

APPLYING TRANSFER LEARNING ON MOBINET FOR FACIAL AUTHENTICATION

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INTRODUCTION

Student loans and grants help students finance their education. Although loans are meant to give students a helping hand, the process to acquiring these loans are antiquated and not so convenient.

So the objective is to build a solution that is more efficient, convenient, simpler and faster to enable students in signing and acquiring loan allocations. Perhaps, even as simple as taking a selfie.

METHODOLOGY

I applied Transfer Learning on MobiNet to recognize unique facial features, hence Facial Authentication. Since MobiNet models are optimized to run on low-powered devices with limited resources, such as phones, they can be a mean to run complex computations and provide efficient solutions.

DATASET: The model was trained on Labeled Faces in the Wild (LFW) dataset which contains 13000 images of people, with 62 different classes.

FACE DETECTION: OpenCV DNN was used for automatic face detection and annotation. The coordinates were saved and later used to extract facial features from images dataset.

TRAINING: MobiNet model (ssd_mobilenet_v2_coco) and TensorFlow Object Detection API were trained, running on Google Colab. I ran 8000 epochs that took about 8 hours to complete.

TECHNIQUE: DNN finds the face in real-time and feeds that cropped full face image to the MobileNet classifier.

RESULTS

Average precision for the medium area is 0.427 and for a large area average precision is 0.855. This means the model with only 300x300 pixels of input can correctly identify a person, 85.5% of the time if the shown photo is full face, and 42.7% of the time when the face is a small part of the photo.

In other words, the smaller the face in the photo, the lower the chances of correctly recognizing the person.

CONCLUSION

The results attained proves that, with enough effort and right procedures, MobiNet models can be trained to recognize other objects, in this case, unique facial features.

Limitations: the model accept only low resolution, 300x300 pixel, images and face recognition requires higher resolution photos of the faces to be highly accurate.

As I look forward to serve the model in an Android app to authenticate and enable students to sign loan allocations, I will continue training and improving the model for higher efficiency, performance and accuracy.

REFERENCE

- Dataset (Labeled Faces in the Wild): <http://vis-www.cs.umass.edu/lfw/#deepfunnel-anchor>
- OpenCV DNN: <https://github.com/spmallick/learnopencv/tree/master/FaceDetectionComparison/models>
- MobiNet: https://github.com/tensorflow/models/blob/master/research/object_detection/g3doc/detection_model_zoo.md
- TensorFlow Object Detection API: https://github.com/tensorflow/models/tree/master/research/object_detection
- Real-time Face Recognition: <https://medium.com/@saidakbarp/real-time-face-recognition-tflite-3fb818ac039a>