



Easy Track: Smart Attendance Management systems

Vimalathithan S¹, Angayarkanni N¹, Susindhiran S², Karthikeyan M¹, Geetha K³

¹Department of Computer Science and Engineering, Mohamed Sathak AJ College of Engineering

²Department of Physics, CARE College of Engineering, Tiruchirappalli.

³Department of Chemistry, Anna University (Regional Campus), Tiruchirappalli

Abstract: Keeping track of attendance while engaging students in the classroom may be tough, especially when the class is big. The conventional method of calling pupils' names is tedious and time-consuming, and proxy attendance is always a possibility. To address this problem and maintain track of students' attendance, a smart attendance management system (SAMS) using face recognition and location has been presented. The traditional method is replaced with a mobile application, which eventually reduces the use of pen and paper. The application needs to be installed on the mobile by the student. The application will serve as a user interface that can be accessed by teachers, students, and admins. Overall attendance can be viewed by students using face recognition, and their statistical data is also presented in the application. Each student can be tracked using a unique user ID, and the student's presence can be recognized using GPS coordinates, typically longitudes and latitudes.

Keywords: Smart Attendance, Face Recognition, Geo Location.

I. INTRODUCTION

The modern educational environments necessitate the building of an integrated system for the provisioning of educational resources in all forms, as well as attention to the way they are accessed. This is where smart attendance comes in. The goal is not to force the student to attend but to ensure the presence of students and their acquisition of rich knowledge for their own good and the development of the country. The development of educational systems through the application of new technologies is recommended by the Saudi Vision 2030. The role of artificial intelligence (AI) in this part is to enhance basic daily tasks, such as health factors, automatically and improve well-being. Similarly, it can be utilized for smart attendance by means of facial recognition, iris detection, fingerprints, etc..

II. LITERATURE REVIEW

1. An idea of recording attendance using the face recognition technique and storing the data using IoT was proposed by Sharath Kumar R, Yathish S Dhanajaya, Renukaprasad M R, Subramani Gajanan Moger, and Smitha Mallya. In this method, an Arduino Uno is used as a microcontroller. Faces of individuals or groups of pupils are detected by cameras. Based on the information stored prior, faces are recognized, attendance is recorded, and the database is obtained. This method provides better results in a short span of time but fails to produce the most accurate results, with some chances of errors.
2. An idea of recording attendance using biometrics (fingerprint) for tracking attendance and storing the data using LAN was proposed by Aniket Bansal, Satyam Kumar, Ashutosh Pandey, and Kaushal Kishor. A brief description of the usage, accessibility, accuracy, affordability, and acceptance of the biometric (fingerprint verification) system is provided in this paper. Data is fetched from the individual in the form of a fingerprint, then verified with the data stored prior, and the attendance of the individual is marked. Finally, the database is obtained. This method provides high-accuracy results and consumes less time but is not cost-effective.
3. The idea of granting access based on QR code detection was proposed by Peng-Cheng Huang, Chin-Chen Chang, Yung-Hui Li, and Yanjun Liu. In this method, the QR code is checked, and if it matches the stored data, access is provided for the user; otherwise, access is denied. This method is well-suited for residential purposes and provides better safety and security. The database is not collected in this method, making it less secure than other modern methods.
4. The idea of recording attendance using the face recognition technique is given by Samuel Lukas, Aditya Rama Mitra, Ririnikana Desanti, and Dion Krisnadi. A detailed description of the results and analysis obtained from this method is also provided in this paper. Faces are recognized using cameras, and verification is done, then attendance is marked.



This method is suitable only for a moderate number of people, and the results obtained are nearly 87% accurate. This method fails to recognize people in large quantities and causes errors in results.

5. Attendance monitoring and management using QR code, based on sensing with cloud-based processing, were introduced by Gurlove Singh, Rohit Dwivedi, and Abhineet Anand of Galgotias University, Greater Noida, India. The problem of deceptive attendance and the trouble of faculties in uploading daily attendance on ERP is solved by this proposed technique. The users' attendance can be made more easily and effectively without any hassle using this technique. Less accuracy is given compared to biometrics by the use of this technique.

6. A web-based application developed for daily student attendance in university departments was proposed by Jacksi, Karwan & Ibrahim, Falah & Zebari, Shahab. Access to the attendance of a particular student in a particular class is facilitated by this system. This system also helps in generating reports and evaluating the attendance eligibility of a student. The improvement of work efficiency, students' study and development, and saving of human and material resources are achieved by this system.

7. The management of students' attendance recording, tracking student absenteeism, and supporting information services including students' grading marks, daily timetable, lecture times, classroom numbers, and other student-related instructions provided by faculty department staff is the aim of the proposed system by Norakmar Arbain, Noor Firdus Nordisn, and S. Saladin. Based on the results, the proposed attendance and information system is time-effective and reduces documentation efforts, and it does not consume power. Students attend RFID-based systems.

8. An automated attendance management system based on iris detection and recognition algorithms was proposed by Mr. Prashik S. Bhagat and Prof. S. Y. Chincholika. When the student enters the classroom, they are automatically detected, and attendance is marked by recognizing the student. The reliability of the attendance records is improved, and fraudulent issues that occur when using a manual register are avoided by this system. This system is cost-effective.

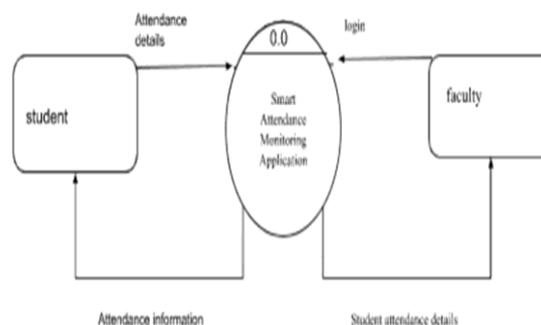
9. The method of taking attendance using the instructor's mobile telephone was presented by Vishal Bhalla, Tapodhan Singla, Ankit Gahlot, and Vijay Gupta. The attendance is taken manually by instructors in universities and colleges, either by calling out an individual's name or passing around an attendance sheet for the student's signature to confirm their presence. This method is cumbersome and time-consuming. A paperless, quick, and accurate method is presented in this paper. The instructor's mobile telephone, through application software, queries students' mobile telephones via Bluetooth connection, and the presence of the student is confirmed through the transfer of students' mobile telephones' Media Access Control (MAC) addresses to the instructor's mobile telephone.

10. A study of a fingerprint recognition system based on minutiae-based fingerprint algorithms used in various techniques was conducted by J. Chandramohan, R. Nagarajan, M. Ashok Kumar, T. Dineshkumar, G. Kannan, and R. Prakash. This track mainly involves the extraction of minutiae points from the model fingerprint images and fingerprint matching based on the number of minutiae pairings among fingerprints. The design method of fingerprint-based student attendance with the help of GSM is also provided in this paper. The requirement for stationary materials and personnel for keeping records is ignored by this system. The main objective of this paper is to develop an embedded system for security applications.

III. METHODOLOGY

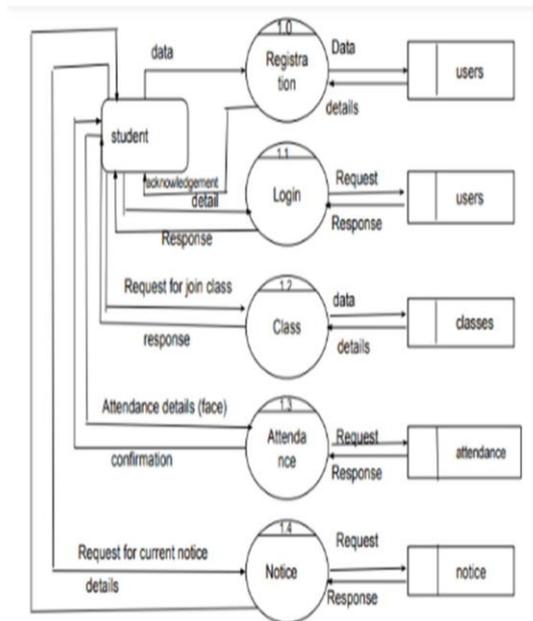
In this paper, an Android app is implemented, in which a smart attendance system is developed. Multi-feature functionality such as attendance information, notice displaying, class joining, and class details visibility are proposed. This app is beneficial for students, school faculty, and teachers. More time and paperwork are required by the traditional method of attendance. This smart attendance system is faster and paperless, and data of previous attendance notices and other class information is saved. All of these features are found within a single app.

A. DFD -0LEVEL

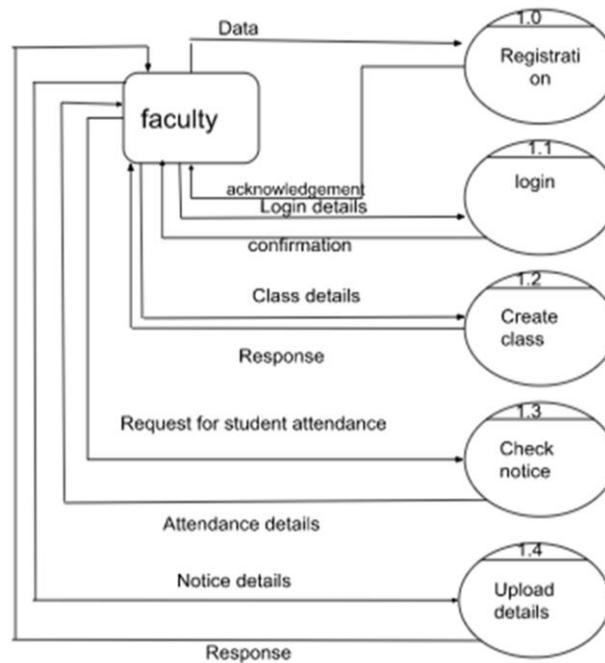




B. DFD-1 Level for Student



C. DFD-1 Level for Faculty





IV. IMPLEMENTATION



V ADVANTAGES

1. The use of paperwork and human efforts is excluded.
2. A systematic overall report of every class attendance is generated by the system.
3. Defaulters can be easily found by the faculty with a single click.
4. Records are maintained in a large database instead of the conventional method of maintaining a register, further simplifying the process of searching for a particular record.
5. The attendance history of a particular student can be easily obtained by users.
6. A manageable and systematic approach to maintaining attendance records is introduced by the system.
7. Time, cost, and institute resources are saved by the user..

VI CONCLUSION

A smart attendance management system has been designed to solve the issues of existing manual systems. Face recognition and the geo-location concept have been used to mark the attendance of students and improve the system. The feature of the app requires the application to be installed on the students' mobile devices. The application will function as a user interface that can be accessed by teachers, students, and administrators. The accuracy and speed of the attendance process are increased by the smart attendance system, ultimately achieving high-precision real-time attendance and its evaluation process. In the future, more machine learning and deep learning-based systems, in contrast to cloud computing, are intended to be investigated for the sake of smart attendance with added security solutions.

REFERENCES

- [1] Sharath Kumar R, Yathish S Dhanajaya, Renukprasada M R, Subramani Gajanan Moger, Smitha Mallya "IOT Based Cloud Integrated Smart Classroom and Sustainable Campus" Vol. 8, Issue 5; ISSN (Online) 2393-8021; ISSN (Print) 2394-1588; May 2021. <https://iarjset.com/papers/iot-based-cloud-integrated-smart-classroom-and-sustainable-campus>.
- [2] Aniket Bansal, Satyam Kumar, Ashutosh Pandey, Kaushal Kishor "Attendance Management System through Fingerprint" ISSN: 2321-9653; Volume 6 Issue IV; IC Value, April 2020. https://www.researchgate.net/publication/325268867_Attendance_Management_System_through_Fingerprint
- [3] Peng-Cheng Huang, Chin-Chen Chang, Yung-Hui Li, Yanjun Liu "Efficient access control system based on aesthetic QR code" DOI:10.1007/s00779-017-1089-y; February 2020



https://www.researchgate.net/publication/320846430_Efficient_access_control_system_based_on_aesthetic_QR_code

- [4] Samuel Lukas, Aditya Rama Mitra, Ririnikana Desanti, Dion Krisnadi, (2021). "Student attendance system in the classroom using face recognition technique" 2016 International Conference on Information and Communication Technology Convergence (ICTC) doi:10.1109/ictc.2016.7763360. <https://ieeexplore.ieee.org/document/7763360>
- [5] Gurlove Singh, Rohit Dwivedi, Abhineet Anand Galgotias University, Greater Noida, India. "Attendance monitoring and management using QR code based sensing with cloud based Processing" Volume 8, Issue 5 (September 2019) Peng-Cheng Huang 1,2 & Chin-Chen Chang 2 & Yung-Hui Li 3 & Yanjun Liu Peng-Cheng Huang 1,2 & Chih-Chen Chang 2 & Yung-Hui Li 3 & Yanjun Liu
- [6] Jacksi, Karwan & Ibrahim, Falah & Zebari, Shahab. (2020). "Student Attendance Management System". International Journal of Engineering and Technology. 6. 49-53. 10.21276/sjet.2018.6.2.1.
- [7] Norakmar Arbain, Noor Firdus Nordisn, S. Saaidin. (2021). "Web-based laboratory attendance system by integrating RFID-ARDUINO technology". <https://doi.org/10.1109/ICEESE.2021.7154601>
- [8] Mr. Prashik S. Bhagat, Prof. S. Y. Chincholikar, Electronics & Telecommunication, Shreeyash College of Engineering & Technology, Dr. BAMU University Aurangabad, Maharashtra, India. "Biometric Attendance System using Iris Recognition".
- [9] Vishal Bhalla, Tapodhan Singla, Ankit Gahlot, Vijay Gupta, Department of Computer Science And Engineering Dronacharya College of Engineering, Gurgaon, Haryana, India. "Bluetooth Based Attendance Management System".
- [10] J. Chandramohan, R. Nagarajan, M. Ashok Kumar, T. Dineshkumar, G. Kannan, R. Prakash. "Attendance Monitoring System of Students Based on Biometric and GPS Tracking System". <https://doi.org/10.24001/IJAEMS.3.3.16>