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Biometric Attendance System for GSIT

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Abstract: *The purpose of this project is to develop a biometric attendance system for the Girijabai Sail Institute of Technology, Karwar. We are going to implement this system for faculties as well as for students. This project aims to reduce the work of faculties and reduce time consumption. The main objective of this project is to recognize and detect the faces of students as well as faculties along with fingerprint sensing. We are implementing this system with python as a programming language and OpenCV library is used for face recognition. And both the technologies are implemented in a single system.*

Keywords: *face detection, face recognition, OpenCV, python, fingerprint detection, fingerprint recognition, Arduino*

I. Introduction

As we are human beings, we are all having different colour, size, shape and features. These features are different eye colour; the different colour of hair, patterns of the palm, fingers, unique features of face etc. These features will differ from person to person. Biometrics is the term used for body measurements and calculations. It refers to metrics associated with human characteristics. Biometrics authentication is used as a sort of identification and access management. Biometrics are mostly used in the field of companies, industries, schools, colleges for the purpose of taking the attendance, to record the login and logout time of employers in industries and companies etc. It also reduces the time consumption and wastage of paper for recording the information. The system biometric system we are implementing is having both faces based and fingerprint-based technologies.

II. Problem Statement

Girijabai Sail Institute of Technology is an engineering college affiliated to VTU Belgaum is situated in Karwar, Karnataka. This college uses the traditional method of marking attendance. Every hour in the beginning or at the end of the period professors have to take the attendance of the students. There will be some cases when a student comes late for the period. And every day when professors enter college, they have to register that they are present for college. The solution to this problem is further described in this paper.

III. Literature Review

The literature review includes the following reference papers.

A. Fingerprint Based Attendance System Using Arduino [1]

This paper represents a fingerprint-based biometric attendance system. The fingerprint module and Arduino UNO are used to take and keep attendance. In this system, there are three main parts: enrolling, searching, and displaying the attendance. This simple device starts with the connection of Arduino and fingerprint sensor to the computer for enrolling. In the searching phase, as soon as the user presses the fingerprint sensor, it reads the user's fingerprint and displays the id. For this system, scanning time, date, user name, and ID number are displayed on the excel sheet.

C. Face Recognition Based Attendance System [3]

In this paper, a computer system will be able to find and recognize human faces fast and precisely in images or videos that are being captured through a surveillance camera. Numerous algorithms and techniques have been developed for improving the performance of face recognition but the concept to be implemented here is Deep Learning. It helps in the conversion of the frames of the video into images so that the face of the student can be easily recognized for their attendance so that the attendance database can be easily reflected automatically.

B Attendance management using face recognition [2]

The system is a real-world solution to handle the day-day activities of an organization such as a college. This paper uses a Principle Component Analysis in recognizing the faces of the detected person with high accuracy. The automated system maintains the attendance records of students as manual management of ledgers is a very tedious task.

The system enrols the subject's face into the database against the subject's ID (unique) and Name. The system then allows attendance to the recognized faces in the database.

D. IoT based biometric attendance system [4]
In this paper, a Biometric Access control system based on IoT is designed and implemented. In this project, we are using a mega 328P controller for the attendance system. the fingerprint sensor will give fingerprint enrolment and fingerprint matching. This system will also help in generating reports and evaluating the attendance eligibility of a student. The fingerprint is compared against a list of pre-registered users, and once a match is made, the individual will be registered as having.

IV. Methodology

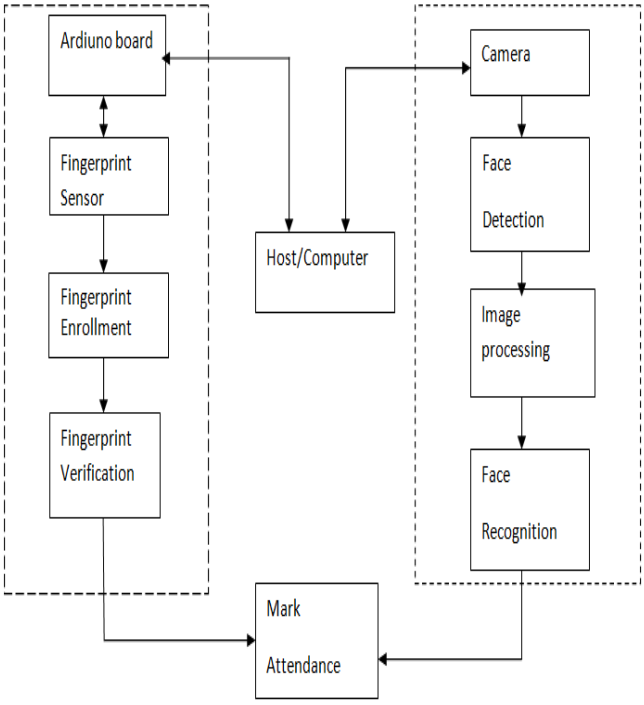

Fig.1: System Architecture

The above diagram fig: 3.1 shows the architecture of the proposed system. It consists of the fingerprint and face module. In the fingerprint module host/computer is connected to the Arduino board which in turn connected to the fingerprint sensor. Firstly, the user is asked to enter the id. When the id is entered system asks the user to keep the fingerprint of the sensor. Once the fingerprint image is captured it asks the user to remove the finger. Again, the user is asked to keep the finger on the sensor to match the fingerprint image, once the fingerprint is matched the enrolment of the user is done. Next time when the enrolled user keeps his finger on the fingerprint sensor it recognizes the user and the attendance is marked in an excel sheet.

The face module consists of a web camera that is connected to the sensor. In this process, the user is asked to enter an id. After entry of the id, the system takes the image of the user and converts it to the grey style images and the data set is trained and captured images are stored in a folder. Next time when the face has recognized the attendance is marked in the excel sheet along with the time stamp.

V. Conclusions

The biometric attendance system developed is a very efficient system that has both face detection and recognition as well as fingerprint detection and recognition. Face detection and recognition are implemented in the web camera itself. For future use, it can be implemented with CCTV cameras along with motion sensors in the classrooms. Where if a student moves away from the door it can be registered as log out and attendance can be marked, and if a student comes inside the classroom it can be registered as login and attendance can be marked. In fingerprint recognition and detection, attendance will be marked when the pattern of the user is matched. It can be developed in such a way that for a single user multiple different finger patterns should be given so that in the case of injuries other finger patterns should be matched. At a time either fingerprint or face can be detected; not both at the same time. For both types of attendances, a single excel sheet will be maintained for marking attendance.

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