Image Processing Based Student Attendance Monitoring System

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Abstract: We are intended to develop a safe and secure student attendance and monitoring system by the use of sensors and Camera. At Present, student's attendance is taken and recorded manually. This manual process requires more time and manpower. Manual attendance can be replaced by automatic methods with the use of sensor. This System uses Fingerprint sensor for initial verification, Camera for further verification. People counting Camera is used for Head count. It creates a major impact in creating a regularity in attendance without any human errors also will save the manual time for attendance.

Key Words: — *Monitoring System, Student Attendance, Manpower.*

I. INTRODUCTION

Attendance plays a key role in determining kids and young people's academic performance in schools and universities. Regular participation indicates that learners are less likely to participate in behaviour that is delinquent or harmful. Chronic lack raises the danger of failure at college and early dropout. Manual maintenance of attendance is inefficient due to the following reasons: It takes away a lot of lecture hours prone to proxies or impersonation. The aim of this research is to create a secure attendance

recording scheme based on electronic attendance to monitor and analyse students' existence. This system can obtain and store information to monitor attendance automatically. Teachers conduct a tiny handheld with a finger scanner and learners press their fingers to record attendance. Manual data entry can be avoided no proxy presence made. The main objective of this

project is to monitor the attendance of students in lecture sessions and laboratory and others in a more effective way. A stricter approach specially to prevent students cheating about their attendance is additionally tedious, where a lecturer calls out the individual names from the students list and validate the presence of every single student.

Such manual techniques have been demonstrated to be hard and time consuming to take student participation. Thus, a semi-automated system is needed to eliminate all these problems. It is therefore our goal to create a mobile attendance scheme fitted with an internet database, in particular to stop data loss and to encourage paperless and a greener workplace. In addition, the application will assist decrease wasted time, resulting in increased teaching productivity in the classroom.

II. LITERATURE SURVEY

Smart Classroom with Student Monitoring System. Megalan Leo N.Meenakshisundaram, V.Vedanarayanan Department of ETCE, Sathyabama Uiversity,Chennai-600119,Tamilnadu,India. Department of ETCE, Sathyabama Uiversity, Chennai-600119, Tamilnadu, India 3Department of ETCE, Sathyabama Uiversity, Chennai-600119, Tamilnadu, India megalanleo@gmail.com, meenak85@gmail.com veda_gopal@rediffmail.com .Prasanna.K et all reviewed the RFID techniques used for library. Among this, Iris recognition needs proper matching algorithm because capturing the iris and matching itself difficult. As well as, it takes longer time. Next model is the face recognition which involves the matching the face with the database. Here the main problem is memory and time delay involve in storing the database and matching. Several algorithms were developed to reduce the storage capacity. AyanSeal et all came with a random forest based fusion algorithm with a-trous wavelet transform coefficients to recognize human face with thermal and visible images [17]. This is a prototype of the actual

model of the smart classroom. The RFID interface shown in the prototype will be placed in the door of the actual model. When the tag will be in the range of the reader the door will open to get access inside the classroom. There is a visual indication of the complete sitting arrangement inside the classroom. The Qtouch sensors will be placed on the chairs. The sensors and RFID are integrated with the microcontroller and in the case of the prototype, the power supply to the microcontroller is taken from the laptop. The whole setup can be visualized by the use Atmel Studio 7.0. In this particular work, the programming is done in embedded C language. The platform we are using for the coding is Atmel Studio 7.0. It is free development software that is easily available in Atmel website. Given below is how the output will be displayed on the monitor. Few steps are required to be followed: After opening the Atmel Studio software click on the QTouch Analyser from Atmel studio. Then the program is compiled. After program is being uploaded to the microcontroller a Pop-up window will appear on the screen. This pop-up window displays that the kit is not yet connected with the Atmel ice programmer cum debugger. And thus, there won't be any kind of graphical display.

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Attendance was commonly used as a technique for tracking the academic behavior of learners. Usually, however, standard methods are time consuming and incorrect.

III. EXISTING SYSTEM

Biometric system that reads finger prints to monitor attendance in an institution.

But these systems aren't efficient and safe considering the post Covid pandemic.

There are also several projects and existing models that uses barcode for this attendance tracking. Smartphones can also be used for this purpose but, it seems there are chances to make fraudulent access in the system.

Many types of the research proposed video and image based automated monitoring where it's not economically feasible and depend on location of the camera, the posture of the student and sometime it may fail when there are two or more students with similar facial features.

IV. PROPOSED SYSTEM

An Arduino is connected with Camera, Fingerprint sensor a, Wi-Fi module Node MCU ESP8266 and an IOT. By enabling IOT connection with the controller, the Data of the Fingerprint sensor send to the database.

The Arduino is selected as a Microcontroller. The data is transferred to the Google Server Cloud. A fingerprint sensor is connected to the Arduino is to ensure the identification of the student. A camera is attached to the arduino to make the head count.
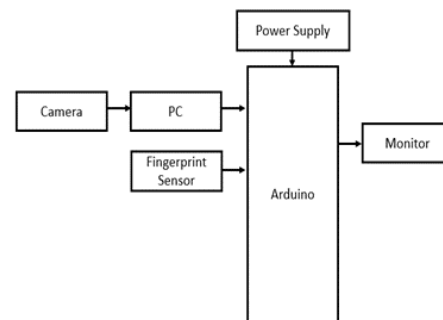

Fig.1. Block Diagram

4.1 Hardware Design

4.1.1. ARDUINO UNO

Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board.

This is what the Arduino board looks like.

Fig.2. Arduino UNO

4.1.2 Webcam

A **webcam** is a video camera which feeds its images in real time to a computer or computer network, often via USB, Ethernet or Wi-Fi. Their most popular use is the establishment of video links, permitting computers to act as videophones or

videoconference stations.

This common use as a video camera for the World Wide Web gave the webcam its name. Other popular uses include security surveillance and computer vision.

The webcam looks like,

Fig.3. Web Cam

4.1.3 Fingerprint Sensor

Fingerprint scanners are security systems of biometrics. They are used to unlock doors and in other security applications. During the 2010s fingerprint scanners became commonplace on mobile phones. The most important use area is in access control for computers.

This is especially important for laptops and PDAs.

Thanks to the price falling, more and more devices are equipped with sensors.

Other devices with built-in fingerprint sensors include USB hard drives, USB memory modules and card readers. They are also available in mice and keyboards.
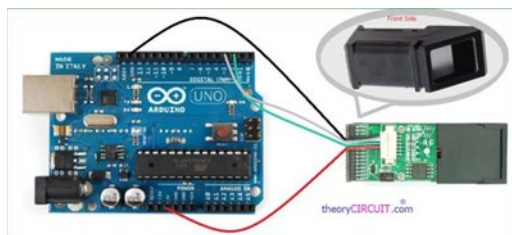

Fig.4. Experimental Setup

4.2 Embedded C Language

Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems.

4.3 Python

Python is a widely used general-purpose, high-level programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or Java. The language provides constructs intended to enable clear programs on both a small and large scale.

Python supports multiple programming paradigms, including object-oriented, imperative and functional programming or procedural styles. It features a dynamic type system and automatic memory management and has a large and comprehensive standard library.

4.4 Open CV

OpenCV is the huge open-source library for the computer vision, machine learning, and image processing and now it plays a major role in real-time operation which is very important in today's systems.

By using it, one can process images and videos to identify objects, faces, or even handwriting of a human.

When it integrated with various libraries, such as NumPy, python is capable of processing the OpenCV array structure for analysis. To Identify image pattern and its various features we use vector space and perform mathematical operations on these features.
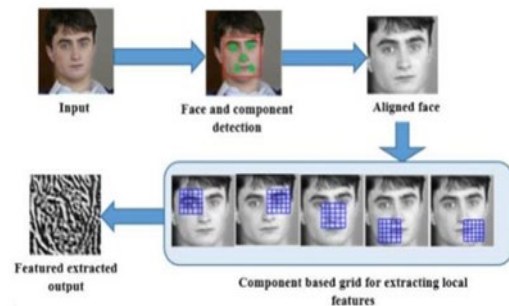

Fig.5. Face Recognition Technique

4.5 Result:

The prototype level of a smart attendance register was completed and tested. The device was tested and it worked without error. The database was also tested and it worked perfectly. From the result of the testing process, it was observed that a reliable, secure, fast and an efficient system has been developed replacing a manual and unreliable system

V. CONCLUSION

Tracking the participation of learners in a class has always been a time consuming and complicated work. The system

intended and deployed an automated tracking system for attendance in this job. Students finish the recognition process by taking the attendance.

Smart and intelligent teaching environment, will make students and teachers to access the quality of information more quickly, effortless and perfectly. Making the life of teaching staffs and students easier and more convenient, this would result in the transformation from traditional form to next generation teaching methods.

In conclusion, a smart attendance register was developed to replace the traditional attendance system that is currently used in many colleges and universities. It also eliminates placing of fingerprint device on the door since it is a wireless technology.

This system was designed to make the whole attendance taking process reliable, convenient, efficient, and accurate. Besides, the implementation of biometric technology helps in reducing errors, changed the current system to fully-computerized system, and provide easy way to track student attendance and generate report.

Future Scope:

Facial recognition solutions are expected to be present in 1.3 billion devices by 2024.Powered by AI, facial recognition software in mobile phone is already being used by companies like iproov and Mastercard to authenticate payments and other high-end authentication tasks.

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