Bus Monitoring System

Neha Parkara[1], Aashini Patel[2], Prof.Ajay kumar T. Shah[3]
[1, 2] Dept of Computer Engineering
[3]HOD, Dept of Computer Engineering
[1, 2, 3] Alpha College of Engineering and Technology

Abstract- *The whole world and the administrators of educational institutions in our country are concerned about the regularity of student attendance. Mainly there are two conventional methods for attendance taking and they are by calling student names or by taking student signs on paper. They both were more time-consuming and inefficient. The focus of this research is to analyze and critically evaluate the recent attendance marking techniques using face recognition methods. The literature review reveals the fact that the intelligent application of iterative facial recognition techniques can make attendance management systems more reliable. In this paper, we propose a conceptual model for an automated attendance system through facial recognition. Based on this review a new approach for student attendance recording and management is proposed to be used for various colleges or academic institutes.*

I. INTRODUCTION

Faculty has to take attendance again if the attendance sheet is being lost and in this case, absent students get a chance to make their presence in the new sheet. Manipulation and management of student attendance data have to be taken care of by the system so that the manual analysis of student attendance by the faculty will be removed. The system should automatically analyze all the data as it was transferred by the faculty. In this paper for student attendance, we present a unified management system using information technology for different purposes in an organization. FACE RECOGNITION is a technique replacing biometrics effectively. It is novel of all as it uses the facial features of the person for identification. It can be attributed as a technique with minimum flaws as the facial features of every human being are unique. Gallantly surpassing in various fields, face recognition can effectively be used for security systems but has not been pursued due to evident flaws. Addressing this issue, innovations have ended up in the wide-ranging use of biometrics. Attendance Management through biometrics had an awkward cost of extra effort and personal time at the user end. After the outbreak of face recognition as a useful method, techniques were evolved to incorporate it in attendance management systems. Biometric Attendance Management mainly uses iris recognition or thumb scanning. With the passage of time. advancements are also needed to pace up with ever-growing technology. As multi-tech classrooms are growing, Attendance Management through biometrics is also being improved and implemented. Facial Recognition is done through a camera without any accessory and the attendance is marked. The faces are used to validate the student's presence. The system is very useful in marking attendance and maintaining a record for the teacher, students, and management. Algorithms are used to match faces with the database faces of the student. Many have explored this aspect and managed to implement the system successfully.There were some limitations of accuracy and validation of the automatically marked attendance through facial recognition. The limitations of some notable works done previously on the subject have been discussed in detail in the next section of the literature review. Section three gives a brief but critical evaluation of all the works reviewed and some meaningful deductions have been derived. The fourth section addresses the solution of all the problems and the concept of a model of a new system is proposed. The last section concludes the study and highlights some future works needed for further refinement of the system.

II. LITERATURE REVIEW

A. Computerized attendance: In 2008, Nucleus Research proposed the use of a computerized attendance system, which can eliminate human involvement, human data entry mistake, repetitive work. This system is going to increase productivity, reduce payroll error, and reduce payroll inflation, reduced overtime, the retirement legacy systems, Elimination of paper costs, and which can provide all the reports on demand. In this system, faculty has to take attendance manually, only these records have to be entered into the computerized system. But in this also, the problem of data entry mistakes may occur. A desktop application developed by Jain et al. [6], in which all the list of registered students in a particular course will be displayed when the lecturer starts the application. The attendance registration is done by clicking a checkbox next to the name of the students that are present, and then a register button is clicked to mark their presence. But in this also, human involvement for attendance tracking is needed.

Another similar project was proposed, but in this case, the student will have to register individually using a client-server socket program from their device (laptop).

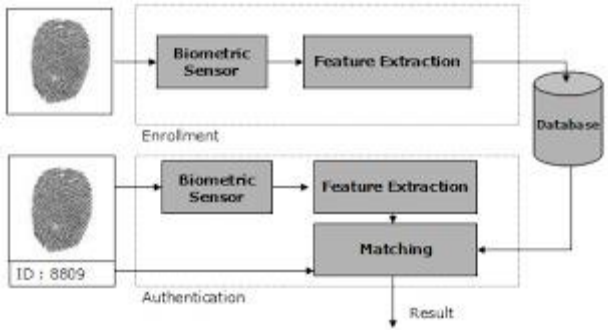
Registering the attendance by proxy is eliminated in the first and second project since the lecturer will see each and every student in the class, while in the latter case student snapshot is taken by the client application. Even though in both projects the time wastage is also there, but still it is an improvement in the manual process since attendance data can be stored safely and reports can be easily generated.

B. Bluetooth Based Attendance System:- In 2013, Vishal Bhalla et al. [14], proposed an attendance system that can take attendance using Bluetooth. In this project, attendance is being taken using the instructor's mobile phone. Application software installed in the instructor's mobile telephone enables it to query the student's mobile telephone via Bluetooth connection and through the transfer of the student's mobile telephone Media Access Control (MAC) addresses to the instructor's mobile telephone, presence of the student can be confirmed. The problem of this proposed system is that a student's phone is required for attendance. In case of students' absence if his mobile is given to his friend then also presents are marked. So the presence of the student is not necessary, only a phone should be in the coverage area

C. NFC Based System :- In the proposed system we use an NFC card as an Identity-Card for students. By using this NFC card we will mark the attendance of students. The attendance record of each student with the lecture is stored on the main server-side. The steps in the proposed system are as follows:- NFC card of every individual student will be registered with an Admin. A unique Identity-Card will be assigned to individual students. Chances of duplication will be overcome primarily by itself. Then the lecturer will go for the lecture with an NFC enabled phone and the proposed attendance android application pre installed in it. Lecturer will login in to the application using his/her username and password. After successful login lecturer will set class time and duration for the attendance record. The lecturer passes the smartphone to every individual student. The student has to scan their NFC card on the lecturer's smartphone. When a student scans a card on mobile then the application reads the card number from NFC card. The android application will send the NFC card number to the main server. At the main server-side student's attendance is recorded for that respective lecture. As the lecture ends the lecturer will close the application.

D. Finger Print Based:- With the introduction of biometric systems, things have become more systematic and hassle-free in many walks of life, and maintenance of attendance is also among one of the positively affected aspects. An automated fingerprint-based attendance system has replaced the annoying manual registers in many organizations. Fingerprint attendance system prevents fraud recording of working hours that employees otherwise used to do with manual paper attendance systems. It also keeps track of the holidays requested via a fingerprint attendance machine.

The fingerprint attendance machine has a reader that scans the finger impressions of employees and determines whether they are identical to the previously stored records. If they are found identical, the attendance criteria for the verified employees are maintained accordingly. The attendance system using fingerprints makes employees punctual. Biometric systems use fingerprints of the employee to verify the identity of the person clocking in and out. The fingerprint of the employee is scanned, the endpoints and intersections of the fingerprint are matched with the record present in the database and accordingly, access is granted. For a new employee, he has to newly add his/her fingerprint to clock in to work each day.



E. RFID BASED: Radio Frequency Identification (RFID) refers to a wireless system comprising two components: tags and readers. The reader is a device that has one or more antennas that emit radio waves and receive signals back from the RFID tag. Tags, which use radio waves to communicate their identity and other information to nearby readers, can be passive or active. Passive RFID tags are powered by the reader and do not have a battery. Active RFID tags are powered by batteries.

RFID tags can store a range of information from one serial number to several pages of data. Readers can be mobile so that they can be carried by hand, or they can be mounted on a post or overhead. Reader systems can also be built into the architecture of a cabinet, room, or building.

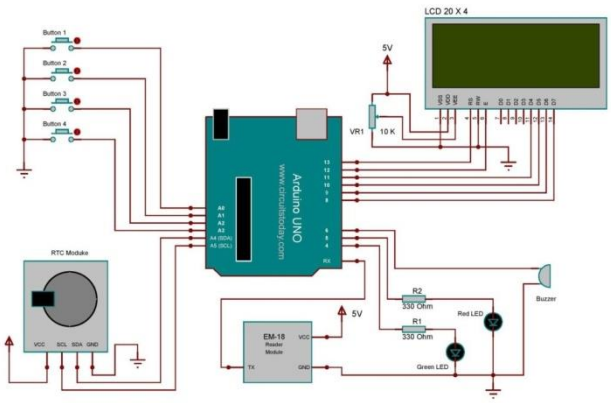
An RFID-based attendance management system can be designed using different types of microcontrollers, say an 8051 series controller, an AVR, a PIC, or an ARM controller.

The same RFID attendance system can also be developed using popular development boards like Arduino, Raspberry Pi, etc.

The choice of a microcontroller or a development board is purely based on the additional features and functionality you plan to incorporate into the system. For example: – If you plan to export all registered data in the system into a web platform (say a cloud host) at the end of every week, it's good not to use the 8051 series controller to design such a system. Such a kind of system which communicates with the internet can be designed efficiently (and easily) using AVR Atmega series controllers. If you are designing for hobby purposes, such a system can be easily designed using Arduino.

RFID Based Attendance System Using Arduino

This is the example of RFID-based attendance systems using Arduino. An RFID-based Attendance Management System is based on some simple concepts. We store a set of RFID card data in our system, say 3 or 10 RFID card data. When the person with the right RFID card (compatible with data preloaded in our program/system) comes and swipes his RFID tag, his arrival time will be stored on the system. When the same person swipes his RFID tag again, the system will save it as his leaving time and add it to his total working hours.



F. Path tracking and Navigations:- Being informed about the location of your vehicle is a necessity to remain safe. offers you the opportunity to track the path followed by your vehicle in Real-time or On-Demand basis at the ease of your Mobile Phone or PC or Tablet

With the Location and Path Tracker feature of our GPS Tracking solution, you can check in real-time, the location of the vehicle or the tracks of town for up to 24 months.

All with an integrated view of cartography 3D Google Maps, which makes it simple and intuitive with the exact availability of information through a satellite map.

Our GPS Tracking device which gets installed in your vehicle communicates with the tracking software and shares all the information through SMS or Email.

With the recent technological advancement of modern science, people are now expecting information about the location of any object for tracking purposes. Presently, we want more location-based services for being advanced and to save time and money also. GPS is a system that is already implemented and everyone can access it without any restriction. Having the facility of GPS to develop this system we need a GPS device to calculate the location from the information taken from GPS. Hence, we have chosen an Android device to perform these calculations because the Android mobile phone is cost-effective and offers multi-dimensional purposes having some special built-in features like GPS service. Thus, this system is developed for location tracking of a group of people with a proximity alert system using various latest demanding tools and technology like Jason, Java, AVD, LAMP, etc.

III. STUDY FINDINGS

A. In order to obtain the attendance of individuals and to record their time of entry and exit, the authors proposed an attendance management system based on face recognition technology in institutions/organizations. The system takes the attendance of each student by continuous observation at the entry and exit points. The result of our preliminary experiment shows improved performance in the estimation of attendance compared to the traditional black and white attendance systems. Current work is focused on the face detection algorithms from images.

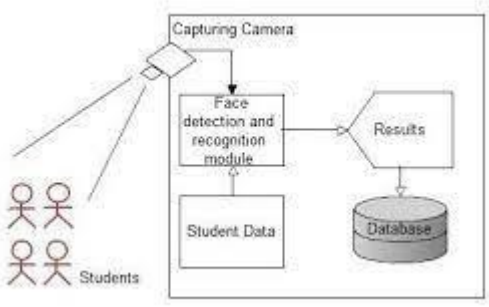
B. This system is user friendly and it can be easily installed, easily accessed, and can be used for various other purposes. It

is developed to provide extensive features to parents and school authorities and optimizes the monitoring of the school buses active on the different routes.

G. Iris recognition based: Iris recognition verification is one of the most reliable personal identification methods in biometrics. With the rapid development of iris recognition verification, a number of its applications have been proposed until now including time attendance system, etc. In this paper, a wireless iris recognition attendance management system is designed and implemented using Daugman's algorithm. These system-based biometrics and wireless techniques solve the problem of spurious attendance and the trouble of laying the corresponding network. It can make the users' attendance more easily and effectively. Iris recognition systems will scan the iris in different ways. It will analyze over 200 points of the iris including rings, furrows, freckles, the corona, and others characteristics. After recording data from each individual, it will save the information in a database for future use in comparing it every time a user wants to access the system.

Iris recognition security systems are considered one of the most accurate security systems nowadays. It is unique and easy to identify a user. Even though the system requires installation equipment and expensive fees, it is still the easiest and fastest method to identify a user.

H. **Facial recognition Based:-** Recognizing people by their faces in pictures and video feeds is seen everywhere starting from social media to phone cameras. A face recognition system is built for matching human faces with digital images. Ultimately what a computer recognizes is pixel values ranging from 0-255. In Computer Vision face recognition has been in for ages and has evolved over the years. Many researchers have come up with many new techniques to efficiently identify and tell apart faces. There are many use cases such as authentication and verification of users. We can use face recognition to record attendance from everyone present in an organization. In this face recognition, many algorithms are performed to dissect and capture images of someone's face, such as Machine Learning and Deep Learning. With this algorithm, the system can recognize a person's face and record attendance from that person so that attendance activities are more efficient and faster.



I. **Mobile-based system:** The mobile attendance system has been built to eliminate the time and effort wasted in taking attendance in schools and colleges. It also greatly reduces the number of paper resources needed in attendance data management. This is an android mobile app. It's built to be used for school/college faculty so that they may take student attendance on their phones.

The system is divided into the following modules:

Student Attendance List Creation: Once this App is installed on a phone, it allows users to create a student attendance sheet consisting of name, roll number, date, Absent/Present mark, and subject. He has to fill in student names along with associated roll numbers. Attendance Marking: The faculty has the list on his phone now. He may see the list call roll numbers and select absent id the student is absent or select present if the student is present. Attendance Storage: This data is now stored in the faculty mobile phone. Faculty may also view it anytime on their phone. Attendance sheet transfer: The faculty can transfer the file to a server (normal computer) via a Bluetooth connection where this data can be stored and maintained by the school or college. Thus this system automates the attendance system and eliminates the use of paperwork needed for attendance marking and monitoring student attendance.

IV. CONCLUSION

Face recognition technology has come a long way in the last twenty years. Today, machines are able to automatically verify identity information for secure transactions, surveillance and security tasks, and for access control to buildings, etc. These applications usually work in controlled environments and recognition algorithms can take advantage of the environmental constraints to obtain high recognition accuracy. However, next-generation face recognition systems are going to have a widespread application in smart environments -- where computers and machines are more like helpful assistants.

To achieve this goal computers must be able to reliably identify nearby people in a manner that fits naturally within the pattern of normal human interactions. They must not require special interactions and must conform to human intuitions about when recognition is likely. This implies that future smart environments should use the same modalities as humans, and have approximately the same limitations. These goals now appear in reach -- however, substantial research remains to be done in making person recognition technology work reliably, in widely varying conditions using information from single or multiple modalities.

Vehicle tracking systems are becoming increasingly important in large cities and it is more secure than other systems. Nowadays vehicle theft is rapidly increasing, with this we can have a good control in it. This technology can also help to advance the system of transportation and can be used in many organizations for security purposes and tracking purposes.

V. ACKNOWLEDGMENT

We express our sincere thanks to Prof. Ajay kumar T. Shah Head of Department of Computer Engineering, Alpha College of Engineering and Technology for their Support and guidance for this project and care taken by them in helping us to complete the project work successfully.

REFERENCES

[1] Hannan, M. A., A. M. Mustapha, A. Hussain, and H. Basri. "Intelligent bus monitoring and management system." In *Proceedings of the world congress on engineering and computer science*, vol. 2, pp. 24-26. 2012.

[2] James, Ciya, and David Nettikadan. "Student Monitoring System for School Bus Using Facial Recognition." In *2019 3rd International Conference on Trends in Electronics and Informatics (ICOEI)*, pp. 659-663. IEEE, 2019.

[3] Kar, Nirmalya, et al. "Study of implementing automated attendance system using face recognition technique." *International Journal of computer and communication engineering* 1.2 (2012): 100.

[4] Mistary, P. V., & Chile, R. H. (2015, December). Real time Vehicle tracking system based on ARM7 GPS and GSM technology. In *2015 Annual IEEE India Conference (INDICON)* (pp. 1-6). IEEE.

[5] Fuzail M, Nouman HM, Mushtaq MO, Raza B, Tayyab A, Talib MW. Face detection system for attendance of class' students. International journal of multidisciplinary sciences and engineering. 2014 Apr;5(4).

[6] Sutabri, Tata, Ade Kurniawan Pamungkur, and Raymond Erz Saragih. "Automatic Attendance System for University Student Using Face Recognition Based on Deep Learning." *International Journal of Machine Learning and Computing* 9.5 (2019): 668-674.

[7] Shehu, V., & Dika, A. (2010, June). Using real time computer vision algorithms in automatic attendance management systems. In *Proceedings of the ITI 2010, 32nd International Conference on Information Technology Interfaces* (pp. 397-402). IEEE.

[8] Lewis, A. K., Porter, M. A., Williams, T. A., Bzishvili, S., North, K. N., & Payne, J. M. (2017). Facial emotion recognition, face scan paths, and face perception in children with neurofibromatosis type 1. *Neuropsychology*, *31*(4), 361.

[9] Lee, SeokJu, Girma Tewolde, and Jaerock Kwon. "Design and implementation of vehicle tracking system using GPS/GSM/GPRS technology and smartphone application." *2014 IEEE world forum on internet of things (WF-IoT)*. IEEE, 2014.

[10] Maurya, Kunal, Mandeep Singh, and Neelu Jain. "Real time vehicle tracking system using GSM and GPS technology-an anti-theft tracking system." *International Journal of Electronics and Computer Science Engineering. ISSN* 22771956 (2012): V1N3-1103.