Readme File

CS 282 Miniproject: Underwater Gesture Recognition

Dumbrique, Martija

Bag of Visual Words (BOVW):

* Scripts (adopted from Kushal Vyas’ implementation of Bag of Visual Words: <https://github.com/kushalvyas/Bag-of-Visual-Words-Python>)
  + Bag.py – main script for training and testing
  + helper.py – contains helper scripts for training and testing
* To test:
  + Put train images in ./images/train folder; this is needed to get the classes to be used in testing
    - Link to train images: <https://drive.google.com/open?id=1JCXaT9PSnyJ4KgTzlumMrmwALVt-2V_t>
  + Put test images in ./images/test folder
    - Link to test images: <https://drive.google.com/open?id=1ducpYZnC9dQznG90HbiyZSX3CYCR8UbR>
  + Put kmeans\_cluster\_3.sav, mega\_histogram\_3.pkl, svm\_train\_3.pkl, and vstack\_3.pkl in the same directory as Bag.py and helpers.py
    - Link to pretrained weights: <https://drive.google.com/open?id=1hSaZwRpbtOqFYep7Z4jW2kkKizEHoVqO>
  + run python Bag.py
* Dependencies:
  + OpenCV 3.4.2.17 (OpenCV-contrib-python==3.4.2.17), scikit-learn 0.20.3

Histogram of Gradients (HOG):

* Scripts:
  + train.py
  + trim\_hnm.py
  + testing.py
  + visualize\_predictions.py
* To test:
  + Put test images in ./images/test folder
    - Link to test images: <https://drive.google.com/open?id=1ducpYZnC9dQznG90HbiyZSX3CYCR8UbR>
  + Put hog\_svm.joblib pre-trained model in ./models folder
    - Link to pretrained weights: <https://drive.google.com/open?id=1pirGWIkZqWXBNSwQKuTdLpmMKowYrOUK>
  + Create ./results/ folder, where the csv containing the target classes and predictions will be saved
  + Run testing.py
* To visualize sample correct and incorrect predictions per class:
  + Create ./visualization/ folder, which will contain the sample images with predictions
  + Run visualize\_predictions.py
* Dependencies:
  + OpenCV 4.1.0.25 (opencv-contrib-python==4.1.0.25), scikit-learn 0.21.0

Squeeze-and-Excitation Network (SENet):

* link to the dataset and model weights - <https://drive.google.com/drive/folders/1X0aOGSVl_9HL1XG2kTswTZ2WMBaOJxnr?usp=sharing>
* Scripts:
  + data\_augmentation.py - contains the data augmentation techniques implemented for the deep learning model. Resulting images (saved as numpy matrices) are saved in the 'data' folder found in the Google Drive link above trim\_hnm.py
  + senet\_v3.py - contains the TensorFlow implementation of SE-Inception-ResNet-v2. Model weights are saved in the 'model' folder found in the Google Drive link above
* Dependencies
  + tensorflow-gpu 1.13.1, OpenCV 4.1.0.25 (opencv-contrib-python==4.1.0.25)