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BONAFIDE CERTIFICATE

Certified that this project on "Automatic Attendance Management System" is a bonafide work of "Vineet Patel (1851104)", "Praveen Kumar (1851120)", "Bibek Mondal (1851121)" and "Monmohan Kumar(1851150)" who carried out the project work under my supervision.

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Computer Science and Engineering

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Index

Sl. No	Topic	Page No
1	Abstract	
2	Purpose	
3	Scope	
3.1	Introduction	
3.2	Our Approach	
4	Conclusions	
5	References	

Abstract

This project involves building an attendance system which utilizes facial recognition to mark the presence of Students. It covers areas such as facial detection, alignment, and recognition. This project intends to serve as an efficient substitute for traditional manual attendance systems. It can be used in corporate offices, schools, and organizations where security is essential.

Scope

Facial recognition is becoming more prominent in our society. It has made major progress in the field of security. It is a very effective tool that can help low enforcers to recognize criminals and software companies are leveraging the technology to help users access the technology. This technology can be further developed to be used in other avenues such as ATMs, accessing confidential files, or other sensitive materials. This project servers as a foundation for future projects based on facial detection and recognition.

Introduction

The purpose of this document is to specify software requirements of the Attendance Management System Using Face Recognition. It is intended to be a complete specification of what functionality the Attendance Management System provides.

Our project consist of two parts:

- a) Face-Recognition
- b) Attendance Management

Technology used:

- OpenCV
- Dlib
- Open-Source Face Recognition Library
- numpy

Tool used:

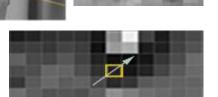
PyCharm

Our Approach

Step 1: Finding all the Faces

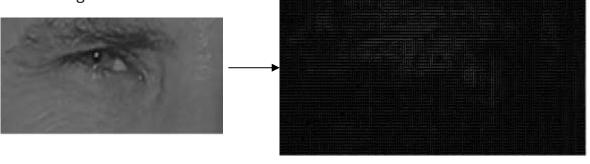
To find faces in an image, we'll start by making our image black and white because we don't need colour data to find faces.

Then we'll look at every single pixel in our image one at a time. For every single pixel, we want to look at the pixels that directly surrounding it.



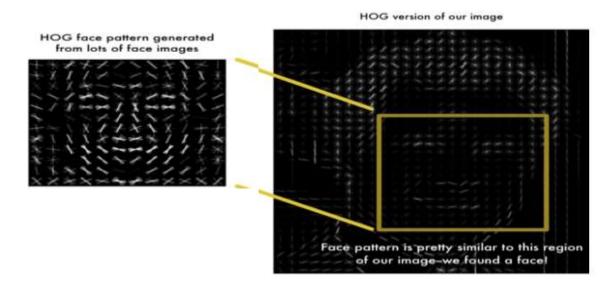
Our goal is to figure out how dark the current pixel is compared to the pixels directly surrounding it. Then we want to draw an arrow showing in which direction the

image is getting darker. If you repeat that process for **every single pixel** in the image, you end up with every pixel being replaced by an arrow. These arrows are called *gradients* and they show the flow from light to dark across the entire image.



But saving the gradient for every single pixel gives us way too much detail. To do this, we'll break up the image into small squares of 16x16 pixels each. In each square, we'll count up how many gradients point in each major direction (how many point up, point up-right, point right, etc...). Then we'll replace that square in the image with the arrow directions that were the strongest. The end result is we turn the original image into a very simple representation that captures the basic structure of a face in a simple way. To find faces in this HOG image, all we have to do is find the part of our image that looks the most

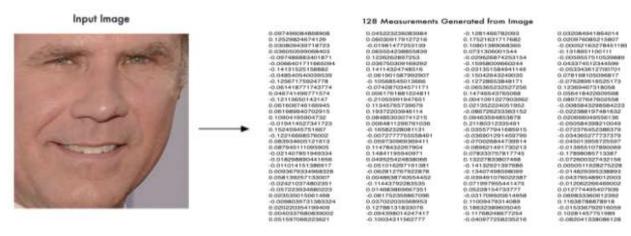
similar to a known HOG pattern that was extracted from a bunch of other training faces.



Step 2: Encoding Faces

What we need is a way to extract a few basic measurements from each face. Then we could measure our unknown face the same way and find the known face with the closest measurements. We are going to train it to generate 128 measurements for each face.

So all we need to do ourselves is run our face images through their pretrained network to get the 128 measurements for each face. Here's the measurements for our test image.



The algorithm returns a unique Id of the student with the minimum difference in the histograms of the image and dataset images. It also returns the calculated distance, which can be used as a confidence measurement. Lower the confidence measurement, more is the precision of the recognizer.

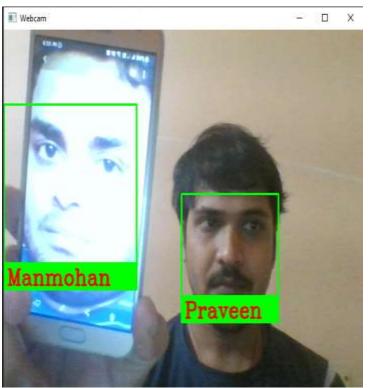
Step 3: Finding the person's name from the encoding

This step is actually the easiest step in the whole process. All we have to do is find the person in our database of known people who has the closest measurements to our test image.

All we need to do is train a classifier that can take in the measurements from a new test image and tells which known person is the closest match. Running this classifier takes milliseconds. The result of the classifier is the name of the person!

Step 4: Maintaining the Attendance Register.

The result of the classifier is the name of the person. This name is passed to the function which maintain the Attendance of the persons listed in the csv file. Only faces recognised on the webcam marked as present else marked as absent.



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A	А	В	c	D	E	1	F	
1	Date:-	20-01-2022						
2	Name	Attendance						
3	Ansh	Absent						
4	Арј	Absent						
5	Bibek	Absent						
6	Dewa	Absent						
7	JoyKrishna	Absent						
8	Manmohan	Present						
-	Naveen	Absent						
9	Obama	Absent						
		Present						
10	Praveen	FIESENL						
10 11	Praveen Vikash	Absent						
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Conclusions

The proposed method uses face detection and face recognition that helps to maintain the automated attendance system. For face recognition Histogram Of Oriented Gradients (HOG) algorithm and linear SVM classifier is applied.

In the result, name of the student is displayed. Lower is the distance, higher is the recognition rate.

According name matched with name present in the register will be marked as Present.

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- For debugging:

https://stackoverflow.com/

THANK YOU