

ENGR 2900 Project 1 Report

Javier Farach and Toby Zhu

February 2024

1 Abstract

In this project we implemented a pipeline for real time facial recognition in videos. We trained the model on a dataset we manually collected from various public data sets.

2 Introduction

Our goal is to predict whether a detected face in video or a picture is Bill Gates. Through trial and error, we eventually achieved just short of 90 percent accuracy.

3 Related Works

Our work was mostly based off of models given to us in class.

4 Methods

We performed transfer learning using Inception ResNet v1, which has been pre-trained on the VGGFace 2 dataset. We train the model on a dataset collected from two separate public datasets, CelebA and the Flickr-Faces-HQ Dataset, and manually labeled with two classes "bill gates" and "not bill gates". We use stochastic gradient descent to train a logistical regression model with a sigmoid activation function.

The model achieves 87 percent accuracy on validation set. We then use the model to perform facial recognition in videos. We use the DNN face detection model to output a bounding box around detected faces, and then feed the cropped face image to our facial recognition model to output either "bill gates" or "not bill gates".

5 Experiments

Our initial goal was to have a fully functioning facial recognition model for 5 tech celebrities: Steve Jobs, Jeff Bezos, Elon Musk, Mark Zuckerberg, and Bill Gates. We had data with over 800 images of each person. We created a functioning model, but its accuracy was low. With an accuracy of about 35 percent, the model was only a little better than guessing. For all of the data, we spent time making sure that the labels matched the actual photos since there were some inaccuracies. We also spent time splitting up the data into training and validation sets, as well as, making sure that the data was structured in a readable manner to load into the colab notebook.

However, since we were not able to get strong results, we decided to work on a simpler case - recognizing 1 celebrity, Bill Gates.

6 Potential for Future Work

Perhaps with more time, we could redevelop our model to detect several faces as originally planned. This would most likely involve significant changes to the model since we only achieved an accuracy slightly better than guessing.