

# Smart Attendance Using Rfid And Face Recognition

<sup>1</sup>Mrs. A. Eenaja, <sup>2</sup>B. Harika, <sup>3</sup>A. Mounika, <sup>4</sup>CH. Keerthi, <sup>5</sup>P. Lakshmi prasanna

<sup>1</sup>Associate Professor, Department of IT (Information Technology),

<sup>(2,3,4,5)</sup>B.Tech 3<sup>rd</sup> Year Students, Department of IT (Information Technology), Vignan's Institute of Management and Technology for Women, Hyderabad, Telangana - 501301, India

<sup>1</sup>[eenaja@vmtw.in](mailto:eenaja@vmtw.in), <sup>2</sup> [harikaamruthreddy12@gmail.com](mailto:harikaamruthreddy12@gmail.com), <sup>3</sup> [amouni3333@gmail.com](mailto:amouni3333@gmail.com),

<sup>4</sup> [chinthalacheruvukeerthi@gmail.com](mailto:chinthalacheruvukeerthi@gmail.com), <sup>5</sup> [lakshmiprasannapendem@gmail.com](mailto:lakshmiprasannapendem@gmail.com).

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## ABSTRACT

Smart Attendance System Using RFID And Face Recognition is a type of attendance system that has made it possible to record attendance in an automated way. The traditional ways that have been used before to record attendance are very ineffective as well as time-consuming, not forgetting the errors such as proxy attendance that may occur.

In this system, each user gets an RFID card or RFID tag, which when read by the system, will allow identification of the user and also provide the details related to the person. As soon as the reader reads the RFID card, simultaneously the user's face is captured through a webcam which makes use of face recognition technology for authentication of the person. Only if both the RFID card as well as face are authenticated by the system does the user get the attendance credit.

This system is extremely useful in terms of reducing proxy attendance and provides increased security to the system. Moreover, it involves minimum labor in the form of no manual intervention and reduced chances of any error taking place.

In conclusion, this system can be described as effective, scalable, and fit for use by large organizations. The efficiency of this system lies in the combination of hardware elements such as RFID technology and cameras alongside software elements including databases and recognition algorithms..

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## 1.INTRODUCTION:

Attendance Management is a vital process in educational institutions and organizations. Manual systems, like keeping attendance manually, are laborious and inefficient. Mistakes can easily happen in manual systems, and they make room for proxy attendance. Therefore, there is a need to introduce a system that addresses all the above challenges. A smart attendance system that uses RFID and face recognition techniques is proposed in this project. RFID is employed to identify individuals swiftly. Face recognition is employed to ascertain the identity of the individual.

The use of two forms of authentication makes the process more accurate and secure. Additionally, this system records attendance automatically in the database along with date and time information. Traditional attendance systems involve time wastage and have problems of allowing attendance by a proxy. In order to counter this problem, a Smart Attendance System based on RFID and Face Recognition technique is suggested. RFID is used to identify students while Face Recognition is utilized for verifying their identities

## 2.LITERATURE SURVEY:

Kumar et al. [1]

In this study, RFID technique is used for taking the attendance of the students. They use RFID card for marking their attendance very fast. The benefit of such a technique is fast processing of the information, but the downside is that an RFID card may be shared.

Sharma et al.[2]

Here, the focus of attention is face recognition-based attendance system, where the system recognizes individual based on his/her facial feature to mark attendance. Such a system is more secure than RFID-based attendance system, but it suffers due to changes in lighting and facial expressions.

Reddy et al. [3]

This article explores the concept of attendance system based on biometric techniques. It is revealed that the use of more authentication procedures enhances the performance of the system, but it leads to higher complexity .

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### 3.PROBLEM STATEMENT:

In many institutions and organizations, the management of attendance is still done using the conventional method such as through the manual register or through simple digital systems that use only single authentication. The conventional attendance management system is inefficient, time consuming, and highly likely to make human errors in the process.

For example the manual recording of attendance is laborious and often results in error in the recording and analysis of data. Proxy attendance, one of the problems encountered by current attendance management systems, where one person marks another person's attendance. The use of systems that use only RFID is unsuitable, because an RFID card can be stolen, misplaced, or misused in the whole process. Similarly, the use of face recognition systems alone may result in inaccurate data if there is poor lighting, change in facial appearances, and malfunctioning cameras. Furthermore, most existing attendance management systems do not have proper data storage. Accessing data from the past, generating reports, and checking attendance becomes difficult.

### 4.PROPOSED SYSTEM:

The proposed Smart Attendance System combines RFID technology and face recognition to provide a secure, efficient, and automated solution for attendance management. Unlike traditional systems that rely on a single authentication method, this approach introduces a dual verification mechanism to improve accuracy and prevent proxy attendance. Each user is enrolled in the system with a unique RFID card and corresponding facial data, which are stored in a centralized database for future verification. Attendance is marked only when both the RFID information and facial features match successfully, ensuring reliable identity verification.

To enhance performance, the system incorporates preprocessing techniques such as image normalization and alignment, enabling accurate recognition under varying environmental conditions like lighting changes and facial expressions. Additionally, the system maintains time-stamped attendance records, which can be accessed and monitored through an integrated interface. This allows administrators to generate reports and track attendance efficiently in real time.

## 5.METHODOLOGY:

The proposed Smart Garage System will be an IoT-based automated system.

### a. Data Collection

The system begins by collecting data from the user, which includes student data, ID number of the RFID card, and images from the facial recognition system. Images of faces collected will be saved in the database and used to train the face recognition model.

### b. RFID Detection

Using an RFID card and the RFID reader, the user will provide the unique ID number associated with his/her RFID card to the system. Based on the ID number, the user's data will be retrieved from the database.

### c. Face Detection

During the same process, the camera will capture the user's face and detect its facial features through the use of image processing.

### d. Face Recognition (Authentication)

Through image processing algorithms, the system matches the user's face with faces stored in the database. If there is a match, the user will be authenticated.

### e. Attendance Marking

In case of successful authentication through RFID and face recognition methods, the user's attendance is automatically marked in the database.

## 6.ALGORITHM:

### FACE RECOGNITION ALGORITHM:

#### 1. FACE DETECTION:

The presence of a human face is detected using a camera.

#### 2. FEATURE EXTRACTION:

Facial features are extracted, which are unique characteristics of a human face.

#### 3. MATCHING PROCESS:

The features are compared with the data stored in the database.

#### MATCHING CONDITION:

If match score  $\geq$  threshold, then the user is authorized.  
If match score  $<$  threshold, then the user is

unauthorized.

**4. THRESHOLD VALUE:**

The threshold value is set to determine the verification of the user.

If the value is high, then security is high.

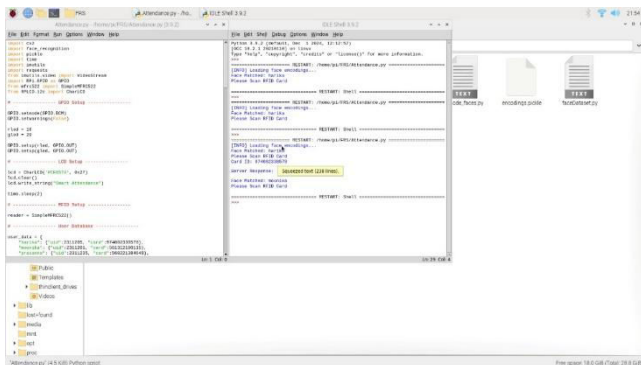
If the value is low, then the recognition speed is high.

**5. SYSTEM ACTION:**

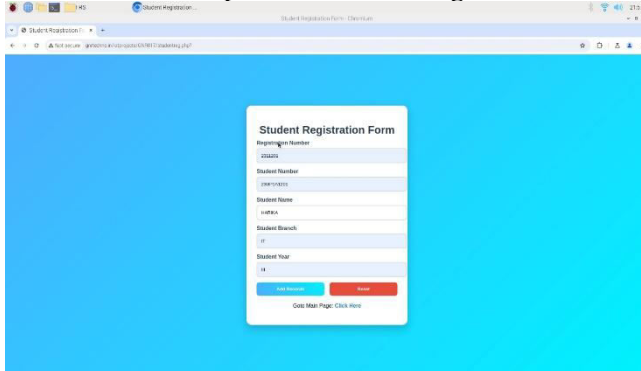
If the user is authorized, then the garage door will open, allowing vehicle delivery.

If the user is unauthorized, then access will be denied.

**7.RESULTS:**



The picture depicts the use of a Smart Attendance System, which uses Raspberry Pi as its platform and includes both face recognition technology and RFID cards for secure authentication purposes. The system works in sequence, starting by scanning and identifying the person's face via the camera connected to it. After successful recognition of the person's face, the system asks the individual to scan the RFID card for further validation. This process reduces the possibility of any unauthorized person marking attendance.



These figures not only demonstrate the full process of the system but also the flow of its operations. Firstly, the RFID card is read by the RFID reader to retrieve the user data from the database. In parallel, or in a later step, the web camera captures the live face image of the user. This face image is processed by the system through face detection and recognition techniques and compared to the face data saved against the scanned RFID data. It is only after this successful matching that the system verifies the user's identity.

Roll No.	Student Name	Status	Year	Date	Login Time	Logout Time
2202205	Harika	P	B	11-03-2025	08:32	08:35
2202205	Harika	P	B	11-03-2025	08:35	08:38
2202205	Harika	P	B	11-03-2025	08:38	08:41
2202205	Harika	P	B	11-03-2025	08:41	08:44
2202205	Harika	P	B	11-03-2025	08:44	08:47
2202205	Harika	P	B	11-03-2025	08:47	08:50

This depicts the attendance marking procedure. If both the RFID and face recognition are successful, attendance will be recorded. Once verification is completed, the attendance is automatically recorded in the database along with the exact date and time. This automated process not only improves the accuracy of attendance recording but also minimizes manual intervention and errors. Additionally, the use of Raspberry Pi makes the system cost-effective, compact, and suitable for real-time applications in classrooms or workplaces.



This is how the output of the system looks like. It signifies whether attendance is marked successfully or not.



These figures show the total process of the Smart Attendance System which uses RFID technology and face recognition. First, the process starts by scanning the RFID card by the user. Afterward, the system will take an image of the user's face using the webcam to authenticate the person using biometrics. The details of RFID and the images from the webcam will be matched against those saved in the database. In case there is a match for both systems, then the user's attendance will be logged along with the exact date and time.

## 8.CONCULSION:

The smart attendance system through the incorporation of RFID and face recognition has provided a robust solution that can help improve attendance management through precision, security, and automation. In particular, the use of RFID with face recognition ensures that there are no challenges associated with manual errors and proxy attendance. The combination of the two authentication processes ensures that only authorized persons can log their attendance.

The combination of the two technologies makes the system more accurate in verifying the identity of users as compared to systems that rely on one technique. For example, the system is able to record attendance information with the exact date and time and then store the information in a central database for easy access and management. Moreover, the hardware used in implementing the system makes it feasible for use.

The proposed attendance system is both efficient and scalable. It can be used by educational institutions and other organizations. The system reduces the need for manual operations, improves security, and increases transparency. With more development work, the system can incorporate more advanced features such as cloud-based storage and mobile application integration.

## 9.FUTURE SCOPE:

The proposed Smart Attendance System Using RFID And Face System can be further enhanced for better performance. There are some ways to improve its performance include implementing the latest technologies to increase efficiency and effectiveness. Firstly, using cloud-based storage instead of local databases will make it possible to access attendance information in real-time from any location. In this way, the administration can keep track of attendance from any place. The second improvement that can be made includes developing a mobile application for students and administrators..

Through the mobile application, users will be able to check attendance details, get notifications, and analyze data. Biometric technology can also be integrated into the smart attendance system to ensure better security and efficiency. Using Artificial Intelligence and Machine Learning algorithms, attendance can be tracked effectively. System can also be enhanced by introducing real-time analytical features to analyze attendance.

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