

GLDv2 code/models

paper [arXiv.2004.01804](#)

These instructions can be used to reproduce results from the [GLDv2 paper](#). We present here results on the Revisited Oxford/Paris datasets since they are smaller and quicker to reproduce -- but note that a very similar procedure can be used to obtain results on the GLDv2 retrieval or recognition datasets.

Note that this directory also contains code to compute GLDv2 metrics: see `compute_retrieval_metrics.py`, `compute_recognition_metrics.py` and associated file reading / metric computation modules.

For more details on the dataset, please refer to its [website](#).

Install DELF library

To be able to use this code, please follow [these instructions](#) to properly install the DELF library.

Download Revisited Oxford/Paris datasets

```
mkdir -p ~/revisitop/data && cd ~/revisitop/data

# Oxford dataset.
wget http://www.robots.ox.ac.uk/~vgg/data/oxbuildings/oxbuild_images.tgz
mkdir oxford5k_images
tar -xvzf oxbuild_images.tgz -C oxford5k_images/

# Paris dataset. Download and move all images to same directory.
wget http://www.robots.ox.ac.uk/~vgg/data/parisbuildings/paris_1.tgz
wget http://www.robots.ox.ac.uk/~vgg/data/parisbuildings/paris_2.tgz
mkdir paris6k_images_tmp
tar -xvzf paris_1.tgz -C paris6k_images_tmp/
tar -xvzf paris_2.tgz -C paris6k_images_tmp/
mkdir paris6k_images
mv paris6k_images_tmp/paris/*.jpg paris6k_images/

# Revisited annotations.
wget http://cmp.felk.cvut.cz/revisitop/data/datasets/roxford5k/gnd_roxford5k.mat
wget http://cmp.felk.cvut.cz/revisitop/data/datasets/rparis6k/gnd_rparis6k.mat
```

Download model

```
# From models/research/delf/delf/python/datasets/google_landmarks_dataset
mkdir parameters && cd parameters

# RN101-ArcFace model trained on GLDv2-clean.
wget https://storage.googleapis.com/delf/rn101_af_gldv2clean_20200814.tar.gz
tar -xvzf rn101_af_gldv2clean_20200814.tar.gz
```

Feature extraction

We present here commands for extraction on `roxford5k` . To extract on `rparis6k` instead, please edit the arguments accordingly (especially the `dataset_file_path` argument).

Query feature extraction

In the Revisited Oxford/Paris experimental protocol, query images must be the cropped before feature extraction (this is done in the `extract_features` script, when setting `image_set=query`). Note that this is specific to these datasets, and not required for the GLDv2 retrieval/recognition datasets.

Run query feature extraction as follows:

```
# From models/research/delf/delf/python/datasets/google_landmarks_dataset
python3 ../../delf/extract_features.py \
  --delf_config_path rn101_af_gldv2clean_config.pbtxt \
  --dataset_file_path ~/revisitop/data/gnd_roxford5k.mat \
  --images_dir ~/revisitop/data/oxford5k_images \
  --image_set query \
  --output_features_dir ~/revisitop/data/oxford5k_features/query
```

Index feature extraction

Run index feature extraction as follows:

```
# From models/research/delf/delf/python/datasets/google_landmarks_dataset
python3 ../../delf/extract_features.py \
  --delf_config_path rn101_af_gldv2clean_config.pbtxt \
  --dataset_file_path ~/revisitop/data/gnd_roxford5k.mat \
  --images_dir ~/revisitop/data/oxford5k_images \
  --image_set index \
  --output_features_dir ~/revisitop/data/oxford5k_features/index
```

Perform retrieval

To run retrieval on `roxford5k` , the following command can be used:

```
# From models/research/delf/delf/python/datasets/google_landmarks_dataset
python3 ../../delf/perform_retrieval.py \
  --dataset_file_path ~/revisitop/data/gnd_roxford5k.mat \
  --query_features_dir ~/revisitop/data/oxford5k_features/query \
  --index_features_dir ~/revisitop/data/oxford5k_features/index \
  --output_dir ~/revisitop/results/oxford5k
```

A file with named `metrics.txt` will be written to the path given in `output_dir` . The contents should look approximately like:

```
hard
mAP=55.54
mP@k[ 1  5 10] [88.57 80.86 70.14]
mR@k[ 1  5 10] [19.46 33.65 42.44]
medium
mAP=76.23
```

```
mP@k[ 1 5 10] [95.71 92.86 90.43]
```

```
mR@k[ 1 5 10] [10.17 25.96 35.29]
```