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Automated Attendance System using RFID and Face Recognition

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ABSTRACT: Automatic face recognition (AFR) technologies have made many improvements in changing world. For this purpose, several automated methods, such as biometric attendance, exist. All of these methods are idle as well, as students must form a line to touch their thumb to the checking device. This paper illustrates the efficient methodology that, without any intervention from outside sources, reliably predicts the turnout. This attendance is collected using a Camera and RFID label attached at the front of the classroom, with the camera constantly snapping photographs of students and the RFID label activating the camera so that a face may be captured and recognized to verify attendance. Then, throughout the course of regular class time, the ultrasonic sensor is activated. If a student departs during class time or arrives late, an ultrasonic sensor will activate the camera, taking a picture that will be sent to the server. The Department Head will update the student's information (if they were a no-show), and an SMS alert will be sent to the parent's mobile phone if the student caused a disturbance in class. Through the Android app, parents may see a photo of their misbehaving child.

KEYWORDS: RFID card, RFID reader, Ultrasonicsensor.

I. INTRODUCTION

The use of advanced face recognition technologies for identity verification is on the rise. Illumination, stance, facial expression, age, hair, and spectacles are all factors that might hinder face identification. RFID tags are employed in a system of electronic access control; they carry data that has been saved electronically. However, conventional RFID-based access control systems rely only on RFID cards to verify user identities. It is not necessary for the user to be the cardholder in order to submit an RFID card for authentication; anybody who presents a card that has been registered may do so. RFID-based access control systems solve this issue with the use of facial recognition technology. Attendance is now taken using paper forms and a lengthy waiting period due to the limitations of available biometric technology. Additionally, taking attendance by hand is a tedious task. Therefore, it is important to increase the efficiency of the attendance management system in order to minimize congestion and take people's urgent demands into account. RFID with Face Recognition: A Smarter Attendance System It is suggested that Video Processing be used in order to resolve the current problems. The goal of this project is to develop an Attendance Management System that makes use of RFID and Face Recognition to alleviate problems inherent in the status quo of attendance monitoring methods. We want to eventually be able to identify people in live video streams. Images with faces on them have been discovered and uploaded to the cloud. When an RFID is read, a comparison is made with the associated source picture in the database, and all attendees whose faces appear in both images are tagged present.

RFID (Radio Frequency Identification)-based Attendance System

In the last several years, a growing body of research and writing has emerged on the topic of Attendance Systems based on Radio Frequency Identification (RFID). Students would use RFID tag ID cards and put them on a card reader to record their attendance, as recommended by the authors. The RS232 port allows the device to communicate with a computer, where the attendance data may be stored. The issue of fraudulent access may arise as a result of using this method. A person without permission may get access to the building by using a legitimate employee's ID.



Fig.RFIDCard

Students' regular presence in class is the single most important factor in their academic success. Students who aren't required to show up to class on a regular basis score poorly on exams since there isn't a reliable way to track their

attendance. As a result, students' time and effort are squandered, some drop out altogether, and the school's image takes a serious hit. Furthermore, interrupting the instructor to take attendance disrupts the flow of the lesson and lowers performance. However, in order to take the final test, you must have attended class for at least 70 percent of the time. In, a mechanism was developed wherein students might be made aware of their attendance records in advance so that they may take preventative measures. These issues, which have grown more pressing in recent years, are only partially addressed by the conventional attendance system. Our new, more precise method of matching a person's face with their ID number eliminates all potential points of fraud and can kick off a more intelligent system capable of dealing with all of the problems just listed. Using previously recorded images of each student's face together with his or her unique identification number, our current system can accurately identify and tally each student as he or she enters the classroom using biometric and RFID-based verification methods. There will be no more disruptions to the flow of the classroom caused by mismanagement, fraud, or negligence, and the instructor may go back to teaching. A good education will not be withheld from the students. Arduino has been used in a number of projects aimed at creating a smart attendance system. The need for, and interest in, smart classroom projects based on automated systems is expanding as the number of students from all over the world, and especially from emerging and impoverished nations, rises fast. As an example, smart classroom projects based on IR modules have been deployed in several locations. Moreover, several educational institutions have used a Bluetooth module attendance system that links mobile phones with computers. During our investigation, we came across the GSM-based automated classroom system project. Using the Raspberry Pi and the ATmega development kit, RFID-based classroom systems have been suggested before. No matter how much we try, using a raspberry pi or ATmega32 development kit does not reduce the overall cost of our project. Since we want to provide this for educational institutions, ensuring accuracy and authenticity while keeping costs low is a major priority. Using RFID and a Real-Time-Clock (RTC) module, we were able to recognize users, verify their identities, and preserve detailed logs of when they entered and left the building. Clients have the option of storing this data locally on an SD card or sending it over the internet through an Ethernet shield.

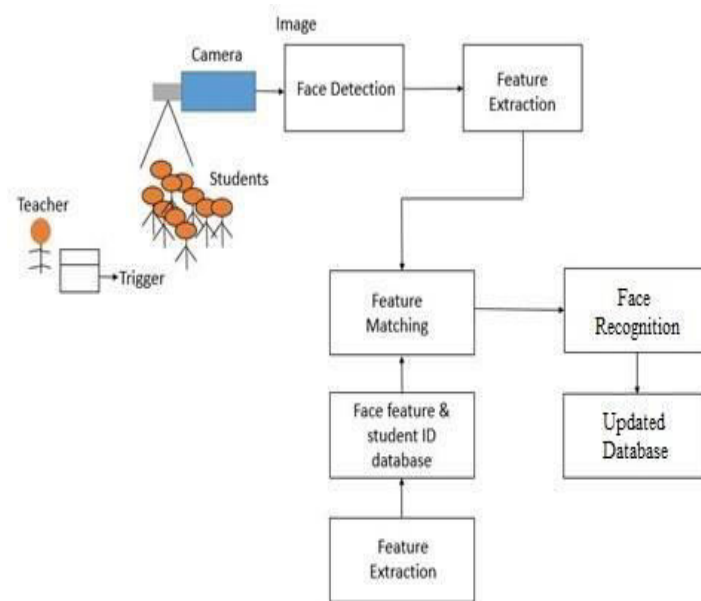


Fig.Face Recognition Block Diagram

II. REVIEW OF LITERATURE

(Praveen, Bala, and Pravin 2018) studied “attendance system using face recognition with rfid” uncovered the fact that class attendance is crucial for a grade and, if done manually, wastes a lot of time. For this purpose, several automated methods, such as biometric attendance, exist. All of these methods are idle as well, as students must form a line to touch their thumb to the checking device. This paper illustrates the efficient methodology that, without any intervention from outside sources, reliably predicts the turnout. This attendance is collected using a Camera and RFID label attached at the front of the classroom, with the camera constantly snapping photographs of students and the RFID label activating the camera so that a face may be captured and recognized to verify attendance. Then, throughout the course of regular class

time, the ultrasonic sensor is activated. If a student departs during class time or arrives late, an ultrasonic sensor will activate the camera, taking a picture that will be sent to the server. The Department Head will update the student's information (if they were a no-show), and an SMS alert will be sent to the parent's mobile phone if the student caused a disturbance in class. Through the Android app, parents may see a photo of their misbehaving child. This article provides a comprehensive review of existing literature on the topic of attendance frameworks, and it illustrates the engineering, programming, calculations, and findings.

(Akbar et al. 2019) studied "Face Recognition and RFID Verified Attendance System" discovered this and For educational institutions to successfully distribute and guarantee that every student receives a quality education, accurate attendance monitoring is very necessary. This article proposes a model of an automated attendance system, with the goal of reducing the amount of human labor required for data collection and removing any possibility of fraudulent activity. The model focuses on how facial recognition may be used with Radio Frequency Identification (RFID) to identify allowed pupils and keep track of them as they enter and exit the classroom. The Smart Attendance System maintains an accurate record of each and every enrolled student, hence making the historically laborious chore far less burdensome. In addition to that, the attendance record of this advanced system includes the information for each student who is enrolled for a certain class, and it offers the required details in accordance with the requirements. The constraints that are present in the manual attendance system that is now in use may largely be eradicated thanks to our technology, which involves simultaneously identifying the individual's face and verifying their RFID tag. The implementation of a system that makes use of IR modules to detect the presence of humans inside a room ensures that the electronics in that room are only activated when there are people present in the room, which helps us save energy. (Padwal et al. 2017) studied "automated attendance system using rfid and face recognition" discovered this and Maintaining regular classroom attendance is a mandatory requirement that, if ignored, may result in a significant loss of productive time. For this particular purpose, there are a number of pre-programmed solutions available, such as biometric attendance. Because students need to form a line in order to touch their thumb to the checking device, each of these strategies also hangs about unused for the most part. This study illustrates the efficient computation that inherently indicates attendance without the need for any intervention from a human being. This attendance is taken utilizing a Camera in addition to an RFID label that is connected before the classroom. The camera has a setting that allows it to continuously take pictures of the students, and the RFID label is what triggers the camera and allows a face to be captured and recognized for the purpose of checking attendance. In the event that an understudy leaves the classroom in the midst of the scheduled class hours or arrives late to the session, the image will capture their departure and be uploaded to the database. The information about a student who caused a disturbance and then left the class is updated in the records by the department in charge, and an SMS alert is sent to the parent's mobile device. It is a completely automated program that is not only trustworthy but also simple to control and redeemable in terms of time. (P, K.V, and P 2022) studied "Smart Attendance System using Face Recognition and RFID Technology" discovered that many methods of identification such as RFID, fingerprint recognition, and iris recognition are used in the process of registering attendance in businesses and other types of organizations. In comparison to the other methods of personal identification, facial recognition requires far less time and is significantly more effective. It has a variety of applications in the systems that control attendance as well as the security systems. The purpose of this work is to establish a system that uses RFID and facial recognition technology to take attendance of students and staff when they enter classrooms or buildings on campus, as well as people working in various industries and other settings. Using the dashboard application, which was built utilizing android, a time frame may be configured for collecting attendance, and the database will be automatically uploaded into the webserver using internet access. This technique is carried out devoid of any involvement from a human being. This system utilizes a Raspberry Pi that has the Open CV library loaded on it. Additionally, a Camera module is linked to the Raspberry Pi in order to detect and recognize faces. In addition, an RFID reader is linked so that the person's identification may be read and confirmed. The information is kept in the Firebase Database, and access to it may be gained via the use of Python programming. The database is then updated with the new attendance information, which can be accessed using the Android application that was designed.

(Preethi and Vodithala 2021) studied "automated attendance system using face recognition Akshara" discovered that and high-dimensional data, this technique is meant to simulate linear variation. found that and high-dimensional data. Its purpose is to locate a collection of mutually orthogonal basis functions that are capable of capturing the directions in which the data exhibit the greatest amount of variation and for which the coefficients are pairwise decorrelated. It is guaranteed that principal component analysis will find the dimensions of the manifold and create a compact representation if the manifold is linearly embedded. PCA was used to characterize face pictures using a set of basis functions, which were referred to as eigenfaces. Eigenfaces was developed early on as an effective application of principle components analysis (PCA) for the purpose of resolving issues pertaining to face identification and detection. The principal component analysis (PCA) is an unsupervised methodology, which means that the procedure does not depend on class knowledge. When we categorize our test vectors based on the Euclidean distance, we make use of the

closest neighbor (NN) technique that we have included in our implementation of eigenfaces. Principal Components Analysis using a Multilinear Approach One way to extend the functionality of principal component analysis (PCA) is to apply it to tensors or multilinear arrays. This yields a technique that is known as multilinear principal component analysis (MPCA). Since a face image is almost always a multilinear array — that is, there are two dimensions that describe the location of each pixel in a face image — the goal is to determine a multilinear projection for the image, as opposed to forming a one-dimensional (1D) vector from the face image and then locating a linear projection for the vector. This is because there are two dimensions that describe the location of each pixel in a face image. It is believed that the multilinear projection would be able to better capture the correlation between neighboring pixels, which would otherwise be lost in the process of creating a one-dimensional vector from the picture.

III. CONCLUSION

This paper symbolizes a student's attendance system via RFID and Face Recognition. In manual systems, it is possible to record a substantial quantity of go-between involvement. This will be replaced by a system that is operated by robots. RFID will take automatic involvement from each student as they are admitted into the class, which will eliminate the time loss experienced by the instructor. Obviously, a Face Recognition check will be performed on the understudy, which will enable the involvement of the intermediate person. The design and implementation of the Attendance System based on Face Recognition and Verification by RFID, which was our aim and objective of the paper at the beginning, ends with a success as both parts work as desired. This achievement brings us one step closer to accomplishing what we set out to do at the beginning of the paper. It should come as no surprise that the model we have presented has the potential of becoming superior to the current manual attendance system due to the fact that it is both time and labor saving and user friendly. Our methodology is not only simpler to use, but it also delivers data that is more accurate and better structured. In addition, with just a few minor adjustments, we are able to deploy our system in any facility that requires security. The planning and execution of an Attendance System that is based on Face Recognition and Verification by RFID, which was our goal and objective from the very beginning, finishes with a success since both parts operate as expected. This was our aim and objective from the very beginning. It should come as no surprise that the model we have presented has the potential of becoming superior to the current manual attendance system due to the fact that it is both time and labor saving and user friendly. Our methodology is not only simpler to use, but it also delivers data that is more accurate and better structured. Additionally, with just a few minor adjustments, we are able to utilize our system in any protected location.

REFERENCES

1. Akbar, Md Sajid, Pronob Sarker, Ahmad Tamim Mansoor, Abu Musa Al Ashray, and Jia Uddin. 2019. "Face Recognition and RFID Verified Attendance System." *Proceedings - 2018 International Conference on Computing, Electronics and Communications Engineering, ICCECE 2018* (January):168–72. doi: 10.1109/ICCECOME.2018.8658705.
2. P, Vignesh Kanna, Anusuya K.V, and Vaishnavi P. 2022. "Smart Attendance System Using Face Recognition and RFID Technology." doi: 10.4108/eai.7-12-2021.2314721.
3. Padwal, Jitesh, Miss Savitra Paharekari, Miss Chaitali Jadhav, Miss Surabhi Nilangekar, and Ujwala K. Bodke J. 2017. "Automated Attendance System Using NFC and Face Recognition." *Imperial Journal of Interdisciplinary Research* 3(1):2454–1362.
4. Praveen, R., Kumar M. Bala, and A. Pravin. 2018. "Attendance System Using Face Recognition With Rfid." *International Journal of Pure and Applied Mathematics* 119(15):2191–96.
5. Preethi, Kolipaka, and Swathy Vodithala. 2021. "Automated Smart Attendance System Using Face Recognition." *Proceedings - 5th International Conference on Intelligent Computing and Control Systems, ICICCS 2021* 1552–55. doi: 10.1109/ICICCS51141.2021.9432140.
6. Gaddam S. C. 251, Ramesh N. V. and Dhanekula H. (2016)
7. Face RecognitionBased Attendance Management System with Raspberry Pi 2 Using Eigen Faces Algorithm. *ARPN Journal of Engineering and Applied Sciences*, 11 (13): 8107-8112.
8. *International Journal of Educational Research and Information Science* 2018; 5(4): 31-37 37
9. FBI (2017) Face Recognition. Available at: https://fbi.gov/file-repository/about-us-cjis-fingerprints_biometrics-biometric-center-of-excellences-face-recognition.pdf. Accessed 14 January 2017.
10. Sato A., Imaoka H., Suzuki T. and Hosoi T. (2005) Advances in Face Detection and Recognition Technologies. *NEC Journal of Advance Technology*, 2 (1): 28-34.



11. Kisku R. and Rana S. (2016) Multithread Face Recognition in Cloud. Available at: <https://www.hindawi.com/journals/js/2016/2575904/>. Accessed 14 January 2017.
12. Badal J. Deshmukh, Sudhir M. Kharad, "Efficient Attendance Management", Volume 1 Issue 1 (September 2014)
13. Faudzi, N.Yahya, "Evaluation of face recognition techniques", 5th International Conference on Intelligent and Advanced Systems (ICCIA), Volume 1, Issue 2, pp.1-6, June 2014.
14. Paul Viola, Michael J. Jones, "Robust Real-Time Face Detection" International Journal of Computer Vision Volume 57 Issue 2, pp. 137 – 154, May 2014.
15. R N Daschoudhary, Rajashree Tripathy, "Real-time Face Detection and Tracking Using Multimodal Density Model" International Journal of Electronics and Computer Science Engineering Volume 3, Issue 2, pp.175-184, April 2014.
16. Sapna Vishwakarma, Prof. Krishan Kant Pathak, "Face Recognition using DCT Coefficient Vectors", International Journal of Engineering Trends and Technology (IJETT), Volume 9, Issue 2, pp.96-100, Mar-2014.
17. Omaira N. A. AL-Allaf. Review Of Face Detection Systems Based Artificial Intelligence Algorithms. The International Journal of Multimedia & Its Applications (Ijma) Vol.6, No.1, February 2014.
18. J.Chatrath, P.Gupta, P.Ahuja, A.Goel, "Real Time Human Face Detection", International Conference on Signal Processing and Integrated Networks (SPIN) Volume 1, Issue 1, pp. 705-710, 2014.
19. Aruna Bhat, "Face Recognition Using Eigen and Fisher Faces", International Journal of Soft Computing, Mathematics and Control (IJSCMC), Vol. 2, No. 3, August 2013.
20. Deepak Ghimire and Joonwhoan Lee, "Face Detection Method Based on Skin Color and Edges", J Inf Process Syst, Vol.9, No.1, March 2013.
21. Kandia Arora, "Real Time Application of Face Recognition Concept", International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231- 2307, Volume-2, Issue-5, November 2012.



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