**Introduction to Machine Learning**

**Final Project Report**

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**Introduction**

The final term project for the machine learning class was to implement a face recognition system using any machine learning techniques we have learned about. This report will lay out how we implemented the face recognition system.

**Implementation**

**Programming language chosen: Python**

The reason we chose this language is because of it’s powerful ability to implement complex programs in a very simple way. Python modules such as CV2 (OpenCV), Pillow, and Numpy were all that was needed for our recognition system.

**Recogniser Implementation: LBPHfacerecognizer**

OpenCV has a built-in recognizer called LBPHfacerecognizer. This is the recognizer we trained our dataset on. It uses the nearest neighbour method to predict the faces.

**Dataset**

Initially we had a dataset of 50 different individuals’ faces with 13 face images each. That makes a total of 650 images. We then decided to use 5 images per person reducing our training set to 250 images. The other pictures were then used in testing.

**Detection**

After training our recognizer we saved its state and then implemented our face detector. Since we were planning on using live video face recognition, we needed to use a webcam. OpenCV has a video capture function for that purpose. We then added the code that draws a square around a detected face and then the ID label on the bottom left of that square.

Results

Our detector was able to recognise the faces in out testing set. However, during video capture it would take a while to show the correct id. Sometimes it would switch between different ids before settling on one. We suggest that there might be several reasons for this. The lighting in the room of where the video capture is happening may affect the detection. Also, there could cameras used to obtain the dataset maybe different and so may affect the result.

**Improvement**

* Prepare the dataset in such a way as to make it as consistent as possible. (Such as resizing and using the same camera with the same lighting conditions for all the pictures in the dataset)
* Add more images to the training set.
* Control lighting for webcam detection.

**What we learnt:**

* How to use Github for collaborating on a project.
* How to use python cv2 module to implement a recognizer.
* How to data organization and preparing is important in Machine Learning.
* How to work on a project as a team.