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# Face Recognition Based Attendance Management System

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**Abstract** -We can implement algorithms for face detection and recognition in image processing to build a system that will detect and recognise frontal faces of students in a classroom. "A face is the front part of a person's head from the forehead to the chin. In human interactions, the face is the most important factor as it contains important information about a person or individual. All humans have the ability to recognise individuals from their faces. The proposed solution is to develop a working prototype of a system that will facilitate class control in a classroom by detecting the frontal faces of students from pictures taken from each student individually. The second part of the system will also be able to perform a facial recognition against a small database. In recent years, research has been carried out and face recognition and detection systems have been developed. Some of which are used on social media platforms, banking apps, government offices e.g. the Metropolitan Police, Facebook etc.

Keyword's: Attendance management system,Students,Attendance

## 1. INTRODUCTION

In Face Detection and Recognition systems, the flow process starts by being able to detect and recognise frontal faces from an input device. In today's world, it has been proven that students engage better during lectures only when there is effective classroom control. The need for high level student engagement is very important. Face detection and recognition is not new in our society we live in. The capacity of the human mind to recognize particular individuals is remarkable. It is amazing how the human mind can still persist in identification of certain individuals even through the passage of time, despite slight changes in appearance. Face detection is to search for faces with different expressions, sizes and angles in images in possession of complicated light and background and feeds back parameters of face".Face recognition processes images and identifies one or more faces in an image by analysing patterns and comparing them. This process uses algorithms which extracts features and compare them to a database to find a match.

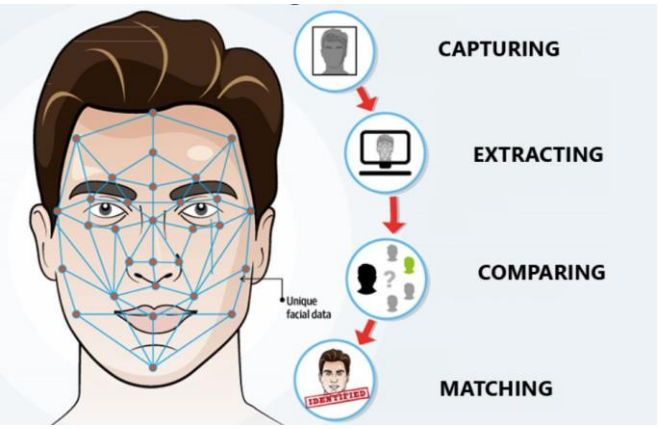


Image -1: Death's caused due to potholes

To develop a prototype that will facilitate classroom control and attendance by face detection and recognition of students faces in a digital image taken by a mobile phone camera or a webcam. The system should be able to detect students' frontal faces in a within 50% accuracy. The system should be able to automatically reveal the number of students present on a GUI. Recognise student stored on a database of faces by matching them to images on a database with accuracy within 30%. The system should be able to match detected students faces cropped from an image to those on a database on the system.

## 1) 1.1 Existing system

This project is being carried out due to the concerns that have been highlighted on the methods which lectures use to take attendance during lectures. The use of clickers, ID cards swiping and manually writing down names on a sheet of paper as a method to track student attendants has prompted this project to be carried out. This is not in any way to criticize the various methods used for student attendance, but to build a system that will detect each and every face individually. With the face detection and recognition system in place, it will be easy to tell if a student is actually present in the classroom or not.

## Dis-advantages

- It requires more data.
- In low light conditions the image detections will be less accurate
- It is more time consuming when more data of students to be trained.

## 2. Proposed system

It is well known almost in every college there is a manual attendance system .The use of clickers, ID cards swiping and manually writing down names on a sheet of paper as a method to track student attendants has prompted this project to be carried out. We further develop a prototype that will facilitate classroom control and attendance by face detection and recognition of students faces in a digital image taken by a mobile phone camera or Webcam.

## 2) 2.1 Methodology

From the figure, below, Face Detection or face detector will detect any given face in the given image or input video. Face localization, will detect where the faces are located in the given image/video, by use of bounding boxes. Face Alignment is when the system will find a face and align landmarks such as nose, eyes, chin, and mouth for feature extraction. Feature extraction, extracts key features such as the eyes, nose, and mouth to undergo tracking. Feature matching and classification. matches a face based on a trained data set of pictures from a database of about 60-65 pictures. Face recognition, gives a positive or negative output of a recognized face based on feature matching and classification from a referenced facial image. Face detection is the process of locating a face in a live video by any special computer software build for this purpose.

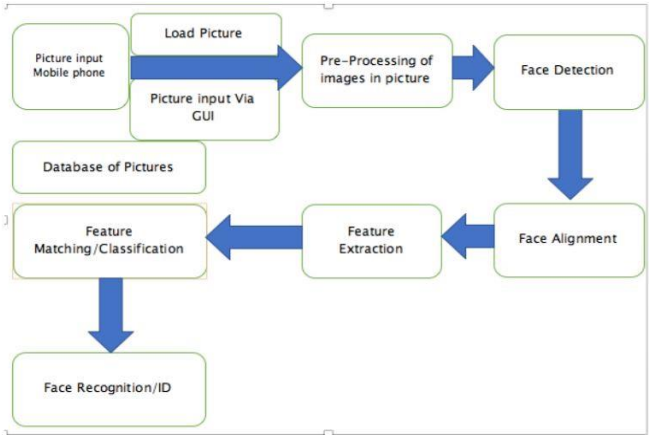


Image -2: Face Detection and Recognition

Flow Diagram

This model is trained to detect and differentiate 2 different classes namely

1. Student
2. Group of students (Having more than 2 students on the image While detecting)

We had labelled and trained the model in such way that detecting Student and group of students is the main priority.

### 2.2 Implementation

1. Gather required images and label them.

   We had got the Students images dataset We had used Labeling which is an open tool for labelling images.

2. Model used: TensorFlow's model

   TensorFlow provides several object detection models (pre-trained classifiers with specific neural network architectures) in its model zoo, we had used haarcascade_frontalface_default pre trained model
3. Training Student images

We had trained this model on my machine (4GB RAM) for like 30 minutes. The more time training the dataset results in high accuracy.

**Advantages**

- It doesn't require more workforce as complete work will be done by Ai.
- Manual attendance in a class can be avoided.
- Students attendance will be saved in a csv format with date and time.
- Automatic attendance will track every single face and detect fastly.

### 2.3 Final results

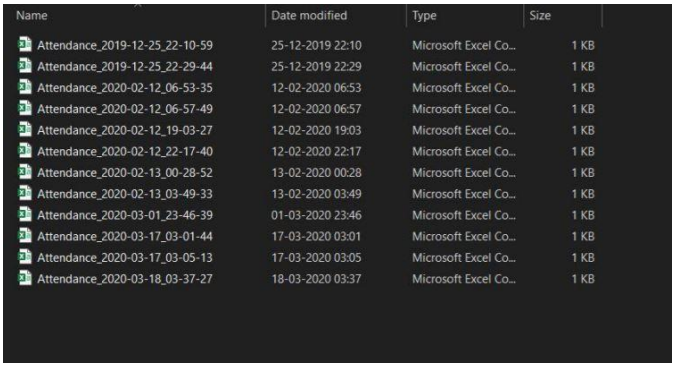


Image -2: Screenshot of CSV files with student attendance

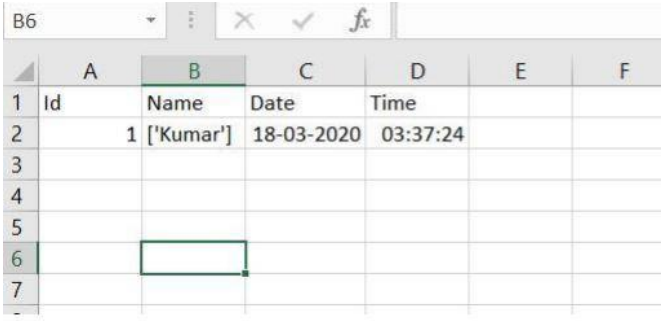


Image -3: Students data who was present

## 3. CONCLUSIONS

The requirements analysis of any project has laid the foundation to take the project forward through to the design and implementation phases. Information gathered from the literature review has been very useful. MoSCoW, SWOT analysis and Use Cases have been a strong tool to identify how the client wants the system to work. However, because aspects in this project are part of ongoing research, there will be changes during the implementation to achieve more which could lead to more contribution in the future.

## 4. Future scope

A more detailed research is needed on a project as such. The methods used could be combined with others to achieve great results. Different methods have been implemented in the past according to the literature review.

## 5.BIOGRAPHIES

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