Facial Recognition Testing
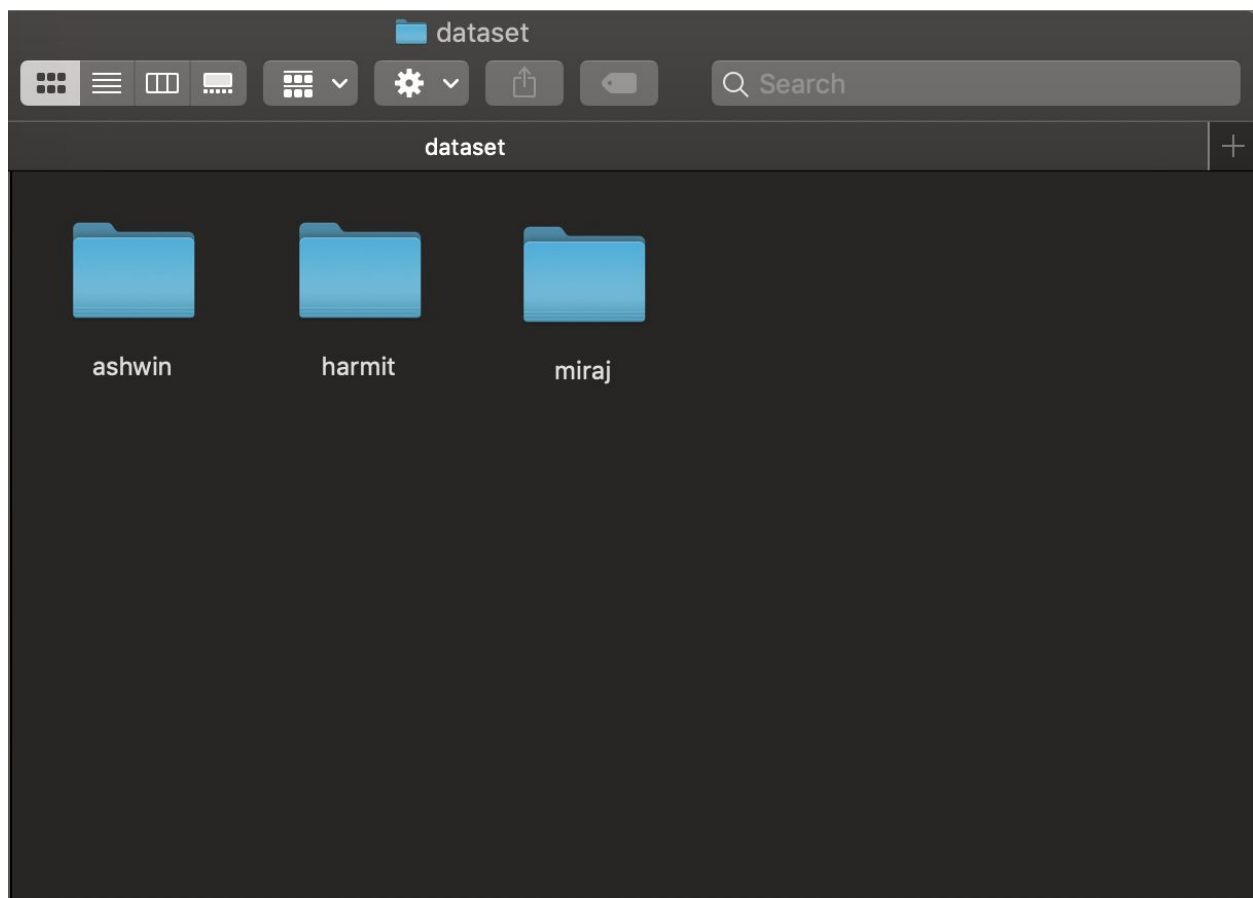
After following the directions itemized in the README.txt (which can also be found in the FacialRecognition directory:

https://github.com/nikunjjhaveri123/HomeSecurityAutomationApp/tree/master/FacialRecognition

the following are the unit tests that the facial recognition software passed.
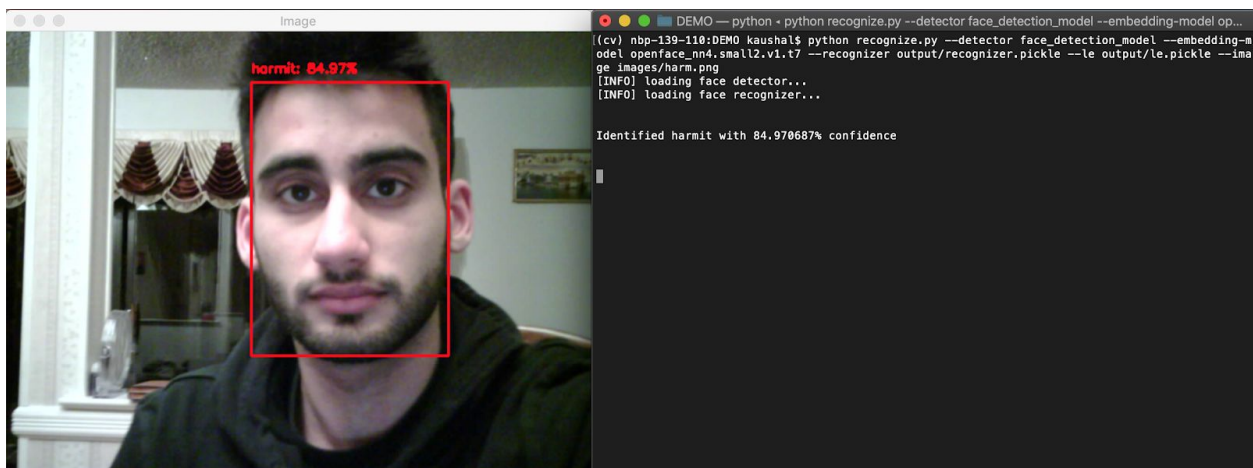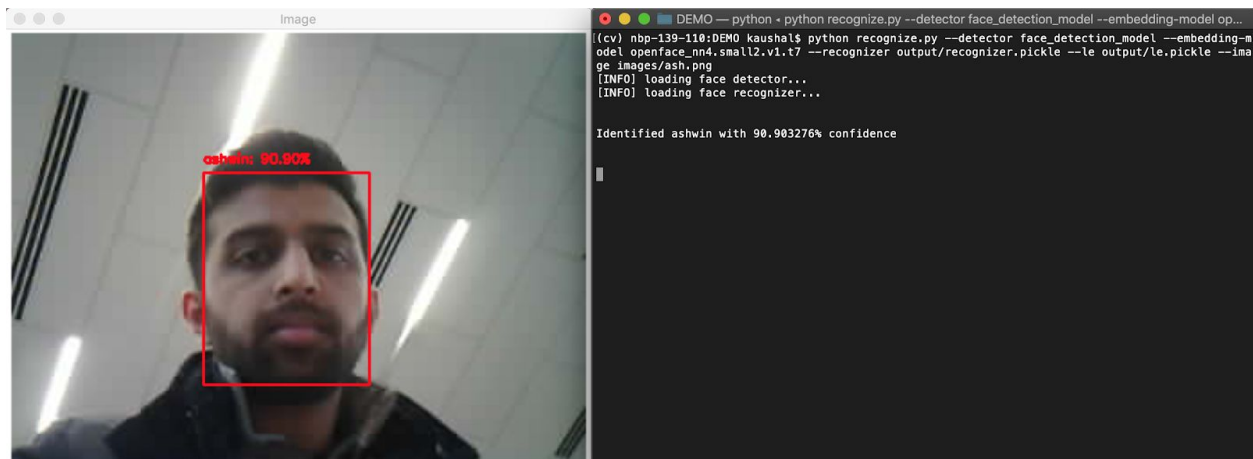
The dataset used can be seen in the following images:

This the dataset directory. It shows the three registered users that we wish the facial recognition system to identify.

It is important to train the model based on facial expressions and angles that the ArduCam is predicted to capture at. The model can be misled with pictures of the users smiling, in bad-lighting, non-shaved/shaven features, glasses/no glasses, etc. With clear, high-resolution images of each dataset subject, embeddings can hold more quantitative information that can help in its recognition of the subject, as well as the confidence with which it recognizes the subjects.

After executing the commands (which can be found in the README.txt) for extracting the embeddings and training the model, the facial recognition software outputted the following results:

Image

```
[(cv) nbp-139-110:DEMO kaushal$ python recognize.py --detector face_detection_model --embedding-m]
odel openface_nn4.small2.v1.t7 --recognizer output/recognizer.pickle --le output/le.pickle --ima
ge images/ash.png
[INFO] loading face detector...
[INFO] loading face recognizer...

Identified ashwin with 90.903276% confidence
```

ashwin: 90.90%

Image

```
[(cv) nbp-139-110:DEMO kaushal$ python recognize.py --detector face_detection_model --embedding-m]
odel openface_nn4.small2.v1.t7 --recognizer output/recognizer.pickle --le output/le.pickle --ima
ge images/harm.png
[INFO] loading face detector...
[INFO] loading face recognizer...

Identified harmit with 84.970687% confidence
```

harmit: 84.97%

The results are relatively high and can shift based on the latest training of the model by around 2%. The reason for there not being a full 100% confidence in identification is due to a drop in resolution between the test image and the data set images. With greater resolution comes more detailed and more accurate embeddings - the drop in embeddings between the two causes a lower confidence. Yet, the similarity in appearance of test images and dataset data causes the confidence to be relatively high.