 'threaded'.
- `progressbar (bool)`: Displays a progress bar if True (default).
- `skip_ok (bool)`: If True, skips the check for output tensors generated.
  - This allows the user to skip certain tensors in the function definition.
  - This is especially useful for inplace transformations in which certain tensors are not modified. Defaults to `False`.
- `ignore_errors (bool)`: If `True`, input samples that causes transform to fail will be skipped and the errors will be ignored **if possible**.

It raises the following errors:

- `InvalidInputDataError`: If data_in passed to transform is invalid. It should support `__getitem__` and `__len__` operations. Using scheduler other than "threaded" with deeplake dataset having base storage as memory as data_in will also raise this.
- `InvalidOutputDatasetError`: If all the tensors of ds_out passed to transform don't have the same length. Using scheduler other than "threaded" with deeplake dataset having base storage as memory as ds_out will also raise this.
- `TensorMismatchError`: If one or more of the outputs generated during transform contain different tensors than the ones present in 'ds_out' provided to transform.
- `UnsupportedSchedulerError`: If the scheduler passed is not recognized. Supported values include: 'serial', 'threaded', 'processed' and 'ray'.
- `TransformError`: All other exceptions raised if there are problems while running the pipeline.

CHAPTER

SEVENTEEN

DEEPLAKE.VECTORSTORE

class deeplake.core.vectorstore.deeplake_vectorstore.**VectorStore**

Base class for VectorStore

__init__(*path: ~typing.Optional[~typing.Union[str, ~pathlib.Path]] = None, dataset: ~typing.Optional[~deeplake.core.dataset.dataset.Dataset] = None, tensor_params: ~typing.List[~typing.Dict[str, object]] = [{'name': 'text', 'htype': 'text', 'create_id_tensor': False, 'create_sample_info_tensor': False, 'create_shape_tensor': False}, {'name': 'metadata', 'htype': 'json', 'create_id_tensor': False, 'create_sample_info_tensor': False, 'create_shape_tensor': False}, {'name': 'embedding', 'htype': 'embedding', 'dtype': <class 'numpy.float32'>, 'create_id_tensor': False, 'create_sample_info_tensor': False, 'create_shape_tensor': True, 'max_chunk_size': 64000000}, {'name': 'id', 'htype': 'text', 'create_id_tensor': False, 'create_sample_info_tensor': False, 'create_shape_tensor': False}], embedding_function: ~typing.Optional[~typing.Any] = None, read_only: ~typing.Optional[bool] = None, ingestion_batch_size: int = 1000, index_params: ~typing.Optional[~typing.Dict[str, ~typing.Union[int, str]]] = None, exec_option: str = 'auto', token: ~typing.Optional[str] = None, overwrite: bool = False, verbose: bool = True, runtime: ~typing.Optional[~typing.Dict] = None, creds: ~typing.Optional[~typing.Union[~typing.Dict, str]] = None, org_id: ~typing.Optional[str] = None, logger: ~logging.Logger = <Logger deeplake.core.vectorstore.deeplake_vectorstore (INFO)>, branch: str = 'main', **kwargs: ~typing.Any*) → None

Creates an empty VectorStore or loads an existing one if it exists at the specified `path`.

Examples

```
>>> # Create a vector store with default tensors
>>> data = VectorStore(
...         path = "./my_vector_store",
... )
```

```
>>> # Create a vector store in the Deep Lake Managed Tensor Database
>>> data = VectorStore(
...         path = "hub://org_id/dataset_name",
...         runtime = {"tensor_db": True},
... )
```

```
>>> # Create a vector store with custom tensors
>>> data = VectorStore(
...         path = "./my_vector_store",
...         tensor_params = [{"name": "text", "htype": "text"},
...                          {"name": "embedding_1", "htype": "embedding"},
```

(continues on next page)

(continued from previous page)

```
...                         {"name": "embedding_2", "htype": "embedding"},
...                         {"name": "source", "htype": "text"},
...                         {"name": "metadata", "htype": "json"}
...                        ]
... )
```

Parameters

- **path** (*str, pathlib.Path*) –
  - The full path for storing to the Deep Lake Vector Store. It can be:
  - a Deep Lake cloud path of the form `hub://org_id/dataset_name`. Requires registration with Deep Lake.
  - an s3 path of the form `s3://bucketname/path/to/dataset`. Credentials are required in either the environment or passed to the creds argument.
  - a local file system path of the form `./path/to/dataset` or `~/path/to/dataset` or `path/to/dataset`.
  - a memory path of the form `mem://path/to/dataset` which doesn't save the dataset but keeps it in memory instead. Should be used only for testing as it does not persist.
- **tensor_params** (*List[Dict[str, dict]], optional*) – List of dictionaries that contains information about tensors that user wants to create. See `create_tensor` in Deep Lake API docs for more information. Defaults to `DEFAULT_VECTORSTORE_TENSORS`.
- **embedding_function** (*Optional[Any], optional*) – Function or class that converts the embeddable data into embeddings. Input to *embedding_function* is a list of data and output is a list of embeddings. Defaults to None.
- **read_only** (*bool, optional*) – Opens dataset in read-only mode if True. Defaults to False.
- **ingestion_batch_size** (*int*) – Batch size to use for parallel ingestion.
- **index_params** (*Dict[str, Union[int, str]]*) – Dictionary containing information about vector index that will be created. Defaults to `None`, which will utilize `DEFAULT_VECTORSTORE_INDEX_PARAMS` from `deeplake.constants`. The specified key-values override the default ones:
  - 'threshold': The threshold for the dataset size above which an index will be created for the embedding tensor. When the threshold value is set to -1, index creation is turned off. Defaults to -1, which turns off the index.
  - 'distance_metric': This key specifies the method of calculating the distance between vectors when creating the vector database (VDB) index. It can either be a string that corresponds to a member of the DistanceType enumeration, or the string value itself.
    - If no value is provided, it defaults to "L2".
    - "L2" corresponds to DistanceType.L2_NORM.
    - "COS" corresponds to DistanceType.COSINE_SIMILARITY.
  - 'additional_params': Additional parameters for fine-tuning the index.

- **exec_option** (*str*) – Default method for search execution. It could be either "auto", "python", "compute_engine" or "tensor_db". Defaults to "auto". If None, it's set to "auto". - auto- Selects the best execution method based on the storage location of the Vector Store. It is the default option. - python - Pure-python implementation that runs on the client and can be used for data stored anywhere. WARNING: using this option with big datasets is discouraged because it can lead to memory issues. - compute_engine - Performant C++ implementation of the Deep Lake Compute Engine that runs on the client and can be used for any data stored in or connected to Deep Lake. It cannot be used with in-memory or local datasets. - tensor_db - Performant and fully-hosted Managed Tensor Database that is responsible for storage and query execution. Only available for data stored in the Deep Lake Managed Database. Store datasets in this database by specifying runtime = {"tensor_db": True} during dataset creation.
- **token** (*str, optional*) – Activeloop token, used for fetching user credentials. This is Optional, tokens are normally autogenerated. Defaults to None.
- **overwrite** (*bool*) – If set to True this overwrites the Vector Store if it already exists. Defaults to False.
- **verbose** (*bool*) – Whether to print summary of the dataset created. Defaults to True.
- **creds** (*dict, str, optional*) – The string ENV or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **runtime** (*Dict, optional*) – Parameters for creating the Vector Store in Deep Lake's Managed Tensor Database. Not applicable when loading an existing Vector Store. To create a Vector Store in the Managed Tensor Database, set *runtime = {"tensor_db": True}*.
- **branch** (*str*) – Branch name to use for the Vector Store. Defaults to "main".
- ****kwargs** (*dict*) – Additional keyword arguments.

> **Danger:** Setting overwrite to True will delete all of your data if the Vector Store exists! Be very careful when setting this parameter.

add(*embedding_function: Optional[Union[Callable, List[Callable]]] = None*, *embedding_data: Optional[Union[List, List[List]]] = None*, *embedding_tensor: Optional[Union[str, List[str]]] = None*, *return_ids: bool = False*, *rate_limiter: Dict = {'batch_byte_size': 10000, 'bytes_per_minute': 1800000.0, 'enabled': False}*, ***tensors*) → Optional[List[str]]

Adding elements to deeplake vector store.

Tensor names are specified as parameters, and data for each tensor is specified as parameter values. All data must of equal length.

Examples

```
>>> # Dummy data
>>> texts = ["Hello", "World"]
>>> embeddings = [[1, 2, 3], [4, 5, 6]]
>>> metadatas = [{"timestamp": "01:20"}, {"timestamp": "01:22"}]
>>> emebdding_fn = lambda x: [[1, 2, 3]] * len(x)
>>> embedding_fn_2 = lambda x: [[4, 5]] * len(x)
>>> # Directly upload embeddings
>>> deeplake_vector_store.add(
...     text = texts,
...     embedding = embeddings,
...     metadata = metadatas,
... )
>>> # Upload embedding via embedding function
>>> deeplake_vector_store.add(
...     text = texts,
...     metadata = metadatas,
...     embedding_function = embedding_fn,
...     embedding_data = texts,
... )
>>> # Upload embedding via embedding function to a user-defined embedding␣
↪tensor
>>> deeplake_vector_store.add(
...     text = texts,
...     metadata = metadatas,
...     embedding_function = embedding_fn,
...     embedding_data = texts,
...     embedding_tensor = "embedding_1",
... )
>>> # Multiple embedding functions (user defined embedding tensors must be␣
↪specified)
>>> deeplake_vector_store.add(
...     embedding_tensor = ["embedding_1", "embedding_2"]
...     embedding_function = [embedding_fn, embedding_fn_2],
...     embedding_data = [texts, texts],
... )
>>> # Alternative syntax for multiple embedding functions
>>> deeplake_vector_store.add(
...     text = texts,
...     metadata = metadatas,
...     embedding_tensor_1 = (embedding_fn, texts),
...     embedding_tensor_2 = (embedding_fn_2, texts),
... )
>>> # Add data to fully custom tensors
>>> deeplake_vector_store.add(
...     tensor_A = [1, 2],
...     tensor_B = ["a", "b"],
...     tensor_C = ["some", "data"],
...     embedding_function = embedding_fn,
...     embedding_data = texts,
...     embedding_tensor = "embedding_1",
... )
```

Parameters

- **embedding_function** (*Optional[Callable]*) – embedding function used to convert `embedding_data` into embeddings. Input to *embedding_function* is a list of data and output is a list of embeddings. Overrides the `embedding_function` specified when initializing the Vector Store.
- **embedding_data** (*Optional[List]*) – Data to be converted into embeddings using the provided `embedding_function`. Defaults to None.
- **embedding_tensor** (*Optional[str]*) – Tensor where results from the embedding function will be stored. If None, the embedding tensor is automatically inferred (when possible). Defaults to None.
- **return_ids** (*bool*) – Whether to return added ids as an ouput of the method. Defaults to False.
- **rate_limiter** (*Dict*) – Rate limiter configuration. Defaults to `{"enabled": False, "bytes_per_minute": MAX_BYTES_PER_MINUTE, "batch_byte_size": TARGET_BYTE_SIZE}`.
- ****tensors** – Keyword arguments where the key is the tensor name, and the value is a list of samples that should be uploaded to that tensor.

Returns

List of ids if `return_ids` is set to True. Otherwise, None.

Return type

Optional[List[str]]

checkout(*branch: str = 'main'*, *create=False*) → None

Checkout the Vector Store to a specific branch.

Parameters

- **branch** (*str*) – Branch name to checkout. Defaults to "main".
- **create** (*bool*) – Whether to create the branch if it doesn't exist. Defaults to False.

commit(*allow_empty: bool = True*) → None

Commits the Vector Store.

Parameters

allow_empty (*bool*) – Whether to allow empty commits. Defaults to True.

property dataset

Returns the dataset

delete(*row_ids: Optional[List[int]] = None*, *ids: Optional[List[str]] = None*, *filter: Optional[Union[Dict, Callable]] = None*, *query: Optional[str] = None*, *exec_option: Optional[str] = None*, *delete_all: Optional[bool] = None*) → bool

Delete the data in the Vector Store. Does not delete the tensor definitions. To delete the vector store completely, first run *VectorStore.delete_by_path()*.

Examples

```
>>> # Delete using ids:
>>> data = vector_store.delete(ids)
>>> # Delete data using filter
>>> data = vector_store.delete(
...         filter = {"json_tensor_name": {"key: value"}, "json_tensor_name_2":
↪{"key_2: value_2"}},
... )
>>> # Delete data using TQL
>>> data = vector_store.delete(
...         query = "select * where ..... <add TQL syntax>",
...         exec_option = "compute_engine",
... )
```

Parameters

- **ids** (*Optional[List[str]]*) – List of unique ids. Defaults to None.
- **row_ids** (*Optional[List[int]]*) – List of absolute row indices from the dataset. Defaults to None.
- **filter** (*Union[Dict, Callable], optional*) – Filter for finding samples for deletion. - `Dict` - Key-value search on tensors of htype json, evaluated on an AND basis (a sample must satisfy all key-value filters to be True) Dict = {"tensor_name_1": {"key": value}, "tensor_name_2": {"key": value}} - `Function` - Any function that is compatible with *deeplake.filter*.
- **query** (*Optional[str]*) – TQL Query string for direct evaluation for finding samples for deletion, without application of additional filters.
- **exec_option** (*Optional[str]*) – Method for search execution. It could be either `"python"`, `"compute_engine"` or `"tensor_db"`. Defaults to `None`, which inherits the option from the Vector Store initialization. - `python` - Pure-python implementation that runs on the client and can be used for data stored anywhere. WARNING: using this option with big datasets is discouraged because it can lead to memory issues. - `compute_engine` - Performant C++ implementation of the Deep Lake Compute Engine that runs on the client and can be used for any data stored in or connected to Deep Lake. It cannot be used with in-memory or local datasets. - `tensor_db` - Performant and fully-hosted Managed Tensor Database that is responsible for storage and query execution. Only available for data stored in the Deep Lake Managed Database. Store datasets in this database by specifying runtime = {"tensor_db": True} during dataset creation.
- **delete_all** (*Optional[bool]*) – Whether to delete all the samples and version history of the dataset. Defaults to None.

Returns

Returns True if deletion was successful, otherwise it raises a ValueError.

Return type

bool

Raises

ValueError – If neither `ids`, `filter`, `query`, nor `delete_all` are specified, or if an invalid `exec_option` is provided.

static delete_by_path(*path: Union[str, Path]*, *token: Optional[str] = None*, *force: bool = False*, *creds: Optional[Union[Dict, str]] = None*) → None

Deleted the Vector Store at the specified path.

Parameters

- **path** (*str, pathlib.Path*) – The full path to the Deep Lake Vector Store.
- **token** (*str, optional*) – Activeloop token, used for fetching user credentials. This is optional, as tokens are normally autogenerated. Defaults to None.
- **creds** (*dict, str, optional*) – The string ENV or a dictionary containing credentials used to access the dataset at the path. - If 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token' are present, these take precedence over credentials present in the environment or in credentials file. Currently only works with s3 paths. - It supports 'aws_access_key_id', 'aws_secret_access_key', 'aws_session_token', 'endpoint_url', 'aws_region', 'profile_name' as keys. - If 'ENV' is passed, credentials are fetched from the environment variables. This is also the case when creds is not passed for cloud datasets. For datasets connected to hub cloud, specifying 'ENV' will override the credentials fetched from Activeloop and use local ones.
- **force** (*bool*) – delete the path in a forced manner without rising an exception. Defaults to True.

Danger: This method permanently deletes all of your data if the Vector Store exists! Be very careful when using this method.

search(*embedding_data: Optional[Union[str, List[str]]] = None*, *embedding_function: Optional[Callable] = None*, *embedding: Optional[Union[List[float], ndarray]] = None*, *k: int = 4*, *distance_metric: Optional[str] = None*, *query: Optional[str] = None*, *filter: Optional[Union[Dict, Callable]] = None*, *exec_option: Optional[str] = None*, *embedding_tensor: str = 'embedding'*, *return_tensors: Optional[List[str]] = None*, *return_view: bool = False*, *deep_memory: bool = False*, *return_tql: bool = False*) → Union[Dict, *Dataset*]

VectorStore search method that combines embedding search, metadata search, and custom TQL search.

Examples

```
>>> # Search using an embedding
>>> data = vector_store.search(
...         embedding = [1, 2, 3],
...         exec_option = "python",
... )
>>> # Search using an embedding function and data for embedding
>>> data = vector_store.search(
...         embedding_data = "What does this chatbot do?",
...         embedding_function = query_embedding_fn,
...         exec_option = "compute_engine",
... )
>>> # Add a filter to your search
>>> data = vector_store.search(
...         embedding = np.ones(3),
...         exec_option = "python",
...         filter = {"json_tensor_name": {"key: value"}, "json_tensor_name_2":
↪{"key_2: value_2"},...}, # Only valid for exec_option = "python"
```

(continues on next page)

(continued from previous page)

```
... )
>>> # Search using TQL
>>> data = vector_store.search(
...         query = "select * where ..... <add TQL syntax>",
...         exec_option = "tensor_db", # Only valid for exec_option = "compute_
↪engine" or "tensor_db"
... )
```

Parameters

- **embedding** (*Union[np.ndarray, List[float]], optional*) – Embedding representation for performing the search. Defaults to None. The `embedding_data` and `embedding` cannot both be specified.
- **embedding_data** (*List[str]*) – Data against which the search will be performed by embedding it using the *embedding_function*. Defaults to None. The *embedding_data* and *embedding* cannot both be specified.
- **embedding_function** (*Optional[Callable], optional*) – function for converting *embedding_data* into embedding. Only valid if *embedding_data* is specified. Input to *embedding_function* is a list of data and output is a list of embeddings.
- **k** (*int*) – Number of elements to return after running query. Defaults to 4.
- **distance_metric** (*str*) – Distance metric to use for sorting the data. Avaliable options are: `"L1"`, `"L2"`, `"COS"`, `"MAX"`. Defaults to None, which uses same distance metric specified in `index_params`. If there is no index, it performs linear search using `DEFAULT_VECTORSTORE_DISTANCE_METRIC`.
- **query** (*Optional[str]*) – TQL Query string for direct evaluation, without application of additional filters or vector search.
- **filter** (*Union[Dict, Callable], optional*) – Additional filter evaluated prior to the embedding search.
  - `Dict` - Key-value search on tensors of htype json, evaluated on an AND basis (a sample must satisfy all key-value filters to be True) Dict = {"tensor_name_1": {"key": value}, "tensor_name_2": {"key": value}}
  - `Function` - Any function that is compatible with *Dataset.filter*.
- **exec_option** (*Optional[str]*) – Method for search execution. It could be either `"python"`, `"compute_engine"` or `"tensor_db"`. Defaults to `None`, which inherits the option from the Vector Store initialization.
  - `python` - Pure-python implementation that runs on the client and can be used for data stored anywhere. WARNING: using this option with big datasets is discouraged because it can lead to memory issues.
  - `compute_engine` - Performant C++ implementation of the Deep Lake Compute Engine that runs on the client and can be used for any data stored in or connected to Deep Lake. It cannot be used with in-memory or local datasets.
  - `tensor_db` - Performant and fully-hosted Managed Tensor Database that is responsible for storage and query execution. Only available for data stored in the Deep Lake Managed Database. Store datasets in this database by specifying runtime = {"tensor_db": True} during dataset creation.

- **embedding_tensor** (*str*) – Name of tensor with embeddings. Defaults to "embedding".
- **return_tensors** (*Optional[List[str]]*) – List of tensors to return data for. Defaults to None, which returns data for all tensors except the embedding tensor (in order to minimize payload). To return data for all tensors, specify return_tensors = "*".
- **return_view** (*bool*) – Return a Deep Lake dataset view that satisfied the search parameters, instead of a dictionary with data. Defaults to False. If True return_tensors is set to "*" beucase data is lazy-loaded and there is no cost to including all tensors in the view.
- **deep_memory** (*bool*) – Whether to use the Deep Memory model for improving search results. Defaults to False if deep_memory is not specified in the Vector Store initialization. If True, the distance metric is set to "deepmemory_distance", which represents the metric with which the model was trained. The search is performed using the Deep Memory model. If False, the distance metric is set to "COS" or whatever distance metric user specifies.
- **return_tql** (*bool*) – Whether to return the TQL query string used for the search. Defaults to False.

Raises

- **ValueError** – When invalid parameters are specified.
- **ValueError** – when deep_memory is True. Deep Memory is only available for datasets stored in the Deep Lake Managed Database for paid accounts.
- **DeepMemoryAccessError** – if user does not have access to deep_memory.

Returns

Dictionary where keys are tensor names and values are the results of the search

Return type

Dict

summary()

Prints a summary of the dataset

tensors()

Returns the list of tensors present in the dataset

update_embedding(*row_ids: Optional[List[str]] = None*, *ids: Optional[List[str]] = None*, *filter: Optional[Union[Dict, Callable]] = None*, *query: Optional[str] = None*, *exec_option: Optional[str] = None*, *embedding_function: Optional[Union[Callable, List[Callable]]] = None*, *embedding_source_tensor: Union[str, List[str]] = 'text'*, *embedding_tensor: Optional[Union[str, List[str]]] = None*)

Recompute existing embeddings of the VectorStore, that match either query, filter, ids or row_ids.

Examples

```
>>> # Update using ids:
>>> data = vector_store.update(
...     ids,
...     embedding_source_tensor = "text",
...     embedding_tensor = "embedding",
...     embedding_function = embedding_function,
... )
>>> # Update data using filter and several embedding_tensors, several␣
↪embedding_source_tensors
>>> # and several embedding_functions:
>>> data = vector_store.update(
...      embedding_source_tensor = ["text", "metadata"],
...      embedding_function = ["text_embedding_function", "metadata_embedding_
↪function"],
...      filter = {"json_tensor_name": {"key: value"}, "json_tensor_name_2": {
↪"key_2: value_2"}},
...      embedding_tensor = ["text_embedding", "metadata_embedding"]
... )
>>> # Update data using TQL, if new embedding function is not specified the␣
↪embedding_function used
>>> # during initialization will be used
>>> data = vector_store.update(
...      embedding_source_tensor = "text",
...      query = "select * where ..... <add TQL syntax>",
...      exec_option = "compute_engine",
...      embedding_tensor = "embedding_tensor",
... )
```

Parameters

- **row_ids** (*Optional[List[str]], optional*) – Row ids of the elements for replacement. Defaults to None.
- **ids** (*Optional[List[str]], optional*) – hash ids of the elements for replacement. Defaults to None.
- **filter** (*Optional[Union[Dict, Callable]], optional*) – Filter for finding samples for replacement. - `Dict` - Key-value search on tensors of htype json, evaluated on an AND basis (a sample must satisfy all key-value filters to be True) Dict = {"tensor_name_1": {"key": value}, "tensor_name_2": {"key": value}} - `Function` - Any function that is compatible with *deeplake.filter*
- **query** (*Optional[str], optional*) – TQL Query string for direct evaluation for finding samples for deletion, without application of additional filters. Defaults to None.
- **exec_option** (*Optional[str]*) – Method for search execution. It could be either `"python"`, `"compute_engine"` or `"tensor_db"`. Defaults to `None`, which inherits the option from the Vector Store initialization. - `python` - Pure-python implementation that runs on the client and can be used for data stored anywhere. WARNING: using this option with big datasets is discouraged because it can lead to memory issues. - `compute_engine` - Performant C++ implementation of the Deep Lake Compute Engine that runs on the client and can be used for any data stored in or connected to Deep Lake. It cannot be used with in-memory or local

datasets. - `tensor_db` - Performant and fully-hosted Managed Tensor Database that is responsible for storage and query execution. Only available for data stored in the Deep Lake Managed Database. Store datasets in this database by specifying runtime = {"tensor_db": True} during dataset creation.

- **embedding_function** (*Optional[Union[Callable, List[Callable]], optional*) – function for converting *embedding_source_tensor* into embedding. Only valid if *embedding_source_tensor* is specified. Defaults to None.
- **embedding_source_tensor** (*Union[str, List[str]], optional*) – Name of tensor with data that needs to be converted to embeddings. Defaults to *text*.
- **embedding_tensor** (*Optional[Union[str, List[str]]], optional*) – Name of the tensor with embeddings. Defaults to None.

CHAPTER

EIGHTEEN

DEEPLAKE.CORE

18.1 deeplake.core.sample

class deeplake.core.sample.**Sample**

__init__(*path: Optional[str] = None*, *array: Optional[ndarray] = None*, *buffer: Optional[Union[bytes, memoryview]] = None*, *compression: Optional[str] = None*, *verify: bool = False*, *shape: Optional[Tuple[int]] = None*, *dtype: Optional[str] = None*, *creds: Optional[Dict] = None*, *storage: Optional[*StorageProvider*] = None*, *timeout: Optional[float] = None*)

Represents a single sample for a tensor. Provides all important meta information in one place.

Note: If `self.is_lazy` is `True`, this *Sample* doesn't actually have any data loaded. To read this data, simply try to read it into a numpy array (*sample.array*)

Parameters

- **path** (*str*) – Path to a sample stored on the local file system that represents a single sample. If `path` is provided, `array` should not be. Implicitly makes `self.is_lazy == True`.
- **array** (*np.ndarray*) – Array that represents a single sample. If `array` is provided, `path` should not be. Implicitly makes `self.is_lazy == False`.
- **buffer** – (bytes): Byte buffer that represents a single sample. If compressed, `compression` argument should be provided.
- **compression** (*str*) – Specify in case of byte buffer.
- **verify** (*bool*) – If a path is provided, verifies the sample if `True`.
- **shape** (*Tuple[int]*) – Shape of the sample.
- **dtype** (*optional, str*) – Data type of the sample.
- **creds** (*optional, Dict*) – Credentials for s3, gcp and http urls.
- **storage** (*optional,* StorageProvider) – Storage provider.
- **timeout** (*optional, float*) – Timeout in seconds for reading the file. Applicable only for http(s) urls.

property array: ndarray

Return numpy array corresponding to the sample. Decompresses the sample if necessary.

Example

```
>>> sample = deeplake.read("./images/dog.jpg")
>>> arr = sample.array
>>> arr.shape
(323, 480, 3)
```

compressed_bytes(*compression: Optional[str]*) → bytes

Returns this sample as compressed bytes.

Note: If this sample is pointing to a path and the requested `compression` is the same as it's stored in, the data is returned without re-compressing.

Parameters

compression (*Optional[str]*) – `self.array` will be compressed into this format. If `compression` is `None`, return *uncompressed_bytes()*.

Returns

Bytes for the compressed sample. Contains all metadata required to decompress within these bytes.

Return type

bytes

Raises

ValueError – On recompression of unsupported formats.

property pil: Image

Return PIL image corresponding to the sample. Decompresses the sample if necessary.

Example

```
>>> sample = deeplake.read("./images/dog.jpg")
>>> pil = sample.pil
>>> pil.size
(480, 323)
```

uncompressed_bytes() → Optional[bytes]

Returns uncompressed bytes.

18.2 deeplake.core.linked_sample

class deeplake.core.linked_sample.**LinkedSample**(*path: str*, *creds_key: Optional[str] = None*)

Represents a sample that is initialized using external links. See *deeplake.link()*.

18.3 deeplake.core.partial_sample

class deeplake.core.partial_sample.**PartialSample**(*sample_shape: Tuple[int, ...]*, *tile_shape: Optional[Tuple[int, ...]] = None*, *dtype: Optional[Union[dtype, str]] = dtype('uint8')*)

Represents a sample that is initialized by just shape and the data is updated later.

18.4 deeplake.core.linked_tiled_sample

class deeplake.core.linked_tiled_sample.**LinkedTiledSample**(*path_array: ndarray*, *creds_key: Optional[str] = None*)

Represents a sample that is initialized using external links. See `deeplake.link_tiled()`.

18.5 deeplake.core.storage

18.5.1 Base Storage Provider

class deeplake.core.storage.**StorageProvider**

abstract __delitem__(*path: str*)

Delete the object present at the path.

Parameters

path (*str*) – the path to the object relative to the root of the provider.

Raises

KeyError – If an object is not found at the path.

abstract __getitem__(*path: str*)

Gets the object present at the path within the given byte range.

Parameters

path (*str*) – The path relative to the root of the provider.

Returns

The bytes of the object present at the path.

Return type

bytes

Raises

KeyError – If an object is not found at the path.

abstract __iter__()

Generator function that iterates over the keys of the provider.

Yields

str – the path of the object that it is iterating over, relative to the root of the provider.

abstract __len__()

Returns the number of files present inside the root of the provider.

Returns

the number of files present inside the root.

Return type

int

abstract __setitem__(*path: str*, *value: bytes*)

Sets the object present at the path with the value

Parameters

- **path** (*str*) – the path relative to the root of the provider.
- **value** (*bytes*) – the value to be assigned at the path.

__weakref__

list of weak references to the object (if defined)

abstract _all_keys() → Set[str]

Generator function that iterates over the keys of the provider.

Returns

set of all keys present at the root of the provider.

Return type

set

_is_hub_path = False

An abstract base class for implementing a storage provider.

To add a new provider using Provider, create a subclass and implement all 5 abstract methods below.

check_readonly()

Raises an exception if the provider is in read-only mode.

abstract clear(*prefix=''*)

Delete the contents of the provider.

copy()

Returns a copy of the provider.

Returns

A copy of the provider.

Return type

StorageProvider

disable_readonly()

Disables read-only mode for the provider.

enable_readonly()

Enables read-only mode for the provider.

flush()

Only needs to be implemented for caches. Flushes the data to the next storage provider. Should be a no op for Base Storage Providers like local, s3, azure, gcs, etc.

get_bytes(*path: str*, *start_byte: Optional[int] = None*, *end_byte: Optional[int] = None*)

Gets the object present at the path within the given byte range.

Parameters

- **path** (*str*) – The path relative to the root of the provider.
- **start_byte** (*int, optional*) – If only specific bytes starting from start_byte are required.
- **end_byte** (*int, optional*) – If only specific bytes up to end_byte are required.

Returns

The bytes of the object present at the path within the given byte range.

Return type

bytes

Raises

- *InvalidBytesRequestedError* – If *start_byte* > *end_byte* or *start_byte* < 0 or *end_byte* < 0.
- **KeyError** – If an object is not found at the path.

maybe_flush()

Flush cache if autoflush has been enabled. Called at the end of methods which write data, to ensure consistency as a default.

set_bytes(*path: str*, *value: bytes*, *start_byte: Optional[int] = None*, *overwrite: Optional[bool] = False*)

Sets the object present at the path with the value

Parameters

- **path** (*str*) – the path relative to the root of the provider.
- **value** (*bytes*) – the value to be assigned at the path.
- **start_byte** (*int, optional*) – If only specific bytes starting from start_byte are to be assigned.
- **overwrite** (*boolean, optional*) – If the value is True, if there is an object present at the path it is completely overwritten, without fetching it's data.

Raises

- *InvalidBytesRequestedError* – If *start_byte* < 0.
- *ReadOnlyModeError* – If the provider is in read-only mode.

18.5.2 LRU Cache

class deeplake.core.storage.**LRUCache**

Bases: *StorageProvider*

LRU Cache that uses StorageProvider for caching

__delitem__(*path: str*)

Deletes the object present at the path from the cache and the underlying storage.

Parameters

path (*str*) – the path to the object relative to the root of the provider.

Raises

- **KeyError** – If an object is not found at the path.
- **ReadOnlyError** – If the provider is in read-only mode.

__getitem__(*path: str*)

If item is in cache_storage, retrieves from there and returns. If item isn't in cache_storage, retrieves from next storage, stores in cache_storage (if possible) and returns.

Parameters

path (*str*) – The path relative to the root of the underlying storage.

Raises

KeyError – if an object is not found at the path.

Returns

The bytes of the object present at the path.

Return type

bytes

__getstate__() → Dict[str, Any]

Returns the state of the cache, for pickling

__init__(*cache_storage: StorageProvider*, *next_storage: Optional[StorageProvider]*, *cache_size: int*)

Initializes the LRUCache. It can be chained with other LRUCache objects to create multilayer caches.

Parameters

- **cache_storage** (StorageProvider) – The storage being used as the caching layer of the cache. This should be a base provider such as MemoryProvider, LocalProvider or S3Provider but not another LRUCache.
- **next_storage** (StorageProvider) – The next storage layer of the cache. This can either be a base provider (i.e. it is the final storage) or another LRUCache (i.e. in case of chained cache). While reading data, all misses from cache would be retrieved from here. While writing data, the data will be written to the next_storage when cache_storage is full or flush is called.
- **cache_size** (*int*) – The total space that can be used from the cache_storage in bytes. This number may be less than the actual space available on the cache_storage. Setting it to a higher value than actually available space may lead to unexpected behaviors.

__iter__()

Generator function that iterates over the keys of the cache and the underlying storage.

Yields

str – the path of the object that it is iterating over, relative to the root of the provider.

__len__()

Returns the number of files present in the cache and the underlying storage.

Returns

the number of files present inside the root.

Return type

int

__setitem__(*path: str*, *value: Union[bytes, DeepLakeMemoryObject]*)

Puts the item in the cache_storage (if possible), else writes to next_storage.

Parameters

- **path** (*str*) – the path relative to the root of the underlying storage.
- **value** (*bytes*) – the value to be assigned at the path.

Raises

ReadOnlyError – If the provider is in read-only mode.

__setstate__(*state: Dict[str, Any]*)

Recreates a cache with the same configuration as the state.

Parameters

state (*dict*) – The state to be used to recreate the cache.

Note: While restoring the cache, we reset its contents. In case the cache storage was local/s3 and is still accessible when unpickled (if same machine/s3 creds present respectively), the earlier cache contents are no longer accessible.

_all_keys()

Helper function that lists all the objects present in the cache and the underlying storage.

Returns

set of all the objects found in the cache and the underlying storage.

Return type
set

`_flush_if_not_read_only()`

Flushes the cache if not in read-only mode.

`_forward(path)`

Forward the value at a given path to the next storage, and un-marks its key.

`_forward_value(path, value)`

Forwards a path-value pair to the next storage, and un-marks its key.

Parameters

- **path** (*str*) – the path to the object relative to the root of the provider.
- **value** (*bytes, DeepLakeMemoryObject*) – the value to send to the next storage.

`_free_up_space(extra_size: int)`

Helper function that frees up space the requred space in cache.
No action is taken if there is sufficient space in the cache.

Parameters
extra_size (*int*) – the space that needs is required in bytes.

`_insert_in_cache(path: str, value: Union[bytes, DeepLakeMemoryObject])`

Helper function that adds a key value pair to the cache.

Parameters

- **path** (*str*) – the path relative to the root of the underlying storage.
- **value** (*bytes*) – the value to be assigned at the path.

Raises
ReadOnlyError – If the provider is in read-only mode.

`_pop_from_cache()`

Helper function that pops the least recently used key, value pair from the cache

`clear(prefix='')`

Deletes ALL the data from all the layers of the cache and the actual storage. This is an IRREVERSIBLE operation. Data once deleted can not be recovered.

`clear_cache()`

Flushes the content of all the cache layers if not in read mode and and then deletes contents of all the layers of it. This doesn't delete data from the actual storage.

`clear_deeplake_objects()`

Removes all DeepLakeMemoryObjects from the cache.

`flush()`

Writes data from cache_storage to next_storage. Only the dirty keys are written. This is a cascading function and leads to data being written to the final storage in case of a chained cache.

`get_bytes(path: str, start_byte: Optional[int] = None, end_byte: Optional[int] = None)`

Gets the object present at the path within the given byte range.

Parameters

- **path** (*str*) – The path relative to the root of the provider.
- **start_byte** (*int, optional*) – If only specific bytes starting from start_byte are required.

- **end_byte** (*int, optional*) – If only specific bytes up to end_byte are required.

Returns
The bytes of the object present at the path within the given byte range.

Return type
bytes

Raises

- *InvalidBytesRequestedError* – If *start_byte* > *end_byte* or *start_byte* < 0 or *end_byte* < 0.
- **KeyError** – If an object is not found at the path.

get_deeplake_object(*path: str*, *expected_class*, *meta: Optional[Dict] = None*, *url=False*, *partial_bytes: int = 0*)

If the data at *path* was stored using the output of a DeepLakeMemoryObject's *tobytes* function, this function will read it back into object form & keep the object in cache.

Parameters

- **path** (*str*) – Path to the stored object.
- **expected_class** (*callable*) – The expected subclass of *DeepLakeMemoryObject*.
- **meta** (*dict, optional*) – Metadata associated with the stored object
- **url** (*bool*) – Get presigned url instead of downloading chunk (only for videos)
- **partial_bytes** (*int*) – Number of bytes to read from the beginning of the file. If 0, reads the whole file. Defaults to 0.

Raises

- **ValueError** – If the incorrect *expected_class* was provided.
- **ValueError** – If the type of the data at *path* is invalid.
- **ValueError** – If url is True but *expected_class* is not a subclass of BaseChunk.

Returns
An instance of *expected_class* populated with the data.

get_items(*paths*)

Pre-load items from next storage into cache

register_deeplake_object(*path: str*, *obj: DeepLakeMemoryObject*)

Registers a new object in the cache.

remove_deeplake_object(*path: str*)

Removes a DeepLakeMemoryObject from the cache.

18.5.3 S3 Storage Provider

class deeplake.core.storage.**S3Provider**

Bases: *StorageProvider*

Provider class for using S3 storage.

__delitem__(*path*)

Delete the object present at the path.

Parameters
path (*str*) – the path to the object relative to the root of the S3Provider.

Note: If the object is not found, s3 won't raise KeyError.

Raises

- *S3DeletionError* – Any S3 error encountered while deleting the object.
- **ReadOnlyError** – If the provider is in read-only mode.

__getitem__(*path*)

Gets the object present at the path.

Parameters

path (*str*) – the path relative to the root of the S3Provider.

Returns

The bytes of the object present at the path.

Return type

bytes

Raises

- **KeyError** – If an object is not found at the path.
- *S3GetError* – Any other error other than KeyError while retrieving the object.

__init__(*root: str*, *aws_access_key_id: Optional[str] = None*, *aws_secret_access_key: Optional[str] = None*, *aws_session_token: Optional[str] = None*, *endpoint_url: Optional[str] = None*, *aws_region: Optional[str] = None*, *profile_name: Optional[str] = None*, *token: Optional[str] = None*, ***kwargs*)

Initializes the S3Provider

Example

```
>>> s3_provider = S3Provider("snark-test/benchmarks")
```

Parameters

- **root** (*str*) – The root of the provider. All read/write request keys will be appended to root.
- **aws_access_key_id** (*str, optional*) – Specifies the AWS access key used as part of the credentials to authenticate the user.
- **aws_secret_access_key** (*str, optional*) – Specifies the AWS secret key used as part of the credentials to authenticate the user.
- **aws_session_token** (*str, optional*) – Specifies an AWS session token used as part of the credentials to authenticate the user.
- **endpoint_url** (*str, optional*) – The complete URL to use for the constructed client. This needs to be provided for cases in which you're interacting with MinIO, Wasabi, etc.
- **aws_region** (*str, optional*) – Specifies the AWS Region to send requests to.
- **profile_name** (*str, optional*) – Specifies the AWS profile name to use.
- **token** (*str, optional*) – Activeloop token, used for fetching credentials for Deep Lake datasets (if this is underlying storage for Deep Lake dataset). This is optional, tokens are normally autogenerated.

- ****kwargs** – Additional arguments to pass to the S3 client. Includes: `expiration`.

`__iter__()`

Generator function that iterates over the keys of the S3Provider.

Yields

str – the name of the object that it is iterating over.

`__len__()`

Returns the number of files present at the root of the S3Provider.

Note: This is an expensive operation.

Returns

the number of files present inside the root.

Return type

int

Raises

S3ListError – Any S3 error encountered while listing the objects.

`__setitem__(path, content)`

Sets the object present at the path with the value

Parameters

- **path** (*str*) – the path relative to the root of the S3Provider.
- **content** (*bytes*) – the value to be assigned at the path.

Raises

- *S3SetError* – Any S3 error encountered while setting the value at the path.
- **ReadOnlyError** – If the provider is in read-only mode.

`_all_keys()`

Helper function that lists all the objects present at the root of the S3Provider.

Returns

set of all the objects found at the root of the S3Provider.

Return type

set

Raises

S3ListError – Any S3 error encountered while listing the objects.

`_check_update_creds(force=False)`

If the client has an expiration time, check if creds are expired and fetch new ones. This would only happen for datasets stored on Deep Lake storage for which temporary 12 hour credentials are generated.

`_set_hub_creds_info(hub_path: str, expiration: str, db_engine: bool = True, repository: Optional[str] = None)`

Sets the tag and expiration of the credentials. These are only relevant to datasets using Deep Lake storage. This info is used to fetch new credentials when the temporary 12 hour credentials expire.

Parameters

- **hub_path** (*str*) – The deeplake cloud path to the dataset.
- **expiration** (*str*) – The time at which the credentials expire.
- **db_engine** (*bool*) – Whether Activeloop DB Engine enabled.

- **repository** (*str, Optional*) – Backend repository where the dataset is stored.

_state_keys()

Keys used to store the state of the provider.

clear(*prefix=''*)

Deletes ALL data with keys having given prefix on the s3 bucket (under self.root).

> **Warning:** Exercise caution!

get_bytes(*path: str*, *start_byte: Optional[int] = None*, *end_byte: Optional[int] = None*)

Gets the object present at the path within the given byte range.

Parameters

- **path** (*str*) – The path relative to the root of the provider.
- **start_byte** (*int, optional*) – If only specific bytes starting from start_byte are required.
- **end_byte** (*int, optional*) – If only specific bytes up to end_byte are required.

Returns

The bytes of the object present at the path within the given byte range.

Return type

bytes

Raises

- *InvalidBytesRequestedError* – If start_byte > end_byte or start_byte < 0 or end_byte < 0.
- **KeyError** – If an object is not found at the path.
- **S3GetAccessError** – Invalid credentials for the object path storage.
- *S3GetError* – Any other error while retrieving the object.

need_to_reload_creds(*err: ClientError*) → bool

Checks if the credentials need to be reloaded. This happens if the credentials were loaded from the environment and have now expired.

rename(*root*)

Rename root folder.

18.5.4 Google Cloud Storage Provider

class deeplake.core.storage.**GCSProvider**

Bases: *StorageProvider*

Provider class for using GC storage.

__contains__(*key*)

Checks if key exists in mapping.

__delitem__(*key*)

Remove key.

__getitem__(*key*)

Retrieve data.

__init__(*root: str*, *token: Optional[Union[Dict, str]] = None*, *project: Optional[str] = None*)

Initializes the GCSProvider.

Example

```
>>> gcs_provider = GCSProvider("gcs://my-bucket/gcs_ds")
```

Parameters

- **root** (*str*) – The root of the provider. All read/write request keys will be appended to root.
- **token** (*str/Dict*) – GCP token, used for fetching credentials for storage). Can be a path to the credentials file, actual credential dictionary or one of the folowing: - `google_default`: Tries to load default credentials for the specified project. - `cache`: Retrieves the previously used credentials from cache if exist. - `anon`: Sets `credentials=None`. - `browser`: Generates and stores new token file using cli.
- **project** (*str*) – Name of the project from GCloud.

Raises

ModuleNotFoundError – If google cloud packages aren't installed.

__iter__()

Iterating over the structure.

__len__()

Returns length of the structure.

__setitem__(*key*, *value*)

Store value in key.

_all_keys()

Generator function that iterates over the keys of the provider.

Returns

set of all keys present at the root of the provider.

Return type

set

_set_hub_creds_info(*hub_path: str*, *expiration: str*, *db_engine: bool = True*, *repository: Optional[str] = None*)

Sets the tag and expiration of the credentials. These are only relevant to datasets using Deep Lake storage. This info is used to fetch new credentials when the temporary 12 hour credentials expire.

Parameters

- **hub_path** (*str*) – The deeplake cloud path to the dataset.
- **expiration** (*str*) – The time at which the credentials expire.
- **db_engine** (*bool*) – Whether Activeloop DB Engine enabled.
- **repository** (*str, Optional*) – Backend repository where the dataset is stored.

clear(*prefix=''*)

Remove all keys with given prefix below root - empties out mapping.

> **Warning:** Exercise caution!

get_bytes(*path: str*, *start_byte: Optional[int] = None*, *end_byte: Optional[int] = None*)

Gets the object present at the path within the given byte range.

Parameters

- **path** (*str*) – The path relative to the root of the provider.
- **start_byte** (*int, optional*) – If only specific bytes starting from start_byte are required.
- **end_byte** (*int, optional*) – If only specific bytes up to end_byte are required.

Returns

The bytes of the object present at the path within the given byte range.

Return type

bytes

Raises

- *InvalidBytesRequestedError* – If start_byte > end_byte or start_byte < 0 or end_byte < 0.
- **KeyError** – If an object is not found at the path.

rename(*root*)

Rename root folder.

18.5.5 Google Drive Storage Provider

class deeplake.core.storage.**GDriveProvider**

Bases: *StorageProvider*

Provider class for using Google Drive storage.

__delitem__(*path*)

Delete the object present at the path.

Parameters

path (*str*) – the path to the object relative to the root of the provider.

Raises

KeyError – If an object is not found at the path.

__getitem__(*path*)

Gets the object present at the path within the given byte range.

Parameters

path (*str*) – The path relative to the root of the provider.

Returns

The bytes of the object present at the path.

Return type

bytes

Raises

KeyError – If an object is not found at the path.

__init__(*root: str*, *token: Optional[Union[Dict, str]] = None*, *makemap: bool = True*)

Initializes the GDriveProvider

Example

```
>>> gdrive_provider = GDriveProvider("gdrive://folder_name/folder_name")
```

Parameters

- **root** (*str*) – The root of the provider. All read/write request keys will be appended to root.
- **token** (*dict, str, optional*) – Google Drive token. Can be path to the token file or the actual credentials dictionary.
- **makemap** (*bool*) – Creates path to id map if `True`.

Raises

ImportError – If required packages are not installed.

Note:

- Requires `client_secrets.json` in working directory if `token` is not provided.
- Due to limits on requests per 100 seconds on google drive api, continuous requests such as uploading many small files can be slow.
- Users can request to increse their quotas on their google cloud platform.

__iter__()

Generator function that iterates over the keys of the provider.

Yields

str – the path of the object that it is iterating over, relative to the root of the provider.

__len__()

Returns the number of files present inside the root of the provider.

Returns

the number of files present inside the root.

Return type

int

__setitem__(*path*, *content*)

Sets the object present at the path with the value

Parameters

- **path** (*str*) – the path relative to the root of the provider.
- **value** (*bytes*) – the value to be assigned at the path.

_all_keys()

Generator function that iterates over the keys of the provider.

Returns

set of all keys present at the root of the provider.

Return type

set

clear(*prefix=''*)

Delete the contents of the provider.

sync()

Sync provider keys with actual storage

18.5.6 Local Storage Provider

class deeplake.core.storage.**LocalProvider**

Bases: *StorageProvider*

Provider class for using the local filesystem.

__delitem__(*path: str*)

Delete the object present at the path.

Example

```
>>> local_provider = LocalProvider("/home/ubuntu/Documents/")
>>> del local_provider["abc.txt"]
```

Parameters

path (*str*) – the path to the object relative to the root of the provider.

Raises

- **KeyError** – If an object is not found at the path.
- *DirectoryAtPathException* – If a directory is found at the path.
- **Exception** – Any other exception encountered while trying to fetch the object.
- **ReadOnlyError** – If the provider is in read-only mode.

__getitem__(*path: str*)

Gets the object present at the path within the given byte range.

Example

```
>>> local_provider = LocalProvider("/home/ubuntu/Documents/")
>>> my_data = local_provider["abc.txt"]
```

Parameters

path (*str*) – The path relative to the root of the provider.

Returns

The bytes of the object present at the path.

Return type

bytes

Raises

- **KeyError** – If an object is not found at the path.
- *DirectoryAtPathException* – If a directory is found at the path.
- **Exception** – Any other exception encountered while trying to fetch the object.

__init__(*root: str*)

Initializes the LocalProvider.

Example

```
>>> local_provider = LocalProvider("/home/ubuntu/Documents/")
```

Parameters

root (*str*) – The root of the provider. All read/write request keys will be appended to root."

Raises

FileAtPathException – If the root is a file instead of a directory.

__iter__()

Generator function that iterates over the keys of the provider.

Example

```
>>> local_provider = LocalProvider("/home/ubuntu/Documents/")
>>> for my_data in local_provider:
...     pass
```

Yields

str – the path of the object that it is iterating over, relative to the root of the provider.

__len__()

Returns the number of files present inside the root of the provider.

Example

```
>>> local_provider = LocalProvider("/home/ubuntu/Documents/")
>>> len(local_provider)
```

Returns

the number of files present inside the root.

Return type

int

__setitem__(*path: str*, *value: bytes*)

Sets the object present at the path with the value

Example

```
>>> local_provider = LocalProvider("/home/ubuntu/Documents/")
>>> local_provider["abc.txt"] = b"abcd"
```

Parameters

- **path** (*str*) – the path relative to the root of the provider.
- **value** (*bytes*) – the value to be assigned at the path.

Raises

- **Exception** – If unable to set item due to directory at path or permission or space issues.

- *FileAtPathException* – If the directory to the path is a file instead of a directory.
- **ReadOnlyError** – If the provider is in read-only mode.

_all_keys(*refresh: bool = False*) → Set[str]

Lists all the objects present at the root of the Provider.

Parameters

refresh (*bool*) – refresh keys

Returns

set of all the objects found at the root of the Provider.

Return type

set

_check_is_file(*path: str*)

Checks if the path is a file. Returns the full_path to file if True.

Parameters

path (*str*) – the path to the object relative to the root of the provider.

Returns

the full path to the requested file.

Return type

str

Raises

DirectoryAtPathException – If a directory is found at the path.

_set_hub_creds_info(*hub_path: str*, *expiration: str*, *db_engine: bool = True*, *repository: Optional[str] = None*)

Sets the tag and expiration of the credentials. These are only relevant to datasets using Deep Lake storage. This info is used to fetch new credentials when the temporary 12 hour credentials expire.

Parameters

- **hub_path** (*str*) – The deeplake cloud path to the dataset.
- **expiration** (*str*) – The time at which the credentials expire.
- **db_engine** (*bool*) – Whether Activeloop DB Engine enabled.
- **repository** (*str, Optional*) – Backend repository where the dataset is stored.

clear(*prefix=''*)

Deletes ALL data with keys having given prefix on the local machine (under self.root). Exercise caution!

get_bytes(*path: str*, *start_byte: Optional[int] = None*, *end_byte: Optional[int] = None*)

Gets the object present at the path within the given byte range.

Parameters

- **path** (*str*) – The path relative to the root of the provider.
- **start_byte** (*int, optional*) – If only specific bytes starting from start_byte are required.
- **end_byte** (*int, optional*) – If only specific bytes up to end_byte are required.

Returns

The bytes of the object present at the path within the given byte range.

Return type

bytes

Raises

- *InvalidBytesRequestedError* – If *start_byte* > *end_byte* or *start_byte* < 0 or *end_byte* < 0.
- **KeyError** – If an object is not found at the path.

rename(*path*)

Renames root folder

18.5.7 Memory Provider

class deeplake.core.storage.**MemoryProvider**

Bases: *StorageProvider*

Provider class for using the memory.

__delitem__(*path: str*)

Delete the object present at the path.

Example

```
>>> memory_provider = MemoryProvider("xyz")
>>> del memory_provider["abc.txt"]
```

Parameters

path (*str*) – the path to the object relative to the root of the provider.

Raises

- **KeyError** – If an object is not found at the path.
- **ReadOnlyError** – If the provider is in read-only mode.

__getitem__(*path: str*)

Gets the object present at the path within the given byte range.

Example

```
>>> memory_provider = MemoryProvider("xyz")
>>> my_data = memory_provider["abc.txt"]
```

Parameters

path (*str*) – The path relative to the root of the provider.

Returns

The bytes of the object present at the path.

Return type

bytes

Raises

KeyError – If an object is not found at the path.

__getstate__() → str

Does NOT save the in memory data in state.

__init__(*root: str = ''*)

__iter__()

Generator function that iterates over the keys of the provider.

Example

```
>>> memory_provider = MemoryProvider("xyz")
>>> for my_data in memory_provider:
...     pass
```

Yields
str – the path of the object that it is iterating over, relative to the root of the provider.

__len__()

Returns the number of files present inside the root of the provider.

Example

```
>>> memory_provider = MemoryProvider("xyz")
>>> len(memory_provider)
```

Returns
the number of files present inside the root.
Return type
int

__setitem__(*path: str*, *value: bytes*)

Sets the object present at the path with the value

Example

```
>>> memory_provider = MemoryProvider("xyz")
>>> memory_provider["abc.txt"] = b"abcd"
```

Parameters

- **path** (*str*) – the path relative to the root of the provider.
- **value** (*bytes*) – the value to be assigned at the path.

Raises
ReadOnlyError – If the provider is in read-only mode.

_all_keys()

Lists all the objects present at the root of the Provider.

Returns
set of all the objects found at the root of the Provider.
Return type
set

clear(*prefix=''*)

Clears the provider.

18.6 deeplake.core.index

class deeplake.core.index.**IndexEntry**(*value: Union[int, slice, Tuple[int, ...]] = slice(None, None, None)*)

__getitem__(*item: Union[int, slice, Tuple[int, ...]]*)

Combines the given `item` and this IndexEntry. Returns a new IndexEntry representing the composition of the two.

Examples

```
>>> IndexEntry()[0:100]
IndexEntry(slice(0, 100, None))
```

```
>>> IndexEntry()[100:200][5]
IndexEntry(105)
```

```
>>> IndexEntry()[(0, 1, 2, 3)]
IndexEntry((0, 1, 2, 3))
```

```
>>> IndexEntry()[1, 2, 3]
IndexEntry((0, 1, 2, 3))
```

Parameters

item – The desired sub-index to be composed with this IndexEntry. Can be an int, a slice, or a tuple of ints.

Returns

The new IndexEntry object.

Return type

IndexEntry

Raises

TypeError – An integer IndexEntry should not be indexed further.

__init__(*value: Union[int, slice, Tuple[int, ...]] = slice(None, None, None)*)

__str__()

Return str(self).

__weakref__

list of weak references to the object (if defined)

downsample(*factor: int*, *length: int*)

Downsamples an IndexEntry by a given factor.

Parameters

- **factor** (*int*) – The factor by which to downsample.
- **length** (*int*) – The length of the downsampled IndexEntry.

Returns

The downsampled IndexEntry.

Return type

IndexEntry

Raises

TypeError – If the IndexEntry cannot be downsampled.

indices(*length: int*)

Generates the sequence of integer indices for a target of a given length.

is_trivial()

Checks if an IndexEntry represents the entire slice

length(*parent_length: int*) → int

Returns the length of an IndexEntry given the length of the parent it is indexing.

Examples

```
>>> IndexEntry(slice(5, 10)).length(100)
5
>>> len(list(range(100))[5:10])
5
>>> IndexEntry(slice(5, 100)).length(50)
45
>>> len(list(range(50))[5:100])
45
>>> IndexEntry(0).length(10)
1
```

Parameters
parent_length (*int*) – The length of the target that this IndexEntry is indexing.

Returns
The length of the index if it were applied to a parent of the given length.

Return type
int

subscriptable()

Returns whether an IndexEntry can be further subscripted.

validate(*parent_length: int*)

Checks that the index is not accessing values outside the range of the parent.

class deeplake.core.index.**Index**(*item: Union[int, slice, Tuple[int, ...], Index, List[IndexEntry]] = slice(None, None, None)*)

__getitem__(*item: Union[int, slice, List[int], Tuple[Union[int, slice, Tuple[int, ...]]], Index]*)

Returns a new Index representing a subscripting with the given item. Modeled after NumPy's advanced integer indexing.

See: https://numpy.org/doc/stable/reference/arrays.indexing.html

Examples

```
>>> Index([5, slice(None)])[5]
Index([5, 5])
```

```
>>> Index([5])[5:6]
Index([5, slice(5, 6)])
```

```
>>> Index()[0, 1, 2:5, 3]
Index([0, 1, slice(2, 5), 3])
```

```
>>> Index([slice(5, 6)])[(0, 1, 2:5, 3),]
Index([(5, 1, slice(2, 5), 3)])
```

Parameters
item – The contents of the subscript expression to add to this Index.
Returns
The Index representing the result of the subscript operation.
Return type
Index
Raises
TypeError – Given item should be another Index, or compatible with NumPy's advanced integer indexing.

__init__(*item: Union[int, slice, Tuple[int, ...], Index, List[IndexEntry]] = slice(None, None, None)*)

Initializes an Index from an IndexValue, another Index, or the values from another Index.

Represents a list of IndexEntry objects corresponding to indexes into each axis of an ndarray.

__repr__()

Return repr(self).

__str__()

Return str(self).

__weakref__

list of weak references to the object (if defined)

apply(*samples: List[ndarray]*)

Applies an Index to a list of ndarray samples with the same number of entries as the first entry in the Index.

apply_squeeze(*samples: List[ndarray]*)

Applies the primary axis of an Index to a list of ndarray samples. Will either return the list as given, or return the first sample.

compose_at(*item: Union[int, slice, Tuple[int, ...]], i: Optional[int] = None*)

Returns a new Index representing the addition of an IndexValue, or the composition with a given axis.

Examples

```
>>> Index([slice(None), slice(None)]).compose_at(5)
Index([slice(None), slice(None), 5])
```

```
>>> Index([slice(None), slice(5, 10), slice(None)]).compose_at(3, 1)
Index([slice(None), 8, slice(None)])
```

Parameters

- **item** (*IndexValue*) – The value to append or compose with the Index.
- **i** (*int, optional*) – The axis to compose with the given item. Defaults to None, meaning that the item will be appended instead.

Returns
The result of the addition or composition.
Return type
Index

downsample(*factor: int*, *shape: Tuple[int, ...]*)

Downsamples an Index by the given factor.
Parameters
- **factor** (*int*) – The factor to downsample by.
- **shape** (*Tuple[int, ...]*) – The shape of the downsampled data.

Returns
The downsampled Index.
Return type
Index

find_axis(*offset: int = 0*)

Returns the index for the nth subscriptable axis in the values of an Index.
Parameters
offset (*int*) – The number of subscriptable axes to skip before returning. Defaults to 0, meaning that the first valid axis is returned.
Returns
The index of the found axis, or None if no match is found.
Return type
int

is_trivial()

Checks if an Index is equivalent to the trivial slice *[:]*, aka slice(None).

length(*parent_length: int*)

Returns the primary length of an Index given the length of the parent it is indexing. See: *IndexEntry.length()*

validate(*parent_length*)

Checks that the index is not accessing values outside the range of the parent.

deeplake.core.index.**merge_slices**(*existing_slice: slice*, *new_slice: slice*) → slice

Compose two slice objects

Given an iterable x, the following should be equivalent:

```
x[existing_slice][new_slice] == x[merge_slices(existing_slice, new_slice)]
```

Parameters
- **existing_slice** (*slice*) – The existing slice to be restricted.
- **new_slice** (*slice*) – The new slice to be applied to the existing slice.

Returns
the composition of the given slices
Return type
slice
Raises
NotImplementedError – Composing slices with negative values is not supported. Negative indexing for slices is only supported for the first slice.

deeplake.core.index.**slice_at_int**(*s: slice*, *i: int*)

Returns the `i` th element of a slice `s`.

Examples

```
>>> slice_at_int(slice(None), 10)
10
```

```
>>> slice_at_int(slice(10, 20, 2), 3)
16
```

Parameters

- **s** (*slice*) – The slice to index into.
- **i** (*int*) – The integer offset into the slice.

Returns

The index corresponding to the offset into the slice.

Return type

int

Raises

- **NotImplementedError** – Nontrivial slices should not be indexed with negative integers.
- **IndexError** – If step is negative and start is not greater than stop.

deeplake.core.index.**slice_length**(*s: slice*, *parent_length: int*) → int

Returns the length of a slice given the length of its parent.

CHAPTER

NINETEEN

DEEPLAKE.CORE.DATASET

19.1 Dataset

class deeplake.core.dataset.**Dataset**

add_creds_key(*creds_key: str*, *managed: bool = False*)

Adds a new creds key to the dataset. These keys are used for tensors that are linked to external data.

Examples

```
>>> # create/load a dataset
>>> ds = deeplake.empty("path/to/dataset")
>>> # add a new creds key
>>> ds.add_creds_key("my_s3_key")
```

Parameters

- **creds_key** (*str*) – The key to be added.
- **managed** (*bool*) –
  - If `True`, the creds corresponding to the key will be fetched from Activeloop platform.
  - Defaults to `False`.

Raises

ValueError – If the dataset is not connected to Activeloop platform and `managed` is `True`.

Note: `managed` parameter is applicable only for datasets that are connected to Activeloop platform.

property allow_delete: bool

Returns True if dataset can be deleted from storage. Whether it can be deleted or not is stored in the database_meta.json and can be changed with *allow_delete = True|False*

append(*sample: Dict[str, Any]*, *skip_ok: bool = False*, *append_empty: bool = False*)

Append samples to mutliple tensors at once. This method expects all tensors being updated to be of the same length.

Parameters

- **sample** (*dict*) – Dictionary with tensor names as keys and samples as values.

- **skip_ok** (*bool*) – Skip tensors not in `sample` if set to `True`.
- **append_empty** (*bool*) – Append empty samples to tensors not specified in `sample` if set to `True`. If True, `skip_ok` is ignored.

Raises

- **KeyError** – If any tensor in the dataset is not a key in `sample` and `skip_ok` is `False`.
- *TensorDoesNotExistError* – If tensor in `sample` does not exist.
- **ValueError** – If all tensors being updated are not of the same length.
- **NotImplementedError** – If an error occurs while writing tiles.
- **Exception** – Error while attempting to rollback appends.
- **SampleAppendingError** – Error that occurs when someone tries to append a tensor value directly to the dataset without specifying tensor name.

Examples

```
>>> ds = deeplake.empty("../test/test_ds")
>>> ds.create_tensor('data')
Tensor(key='data')
>>> ds.create_tensor('labels')
Tensor(key='labels')
>>> ds.append({"data": [1, 2, 3, 4], "labels":[0, 1, 2, 3]})
```

property branch: str

The current branch of the dataset

property branches

Lists all the branches of the dataset.

Returns

List of branches.

checkout(*address: str*, *create: bool = False*, *reset: bool = False*) → Optional[str]

Checks out to a specific commit_id or branch. If `create = True`, creates a new branch with name `address`.

Parameters

- **address** (*str*) – The commit_id or branch to checkout to.
- **create** (*bool*) – If `True`, creates a new branch with name as address.
- **reset** (*bool*) – If checkout fails due to a corrupted HEAD state of the branch, setting `reset=True` will reset HEAD changes and attempt the checkout again.

Returns

The commit_id of the dataset after checkout.

Return type

Optional[str]

Raises

- *CheckoutError* – If `address` could not be found.
- *ReadOnlyModeError* – If branch creation or reset is attempted in read-only mode.

- **DatasetCorruptError** – If checkout failed due to dataset corruption and `reset` is not `True`.
- **Exception** – If the dataset is a filtered view.

Examples

```
>>> ds = deeplake.empty("../test/test_ds")
>>> ds.create_tensor("abc")
Tensor(key='abc')
>>> ds.abc.append([1, 2, 3])
>>> first_commit = ds.commit()
>>> ds.checkout("alt", create=True)
'firstdbf9474d461a19e9333c2fd19b46115348f'
>>> ds.abc.append([4, 5, 6])
>>> ds.abc.numpy()
array([[1, 2, 3],
       [4, 5, 6]])
>>> ds.checkout(first_commit)
'firstdbf9474d461a19e9333c2fd19b46115348f'
>>> ds.abc.numpy()
array([[1, 2, 3]])
```

Note: Checkout from a head node in any branch that contains uncommitted data will lead to an automatic commit before the checkout.

clear_cache()

- Flushes (see *Dataset.flush()*) the contents of the cache layers (if any) and then deletes contents of all the layers of it.
- This doesn't delete data from the actual storage.
- This is useful if you have multiple datasets with memory caches open, taking up too much RAM.
- Also useful when local cache is no longer needed for certain datasets and is taking up storage space.

property client

Returns the client of the dataset.

commit(*message: Optional[str] = None*, *allow_empty=False*) → str

Stores a snapshot of the current state of the dataset.

Parameters

- **message** (*str, Optional*) – Used to describe the commit.
- **allow_empty** (*bool*) – If `True`, commit even if there are no changes.

Returns

the commit id of the saved commit that can be used to access the snapshot.

Return type

str

Raises

- **Exception** – If dataset is a filtered view.
- ***EmptyCommitError*** – if there are no changes and user does not forced to commit unchanged data.

Note:

- Commiting from a non-head node in any branch, will lead to an automatic checkout to a new branch.
- This same behaviour will happen if new samples are added or existing samples are updated from a non-head node.

property commit_id: Optional[str]

The lasted committed commit id of the dataset. If there are no commits, this returns `None`.

property commits: List[Dict]

Lists all the commits leading to the current dataset state.

Returns

List of dictionaries containing commit information.

connect(*creds_key: str*, *dest_path: Optional[str] = None*, *org_id: Optional[str] = None*, *ds_name: Optional[str] = None*, *token: Optional[str] = None*)

Connect a Deep Lake cloud dataset through a deeplake path.

Examples

```
>>> # create/load an s3 dataset
>>> s3_ds = deeplake.dataset("s3://bucket/dataset")
>>> ds = s3_ds.connect(dest_path="hub://my_org/dataset", creds_key="my_managed_
↪credentials_key", token="my_activeloop_token)
>>> # or
>>> ds = s3_ds.connect(org_id="my_org", creds_key="my_managed_credentials_key",
↪ token="my_activeloop_token")
```

Parameters

- **creds_key** (*str*) – The managed credentials to be used for accessing the source path.
- **dest_path** (*str, optional*) – The full path to where the connected Deep Lake dataset will reside. Can be: a Deep Lake path like `hub://organization/dataset`
- **org_id** (*str, optional*) – The organization to where the connected Deep Lake dataset will be added.
- **ds_name** (*str, optional*) – The name of the connected Deep Lake dataset. Will be infered from `dest_path` or `src_path` if not provided.
- **token** (*str, optional*) – Activeloop token used to fetch the managed credentials.

Raises

- **InvalidSourcePathError** – If the dataset's path is not a valid s3, gcs or azure path.
- **InvalidDestinationPathError** – If `dest_path`, or `org_id` and `ds_name` do not form a valid Deep Lake path.
- ***TokenPermissionError*** – If the user does not have permission to create a dataset in the specified organization.

copy(*dest: Union[str, Path]*, *runtime: Optional[dict] = None*, *tensors: Optional[List[str]] = None*, *overwrite: bool = False*, *creds=None*, *token=None*, *num_workers: int = 0*, *scheduler='threaded'*, *progressbar=True*, *public: bool = False*)

Copies this dataset or dataset view to `dest`. Version control history is not included.

Parameters

- **dest** (*str, pathlib.Path*) – Destination dataset or path to copy to. If a Dataset instance is provided, it is expected to be empty.
- **tensors** (*List[str], optional*) – Names of tensors (and groups) to be copied. If not specified all tensors are copied.
- **runtime** (*dict*) – Parameters for Activeloop DB Engine. Only applicable for hub:// paths.
- **overwrite** (*bool*) – If `True` and a dataset exists at *destination*, it will be overwritten. Defaults to False.
- **creds** (*dict, Optional*) – creds required to create / overwrite datasets at *dest*.
- **token** (*str, Optional*) – token used to for fetching credentials to *dest*.
- **num_workers** (*int*) – The number of workers to use for copying. Defaults to 0. When set to 0, it will always use serial processing, irrespective of the scheduler.
- **scheduler** (*str*) – The scheduler to be used for copying. Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Defaults to 'threaded'.
- **progressbar** (*bool*) – Displays a progress bar If `True` (default).
- **public** (*bool*) – Defines if the dataset will have public access. Applicable only if Deep Lake cloud storage is used and a new Dataset is being created. Defaults to False.

Returns

New dataset object.

Return type

Dataset

Raises

DatasetHandlerError – If a dataset already exists at destination path and overwrite is False.

create_group(*name: str*, *exist_ok=False*) → *Dataset*

Creates a tensor group. Intermediate groups in the path are also created.

Parameters

- **name** – The name of the group to create.
- **exist_ok** – If `True`, the group is created if it does not exist. If `False`, an error is raised if the group already exists. Defaults to `False`.

Returns

The created group.

Raises

TensorGroupAlreadyExistsError – If the group already exists and `exist_ok` is False.

Examples

```
>>> ds.create_group("images")
>>> ds['images'].create_tensor("cats")
```

```
>>> ds.create_groups("images/jpg/cats")
>>> ds["images"].create_tensor("png")
>>> ds["images/jpg"].create_group("dogs")
```

create_tensor(*name: str*, *htype: str = 'unspecified'*, *dtype: Union[str, dtype] = 'unspecified'*, *sample_compression: str = 'unspecified'*, *chunk_compression: str = 'unspecified'*, *hidden: bool = False*, *create_sample_info_tensor: bool = True*, *create_shape_tensor: bool = True*, *create_id_tensor: bool = True*, *verify: bool = True*, *exist_ok: bool = False*, *verbose: bool = True*, *downsampling: Optional[Tuple[int, int]] = None*, *tiling_threshold: Optional[int] = None*, ***kwargs*)

Creates a new tensor in the dataset.

Examples

```
>>> # create dataset
>>> ds = deeplake.dataset("path/to/dataset")
```

```
>>> # create tensors
>>> ds.create_tensor("images", htype="image", sample_compression="jpg")
>>> ds.create_tensor("videos", htype="video", sample_compression="mp4")
>>> ds.create_tensor("data")
>>> ds.create_tensor("point_clouds", htype="point_cloud")
```

```
>>> # append data
>>> ds.images.append(np.ones((400, 400, 3), dtype='uint8'))
>>> ds.videos.append(deeplake.read("videos/sample_video.mp4"))
>>> ds.data.append(np.zeros((100, 100, 2)))
```

Parameters

- **name** (*str*) – The name of the tensor to be created.
- **htype** (*str*) –
  - The class of data for the tensor.
  - The defaults for other parameters are determined in terms of this value.
  - For example, `htype="image"` would have `dtype` default to `uint8`.
  - These defaults can be overridden by explicitly passing any of the other parameters to this function.
  - May also modify the defaults for other parameters.
- **dtype** (*str*) – Optionally override this tensor's `dtype`. All subsequent samples are required to have this `dtype`.
- **sample_compression** (*str*) – All samples will be compressed in the provided format. If `None`, samples are uncompressed. For `link[]` tensors, `sample_compression` is used only for optimizing dataset views.

- **chunk_compression** (*str*) – All chunks will be compressed in the provided format. If `None`, chunks are uncompressed. For `link[]` tensors, `chunk_compression` is used only for optimizing dataset views.
- **hidden** (*bool*) – If `True`, the tensor will be hidden from ds.tensors but can still be accessed via `ds[tensor_name]`.
- **create_sample_info_tensor** (*bool*) – If `True`, meta data of individual samples will be saved in a hidden tensor. This data can be accessed via *tensor[i].sample_info*.
- **create_shape_tensor** (*bool*) – If `True`, an associated tensor containing shapes of each sample will be created.
- **create_id_tensor** (*bool*) – If `True`, an associated tensor containing unique ids for each sample will be created. This is useful for merge operations.
- **verify** (*bool*) – Valid only for link htypes. If `True`, all links will be verified before they are added to the tensor. If `False`, links will be added without verification but note that `create_shape_tensor` and `create_sample_info_tensor` will be set to `False`.
- **exist_ok** (*bool*) – If `True`, the group is created if it does not exist. if `False`, an error is raised if the group already exists.
- **verbose** (*bool*) – Shows warnings if `True`.
- **downsampling** (*tuple[int, int]*) – If not `None`, the tensor will be downsampled by the provided factors. For example, `(2, 5)` will downsample the tensor by a factor of 2 in both dimensions and create 5 layers of downsampled tensors. Only support for image and mask htypes.
- **tiling_threshold** (*Optional, int*) – In bytes. Tiles large images if their size exceeds this threshold. Set to -1 to disable tiling.
- ****kwargs** –
  - `htype` defaults can be overridden by passing any of the compatible parameters.
  - To see all htypes and their correspondent arguments, check out *Htypes*.

Returns

The new tensor, which can be accessed by `dataset[name]` or `dataset.name`.

Return type

Tensor

Raises

- ***TensorAlreadyExistsError*** – If the tensor already exists and `exist_ok` is `False`.
- ***TensorGroupAlreadyExistsError*** – Duplicate tensor groups are not allowed.
- ***InvalidTensorNameError*** – If `name` is in dataset attributes.
- **NotImplementedError** – If trying to override `chunk_compression`.
- ***TensorMetaInvalidHtype*** – If invalid htype is specified.
- **ValueError** – If an illegal argument is specified.

create_tensor_like(*name: str*, *source:* Tensor, *unlink: bool = False*) → *Tensor*

Copies the `source` tensor's meta information and creates a new tensor with it. No samples are copied, only the meta/info for the tensor is.

Examples

```
>>> ds.create_tensor_like("cats", ds["images"])
```

Parameters

- **name** (*str*) – Name for the new tensor.
- **source** (Tensor) – Tensor who's meta/info will be copied. May or may not be contained in the same dataset.
- **unlink** (*bool*) – Whether to unlink linked tensors.

Returns
New Tensor object.

Return type
Tensor

dataloader(*ignore_errors: bool = False*, *verbose: bool = False*)

Returns a *DeepLakeDataLoader* object.

Parameters

- **ignore_errors** (*bool*) – If `True`, the data loader will ignore errors appeared during data iteration otherwise it will collect the statistics and report appeared errors. Default value is `False`
- **verbose** (*bool*) – If `True`, the data loader will dump verbose logs of it's steps. Default value is `False`

Returns
A *deeplake.enterprise.DeepLakeDataLoader* object.

Return type
DeepLakeDataLoader

Examples

Creating a simple dataloader object which returns a batch of numpy arrays

```
>>> import deeplake
>>> ds_train = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> train_loader = ds_train.dataloader().numpy()
>>> for i, data in enumerate(train_loader):
...     # custom logic on data
...     pass
```

Creating dataloader with custom transformation and batch size

```
>>> import deeplake
>>> import torch
>>> from torchvision import datasets, transforms, models
>>>
>>> ds_train = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> tform = transforms.Compose([
...     transforms.ToPILImage(), # Must convert to PIL image for subsequent␣
↪operations to run
...     transforms.RandomRotation(20), # Image augmentation
...     transforms.ToTensor(), # Must convert to pytorch tensor for subsequent␣
```

(continues on next page)

(continued from previous page)

```
↪operations to run
...     transforms.Normalize([0.5], [0.5]),
... ])
...
>>> batch_size = 32
>>> # create dataloader by chaining with transform function and batch size and␣
↪returns batch of pytorch tensors
>>> train_loader = ds_train.dataloader()\
...     .transform({'images': tform, 'labels': None})\
...     .batch(batch_size)\
...     .shuffle()\
...     .pytorch()
...
>>> # loop over the elements
>>> for i, data in enumerate(train_loader):
...     # custom logic on data
...     pass
```

Creating dataloader and chaining with query

```
>>> ds = deeplake.load('hub://activeloop/coco-train')
>>> train_loader = ds_train.dataloader()\
...     .query("(select * where contains(categories, 'car') limit 1000) union␣
↪(select * where contains(categories, 'motorcycle') limit 1000)")\
...     .pytorch()
...
>>> # loop over the elements
>>> for i, data in enumerate(train_loader):
...     # custom logic on data
...     pass
```

delete(*large_ok=False*)

Deletes the entire dataset from the cache layers (if any) and the underlying storage. This is an **IRREVERSIBLE** operation. Data once deleted can not be recovered.

Parameters

large_ok (*bool*) – Delete datasets larger than 1 GB. Defaults to `False`.

Raises

- **DatasetTooLargeToDelete** – If the dataset is larger than 1 GB and `large_ok` is `False`.
- *DatasetHandlerError* – If the dataset is marked as allow_delete=False.

delete_branch(*name: str*) → None

Deletes the branch and cleans up any unneeded data. Branches can only be deleted if there are no sub-branches and if it has never been merged into another branch.

Parameters

name (*str*) – The branch to delete.

Raises

- *CommitError* – If `branch` could not be found.
- *ReadOnlyModeError* – If branch deletion is attempted in read-only mode.
- **Exception** – If you have the given branch currently checked out.

Examples

```
>>> ds = deeplake.empty("../test/test_ds")
>>> ds.create_tensor("abc")
Tensor(key='abc')
>>> ds.abc.append([1, 2, 3])
>>> first_commit = ds.commit()
>>> ds.checkout("alt", create=True)
'firstdbf9474d461a19e9333c2fd19b46115348f'
>>> ds.abc.append([4, 5, 6])
>>> ds.abc.numpy()
array([[1, 2, 3],
       [4, 5, 6]])
>>> ds.checkout(first_commit)
'firstdbf9474d461a19e9333c2fd19b46115348f'
>>> ds.delete_branch("alt")
```

delete_group(*name: str*, *large_ok: bool = False*)

Delete a tensor group from the dataset.

Examples

```
>>> ds.delete_group("images/dogs")
```

Parameters

- **name** (*str*) – The name of tensor group to be deleted.
- **large_ok** (*bool*) – Delete tensor groups larger than 1 GB. Disabled by default.

Returns

None

Raises

TensorGroupDoesNotExistError – If tensor group of name name does not exist in the dataset.

delete_tensor(*name: str*, *large_ok: bool = False*)

Delete a tensor from the dataset.

Examples

```
>>> ds.delete_tensor("images/cats")
```

Parameters

- **name** (*str*) – The name of tensor to be deleted.
- **large_ok** (*bool*) – Delete tensors larger than 1 GB. Disabled by default.

Returns

None

Raises

- *TensorDoesNotExistError* – If tensor of name name does not exist in the dataset.

- **TensorTooLargeToDelete** – If the tensor is larger than 1 GB and `large_ok` is `False`.

delete_view(*id: str*)

Deletes the view with given view id.

Parameters

id (*str*) – Id of the view to delete.

Raises

KeyError – if view with given id does not exist.

diff(*id_1: Optional[str] = None*, *id_2: Optional[str] = None*, *as_dict=False*) → Optional[Dict]

Returns/displays the differences between commits/branches.

For each tensor this contains information about the sample indexes that were added/modified as well as whether the tensor was created.

Parameters

- **id_1** (*str, Optional*) – The first commit_id or branch name.
- **id_2** (*str, Optional*) – The second commit_id or branch name.
- **as_dict** (*bool, Optional*) – If `True`, returns the diff as lists of commit wise dictionaries.

Returns

Optional[Dict]

Raises

ValueError – If `id_1` is None and `id_2` is not None.

Note:

- If both `id_1` and `id_2` are None, the differences between the current state and the previous commit will be calculated. If you're at the head of the branch, this will show the uncommitted changes, if any.
- If only `id_1` is provided, the differences between the current state and id_1 will be calculated. If you're at the head of the branch, this will take into account the uncommitted changes, if any.
- If only `id_2` is provided, a ValueError will be raised.
- If both `id_1` and `id_2` are provided, the differences between `id_1` and `id_2` will be calculated.

Note: A dictionary of the differences between the commits/branches is returned if `as_dict` is `True`. The dictionary will always have 2 keys, "dataset" and "tensors". The values corresponding to these keys are detailed below:

- If `id_1` and `id_2` are None, both the keys will have a single list as their value. This list will contain a dictionary describing changes compared to the previous commit.
- If only `id_1` is provided, both keys will have a tuple of 2 lists as their value. The lists will contain dictionaries describing commitwise differences between commits. The 2 lists will range from current state and `id_1` to most recent common ancestor the commits respectively.
- If only `id_2` is provided, a ValueError will be raised.
- If both `id_1` and `id_2` are provided, both keys will have a tuple of 2 lists as their value. The lists will contain dictionaries describing commitwise differences between commits. The 2 lists will range from `id_1` and `id_2` to most recent common ancestor the commits respectively.

`None` is returned if `as_dict` is `False`.

---

extend(*samples: Dict[str, Any]*, *skip_ok: bool = False*, *append_empty: bool = False*, *ignore_errors: bool = False*, *progressbar: bool = False*)

Appends multiple rows of samples to mutliple tensors at once. This method expects all tensors being

updated to be of the same length.

Parameters

- **samples** (*Dict[str, Any]*) – Dictionary with tensor names as keys and samples as values.
- **skip_ok** (*bool*) – Skip tensors not in `samples` if set to True.
- **append_empty** (*bool*) – Append empty samples to tensors not specified in `sample` if set to `True`. If True, `skip_ok` is ignored.
- **ignore_errors** (*bool*) – Skip samples that cause errors while extending, if set to `True`.
- **progressbar** (*bool*) – Displays a progress bar if set to `True`.

Raises

- **KeyError** – If any tensor in the dataset is not a key in `samples` and `skip_ok` is `False`.
- ***TensorDoesNotExistError*** – If tensor in `samples` does not exist.
- **ValueError** – If all tensors being updated are not of the same length.
- **NotImplementedError** – If an error occurs while writing tiles.
- **SampleExtendError** – If the extend failed while appending a sample.
- **Exception** – Error while attempting to rollback appends.

filter(*function: Union[Callable, str]*, *num_workers: int = 0*, *scheduler: str = 'threaded'*, *progressbar: bool = True*, *save_result: bool = False*, *result_path: Optional[str] = None*, *result_ds_args: Optional[dict] = None*)

Filters the dataset in accordance of filter function `f(x: sample) -> bool`

Parameters

- **function** (*Callable, str*) – Filter function that takes sample as argument and returns `True / False` if sample should be included in result. Also supports simplified expression evaluations. See `deeplake.core.query.query.DatasetQuery` for more details.
- **num_workers** (*int*) – Level of parallelization of filter evaluations. 0 indicates in-place for-loop evaluation, multiprocessing is used otherwise.
- **scheduler** (*str*) – Scheduler to use for multiprocessing evaluation. “threaded” is default.
- **progressbar** (*bool*) – Display progress bar while filtering. `True` is default.
- **save_result** (*bool*) – If `True`, result of the filter will be saved to a dataset asynchronously.
- **result_path** (*Optional, str*) – Path to save the filter result. Only applicable if `save_result` is True.
- **result_ds_args** (*Optional, dict*) – Additional args for result dataset. Only applicable if `save_result` is True.

Returns

View of Dataset with elements that satisfy filter function.

Example

Following filters are identical and return dataset view where all the samples have label equals to 2.

```
>>> dataset.filter(lambda sample: sample.labels.numpy() == 2)
>>> dataset.filter('labels == 2')
```

fix_vc()

Rebuilds version control info. To be used when the version control info is corrupted.

flush()

Necessary operation after writes if caches are being used. Writes all the dirty data from the cache layers (if any) to the underlying storage. Here dirty data corresponds to data that has been changed/assigned and but hasn't yet been sent to the underlying storage.

get_commit_details(*commit_id*) → Dict

Get details of a particular commit.

Parameters
commit_id (*str*) – commit id of the commit.

Returns
Dictionary of details with keys - `commit`, `author`, `time`, `message`.

Return type
Dict

Raises
KeyError – If given `commit_id` is was not found in the dataset.

get_creds_keys() → Set[str]

Returns the set of creds keys added to the dataset. These are used to fetch external data in linked tensors

get_managed_creds_keys() → List[str]

Returns the list of creds keys added to the dataset that are managed by Activeloop platform. These are used to fetch external data in linked tensors.

get_view(*id: str*) → *ViewEntry*

Returns the dataset view corresponding to `id`.

Examples

```
>>> # save view
>>> ds[:100].save_view(id="first_100")
>>> # load view
>>> first_100 = ds.get_view("first_100").load()
>>> # 100
>>> print(len(first_100))
```

See *Dataset.save_view()* to learn more about saving views.

Parameters
id (*str*) – id of required view.

Returns
ViewEntry

Raises
KeyError – If no such view exists.

get_views(*commit_id: Optional[str] = None*) → List[*ViewEntry*]

Returns list of views stored in this Dataset.

Parameters

commit_id (*str, optional*) –

- Commit from which views should be returned.
- If not specified, views from all commits are returned.

Returns

List of *ViewEntry* instances.

Return type

List[*ViewEntry*]

property groups: Dict[str, *Dataset*]

All sub groups in this group

property has_head_changes

Returns True if currently at head node and uncommitted changes are present.

property info

Returns the information about the dataset.

property is_head_node

Returns True if the current commit is the head node of the branch and False otherwise.

property is_view: bool

Returns `True` if this dataset is a view and `False` otherwise.

load_view(*id: str*, *optimize: Optional[bool] = False*, *tensors: Optional[List[str]] = None*, *num_workers: int = 0*, *scheduler: str = 'threaded'*, *progressbar: Optional[bool] = True*)

Loads the view and returns the *Dataset* by id. Equivalent to ds.get_view(id).load().

Parameters

- **id** (*str*) – id of the view to be loaded.
- **optimize** (*bool*) – If `True`, the dataset view is optimized by copying and rechunking the required data before loading. This is necessary to achieve fast streaming speeds when training models using the dataset view. The optimization process will take some time, depending on the size of the data.
- **tensors** (*Optional, List[str]*) – Tensors to be copied if *optimize* is True. By default all tensors are copied.
- **num_workers** (*int*) – Number of workers to be used for the optimization process. Only applicable if *optimize=True*. Defaults to 0.
- **scheduler** (*str*) – The scheduler to be used for optimization. Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Only applicable if *optimize=True*. Defaults to 'threaded'.
- **progressbar** (*bool*) – Whether to use progressbar for optimization. Only applicable if *optimize=True*. Defaults to True.

Returns

The loaded view.

Return type

Dataset

Raises

KeyError – if view with given id does not exist.

log()

Displays the details of all the past commits.

property max_len

Return the maximum length of the tensor.

property max_view

Returns a view of the dataset in which shorter tensors are padded with `None` s to have the same length as the longest tensor.

Example

Creating a dataset with 5 images and 4 labels. `ds.max_view` will return a view with `labels` tensor padded to have 5 samples.

```
>>> import deeplake
>>> ds = deeplake.dataset("../test/test_ds", overwrite=True)
>>> ds.create_tensor("images", htype="link[image]", sample_compression="jpg")
>>> ds.create_tensor("labels", htype="class_label")
>>> ds.images.extend([deeplake.link("https://picsum.photos/20/20") for _ in␣
↪range(5)])
>>> ds.labels.extend([0, 1, 2, 1])
>>> len(ds.images)
5
>>> len(ds.labels)
4
>>> for i, sample in enumerate(ds.max_view):
...     print(sample["images"].shape, sample["labels"].numpy())
...
(20, 20, 3) [0]
(20, 20, 3) [1]
(20, 20, 3) [2]
(20, 20, 3) [1]
(20, 20, 3) [None]
```

merge(*target_id: str*, *conflict_resolution: Optional[str] = None*, *delete_removed_tensors: bool = False*, *force: bool = False*)

Merges the target_id into the current dataset.

Parameters

- **target_id** (*str*) – The commit_id or branch to merge.
- **conflict_resolution** (*str, Optional*) –
  - The strategy to use to resolve merge conflicts.
  - Conflicts are scenarios where both the current dataset and the target id have made changes to the same sample/s since their common ancestor.
  - **Must be one of the following**
    - None - this is the default value, will raise an exception if there are conflicts.
    - ”ours” - during conflicts, values from the current dataset will be used.

* "theirs" - during conflicts, values from target id will be used.

- **delete_removed_tensors** (*bool*) – If `True`, deleted tensors will be deleted from the dataset.
- **force** (*bool*) –
  - Forces merge.
  - **force=True will have these effects in the following cases of merge conflicts:**
    * If tensor is renamed on target but is missing from HEAD, renamed tensor will be registered as a new tensor on current branch.
    * If tensor is renamed on both target and current branch, tensor on target will be registered as a new tensor on current branch.
    * If tensor is renamed on target and a new tensor of the new name was created on the current branch, they will be merged.

Raises

- **Exception** – if dataset is a filtered view.
- **ValueError** – if the conflict resolution strategy is not one of the None, "ours", or "theirs".

property meta: DatasetMeta

Returns the metadata of the dataset.

property min_len

Return the minimum length of the tensor.

property min_view

Returns a view of the dataset in which all tensors are sliced to have the same length as the shortest tensor.

Example

Creating a dataset with 5 images and 4 labels. `ds.min_view` will return a view in which tensors are sliced to have 4 samples.

```
>>> import deeplake
>>> ds = deeplake.dataset("../test/test_ds", overwrite=True)
>>> ds.create_tensor("images", htype="link[image]", sample_compression="jpg")
>>> ds.create_tensor("labels", htype="class_label")
>>> ds.images.extend([deeplake.link("https://picsum.photos/20/20") for _ in␣
↪range(5)])
>>> ds.labels.extend([0, 1, 2, 1])
>>> len(ds.images)
5
>>> len(ds.labels)
4
>>> for i, sample in enumerate(ds.max_view):
...     print(sample["images"].shape, sample["labels"].numpy())
...
(20, 20, 3) [0]
(20, 20, 3) [1]
(20, 20, 3) [2]
(20, 20, 3) [1]
```

property no_view_dataset

Returns the same dataset without slicing.

property num_samples: int

Returns the length of the smallest tensor. Ignores any applied indexing and returns the total length.

property parent

Returns the parent of this group. Returns None if this is the root dataset.

property pending_commit_id: str

The commit_id of the next commit that will be made to the dataset. If you're not at the head of the current branch, this will be the same as the commit_id.

pop(*index: Optional[int] = None*)

Removes a sample from all the tensors of the dataset. For any tensor if the index >= len(tensor), the sample won't be popped from it.

Parameters

index (*int, Optional*) – The index of the sample to be removed. If it is `None`, the index becomes the `length of the longest tensor - 1`.

Raises

- **ValueError** – If duplicate indices are provided.
- **IndexError** – If the index is out of range.

populate_creds(*creds_key: str*, *creds: Optional[dict] = None*, *from_environment: bool = False*)

Populates the creds key added in add_creds_key with the given creds. These creds are used to fetch the external data. This needs to be done everytime the dataset is reloaded for datasets that contain links to external data.

Examples

```
>>> # create/load a dataset
>>> ds = deeplake.dataset("path/to/dataset")
>>> # add a new creds key
>>> ds.add_creds_key("my_s3_key")
>>> # populate the creds
>>> ds.populate_creds("my_s3_key", {"aws_access_key_id": "my_access_key", "aws_
↪secret_access_key": "my_secret_key"})
>>> # or
>>> ds.populate_creds("my_s3_key", from_environment=True)
```

pytorch(*transform: Optional[Callable] = None*, *tensors: Optional[Sequence[str]] = None*, *num_workers: int = 1*, *batch_size: int = 1*, *drop_last: bool = False*, *collate_fn: Optional[Callable] = None*, *pin_memory: bool = False*, *shuffle: bool = False*, *buffer_size: int = 2048*, *use_local_cache: bool = False*, *progressbar: bool = False*, *return_index: bool = True*, *pad_tensors: bool = False*, *transform_kwargs: Optional[Dict[str, Any]] = None*, *decode_method: Optional[Dict[str, str]] = None*, *cache_size: int = 32000000*, **args*, ***kwargs*)

Converts the dataset into a pytorch Dataloader.

Parameters

- ***args** – Additional args to be passed to torch_dataset
- ****kwargs** – Additional kwargs to be passed to torch_dataset
- **transform** (*Callable, Optional*) – Transformation function to be applied to each sample.

- **tensors** (*List, Optional*) – Optionally provide a list of tensor names in the ordering that your training script expects. For example, if you have a dataset that has "image" and "label" tensors, if `tensors=["image", "label"]`, your training script should expect each batch will be provided as a tuple of (image, label).
- **num_workers** (*int*) – The number of workers to use for fetching data in parallel.
- **batch_size** (*int*) – Number of samples per batch to load. Default value is 1.
- **drop_last** (*bool*) – Set to True to drop the last incomplete batch, if the dataset size is not divisible by the batch size. if `False` and the size of dataset is not divisible by the batch size, then the last batch will be smaller. Default value is `False`. Read torch.utils.data.DataLoader docs for more details.
- **collate_fn** (*Callable, Optional*) – merges a list of samples to form a mini-batch of Tensor(s). Used when using batched loading from a map-style dataset. Read torch.utils.data.DataLoader docs for more details.
- **pin_memory** (*bool*) – If `True`, the data loader will copy Tensors into CUDA pinned memory before returning them. Default value is `False`. Read torch.utils.data.DataLoader docs for more details.
- **shuffle** (*bool*) – If `True`, the data loader will shuffle the data indices. Default value is False. Details about how Deep Lake shuffles data can be found at Shuffling in ds.pytorch()
- **buffer_size** (*int*) – The size of the buffer used to shuffle the data in MBs. Defaults to 2048 MB. Increasing the buffer_size will increase the extent of shuffling.
- **use_local_cache** (*bool*) – If `True`, the data loader will use a local cache to store data. The default cache location is ~/.activeloop/cache, but it can be changed by setting the `LOCAL_CACHE_PREFIX` environment variable. This is useful when the dataset can fit on the machine and we don't want to fetch the data multiple times for each iteration. Default value is `False`
- **progressbar** (*bool*) – If `True`, tqdm will be wrapped around the returned dataloader. Default value is True.
- **return_index** (*bool*) – If `True`, the returned dataloader will have a key "index" that contains the index of the sample(s) in the original dataset. Default value is True.
- **pad_tensors** (*bool*) – If `True`, shorter tensors will be padded to the length of the longest tensor. Default value is False.
- **transform_kwargs** (*optional, Dict[str, Any]*) – Additional kwargs to be passed to `transform`.
- **decode_method** (*Dict[str, str], Optional*) – A dictionary of decode methods for each tensor. Defaults to `None`.
  - Supported decode methods are:

    'numpy'
    Default behaviour. Returns samples as numpy arrays.

    'tobytes'
    Returns raw bytes of the samples.

    'pil'
    Returns samples as PIL images. Especially useful

when transformation use torchvision transforms, that require PIL images as input. Only supported for tensors with `sample_compression='jpeg'` or `'png'`.

- **cache_size** (*int*) – The size of the cache per tensor in MBs. Defaults to max(maximum chunk size of tensor, 32 MB).

Returns
A torch.utils.data.DataLoader object.

Raises
EmptyTensorError – If one or more tensors being passed to pytorch are empty.

Note: Pytorch does not support uint16, uint32, uint64 dtypes. These are implicitly type casted to int32, int64 and int64 respectively. This spins up it's own workers to fetch data.

---

query(*query_string: str*, *runtime: Optional[Dict] = None*, *return_data: bool = False*)

Returns a sliced *Dataset* with given query results.

It allows to run SQL like queries on dataset and extract results. See supported keywords and the Tensor Query Language documentation *here*.

Parameters

- **query_string** (*str*) – An SQL string adjusted with new functionalities to run on the given *Dataset* object
- **runtime** (*Optional[Dict]*) – Runtime parameters for query execution. Supported keys: {"tensor_db": True or False}.
- **return_data** (*bool*) – Defaults to `False`. Whether to return raw data along with the view.

Raises
ValueError – if `return_data` is True and runtime is not {"tensor_db": true}

Returns
A *Dataset* object.

Return type
Dataset

Examples

Query from dataset all the samples with lables other than 5

```
>>> import deeplake
>>> ds = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> query_ds = ds.query("select * where labels != 5")
```

Query from dataset first appeard `1000` samples where the `categories` is `car` and `1000` samples where the `categories` is `motorcycle`

```
>>> ds_train = deeplake.load('hub://activeloop/coco-train')
>>> query_ds_train = ds_train.query("(select * where contains(categories, 'car
↪') limit 1000) union (select * where contains(categories, 'motorcycle')␣
↪limit 1000)")
```

random_split(*lengths: Sequence[Union[int, float]]*)

Splits the dataset into non-overlapping *Dataset* objects of given lengths. If a list of fractions that sum

up to 1 is given, the lengths will be computed automatically as floor(frac * len(dataset)) for each fraction provided.

After computing the lengths, if there are any remainders, 1 count will be distributed in round-robin fashion to the lengths until there are no remainders left.

Example

```
>>> import deeplake
>>> ds = deeplake.dataset("../test/test_ds", overwrite=True)
>>> ds.create_tensor("labels", htype="class_label")
>>> ds.labels.extend([0, 1, 2, 1, 3])
>>> len(ds)
5
>>> train_ds, val_ds = ds.random_split([0.8, 0.2])
>>> len(train_ds)
4
>>> len(val_ds)
1
>>> train_ds, val_ds = ds.random_split([3, 2])
>>> len(train_ds)
3
>>> len(val_ds)
2
>> train_loader = train_ds.pytorch(batch_size=2, shuffle=True)
>> val_loader = val_ds.pytorch(batch_size=2, shuffle=False)
```

Parameters

lengths (*Sequence[Union[int, float]]*) – lengths or fractions of splits to be produced.

Returns

a tuple of datasets of the given lengths.

Return type

Tuple[*Dataset*, ...]

Raises

- **ValueError** – If the sum of the lengths is not equal to the length of the dataset.
- **ValueError** – If the dataset has variable length tensors.
- **ValueError** – If lengths are floats and one or more of them are not between 0 and 1.

property read_only

Returns True if dataset is in read-only mode and False otherwise.

rechunk(*tensors: Optional[Union[str, List[str]]] = None*, *num_workers: int = 0*, *scheduler: str = 'threaded'*, *progressbar: bool = True*)

Rewrites the underlying chunks to make their sizes optimal. This is usually needed in cases where a lot of updates have been made to the data.

Parameters

- **tensors** (*str, List[str], Optional*) – Name/names of the tensors to rechunk. If None, all tensors in the dataset are rechunked.
- **num_workers** (*int*) – The number of workers to use for rechunking. Defaults to 0. When set to 0, it will always use serial processing, irrespective of the scheduler.

- **scheduler** (*str*) – The scheduler to be used for rechunking. Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Defaults to 'threaded'.
- **progressbar** (*bool*) – Displays a progress bar If `True` (default).

rename(*path: Union[str, Path]*)

Renames the dataset to *path*.

Example

```
>>> ds = deeplake.load("hub://username/dataset")
>>> ds.rename("hub://username/renamed_dataset")
```

Parameters

path (*str, pathlib.Path*) – New path to the dataset.

Raises

RenameError – If `path` points to a different directory.

rename_group(*name: str*, *new_name: str*) → None

Renames group with name `name` to `new_name`

Parameters

- **name** (*str*) – Name of group to be renamed.
- **new_name** (*str*) – New name of group.

Raises

- *TensorGroupDoesNotExistError* – If tensor group of name `name` does not exist in the dataset.
- *TensorAlreadyExistsError* – Duplicate tensors are not allowed.
- *TensorGroupAlreadyExistsError* – Duplicate tensor groups are not allowed.
- *InvalidTensorGroupNameError* – If `name` is in dataset attributes.
- *RenameError* – If `new_name` points to a group different from `name`.

rename_tensor(*name: str*, *new_name: str*) → *Tensor*

Renames tensor with name `name` to `new_name`

Parameters

- **name** (*str*) – Name of tensor to be renamed.
- **new_name** (*str*) – New name of tensor.

Returns

Renamed tensor.

Return type

Tensor

Raises

- *TensorDoesNotExistError* – If tensor of name `name` does not exist in the dataset.
- *TensorAlreadyExistsError* – Duplicate tensors are not allowed.
- *TensorGroupAlreadyExistsError* – Duplicate tensor groups are not allowed.
- *InvalidTensorNameError* – If `new_name` is in dataset attributes.
- *RenameError* – If `new_name` points to a group different from `name`.

reset(*force: bool = False*)

Resets the uncommitted changes present in the branch.

Note: The uncommitted data is deleted from underlying storage, this is not a reversible operation.

property root

Returns the root dataset of a group.

sample_by(*weights: Union[str, list, tuple]*, *replace: Optional[bool] = True*, *size: Optional[int] = None*)

Returns a sliced *Dataset* with given weighted sampler applied.

Parameters

- **weights** – (Union[str, list, tuple]): If it's string then tql will be run to calculate the weights based on the expression. list and tuple will be treated as the list of the weights per sample.
- **replace** – Optional[bool] If true the samples can be repeated in the result view. Defaults to `True`
- **size** – Optional[int] The length of the result view. Defaults to length of the dataset.

Returns

A deeplake.Dataset object.

Return type

Dataset

Examples

Sample the dataset with `labels == 5` twice more than `labels == 6`

```
>>> from deeplake.experimental import query
>>> ds = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> sampled_ds = ds.sample_by("max_weight(labels == 5: 10, labels == 6: 5)")
```

Sample the dataset treating *labels* tensor as weights.

```
>>> import deeplake
>>> ds = deeplake.load('hub://activeloop/fashion-mnist-train')
>>> sampled_ds = ds.sample_by("max_weight(labels == 5: 10, labels == 6: 5")
```

Sample the dataset with the given weights;

```
>>> ds = deeplake.load('hub://activeloop/coco-train')
>>> weights = list()
>>> for i in range(len(ds)):
...     weights.append(i % 5)
...
>>> sampled_ds = ds.sample_by(weights, replace=False)
```

property sample_indices

Returns all the indices pointed to by this dataset view.

save_view(*message: Optional[str] = None*, *path: Optional[Union[str, Path]] = None*, *id: Optional[str] = None*, *optimize: bool = False*, *tensors: Optional[List[str]] = None*, *num_workers: int = 0*, *scheduler: str = 'threaded'*, *verbose: bool = True*, *ignore_errors: bool = False*, ***ds_args*) → str

Saves a dataset view as a virtual dataset (VDS)

Examples

```
>>> # Save to specified path
>>> vds_path = ds[:10].save_view(path="views/first_10", id="first_10")
>>> vds_path
views/first_10
```

```
>>> # Path unspecified
>>> vds_path = ds[:100].save_view(id="first_100", message="first 100 samples")
>>> # vds_path = path/to/dataset
```

```
>>> # Random id
>>> vds_path = ds[:100].save_view()
>>> # vds_path = path/to/dataset/.queries/
↪92f41922ed0471ec2d27690b7351fc96bea060e6c5ee22b14f7ffa5f291aa068
```

See *Dataset.get_view()* to learn how to load views by id. These virtual datasets can also be loaded from their path like normal datasets.

Parameters

- **message** (*Optional, str*) – Custom user message.
- **path** (*Optional, str, pathlib.Path*) –
  - The VDS will be saved as a standalone dataset at the specified path.
  - If not specified, the VDS is saved under `.queries` subdirectory of the source dataset's storage.
- **id** (*Optional, str*) – Unique id for this view. Random id will be generated if not specified.
- **optimize** (*bool*) –
  - If `True`, the dataset view will be optimized by copying and rechunking the required data. This is necessary to achieve fast streaming speeds when training models using the dataset view. The optimization process will take some time, depending on the size of the data.
  - You can also choose to optimize the saved view later by calling its *ViewEntry.optimize()* method.
- **tensors** (*List, optional*) – Names of tensors (and groups) to be copied. If not specified all tensors are copied.
- **num_workers** (*int*) – Number of workers to be used for optimization process. Applicable only if `optimize=True`. Defaults to 0.
- **scheduler** (*str*) – The scheduler to be used for optimization. Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Only applicable if `optimize=True`. Defaults to 'threaded'.
- **verbose** (*bool*) – If `True`, logs will be printed. Defaults to `True`.
- **ignore_errors** (*bool*) – Skip samples that cause errors while saving views. Only applicable if `optimize=True`. Defaults to `False`.

- **ds_args** (*dict*) – Additional args for creating VDS when path is specified. (See documentation for *deeplake.dataset()*)

Returns
Path to the saved VDS.

Return type
str

Raises

- *ReadOnlyModeError* – When attempting to save a view inplace and the user doesn't have write access.
- *DatasetViewSavingError* – If HEAD node has uncommitted changes.
- **TypeError** – If `id` is not of type `str`.

Note: Specifying `path` makes the view external. External views cannot be accessed using the parent dataset's *Dataset.get_view()*, *Dataset.load_view()*, *Dataset.delete_view()* methods. They have to be loaded using *deeplake.load()*.

---

set_token(*new_token: str*)

Method to set a new token

size_approx()

Estimates the size in bytes of the dataset. Includes only content, so will generally return an under-estimate.

summary(*force: bool = False*)

Prints a summary of the dataset.

Parameters
force (*bool*) – Dataset views with more than 10000 samples might take a long time to summarize. If *force=True*, the summary will be printed regardless. An error will be raised otherwise.

Raises
ValueError – If the dataset view might take a long time to summarize and *force=False*

tensorflow(*tensors: Optional[Sequence[str]] = None*, *tobytes: Union[bool, Sequence[str]] = False*, *fetch_chunks: bool = True*)

Converts the dataset into a tensorflow compatible format.

See https://www.tensorflow.org/api_docs/python/tf/data/Dataset

Parameters

- **tensors** (*List, Optional*) – Optionally provide a list of tensor names in the ordering that your training script expects. For example, if you have a dataset that has "image" and "label" tensors, if `tensors=["image", "label"]`, your training script should expect each batch will be provided as a tuple of (image, label).
- **tobytes** (*bool*) – If `True`, samples will not be decompressed and their raw bytes will be returned instead of numpy arrays. Can also be a list of tensors, in which case those tensors alone will not be decompressed.
- **fetch_chunks** – See fetch_chunks argument in deeplake.core.tensor.Tensor.numpy()

Returns
tf.data.Dataset object that can be used for tensorflow training.

property tensors: Dict[str, *Tensor*]

All tensors belonging to this group, including those within sub groups. Always returns the sliced tensors.

property token

Get attached token of the dataset

update(*sample: Dict[str, Any]*)

Update existing samples in the dataset with new values.

Examples

```
>>> ds[0].update({"images": deeplake.read("new_image.png"), "labels": 1})
```

```
>>> new_images = [deeplake.read(f"new_image_{i}.png") for i in range(3)]
>>> ds[:3].update({"images": new_images, "labels": [1, 2, 3]})
```

Parameters

sample (*dict*) – Dictionary with tensor names as keys and samples as values.

Raises

- **ValueError** – If partial update of a sample is attempted.
- **Exception** – Error while attempting to rollback updates.

update_creds_key(*creds_key: str*, *new_creds_key: Optional[str] = None*, *managed: Optional[bool] = None*)

Updates the name and/or management status of a creds key.

Parameters

- **creds_key** (*str*) – The key whose name and/or management status is to be changed.
- **new_creds_key** (*str, optional*) – The new key to replace the old key. If not provided, the old key will be used.
- **managed** (*bool*) – The target management status. If `True`, the creds corresponding to the key will be fetched from activeloop platform.

Raises

- **ValueError** – If the dataset is not connected to activeloop platform.
- **ValueError** – If both `new_creds_key` and `managed` are `None`.
- **KeyError** – If the creds key is not present in the dataset.

Examples

```
>>> # create/load a dataset
>>> ds = deeplake.dataset("path/to/dataset")
>>> # add a new creds key
>>> ds.add_creds_key("my_s3_key")
>>> # Populate the name added with creds dictionary
>>> # These creds are only present temporarily and will have to be repopulated␣
↪on every reload
>>> ds.populate_creds("my_s3_key", {})
>>> # Rename the key and change the management status of the key to True.␣
↪Before doing this, ensure that the creds have been created on activeloop␣
↪platform
```

(continues on next page)

(continued from previous page)

```
>>> # Now, this key will no longer use the credentials populated in the␣
↪previous step but will instead fetch them from activeloop platform
>>> # These creds don't have to be populated again on every reload and will be␣
↪fetched every time the dataset is loaded
>>> ds.update_creds_key("my_s3_key", "my_managed_key", True)
```

visualize(*width: Optional[Union[int, str]] = None*, *height: Optional[Union[int, str]] = None*)

Visualizes the dataset in the Jupyter notebook.

Parameters

- **width** – Union[int, str, None] Optional width of the visualizer canvas.
- **height** – Union[int, str, None] Optional height of the visualizer canvas.

Raises

Exception – If the dataset is not a Deep Lake cloud dataset and the visualization is attempted in colab.

19.2 DeepLakeCloudDataset

class deeplake.core.dataset.**DeepLakeCloudDataset**

Bases: *Dataset*

Subclass of *Dataset*. Deep Lake cloud datasets are those datasets which are stored in or connected to Activeloop servers, their paths look like: `hub://username/dataset_name`.

add_creds_key(*creds_key: str*, *managed: bool = False*)

Adds a new creds key to the dataset. These keys are used for tensors that are linked to external data.

Examples

```
>>> # create/load a dataset
>>> ds = deeplake.dataset("hub://username/dataset")
>>> # add a new creds key
>>> ds.add_creds_key("my_s3_key")
```

Parameters

- **creds_key** (*str*) – The key to be added.
- **managed** (*bool*) – If `True`, the creds corresponding to the key will be fetched from activeloop platform. Note, this is only applicable for datasets that are connected to activeloop platform. Defaults to `False`.

property client

Returns the client of the dataset.

connect(**args*, ***kwargs*)

Connect a Deep Lake cloud dataset through a deeplake path.

Examples

```
>>> # create/load an s3 dataset
>>> s3_ds = deeplake.dataset("s3://bucket/dataset")
>>> ds = s3_ds.connect(dest_path="hub://my_org/dataset", creds_key="my_managed_
↪credentials_key", token="my_activeloop_token)
>>> # or
>>> ds = s3_ds.connect(org_id="my_org", creds_key="my_managed_credentials_key",
↪ token="my_activeloop_token")
```

Parameters

- **creds_key** (*str*) – The managed credentials to be used for accessing the source path.
- **dest_path** (*str, optional*) – The full path to where the connected Deep Lake dataset will reside. Can be: a Deep Lake path like `hub://organization/dataset`
- **org_id** (*str, optional*) – The organization to where the connected Deep Lake dataset will be added.
- **ds_name** (*str, optional*) – The name of the connected Deep Lake dataset. Will be infered from `dest_path` or `src_path` if not provided.
- **token** (*str, optional*) – Activeloop token used to fetch the managed credentials.

Raises

- **InvalidSourcePathError** – If the dataset's path is not a valid s3, gcs or azure path.
- **InvalidDestinationPathError** – If `dest_path`, or `org_id` and `ds_name` do not form a valid Deep Lake path.
- ***TokenPermissionError*** – If the user does not have permission to create a dataset in the specified organization.

delete(*large_ok=False*)

Deletes the entire dataset from the cache layers (if any) and the underlying storage. This is an **IRREVERSIBLE** operation. Data once deleted can not be recovered.

Parameters

large_ok (*bool*) – Delete datasets larger than 1 GB. Defaults to `False`.

Raises

- **DatasetTooLargeToDelete** – If the dataset is larger than 1 GB and `large_ok` is `False`.
- ***DatasetHandlerError*** – If the dataset is marked as allow_delete=False.

get_managed_creds_keys() → Set[str]

Returns the set of creds keys added to the dataset that are managed by Activeloop platform. These are used to fetch external data in linked tensors.

property is_actually_cloud: bool

Datasets that are connected to Deep Lake cloud can still technically be stored anywhere. If a dataset is in Deep Lake cloud but stored without `hub://` prefix, it should only be used for testing.

rename(*path*)

Renames the dataset to *path*.

Example

```
>>> ds = deeplake.load("hub://username/dataset")
>>> ds.rename("hub://username/renamed_dataset")
```

Parameters
path (*str, pathlib.Path*) – New path to the dataset.
Raises
RenameError – If `path` points to a different directory.

property token

Get attached token of the dataset

update_creds_key(*creds_key: str*, *new_creds_key: Optional[str] = None*, *managed: Optional[bool] = None*)

Updates the name and/or management status of a creds key.

Parameters

- **creds_key** (*str*) – The key whose management status is to be changed.
- **new_creds_key** (*str, optional*) – The new key to replace the old key. If not provided, the old key will be used.
- **managed** (*bool*) – The target management status. If `True`, the creds corresponding to the key will be fetched from activeloop platform.

Raises

- **ValueError** – If the dataset is not connected to activeloop platform.
- **ValueError** – If both `new_creds_key` and `managed` are `None`.
- **KeyError** – If the creds key is not present in the dataset.
- **Exception** – All other errors such as during population of managed creds.

Examples

```
>>> # create/load a dataset
>>> ds = deeplake.dataset("path/to/dataset")
>>> # add a new creds key
>>> ds.add_creds_key("my_s3_key")
>>> # Populate the name added with creds dictionary
>>> # These creds are only present temporarily and will have to be repopulated␣
↪on every reload
>>> ds.populate_creds("my_s3_key", {})
>>> # Rename the key and change the management status of the key to True.␣
↪Before doing this, ensure that the creds have been created on activeloop␣
↪platform
>>> # Now, this key will no longer use the credentials populated in the␣
↪previous step but will instead fetch them from activeloop platform
>>> # These creds don't have to be populated again on every reload and will be␣
↪fetched every time the dataset is loaded
>>> ds.update_creds_key("my_s3_key", "my_managed_key", True)
```

visualize(*width: Optional[Union[int, str]] = None*, *height: Optional[Union[int, str]] = None*)

Visualizes the dataset in the Jupyter notebook.

Parameters

- **width** – Union[int, str, None] Optional width of the visualizer canvas.
- **height** – Union[int, str, None] Optional height of the visualizer canvas.

Raises

Exception – If the dataset is not a Deep Lake cloud dataset and the visualization is attempted in colab.

19.3 ViewEntry

class deeplake.core.dataset.**ViewEntry**

Represents a view saved inside a dataset.

delete()

Deletes the view.

property id: str

Returns id of the view.

load(*verbose=True*)

Loads the view and returns the *Dataset*.

Parameters

verbose (*bool*) – If `True`, logs will be printed. Defaults to `True`.

Returns

Loaded dataset view.

Return type

Dataset

property message: str

Returns the message with which the view was saved.

optimize(*tensors: Optional[List[str]] = None*, *unlink=True*, *num_workers=0*, *scheduler='threaded'*, *progressbar=True*)

Optimizes the dataset view by copying and rechunking the required data. This is necessary to achieve fast streaming speeds when training models using the dataset view. The optimization process will take some time, depending on the size of the data.

Example

```
>>> # save view
>>> ds[:10].save_view(id="first_10")
>>> # optimize view
>>> ds.get_view("first_10").optimize()
>>> # load optimized view
>>> ds.load_view("first_10")
```

Parameters

- **tensors** (*List[str]*) – Tensors required in the optimized view. By default all tensors are copied.
- **unlink** (*bool*) –

- If `True`, this unlinks linked tensors (if any) by copying data from the links to the view.
- This does not apply to linked videos. Set `deeplake.constants._UNLINK_VIDEOS` to `True` to change this behavior.

- **num_workers** (*int*) – Number of workers to be used for the optimization process. Defaults to 0.
- **scheduler** (*str*) – The scheduler to be used for optimization. Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Only applicable if `optimize=True`. Defaults to 'threaded'.
- **progressbar** (*bool*) – Whether to display a progressbar.

Returns

ViewEntry

Raises

Exception – When query view cannot be optimized.

CHAPTER

TWENTY

DEEPLAKE.CORE.TENSOR

20.1 Tensor

class deeplake.core.tensor.**Tensor**

__len__()

Returns the length of the primary axis of the tensor. Accounts for indexing into the tensor object.

Examples

```
>>> len(tensor)
0
>>> tensor.extend(np.zeros((100, 10, 10)))
>>> len(tensor)
100
>>> len(tensor[5:10])
5
```

Returns
The current length of this tensor.

Return type
int

__setitem__(*item: Union[int, slice]*, *value: Any*)

Update samples with new values.

Example

```
>>> tensor.append(np.zeros((10, 10)))
>>> tensor.shape
(1, 10, 10)
>>> tensor[0] = np.zeros((3, 3))
>>> tensor.shape
(1, 3, 3)
```

_check_compatibility_with_htype(*htype*)

Checks if the tensor is compatible with the given htype. Raises an error if not compatible.

property _config

Returns a summary of the configuration of the tensor.

_linked_sample()

Returns the linked sample at the given index. This is only applicable for tensors of `link[]` htype and can only be used for exactly one sample.

```
>>> linked_sample = ds.abc[0]._linked_sample().path
'https://picsum.photos/200/300'
```

_pop(*index: List[int]*)

Removes elements at the given indices. `index` must be sorted in descending order.

append(*sample: Union[*Sample*, ndarray, int, float, bool, dict, list, str, integer, floating, bool_]*)

Appends a single sample to the end of the tensor. Can be an array, scalar value, or the return value from *deeplake.read()*, which can be used to load files. See examples down below.

Examples

Numpy input:

```
>>> len(tensor)
0
>>> tensor.append(np.zeros((28, 28, 1)))
>>> len(tensor)
1
```

File input:

```
>>> len(tensor)
0
>>> tensor.append(deeplake.read("path/to/file"))
>>> len(tensor)
1
```

Parameters

sample (*InputSample*) – The data to append to the tensor. *Sample* is generated by *deeplake.read()*. See the above examples.

property base_htype

Base htype of the tensor.

Example

```
>>> ds.create_tensor("video_seq", htype="sequence[video]", sample_compression=
↪"mp4")
>>> ds.video_seq.htype
sequence[video]
>>> ds.video_seq.base_htype
video
```

clear()

Deletes all samples from the tensor

creds_key()

Return path data. Only applicable for linked tensors

data(*aslist: bool = False*, *fetch_chunks: bool = False*) → Any

Returns data in the tensor in a format based on the tensor's base htype.

- **If tensor has `text` base htype**
  - Returns dict with dict["value"] = *Tensor.text()*
- **If tensor has `json` base htype**
  - Returns dict with dict["value"] = *Tensor.dict()*
- **If tensor has `list` base htype**
  - Returns dict with dict["value"] = *Tensor.list()*
- For `video` tensors, returns a dict with keys "frames", "timestamps" and "sample_info":
  - Value of dict["frames"] will be same as *numpy()*.
  - Value of dict["timestamps"] will be same as *timestamps* corresponding to the frames.
  - Value of dict["sample_info"] will be same as *sample_info*.
- For `class_label` tensors, returns a dict with keys "value" and "text".
  - Value of dict["value"] will be same as *numpy()*.
  - Value of dict["text"] will be list of class labels as strings.
- For `image` or `dicom` tensors, returns dict with keys "value" and "sample_info".
  - Value of dict["value"] will be same as *numpy()*.
  - Value of dict["sample_info"] will be same as *sample_info*.
- For all else, returns dict with key "value" with value same as *numpy()*.

dict(*fetch_chunks: bool = False*)

Return json data. Only applicable for tensors with 'json' base htype.

property dtype: Optional[dtype]

Dtype of the tensor.

extend(*samples: Union[ndarray, Sequence[Union[*Sample*, ndarray, int, float, bool, dict, list, str, integer, floating, bool_]], *Tensor*], *progressbar: bool = False*, *ignore_errors: bool = False*)

Extends the end of the tensor by appending multiple elements from a sequence. Accepts a sequence, a single batched numpy array, or a sequence of *deeplake.read()* outputs, which can be used to load files. See examples down below.

Example

Numpy input:

```
>>> len(tensor)
0
>>> tensor.extend(np.zeros((100, 28, 28, 1)))
>>> len(tensor)
100
```

File input:

```
>>> len(tensor)
0
>>> tensor.extend([
        deeplake.read("path/to/image1"),
        deeplake.read("path/to/image2"),
```

(continues on next page)

(continued from previous page)

```
    ])
>>> len(tensor)
2
```

Parameters

- **samples** (*np.ndarray, Sequence, Sequence[Sample]*) – The data to add to the tensor. The length should be equal to the number of samples to add.
- **progressbar** (*bool*) – Specifies whether a progressbar should be displayed while extending.
- **ignore_errors** (*bool*) – Skip samples that cause errors while extending, if set to True.

Raises

TensorDtypeMismatchError – Dtype for array must be equal to or castable to this tensor's dtype.

property hidden: bool

Whether this tensor is a hidden tensor.

property htype

Htype of the tensor.

property info: *Info*

Returns the information about the tensor. User can set info of tensor.

Returns

Information about the tensor.

Return type

Info

Example

```
>>> # update info
>>> ds.images.info.update(large=True, gray=False)
>>> # get info
>>> ds.images.info
{'large': True, 'gray': False}
```

```
>>> ds.images.info = {"complete": True}
>>> ds.images.info
{'complete': True}
```

invalidate_libdeeplake_dataset()

Invalidates the libdeeplake dataset object.

property is_dynamic: bool

Will return True if samples in this tensor have shapes that are unequal.

property is_link

Whether this tensor is a link tensor.

property is_sequence

Whether this tensor is a sequence tensor.

list(*fetch_chunks: bool = False*)

Return list data. Only applicable for tensors with 'list' or 'tag' base htype.

property meta

Metadata of the tensor.

modified_samples(*target_id: Optional[str] = None*, *return_indexes: Optional[bool] = False*)

Returns a slice of the tensor with only those elements that were modified/added. By default the modifications are calculated relative to the previous commit made, but this can be changed by providing a `target id`.

Parameters

- **target_id** (*str, optional*) – The commit id or branch name to calculate the modifications relative to. Defaults to `None`.
- **return_indexes** (*bool, optional*) – If `True`, returns the indexes of the modified elements. Defaults to `False`.

Returns

A new tensor with only the modified elements if `return_indexes` is `False`. Tuple[Tensor, List[int]]: A new tensor with only the modified elements and the indexes of the modified elements if `return_indexes` is `True`.

Return type

Tensor

Raises

TensorModifiedError – If a target id is passed which is not an ancestor of the current commit.

property ndim: int

Number of dimensions of the tensor.

property num_samples: int

Returns the length of the primary axis of the tensor. Ignores any applied indexing and returns the total length.

numpy(*aslist=False*, *fetch_chunks=False*) → Union[ndarray, List[ndarray]]

Computes the contents of the tensor in numpy format.

Parameters

- **aslist** (*bool*) – If `True`, a list of np.ndarrays will be returned. Helpful for dynamic tensors. If `False`, a single np.ndarray will be returned unless the samples are dynamically shaped, in which case an error is raised.
- **fetch_chunks** (*bool*) – If `True`, full chunks will be retrieved from the storage, otherwise only required bytes will be retrieved. This will always be `True` even if specified as `False` in the following cases:
  - The tensor is ChunkCompressed.
  - The chunk which is being accessed has more than 128 samples.

Raises

- ***DynamicTensorNumpyError*** – If reading a dynamically-shaped array slice without `aslist=True`.
- **ValueError** – If the tensor is a link and the credentials are not populated.

Returns

A numpy array containing the data represented by this tensor.

Note: For tensors of htype `polygon`, aslist is always `True`.

path(*aslist: bool = True*, *fetch_chunks: bool = False*)

Return path data. Only applicable for linked tensors.

Parameters

- **aslist** (*bool*) – Returns links in a list if `True`.
- **fetch_chunks** (*bool*) – If `True`, full chunks will be retrieved from the storage, otherwise only required bytes will be retrieved.

Returns

A list or numpy array of links.

Return type

Union[np.ndarray, List]

Raises

Exception – If the tensor is not a linked tensor.

play()

Play video sample. Plays video in Jupyter notebook or plays in web browser. Video is streamed directly from storage. This method will fail for incompatible htypes.

Example

```
>>> ds = deeplake.load("./test/my_video_ds")
>>> # play second sample
>>> ds.videos[2].play()
```

Note: Video streaming is not yet supported on colab.

pop(*index: Optional[Union[int, List[int]]] = None*)

Removes element(s) at the given index / indices.

property sample_indices

Returns all the indices pointed to by this tensor in the dataset view.

property sample_info: Union[Dict, List[Dict]]

Returns info about particular samples in a tensor. Returns dict in case of single sample, otherwise list of dicts. Data in returned dict would depend on the tensor's htype and the sample itself.

Example

```
>>> ds.videos[0].sample_info
{'duration': 400400, 'fps': 29.97002997002997, 'timebase': 3.3333333333333335e-
↪05, 'shape': [400, 360, 640, 3], 'format': 'mp4', 'filename': '../deeplake/
↪tests/dummy_data/video/samplemp4.mp4', 'modified': False}
>>> ds.images[:2].sample_info
[{'exif': {'Software': 'Google'}, 'shape': [900, 900, 3], 'format': 'jpeg',
↪'filename': '../deeplake/tests/dummy_data/images/cat.jpeg', 'modified':␣
↪False}, {'exif': {}, 'shape': [495, 750, 3], 'format': 'jpeg', 'filename': '.
↪./deeplake/tests/dummy_data/images/car.jpg', 'modified': False}]
```

property shape: Tuple[Optional[int], ...]

Get the shape of this tensor. Length is included.

Example

```
>>> tensor.append(np.zeros((10, 10)))
>>> tensor.append(np.zeros((10, 15)))
>>> tensor.shape
(2, 10, None)
```

Returns
Tuple where each value is either `None` (if that axis is dynamic) or an int (if that axis is fixed).

Return type
tuple

Note: If you don't want `None` in the output shape or want the lower/upper bound shapes, use *shape_interval* instead.

---

property shape_interval: *ShapeInterval*

Returns a *ShapeInterval* object that describes this tensor's shape more accurately. Length is included.

Example

```
>>> tensor.append(np.zeros((10, 10)))
>>> tensor.append(np.zeros((10, 15)))
>>> tensor.shape_interval
ShapeInterval(lower=(2, 10, 10), upper=(2, 10, 15))
>>> str(tensor.shape_interval)
(2, 10, 10:15)
```

Returns
Object containing `lower` and `upper` properties.

Return type
ShapeInterval

Note: If you are expecting a tuple, use *shape* instead.

---

shapes()

Get the shapes of all the samples in the tensor.

Returns
List of shapes of all the samples in the tensor.

Return type
np.ndarray

summary()

Prints a summary of the tensor.

text(*fetch_chunks: bool = False*)

Return text data. Only applicable for tensors with 'text' base htype.

property timestamps: ndarray

Returns timestamps (in seconds) for video sample as numpy array.

Example

```
>>> # Return timestamps for all frames of first video sample
>>> ds.videos[0].timestamps.shape
(400,)
>>> # Return timestamps for 5th to 10th frame of first video sample
>>> ds.videos[0, 5:10].timestamps
array([0.2002    , 0.23356667, 0.26693332, 0.33366665, 0.4004    ],
dtype=float32)
```

tobytes() → bytes

Returns the bytes of the tensor.

- Only works for a single sample of tensor.
- If the tensor is uncompressed, this returns the bytes of the numpy array.
- If the tensor is sample compressed, this returns the compressed bytes of the sample.
- If the tensor is chunk compressed, this raises an error.

Returns
The bytes of the tensor.

Return type
bytes

Raises
ValueError – If the tensor has multiple samples.

property verify

Whether linked data will be verified when samples are added. Applicable only to tensors with htype `link[htype]`.

CHAPTER

TWENTYONE

DEEPLAKE.API

21.1 deeplake.api.dataset

class deeplake.api.dataset.**dataset**

static exists(*path: Union[str, pathlib.Path]*, *creds: Optional[dict] = None*, *token: Optional[str] = None*) → bool

See *deeplake.exists()*.

static empty(*path: Union[str, pathlib.Path]*, *overwrite: bool = False*, *public: bool = False*, *memory_cache_size: int = DEFAULT_MEMORY_CACHE_SIZE*, *local_cache_size: int = DEFAULT_LOCAL_CACHE_SIZE*, *creds: Optional[dict] = None*, *token: Optional[str] = None*) → *Dataset*

See *deeplake.empty()*.

static load(*path: Union[str, pathlib.Path]*, *read_only: Optional[bool] = None*, *memory_cache_size: int = DEFAULT_MEMORY_CACHE_SIZE*, *local_cache_size: int = DEFAULT_LOCAL_CACHE_SIZE*, *creds: Optional[dict] = None*, *token: Optional[str] = None*, *verbose: bool = True*, *access_method: str = 'stream'*) → *Dataset*

See *deeplake.load()*.

static rename(*old_path: Union[str, pathlib.Path]*, *new_path: Union[str, pathlib.Path]*, *creds: Optional[dict] = None*, *token: Optional[str] = None*) → *Dataset*

See *deeplake.rename()*.

static delete(*path: Union[str, pathlib.Path]*, *force: bool = False*, *large_ok: bool = False*, *creds: Optional[dict] = None*, *token: Optional[str] = None*, *verbose: bool = False*) → None

See *deeplake.delete()*.

static like(*dest: Union[str, pathlib.Path]*, *src: Union[str,* Dataset*, pathlib.Path]*, *tensors: Optional[List[str]] = None*, *overwrite: bool = False*, *creds: Optional[dict] = None*, *token: Optional[str] = None*, *public: bool = False*) → *Dataset*

See *deeplake.like()*.

static copy(*src: Union[str, pathlib.Path,* Dataset*]*, *dest: Union[str, pathlib.Path]*, *tensors: Optional[List[str]] = None*, *overwrite: bool = False*, *src_creds=None*, *dest_creds=None*, *token=None*, *num_workers: int = 0*, *scheduler='threaded'*, *progressbar=True*)

See *deeplake.copy()*.

static deepcopy(*src: Union[str, pathlib.Path]*, *dest: Union[str, pathlib.Path]*, *tensors: Optional[List[str]] = None*, *overwrite: bool = False*, *src_creds=None*, *dest_creds=None*, *token=None*, *num_workers: int = 0*, *scheduler='threaded'*, *progressbar=True*, *public: bool = False*, *verbose: bool = True*)

See *deeplake.deepcopy()*.

static connect(*src_path: str*, *creds_key: str*, *dest_path: Optional[str]*, *org_id: Optional[str]*, *ds_name: Optional[str]*, *token: Optional[str]*)

See *deeplake.connect()*.

static ingest_classification(*src: Union[str, pathlib.Path]*, *dest: Union[str, pathlib.Path]*, *image_params: Optional[Dict] = None*, *label_params: Optional[Dict]: None*, *dest_creds: Optional[Dict] = None*, *progressbar: bool = True*, *summary: bool = True*, *num_workers: int = 0*, *shuffle: bool = False*, *token: Optional[str] = None*, *connect_kwargs: Optional[Dict] = None*, ***dataset_kwargs*) → *Dataset*

See *deeplake.ingest_classification()*.

static ingest_coco(*images_directory: Union[str, pathlib.Path]*, *annotation_files: Union[str, pathlib.Path, List[str]]*, *dest: Union[str, pathlib.Path]*, *key_to_tensor_mapping: Optional[Dict] = None*, *file_to_group_mapping: Optional[Dict] = None*, *ignore_one_group: bool = False*, *ignore_keys: Optional[List[str]] = None*, *image_settings: Optional[Dict] = None*, *src_creds: Optional[Dict] = None*, *dest_creds: Optional[Dict] = None*, *inspect_limit: int = 1000000*, *progressbar: bool = True*, *shuffle: bool = False*, *num_workers: int = 0*, *token: Optional[str] = None*, *connect_kwargs: Optional[Dict] = None*, ***dataset_kwargs*) → *Dataset*

See *deeplake.ingest_coco()*.

def ingest_yolo(data_directory: Union[str, pathlib.Path], dest: Union[str, pathlib.Path], class_names_file: Optional[Union[str, pathlib.Path]] = None, annotations_directory: Optional[Union[str, pathlib.Path]] = None, allow_no_annotation: bool = False, image_params: Optional[Dict] = None, label_params: Optional[Dict] = None, coordinates_params: Optional[Dict] = None, src_creds: Optional[Dict] = None, dest_creds: Optional[Dict] = None, image_creds_key: Optional[str] = None, inspect_limit: int = 1000, progressbar: bool = True, shuffle: bool = False, num_workers: int = 0, token: Optional[str] = None, connect_kwargs: Optional[Dict] = None, **dataset_kwargs) -> Dataset:

See *deeplake.ingest_yolo()*

static ingest_kaggle(*tag: str*, *src: Union[str, pathlib.Path]*, *dest: Union[str, pathlib.Path]*, *exist_ok: bool = False*, *images_compression: str = 'auto'*, *dest_creds: dict = None*, *kaggle_credentials: dict = None*, *progressbar: bool = True*, *summary: bool = True*, ***dataset_kwargs*) → *Dataset*

See *deeplake.ingest_kaggle()*.

static ingest_dataframe(*src*, *dest: Union[str, pathlib.Path]*, *column_params: Optional[Dict] = None*, *src_creds: Optional[Dict] = None*, *dest_creds: Optional[Dict] = None*, *creds_key: Optional[Dict] = None*, *progressbar: bool = True*, *token: Optional[str] = None*, *connect_kwargs: Optional[Dict] = None*, ***dataset_kwargs*)

See *deeplake.ingest_dataframe()*.

static list(*workspace: str = ''*, *token: Optional[str] = None*) → None

See `deeplake.list()`.

21.2 deeplake.api.info

class deeplake.api.info.**Info**

Contains optional key-value pairs that can be stored for datasets/tensors.

clear()

Clear info.

get(*key*, *default=None*)

Get value for key from info.

items()

Return all items in info.

keys()

Return all keys in info.

property nbytes

Returns size of info stored in bytes.

pop(*key*, *default=None*)

Pop item from info by key.

popitem()

Pop item from info.

replace_with(*d*)

Replace info with another dictionary.

setdefault(*key*, *default=None*)

Set default value for a key in info.

update(**args*, ***kwargs*)

Update info.

values()

Return all values in info.

21.3 deeplake.api.link

deeplake.api.link.**link**(*path: str*, *creds_key: Optional[str] = None*) → *LinkedSample*

See *deeplake.link()*.

21.4 deeplake.api.read

deeplake.api.read.**read**(*path: str*, *verify: bool = False*, *creds: Optional[Dict] = None*, *compression: Optional[str] = None*, *storage: Optional[*StorageProvider*] = None*) → *Sample*

See *deeplake.read()*.

21.5 deeplake.api.tiled

deeplake.api.tiled.**tiled**(*sample_shape: Tuple[int, ...]*, *tile_shape: Optional[Tuple[int, ...]] = None*, *dtype: Union[str, np.dtype] = np.dtype('uint8')*)

See *deeplake.tiled()*.

21.6 deeplake.api.link_tiled

deeplake.api.link_tiled.**link_tiled**(*path_array: np.ndarray*, *creds_key: Optional[str] = None*) → LinkedTiledSample:

See *deeplake.link_tiled()*.

CHAPTER

TWENTYTWO

DEEPLAKE.AUTO

22.1 deeplake.auto.structured

22.1.1 deeplake.auto.structured.base

class deeplake.auto.structured.base.**StructuredDataset**(*source*)

Initializes a structured dataset.

Parameters

source (*str*) – The local path to folder or file containing a structured dataset and of the form ./path/to/dataset or ~/path/to/dataset or path/to/dataset.

22.1.2 deeplake.auto.structured.dataframe

class deeplake.auto.structured.dataframe.**DataFrame**(*source*, *column_params=None*, *creds=None*, *creds_key=None*)

fill_dataset(*ds:* Dataset, *progressbar: bool = True*) → *Dataset*

Fill dataset with data from the dataframe - one tensor per column

Parameters

- **ds** (Dataset) – A Deep Lake dataset object.
- **progressbar** (*bool*) – Defines if the method uses a progress bar. Defaults to True.

Returns

A Deep Lake dataset.

22.2 deeplake.auto.unstructured

22.2.1 deeplake.auto.unstructured.base

class deeplake.auto.unstructured.base.**UnstructuredDataset**(*source: str*)

22.2.2 deeplake.auto.unstructured.image_classification

class deeplake.auto.unstructured.image_classification.**ImageClassification**(*source: str*)

structure(*ds:* Dataset, *progressbar: bool = True*, *generate_summary: bool = True*, *shuffle: bool = True*, *image_tensor_args: dict = {}*, *label_tensor_args: dict = {}*, *num_workers: int = 0*) → *Dataset*

Create a structured dataset.

Parameters

- **ds** (*Dataset*) – A Deep Lake dataset object.
- **progressbar** (*bool*) – Defines if the method uses a progress bar. Defaults to True.
- **generate_summary** (*bool*) – Defines if the method generates ingestion summary. Defaults to True.
- **shuffle** (*bool*) – Defines if the file paths should be shuffled prior to ingestion. Defaults to True.
- **image_tensor_args** (*dict*) – Defines the parameters for the images tensor.
- **label_tensor_args** (*dict*) – Defines the parameters for the class_labels tensor.
- **num_workers** (*int*) – The number of workers passed to compute.

Returns

A Deep Lake dataset.

22.2.3 deeplake.auto.unstructured.kaggle

deeplake.auto.unstructured.kaggle.**download_kaggle_dataset**(*tag: str*, *local_path: str*, *kaggle_credentials: Optional[dict] = None*, *exist_ok: bool = False*)

Calls the kaggle API (https://www.kaggle.com/docs/api) to download a kaggle dataset and unzip it's contents.

Parameters

- **tag** (*str*) – Kaggle dataset tag. Example: *"coloradokb/dandelionimages"* points to https://www.kaggle.com/coloradokb/dandelionimages
- **local_path** (*str*) – Path where the kaggle dataset will be downloaded and unzipped. Only local path downloading is supported.
- **kaggle_credentials** (*dict*) – Credentials are gathered from the environment variables or *~/kaggle.json*. If those don't exist, the *kaggle_credentials* argument will be used.
- **exist_ok** (*bool*) – If the kaggle dataset was already downloaded, and *exist_ok* is True, no error is thrown.

Raises

- *KaggleMissingCredentialsError* – If no kaggle credentials are found.
- *KaggleDatasetAlreadyDownloadedError* – If the dataset *tag* already exists in *local_path*.

CHAPTER

TWENTYTHREE

DEEPLAKE.UTIL

23.1 deeplake.util.shape_interval

class deeplake.util.shape_interval.**ShapeInterval**

__init__(*lower: Sequence[int]*, *upper: Optional[Sequence[int]] = None*)

Shapes in Deep Lake are best represented as intervals, this is to support dynamic tensors. Instead of having a single tuple of integers representing shape, we use 2 tuples of integers to represent the lower and upper bounds of the representing shape.

- If `lower == upper` for all cases, the shape is considered "fixed".
- If `lower != upper` for any cases, the shape is considered "dynamic".

Parameters

- **lower** (*sequence*) – Sequence of integers that represent the lower-bound shape.
- **upper** (*sequence*) – Sequence of integers that represent the upper-bound shape. If None is provided, lower is used as upper (implicitly fixed-shape).

Raises

InvalidShapeIntervalError – If the provided lower/upper bounds are incompatible to represent a shape.

23.2 deeplake.util.remove_cache

deeplake.util.remove_cache.**remove_memory_cache**(*storage:* StorageProvider)

Removes the memory cache.

deeplake.util.remove_cache.**get_base_storage**(*storage:* StorageProvider)

Removes all layers of caching and returns the underlying storage.

deeplake.util.remove_cache.**get_dataset_with_zero_size_cache**(*ds*)

Returns a dataset with same storage but cache size set to zero.

deeplake.util.remove_cache.**create_read_copy_dataset**(*dataset*, *commit_id: Optional[str] = None*)

Creates a read-only copy of the given dataset object, without copying underlying data.

Parameters

- **dataset** – The Dataset object to copy.
- **commit_id** – The commit id to checkout the new read-only copy to.

Returns

A new Dataset object in read-only mode.

23.3 deeplake.util.notebook

deeplake.util.notebook.**is_notebook**()
Whether running in a notebook.

deeplake.util.notebook.**is_jupyter**()
Whether running in a Jupyter notebook.

deeplake.util.notebook.**is_colab**()
Whether running in a colab notebook.

23.4 deeplake.util.exceptions

class deeplake.util.exceptions.**ExternalCommandError**(*command: str*, *status: int*)
Bases: Exception

class deeplake.util.exceptions.**KaggleError**
Bases: Exception

class deeplake.util.exceptions.**KaggleMissingCredentialsError**(*env_var_name: str*)
Bases: *KaggleError*

class deeplake.util.exceptions.**KaggleDatasetAlreadyDownloadedError**(*tag: str*, *path: str*)
Bases: *KaggleError*

class deeplake.util.exceptions.**InvalidPathException**(*directory*)
Bases: Exception

class deeplake.util.exceptions.**AutoCompressionError**(*directory*)
Bases: Exception

class deeplake.util.exceptions.**InvalidFileExtension**(*directory*)
Bases: Exception

class deeplake.util.exceptions.**SamePathException**(*directory*)
Bases: Exception

class deeplake.util.exceptions.**TensorInvalidSampleShapeError**(*shape: Sequence[int]*, *expected_dims: int*)
Bases: Exception

class deeplake.util.exceptions.**TensorMetaMissingKey**(*key: str*, *meta: dict*)
Bases: Exception

class deeplake.util.exceptions.**TensorDoesNotExistError**(*tensor_name: str*)
Bases: KeyError, AttributeError

class deeplake.util.exceptions.**TensorAlreadyExistsError**(*key: str*)
Bases: Exception

class deeplake.util.exceptions.**TensorGroupDoesNotExistError**(*group_name: str*)
Bases: KeyError

class deeplake.util.exceptions.**TensorGroupAlreadyExistsError**(*key: str*)

Bases: Exception

class deeplake.util.exceptions.**InvalidTensorNameError**(*name: str*)

Bases: Exception

class deeplake.util.exceptions.**InvalidTensorGroupNameError**(*name: str*)

Bases: Exception

class deeplake.util.exceptions.**DynamicTensorNumpyError**(*key: str*, *index*, *property_key: str*)

Bases: Exception

class deeplake.util.exceptions.**InvalidShapeIntervalError**(*message: str*, *lower: Optional[Sequence[int]] = None*, *upper: Optional[Sequence[int]] = None*)

Bases: Exception

class deeplake.util.exceptions.**InvalidKeyTypeError**(*item: Any*)

Bases: TypeError

class deeplake.util.exceptions.**UnsupportedTensorTypeError**(*item: Any*)

Bases: TypeError

class deeplake.util.exceptions.**InvalidBytesRequestedError**

Bases: Exception

class deeplake.util.exceptions.**ProviderListEmptyError**

Bases: Exception

class deeplake.util.exceptions.**DirectoryAtPathException**

Bases: Exception

class deeplake.util.exceptions.**FileAtPathException**(*path*)

Bases: Exception

class deeplake.util.exceptions.**ProviderSizeListMismatch**

Bases: Exception

class deeplake.util.exceptions.**ModuleNotInstalledException**(*message*)

Bases: Exception

class deeplake.util.exceptions.**LoginException**(*message='Error while logging in, invalid auth token. Please try logging in again.'*)

Bases: Exception

class deeplake.util.exceptions.**UserNotLoggedInException**

Bases: Exception

class deeplake.util.exceptions.**InvalidHubPathException**(*path*)

Bases: Exception

class deeplake.util.exceptions.**PathNotEmptyException**(*use_hub=True*)

Bases: Exception

class deeplake.util.exceptions.**AuthenticationException**(*message='Authentication failed. Please try logging in again.'*)

Bases: Exception

class deeplake.util.exceptions.**AuthorizationException**(*message='You are not authorized to access this resource on Activeloop Server.'*, *response=None*)

Bases: Exception

class deeplake.util.exceptions.**InvalidPasswordException**(*message='The password you provided was invalid.'*)

Bases: *AuthorizationException*

class deeplake.util.exceptions.**CouldNotCreateNewDatasetException**(*path: str*)

Bases: *AuthorizationException*

class deeplake.util.exceptions.**ResourceNotFoundException**(*message='The resource you are looking for was not found. Check if the name or id is correct.'*)

Bases: Exception

class deeplake.util.exceptions.**BadRequestException**(*message*)

Bases: Exception

class deeplake.util.exceptions.**OverLimitException**(*message='You are over the allowed limits for this operation.'*)

Bases: Exception

class deeplake.util.exceptions.**ServerException**(*message='Internal Activeloop server error.'*)

Bases: Exception

class deeplake.util.exceptions.**BadGatewayException**(*message='Invalid response from Activeloop server.'*)

Bases: Exception

class deeplake.util.exceptions.**GatewayTimeoutException**(*message='Activeloop server took too long to respond.'*)

Bases: Exception

class deeplake.util.exceptions.**WaitTimeoutException**(*message='Timeout waiting for server state update.'*)

Bases: Exception

class deeplake.util.exceptions.**LockedException**(*message='The resource is currently locked.'*)

Bases: Exception

class deeplake.util.exceptions.**UnexpectedStatusCodeException**(*message*)

Bases: Exception

class deeplake.util.exceptions.**EmptyTokenException**(*message='The authentication token is empty.'*)

Bases: Exception

class deeplake.util.exceptions.**S3Error**

Bases: Exception

Catchall for all errors encountered while working with S3

class deeplake.util.exceptions.**S3GetError**

Bases: *S3Error*

Catchall for all errors encountered while working getting an object from S3

class deeplake.util.exceptions.**S3SetError**

Bases: *S3Error*

Catchall for all errors encountered while working setting an object in S3

class deeplake.util.exceptions.**S3DeletionError**

Bases: *S3Error*

Catchall for all errors encountered while working deleting an object in S3

class deeplake.util.exceptions.**S3ListError**

Bases: *S3Error*

Catchall for all errors encountered while retrieving a list of objects present in S3

class deeplake.util.exceptions.**UnsupportedCompressionError**(*compression: Optional[str]*, *htype: Optional[str] = None*)

Bases: CompressionError

class deeplake.util.exceptions.**SampleCompressionError**(*sample_shape: Tuple[int, ...]*, *compression_format: Optional[str]*, *message: str*)

Bases: CompressionError

class deeplake.util.exceptions.**SampleDecompressionError**(*path: Optional[str] = None*)

Bases: CompressionError

class deeplake.util.exceptions.**InvalidImageDimensions**(*actual_dims*, *expected_dims*)

Bases: Exception

class deeplake.util.exceptions.**TensorUnsupportedSampleType**

Bases: Exception

class deeplake.util.exceptions.**MetaError**

Bases: Exception

class deeplake.util.exceptions.**MetaDoesNotExistError**(*key: str*)

Bases: *MetaError*

class deeplake.util.exceptions.**MetaAlreadyExistsError**(*key: str*, *required_meta: dict*)

Bases: *MetaError*

class deeplake.util.exceptions.**MetaInvalidKey**(*name: str*, *available_keys: List[str]*)

Bases: *MetaError*

class deeplake.util.exceptions.**MetaInvalidRequiredMetaKey**(*key: str*, *subclass_name: str*)

Bases: *MetaError*

class deeplake.util.exceptions.**TensorMetaInvalidHtype**(*htype: str*, *available_htypes: Sequence[str]*)

Bases: *MetaError*

class deeplake.util.exceptions.**TensorMetaInvalidHtypeOverwriteValue**(*key: str*, *value: Any*, *explanation: str = ''*)

Bases: *MetaError*

class deeplake.util.exceptions.**TensorMetaMissingRequiredValue**(*htype: str*, *key: Union[str, List[str]]*)

Bases: *MetaError*

class deeplake.util.exceptions.**TensorMetaInvalidHtypeOverwriteKey**(*htype: str*, *key: str*, *available_keys: Sequence[str]*)

Bases: *MetaError*

class deeplake.util.exceptions.**TensorDtypeMismatchError**(*expected: Union[dtype, str]*, *actual: str*, *htype: str*)

Bases: *MetaError*

class deeplake.util.exceptions.**InvalidTensorLinkError**(*msg='Invalid tensor link.'*)

Bases: *MetaError*

class deeplake.util.exceptions.**TensorMetaMutuallyExclusiveKeysError**(*keys: Optional[List[str]] = None*, *custom_message: Optional[str] = None*)

Bases: *MetaError*

class deeplake.util.exceptions.**ReadOnlyModeError**(*custom_message: Optional[str] = None*)

Bases: Exception

class deeplake.util.exceptions.**TransformError**(*index=None*, *sample=None*, *samples_processed=0*, *suggest=False*)

Bases: Exception

class deeplake.util.exceptions.**FilterError**

Bases: Exception

class deeplake.util.exceptions.**InvalidInputDataError**(*operation*)

Bases: *TransformError*

class deeplake.util.exceptions.**UnsupportedSchedulerError**(*scheduler*)

Bases: *TransformError*

class deeplake.util.exceptions.**TensorMismatchError**(*tensors*, *output_keys*, *skip_ok=False*)

Bases: *TransformError*

class deeplake.util.exceptions.**InvalidOutputDatasetError**(*message='The output Dataset to transform should not be `read_only`.'*)

Bases: *TransformError*

class deeplake.util.exceptions.**InvalidTransformDataset**(*message='The TransformDataset (2nd argument to transform function) of one of the functions is invalid. All the tensors should have equal length for it to be valid.'*)

Bases: *TransformError*

class deeplake.util.exceptions.**HubComposeEmptyListError**(*message='Cannot deeplake.compose an empty list.'*)

Bases: *TransformError*

class deeplake.util.exceptions.**HubComposeIncompatibleFunction**(*index: int*)

Bases: *TransformError*

class deeplake.util.exceptions.**DatasetUnsupportedPytorch**(*reason*)

Bases: Exception

class deeplake.util.exceptions.**CorruptedMetaError**

Bases: Exception

class deeplake.util.exceptions.**ChunkEngineError**

Bases: Exception

class deeplake.util.exceptions.**FullChunkError**

Bases: *ChunkEngineError*

class deeplake.util.exceptions.**ChunkIdEncoderError**

Bases: *ChunkEngineError*

class deeplake.util.exceptions.**ChunkSizeTooSmallError**(*message='If the size of the last chunk is given, it must be smaller than the requested chunk size.'*)

Bases: *ChunkEngineError*

class deeplake.util.exceptions.**DatasetHandlerError**(*message*)

Bases: Exception

class deeplake.util.exceptions.**MemoryDatasetCanNotBePickledError**

Bases: Exception

class deeplake.util.exceptions.**CorruptedSampleError**(*compression*, *path: Optional[str] = None*)

Bases: Exception

class deeplake.util.exceptions.**VersionControlError**

Bases: Exception

class deeplake.util.exceptions.**MergeError**

Bases: Exception

class deeplake.util.exceptions.**MergeNotSupportedError**

Bases: *MergeError*

class deeplake.util.exceptions.**MergeMismatchError**(*tensor_name*, *mismatch_type*, *original_value*, *target_value*)

Bases: *MergeError*

class deeplake.util.exceptions.**MergeConflictError**(*conflict_tensors=None*, *message=''*)

Bases: *MergeError*

class deeplake.util.exceptions.**CheckoutError**

Bases: *VersionControlError*

class deeplake.util.exceptions.**CommitError**

Bases: *VersionControlError*

class deeplake.util.exceptions.**EmptyCommitError**

Bases: *CommitError*

class deeplake.util.exceptions.**TensorModifiedError**

Bases: Exception

class deeplake.util.exceptions.**GCSDefaultCredsNotFoundError**

Bases: Exception

class deeplake.util.exceptions.**InvalidOperationError**(*method: str*, *type: str*)

Bases: Exception

class deeplake.util.exceptions.**AgreementError**

Bases: Exception

class deeplake.util.exceptions.**AgreementNotAcceptedError**(*agreements=None*)

Bases: *AgreementError*

class deeplake.util.exceptions.**RenameError**(*msg='Only name of the dataset can be different in new path.'*)

Bases: Exception

class deeplake.util.exceptions.**BufferError**

Bases: Exception

class deeplake.util.exceptions.**InfoError**

Bases: Exception

class deeplake.util.exceptions.**OutOfChunkCountError**

Bases: Exception

class deeplake.util.exceptions.**OutOfSampleCountError**

Bases: Exception

class deeplake.util.exceptions.**SampleHtypeMismatchError**(*htype*, *sample_type*)

Bases: Exception

class deeplake.util.exceptions.**EmptyTensorError**(*message*)

Bases: Exception

class deeplake.util.exceptions.**DatasetViewSavingError**

Bases: Exception

class deeplake.util.exceptions.**ManagedCredentialsNotFoundError**(*org_id*, *creds_key*)

Bases: Exception

class deeplake.util.exceptions.**UnableToReadFromUrlError**(*url*, *status_code*)

Bases: Exception

class deeplake.util.exceptions.**InvalidTokenException**

Bases: Exception

class deeplake.util.exceptions.**TokenPermissionError**(*message=None*)

Bases: Exception

CHAPTER

TWENTYFOUR

DEEPLAKE.CLIENT.LOG

Deep Lake does logging using the "deeplake" logger. Logging level is `logging.INFO` by default. See example on how to change this.

```
>>> import deeplake
>>> import logging
>>> logger = logging.getLogger("deeplake")
>>> logger.setLevel(logging.WARNING)
```

CHAPTER

TWENTYFIVE

DEEPLAKE.CORE.TRANSFORM

class deeplake.core.transform.**Pipeline**(*functions: List[ComputeFunction]*)

eval(*data_in*, *ds_out: Optional[Dataset] = None*, *num_workers: int = 0*, *scheduler: str = 'threaded'*, *progressbar: bool = True*, *skip_ok: bool = False*, *check_lengths: bool = True*, *pad_data_in: bool = False*, *read_only_ok: bool = False*, *cache_size: int = 16*, *checkpoint_interval: int = 0*, *ignore_errors: bool = False*, *verbose: bool = True*, ***kwargs*)

Evaluates the pipeline on `data_in` to produce an output dataset `ds_out`.

Parameters

- **data_in** – Input passed to the transform to generate output dataset. Should support __getitem__ and __len__. Can be a Deep Lake dataset.
- **ds_out** (*Dataset, optional*) –
  - The dataset object to which the transform will get written. If this is not provided, `data_in` will be overwritten if it is a Deep Lake dataset, otherwise error will be raised.
  - It should have all keys being generated in output already present as tensors. It's initial state should be either:
  - **Empty**, i.e., all tensors have no samples. In this case all samples are added to the dataset.
  - **All tensors are populated and have same length.** In this case new samples are appended to the dataset.
- **num_workers** (*int*) – The number of workers to use for performing the transform. Defaults to 0. When set to 0, it will always use serial processing, irrespective of the scheduler.
- **scheduler** (*str*) – The scheduler to be used to compute the transformation. Supported values include: 'serial', 'threaded', 'processed' and 'ray'. Defaults to 'threaded'.
- **progressbar** (*bool*) – Displays a progress bar if `True` (default).
- **skip_ok** (*bool*) – If `True`, skips the check for output tensors generated. This allows the user to skip certain tensors in the function definition. This is especially useful for inplace transformations in which certain tensors are not modified. Defaults to `False`.
- **check_lengths** (*bool*) – If `True`, checks whether `ds_out` has tensors of same lengths initially.
- **pad_data_in** (*bool*) – If `True`, pads tensors of `data_in` to match the length of the largest tensor in `data_in`. Defaults to `False`.

- **read_only_ok** (*bool*) – If `True` and output dataset is same as input dataset, the read-only check is skipped. Defaults to False.
- **cache_size** (*int*) – Cache size to be used by transform per worker.
- **checkpoint_interval** (*int*) – If > 0, the transform will be checkpointed with a commit every `checkpoint_interval` input samples to avoid restarting full transform due to intermitten failures. If the transform is interrupted, the intermediate data is deleted and the dataset is reset to the last commit. If <= 0, no checkpointing is done. Checkpoint interval should be a multiple of num_workers if num_workers > 0. Defaults to 0.
- **ignore_errors** (*bool*) – If `True`, input samples that causes transform to fail will be skipped and the errors will be ignored **if possible**.
- **verbose** (*bool*) – If `True`, prints additional information about the transform.
- ****kwargs** – Additional arguments.

Raises

- *InvalidInputDataError* – If `data_in` passed to transform is invalid. It should support __getitem__ and __len__ operations. Using scheduler other than "threaded" with deeplake dataset having base storage as memory as `data_in` will also raise this.
- *InvalidOutputDatasetError* – If all the tensors of `ds_out` passed to transform don't have the same length. Using scheduler other than "threaded" with deeplake dataset having base storage as memory as `ds_out` will also raise this.
- *TensorMismatchError* – If one or more of the outputs generated during transform contain different tensors than the ones present in 'ds_out' provided to transform.
- *UnsupportedSchedulerError* – If the scheduler passed is not recognized. Supported values include: 'serial', 'threaded', 'processed' and 'ray'.
- *TransformError* – All other exceptions raised if there are problems while running the pipeline.
- **ValueError** – If `num_workers` > 0 and `checkpoint_interval` is not a multiple of `num_workers` or if `checkpoint_interval` > 0 and ds_out is None.

noqa: DAR401

Example:

```
@deeplake.compute
def my_fn(sample_in: Any, samples_out, my_arg0, my_arg1=0):
    samples_out.my_tensor.append(my_arg0 * my_arg1)

# This transform can be used using the eval method in one of these 2 ways:-

# Directly evaluating the method
# here arg0 and arg1 correspond to the 3rd and 4th argument in my_fn
my_fn(arg0, arg1).eval(data_in, ds_out, scheduler="threaded", num_workers=5)

# As a part of a Transform pipeline containing other functions
pipeline = deeplake.compose([my_fn(a, b), another_function(x=2)])
pipeline.eval(data_in, ds_out, scheduler="processed", num_workers=2)
```

Note: `pad_data_in` is only applicable if `data_in` is a Deep Lake dataset.

CHAPTER

TWENTYSIX

DEEPLAKE.CORE.VECTORSTORE.DEEP_MEMORY

26.1 DeepMemory

class deeplake.core.vectorstore.deep_memory.deep_memory.**DeepMemory**

__init__(*dataset: Dataset*, *path: Union[str, Path]*, *logger: Logger*, *embedding_function: Optional[Any] = None*, *token: Optional[str] = None*, *creds: Optional[Union[Dict, str]] = None*)

Base Deep Memory class to train and evaluate models on DeepMemory managed service.

Parameters

- **dataset** (*Dataset*) – deeplake dataset object or path.
- **path** (*Union[str, pathlib.Path]*) – Path to the dataset.
- **logger** (*logging.Logger*) – Logger object.
- **embedding_function** (*Optional[Any], optional*) – Embedding funtion class used to convert queries/documents to embeddings. Defaults to None.
- **token** (*Optional[str], optional*) – API token for the DeepMemory managed service. Defaults to None.
- **creds** (*Optional[Dict[str, Any]], optional*) – Credentials to access the dataset. Defaults to None.

Raises

ImportError – if indra is not installed

cancel(*job_id: str*)

Cancel a training job on DeepMemory managed service.

Examples

```
>>> cancelled: bool = vectorstore.deep_memory.cancel(job_id)
```

Parameters

job_id (*str*) – job_id of the training job.

Returns

True if job was cancelled successfully, False otherwise.

Return type

bool

delete(*job_id: str*)

Delete a training job on DeepMemory managed service.

Examples

```
>>> deleted: bool = vectorstore.deep_memory.delete(job_id)
```

Parameters
job_id (*str*) – job_id of the training job.
Returns
True if job was deleted successfully, False otherwise.
Return type
bool

evaluate(*relevance: List[List[Tuple[str, int]]]*, *queries: List[str]*, *embedding_function: Optional[Callable[[...], List[ndarray]]] = None*, *embedding: Optional[Union[List[ndarray], List[List[float]]]] = None*, *top_k: List[int] = [1, 3, 5, 10, 50, 100]*, *qvs_params: Optional[Dict[str, Any]] = None*) → Dict[str, Dict[str, float]]

Evaluate a model using the DeepMemory managed service.

Examples

```
>>> # 1. Evaluate a model using an embedding function:
>>> relevance = [[("doc_id_1", 1), ("doc_id_2", 1)], [("doc_id_3", 1)]]
>>> queries = ["What is the capital of India?", "What is the capital of France?
↪"]
>>> embedding_function = openai_embedding.embed_documents
>>> vectorstore.deep_memory.evaluate(
...     relevance=relevance,
...     queries=queries,
...     embedding_function=embedding_function,
... )
```

```
>>> # 2. Evaluate a model with precomputed embeddings:
>>> embeddings = [[-1.2, 12, ...], ...]
>>> vectorstore.deep_memory.evaluate(
...     relevance=relevance,
...     queries=queries,
...     embedding=embeddings,
>>> )
```

```
>>> # 3. Evaluate a model with precomputed embeddings and log queries:
>>> vectorstore.deep_memory.evaluate(
...     relevance=relevance,
...     queries=queries,
...     embedding=embeddings,
...     qvs_params={"log_queries": True},
... )
```

```
>>> # 4. Evaluate with precomputed embeddings, log queries, and a custom␣
↪branch:
>>> vectorstore.deep_memory.evaluate(
...     relevance=relevance,
...     queries=queries,
```

(continues on next page)

(continued from previous page)

```
...     embedding=embeddings,
...     qvs_params={
...         "log_queries": True,
...         "branch": "queries",
...     }
... )
```

Parameters

- **queries** (*List[str]*) – Queries for model evaluation.
- **relevance** (*List[List[Tuple[str, int]]]*) – Relevant documents and scores for each query. - Outer list: matches the queries. - Inner list: pairs of doc_id and relevance score. - doc_id: Document ID from the corpus dataset, found in the *id* tensor. - relevance_score: Between 0 (not relevant) and 1 (relevant).
- **embedding** (*Optional[np.ndarray], optional*) – Query embeddings. Defaults to None.
- **embedding_function** (*Optional[Callable[..., List[np.ndarray]]], optional*) – Function to convert queries into embeddings. Defaults to None.
- **top_k** (*List[int], optional*) – Ranks for model evaluation. Defaults to [1, 3, 5, 10, 50, 100].
- **qvs_params** (*Optional[Dict], optional*) – Parameters to initialize the queries vectorstore. When specified, creates a new vectorstore to track evaluation queries, the Deep Memory response, and the naive vector search results. Defaults to None.

Returns

Recalls for each rank.

Return type

Dict[str, Dict[str, float]]

Raises

- **ImportError** – If *indra* is not installed.
- **ValueError** – If no embedding_function is provided either during initialization or evaluation.

get_model()

Get the name of the model currently being used by DeepMemory managed service.

list_jobs(*debug=False*)

List all training jobs on DeepMemory managed service.

set_model(*model_name: str*)

Set model.npy to use *model_name* instead of default model :param model_name: name of the model to use :type model_name: str

status(*job_id: str*)

Get the status of a training job on DeepMemory managed service.

Examples

```
>>> vectorstore.deep_memory.status(job_id)
-------------------------------------------------------------
|                 6508464cd80cab681bfcfff3                  |
-------------------------------------------------------------
| status                    | pending                       |
-------------------------------------------------------------
| progress                  | None                          |
-------------------------------------------------------------
| results                   | not available yet             |
-------------------------------------------------------------
```

Parameters

job_id (*str*) – job_id of the training job.

train(*queries: List[str]*, *relevance: List[List[Tuple[str, int]]]*, *embedding_function: Optional[Callable[[str], ndarray]] = None*, *token: Optional[str] = None*) → str

Train a model on DeepMemory managed service.

Examples

```
>>> queries: List[str] = ["What is the capital of India?", "What is the␣
↪capital of France?"]
>>> relevance: List[List[Tuple[str, int]]] = [[("doc_id_1", 1), ("doc_id_2",␣
↪1)], [("doc_id_3", 1)]]
>>> # doc_id_1, doc_id_2, doc_id_3 are the ids of the documents in the corpus␣
↪dataset that is relevant to the queries. It is stored in the `id` tensor of␣
↪the corpus dataset.
>>> job_id: str = vectorstore.deep_memory.train(queries, relevance)
```

Parameters

- **queries** (*List[str]*) – List of queries to train the model on.
- **relevance** (*List[List[Tuple[str, int]]]*) – List of relevant documents for each query with their respective relevance score. The outer list corresponds to the queries and the inner list corresponds to the doc_id, relevence_score pair for each query. doc_id is the document id in the corpus dataset. It is stored in the *id* tensor of the corpus dataset. relevence_score is the relevance score of the document for the query. The value is either 0 and 1, where 0 stands for not relevant (unknown relevance) and 1 stands for relevant. Currently, only values of 1 contribute to the training, and there is no reason to provide examples with relevance of 0.
- **embedding_function** (*Optional[Callable[[str], np.ndarray]], optional*) – Embedding funtion used to convert queries to embeddings. Defaults to None.
- **token** (*str, optional*) – API token for the DeepMemory managed service. Defaults to None.

Returns

job_id of the training job.

Return type

str

Raises

ValueError – if embedding_function is not specified either during initialization or during training.

CHAPTER

TWENTYSEVEN

DEEPLAKE.RANDOM.SEED

class deeplake.core.seed.**DeeplakeRandom**

get_seed() → Optional[int]

Returns the seed which set to the deeplake to control the flows

seed(*seed: Optional[int] = None*)

Set random seed to the deeplake engines

Parameters

seed (*int, optional*) – Integer seed for initializing the computational engines, used for bringing reproducibility to random operations. Set to `None` to reset the seed. Defaults to `None`.

Raises

TypeError – If the provided value type is not supported.

27.1 Background

Specify a seed to train models and run randomized Deep Lake operations reproducibly. Features affected are:

- Dataloader shuffling
- Sampling and random operations in Tensor Query Language (TQL)
- *Dataset.random_split*

The random seed can be specified using `deeplake.random.seed`:

```
>>> import deeplake
>>> deeplake.random.seed(0)
```

27.2 Random number generators in other libraries

The Deep Lake random seed does not affect random number generators in other libraries such as `numpy`.

However, seeds in other libraries will affect code where Deep Lake uses those libraries, but it will not impact the methods above where Deep Lake uses its internal seed.

CHAPTER

TWENTYEIGHT

INDICES AND TABLES

- genindex
- modindex
- search

PYTHON MODULE INDEX

d

INDEX

Symbols

A

E

F

G

H

I

K

L

M

N

T

U

V

W