

# Self-X: Geo Fencing and Face Recognition based Smart Attendance Management Application

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**Abstract** - The attendance system, primarily in colleges or organizations, is necessary to monitor students discipline and attendance. Some biometric, barcode, and QR Code-based attendance systems haven't been able to eliminate the need for students to stand in line in front of the attendance machine, rendering the attendance procedure more cumbersome. With the use of a mobile application based on geofencing and facial recognition, this study aims to develop a flexible attendance system that may optimize and accelerate the process, saving the organization money by eliminating the need to purchase high tech equipment. A mobile application is utilized by the system as a presence device.

**Key Words:** Geo-Fencing, Face recognition, Face detection, mobile-based application system.

## 1. INTRODUCTION

Prior to the advent of computers and mobile devices, using a pen and paper was the most typical way to take attendance in classrooms at our institutions. Traditionally, the attendance system comprises calling out student's names or circulating an attendance sheet around the class, where each student is asked to sign it to attest to their actual present.

In the industrial era, all activities can be connected to and accessed by utilising a smartphone and the internet, although technology is now evolving very rapidly. The attendance system is expanding as well to make it simpler for students to use and to enhance student monitoring.

## 2. LITERATURE REVIEW

### 2.1. Fingerprint Based Recognition System

The portable fingerprint device needs to be pre-configured with each individual's fingerprints in advance for a departure system that uses fingerprints. The student should leave fingerprints on the suspended device before or after teaching hours to confirm their daily attendance. The idea is that people's eyes should be distracted while they are studying.

### 2.2. RFID (Radio Frequency Identification) Based Recognition System

Co-ed should always carry proper identity and place an ID with a cardboard reader to record their daily presence in

an RFID-based system that is already in place. The device may establish an RS232 connection and log participants on a previously visited website. There's a chance that someone could gain access fraudulently. When the real student is not there, some students may use another student's ID to prove their presence, or they may even attempt to abuse it occasionally.

### 2.3. Iris Based Recognition System

The student should rotate in front of the camera during an Iris-based student travel programme so that the camera can read the Iris code. The specific data saved on the website is compared to the scanned iris, and any discrepancies should be corrected. As a result, fewer college members of the organisation use paper and pens. Additionally, it helps preserve safe code records and lowers the likelihood of representation in the classroom. It is a wireless biometric technique that addresses the issue of fake existence and, as a result, the challenge of establishing a functional network.

### 2.4. Face Based Recognition System

The student should rotate in front of the camera during an Iris-based student travel programme so that the camera can read the Iris code. The specific data saved on the website is compared to the scanned iris, and any discrepancies should be corrected. As a result, fewer college members of the organisation use paper and pens. Additionally, it helps preserve safe code records and lowers the likelihood of representation in the classroom. It is a wireless biometric technique that addresses the issue of fake existence and, as a result, the challenge of establishing a functional network.

## 3. PROPOSED SYSTEM

### 3.1. Dataset Creation

A phone camera is used to take pictures of the students. A single student will be captured in numerous pictures from various perspectives and motions. There is pre-processing done to these pictures. To acquire the Region of Interest (ROI), which will be used in the recognition procedure, the photos are cropped. The clipped photos must then be resized to a specific pixel position. Then, these RGB photos will be transformed to grayscale versions. And after that, these pictures will be saved in a folder with the names of the respective students.



Fig -1: Dataset Creation

### 3.2. Face Detection

Finding human faces in visual material mechanically is a technique called face detection. We can find people in a picture, recognise important facial characteristics, and obtain the contours of faces that have been found using the face detection API provided by ML Kit. We can obtain the data we need to carry out tasks like enhancing selfies and images or creating avatars from a user's photo using facial recognition. We can use ML Kit in programmes like video chat or games that react to the player's facial emotions because it can conduct face recognition in real-time. When a visage is discovered, its location, size, and direction are recorded. Once a visage has been identified, it can be probed for features like the eyes and nostrils.

### 3.3. Face Recognition

Preparing training data, training the face recognizer, and prediction are the three processes in the face recognition process. The photographs in the dataset will serve as the training data in this case. They will be given an integer label designating which student they belong to. Face recognition software is then used to these pictures.

An individual can be identified using facial recognition, a well-known technology Google ML Kit, from their digital image or a video frame that is kept in our database. They are typically carried out by choosing particular facial characteristics from the picture with captured faces in our database. It is also described as a biometric AI-based tool that can recognise a person by their distinctive facial form and texture after examining specific patterns. Facial recognition is used in this module to recognise the picture and match it to the source information. A video frame or digital picture is taken from a video source, and that is how the individual is recognised.

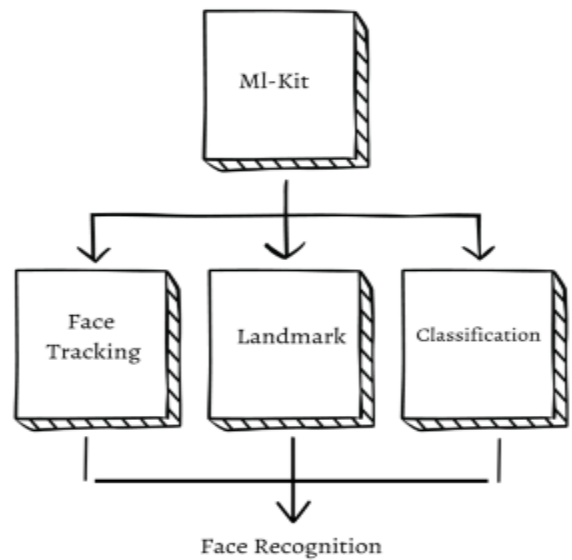


Fig -2: ML-Kit

### 3.4. Geo Fencing Authentication

The system compares the current student location's longitude and latitude with the geofencing information that has been stored using the GPS data. The system will lock the presence button until the location fits the geofencing if location data are inconsistent with the stored data. The suggested library trust\_location 2.0.13 that can detect Fake GPS users in order to prevent the GPS position in smartphones from being modified by an employing a Fake GPS application. Every few seconds, this library maintains longitude and latitude data, and if the data changes as a result of a fake GPS, the system can refuse to utilise it.

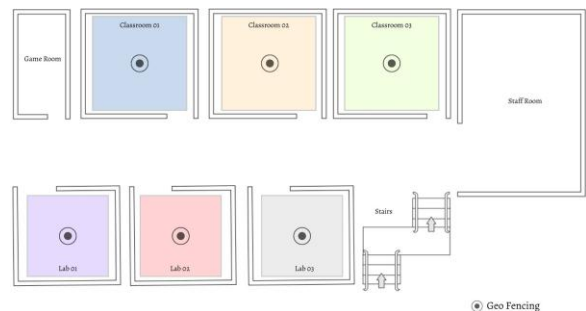


Fig -3: Geo-Fence

### 3.5. Attendance Updation

Following the face recognition process, the excel sheet will have the recognised faces marked as present and the remaining faces marked as absent. The list of absentees will then be mailed to the appropriate faculties. At the conclusion of each month, faculties will receive an update with their monthly attendance sheet.

#### 4. Flow Chart

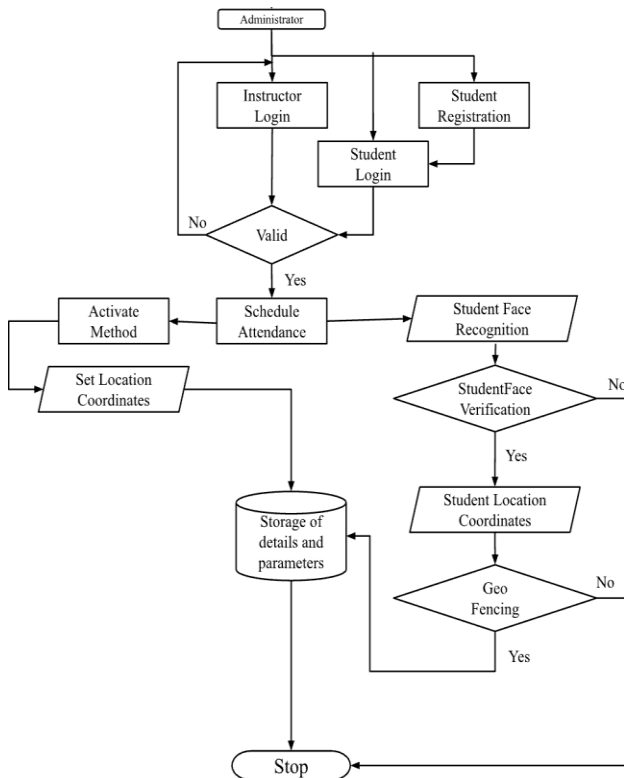


Fig-4: Flowchart

#### 5. Results

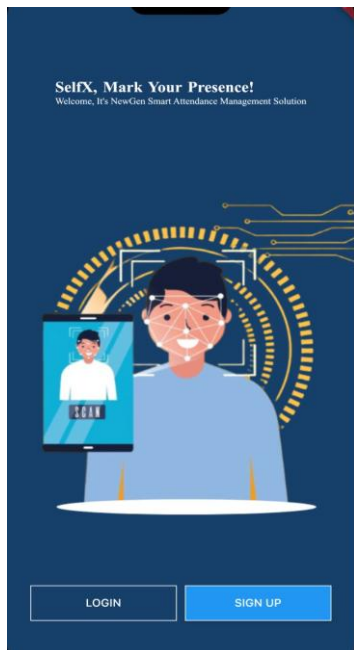


Fig 5- Welcome Page

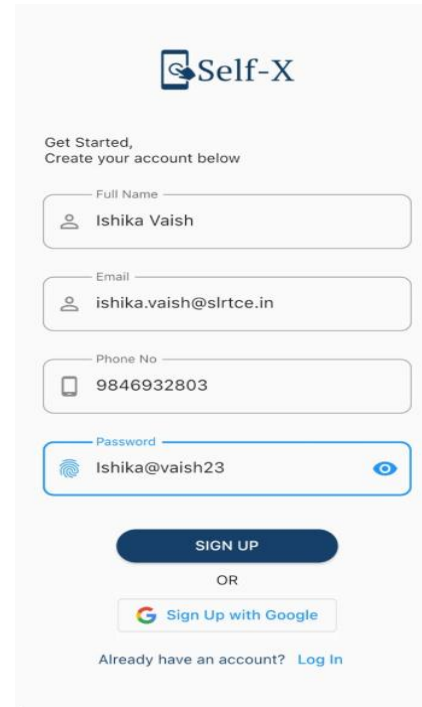
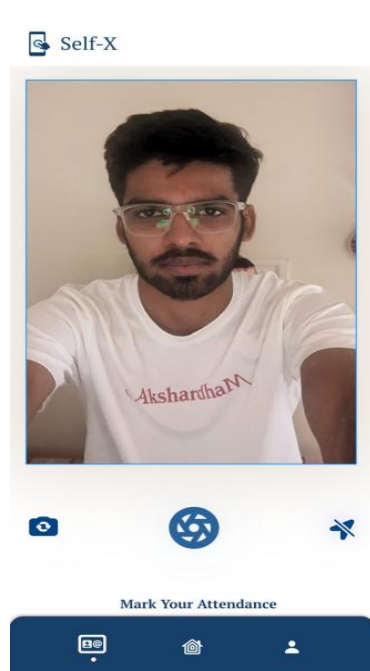


Fig 6- Registration Page



Fig 7- Dashboard Page



**Fig 8-** Attendance Page

## 6. CONCLUSIONS

Our project introduces a smart, geofencing based attendance monitoring system which use Face Recognition for the validation of the student. The area is set for tracking using GPS coordinate inside the area border depicts where lecture is to take place. We developed this system for Mobile app. We have planned to implement system for various applications like employees attendance or seminar attendance. Moreover can also build robust attendance management system.

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