# ABSTRACT

Automatic Face Recognition (AFR) technologies have made a lot of improvements in the world of science and technology. The main purpose of this project is to build a face recognition-based attendance monitoring system for educational institution to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The current old system has a lot of ambiguity that caused inaccurate and inefficient of attendance taking. Face recognition-based attendance system is a process of recognizing the faces of the students while taking attendance by using face bio-metrics based on high – definition monitor video and other information technology. In our face recognition project, a computer system will be able to find and recognize human faces quickly and precisely in images or videos that are being captured through a webcam / a surveillance camera. Here, faces will be recognized using face recognition algorithm. The processed image will then be compared against the existing record and then attendance marked in the database accordingly. The human face is the most distinctive feature used to uniquely identify an individual. Therefore, it is used to trace identity as the possibilities for a face to deviate or being duplicated is low.

**Key Words:** Face detection, Face Recognition, spreadsheet, Python, OpenCV, Tkinter GUI

# 1 INTRODUCTION

The technology aims in imparting a tremendous knowledge oriented technical innovation these days. Generally, in the classroom the attendance was taken by the teachers manually at the beginning and ending of the class. The problem with this approach is that it requires some time to take attendance and the manual process will have chances to make mistakes in most of the cases. To overcome that problem, RFID (Radio Frequency Identification) was introduced in the past years. But those are also having the fail proof of attendance system. So, we are introducing the concept of Face Recognition Based Student Attendance System. The main objective of proposed system is to allot attendance to the students using face recognition-based algorithms to achieve fail proof attendance system.

Face detection is used for many applications for the identification of human faces in digital images or video. It is defined as specific case of object-class detection; where it is used to find the locations and sizes of all objects in an image that belong to a given class. The technology is can be able to predict fontal or near-frontal faces in a photo, regardless of orientation, lighting conditions or skin color.

Face Recognition is a form of biometric software that maps an individual’s facial features mathematically and stores the data as a face print. The software consists of Deep Learning algorithms to compare a live capture or digital image to the stored face print in order to verify an individual’s identity.

## 1.1 Background

Maintaining the attendance is very essential in all the educational institutions for checking the performance of students. Many biometric systems are available in the market but the key authentications are same in all of the techniques. Every biometric system consists of enrollment process in which the unique features of a person is stored in the database and after that, there are some processes of identification and verification of the person. These two processes compare the biometric feature of a person with previously stored template captured at the time of enrollment of a student.

## 1.2 Problem Statement

1. According to the previous attendance management system, the accuracy of the data collected is the biggest issue. This is because the attendance might not be recorded personally by the original person, in another word, the attendance of a particular person can be taken by a third party without the realization of the institution which violates the accuracy of the data. For example, student A is lazy to attend a particular class, so student B helped him/her to sign for the attendance which in fact student A didn't attend the class, but the system overlooked this matter due to no enforcement practiced. Supposing the institution establish an enforcement, it might need to waste a lot of human resource and time which in turn will not be practical at all. Thus, all the recorded attendance in the previous system is not reliable for analysis usage. The second problem of the previous system is where it is too time consuming. Assuming the time taken for a student to sign his/her attendance on a 3-4 paged name list is approximately 1 minute. In 1 hour, only approximately 60 students can sign their attendance which is obviously inefficient and time consuming. The third issue is with the accessibility of those information by the legitimate concerned party. For an example, most of the parents are very concerned to track their child’s actual whereabouts to ensure their kid really attend the classes in college/school. However, in the previous system, there are no ways for the parents to access such information.

Therefore, evolution is needed to be done to the previous system to improve efficiency, data accuracy and provides accessibility to the information for those legitimate party.

## 1.3 Objectives

The proposed system will reduce the paperwork where attendance will no longer involve any manual recording. The new system will also reduce the total time needed to do attendance recording. The new system will acquire individual attendance by means of facial recognition to secure data accuracy of the attendance.

The following are objectives of the project:

* To develop a portable Smart Attendance System which is handy and self-powered.
* To ensure the speed of the attendance recording process is faster than the previous system which can go as fast as approximately 3 second for each student.
* To detect unique faces with the help of computer’s camera
* Able to recognize the face of an individual accurately based on the face database.
* Allow parents to track their child’s attendance.
* Develop a database for the attendance management system.
* Provide a user-friendly interface for admins to access the attendance database and for non-admins (parents) to check their child’s attendance by mailing the attendance.
* Allow new students or to store their faces in the database by using a GUI

## 1.4 Project Features

1. Long term storage of records
2. High accuracy in calculation
3. Time saving
4. Optimize the resources
5. Efficiency in modification, sorting and retrieval of data
6. Inexpensive updating in facilities and terms of organizations.

## 1.5 Scope and Limitations

As with any technology, there are potential drawbacks to using facial recognition, such as threats to privacy, violations of rights and personal freedoms, potential data theft and other crimes. There’s also the risk of errors due to flaws int the technology. Though there are some weaknesses of this system, there is a tremendous scope in present world. Here we discuss about scope and limitations of our project.

### 1.5.1 Scope of project

1. The main intention of this project is to solve the issues encountered in the old attendance system while reproducing a brand new innovative smart system that can provide convenience to the institution.
2. Provides facility for the automated attendance of students.
3. An excel sheet is created which contains the student attendance and is mailed to the respected faculty.

### 1.5.2 Limitation of project

1. The main problem of face recognition is large variability of recorded image due to pose, illumination condition, facial expression, different hairstyles, presence of glasses, beard.
2. Difficulties in code writing.
3. Difficulty to overcome ambiguity.

# 2 LITERATURE REVIEW

## 2.1 Introduction

The literature review deals with the topics and the researches that would help to understand Face Recognition Based Student Attendance System from the existing systems that are similar to Face Recognition Based Student Attendance system. The objective of this literature review is to analyze the related work to this project and mechanisms used in previous studies.