Smart RFID-Enabled Notification and Monitoring System For Authorities

Mrs M.Lakshmi Prasanna[1]|Gutta Bhagyasri[2]|Ramanaboina Kalyan Babu[3]|Lagadapati Phaneendra[4]|Gumma Pavan[5].

[1,2,3,4,5]Department of CSE-AIML, Chalapathi Institute of Engineering and Technology, LAM, Guntur, Andhra Pradesh, India

ABSTRACT: The Intimating System is an application designed to monitor faculty attendance in real time, ensuring the smooth functioning of educational institutions. Maintaining punctual faculty presence in classrooms is essential, yet it is often difficult for higher authorities such as the Head of Department (HOD) to track attendance across multiple classes and sections. To overcome this challenge, the proposed system utilizes RTC (Real-Time Clock) and RFID (Radio Frequency Identification) technologies to accurately record and verify faculty attendance based on scheduled timings. Additionally, an IoT-based bot application is integrated to provide real-time updates and notifications to the faculty monitoring system, enabling authorities to access attendance information remotely and take immediate actions when required. This enhanced system improves overall efficiency, transparency, and effective class management without the need for an IR sensor-based monitoring module.

Key Words: RTC (Real Time Clock), Internet of Things, Regulated power supply, Attendance

1. INTRODUCTION

In the present era of digital transformation, educational institutions are increasingly adopting smart technologies to improve operational efficiency, transparency, and discipline. One of the key challenges in academic management is ensuring timely faculty attendance and effective classroom monitoring. Faculty punctuality plays a crucial role in maintaining academic schedules, enhancing student engagement, and improving overall institutional performance. However, in large institutions with multiple departments and classrooms, it becomes difficult for authorities such as the Head of Department (HOD) or Principal to manually track faculty presence in real time. Conventional attendance methods, which are often paper-based or semi-automated, are prone to errors, delays, and manipulation, highlighting the need for a more reliable and automated solution.To address these challenges, the proposed system integrates advanced technologies such as RFID (Radio Frequency Identification), RTC (Real-Time Clock), and IoT (Internet of Things) to develop an intelligent and real-

time faculty monitoring system. In this system, each faculty member is assigned a unique RFID tag. Upon entering the classroom, the faculty member scans the tag using an RFID reader, and the system records the exact time and date with the help of the RTC module. This data is processed by a microcontroller and transmitted to a centralized server or cloud platform through an IoT-based communication system.

An IoT-based bot application is further incorporated to provide real-time updates and notifications to higher authorities, enabling them to monitor faculty attendance remotely and take immediate action if any irregularities occur. This eliminates the need for manual attendance registers, reduces administrative workload, and ensures accurate and tamper-proof record keeping. In cases of delay or absence, the system automatically alerts the HOD or academic coordinator, allowing quick alternative arrangements to maintain uninterrupted classroom activities. Overall, the proposed system enhances efficiency, accountability, and transparency in academic institutions while ensuring smooth and effective classroom management.

2. LITERATURE SURVEY

A Research Gate study (2024) introduced the integration of motion sensors with RFID for enhanced attendance accuracy in smart campuses. An IR-based IoT attendance monitoring system proposed in 2024 focused on presence detection to improve tracking accuracy in classrooms. Another study (2019) presented a UHF RFID-based classroom attendance system with a web application, significantly reducing manual attendance procedures.

Indoor occupancy modelling research by various authors (2022) utilized environmental sensors and machine learning techniques to estimate classroom occupancy, complementing RFID-based attendance systems. An IR and GSM-based attendance monitoring system proposed in 2021 enabled remote alerts and real-time reporting to academic authorities. A comprehensive review in 2023 analyzed smart student monitoring systems and highlighted the effectiveness of RFID-based automation in educational environments.Further research by Soni et al. (2025) emphasized cloud analytics for RFID attendance systems, providing actionable insights for administrators. A study in 2022 explored IoT-based IR people-counting systems to monitor in/out movement, enhancing classroom discipline and occupancy control. Finally, a hybrid RFID and IoT system review (2025) concluded that integrating multiple sensors and IoT protocols significantly improves scalability, reliability, and real-time

monitoring in smart educational institutions.

3. PROPOSED SYSTEM

The proposed system automates faculty attendance tracking and classroom monitoring in real time using RFID, RTC, and IoT technologies. Faculty members scan their RFID tags at the classroom entrance, and the system records attendance with accurate time and date, then uploads the data to a cloud platform for remote monitoring by authorities. An IoT-based bot application provides instant updates and alerts for delays or absences, enabling quick action. The system ensures secure data storage, reduces manual errors, and improves transparency, efficiency, and overall academic management.

3.1 Block Diagram

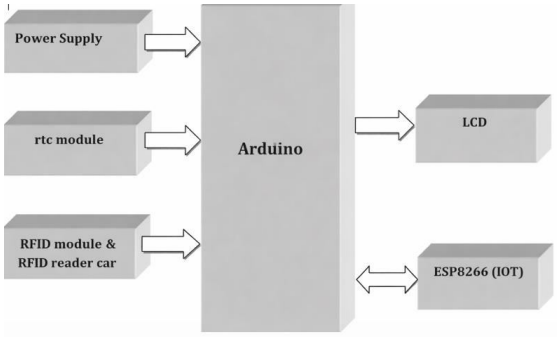

Fig 1: Proposed System

The block diagram represents an IoT-based faculty monitoring system centered on an Arduino microcontroller, which acts as the main control unit. A regulated power supply ensures stable operation of all components. The RFID module is used to identify faculty by scanning their unique RFID cards, while the RTC module records accurate date and time for attendance logging. An LCD display provides real-time status updates such as attendance confirmation and system information. The ESP8266 Wi-Fi module enables communication with a cloud platform, allowing remote monitoring by authorities. Overall, the system automates attendance tracking, displays real-time information, and transmits data for efficient and centralized academic management.

3.2 Flow chart

The RFID-based intimation system records faculty attendance when the RFID card is scanned and logs the exact time using the RTC module. The Arduino processes the data, displays it on the LCD, and sends it to the cloud via the ESP8266 for remote monitoring. Automated alerts are generated for delays or absences, ensuring real-time and efficient management.

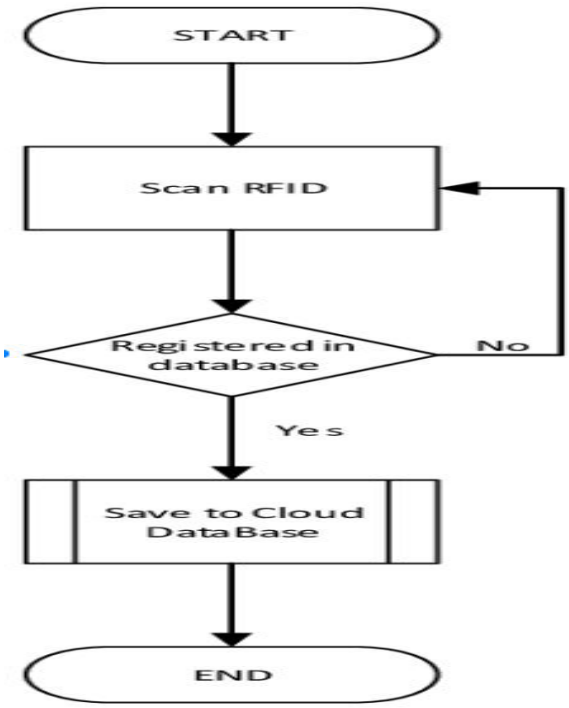

Fig 2: Flow Chart

4. RESULTS AND DISCUSSION

The RFID-based intimation and monitoring system effectively detected authorized and unauthorized tags with high accuracy, enabling real-time identification and data transmission. It improved security and operational efficiency by generating instant alerts and providing continuous monitoring through an IoT platform. Overall, the system proved to be reliable, scalable, and suitable for smart parking and access control applications

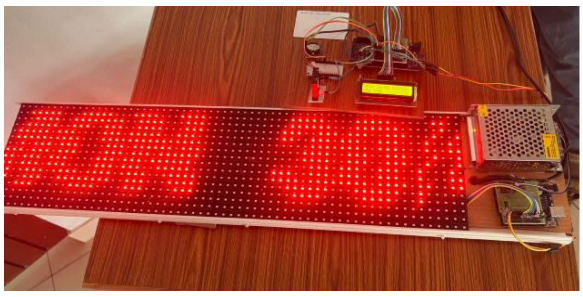

Fig 3: Hardware Implementation

The RFID-based IoT system automates faculty attendance by identifying individuals using unique RFID cards with accurate time tracking. It ensures real-time monitoring, reduces manual errors, and improves transparency.

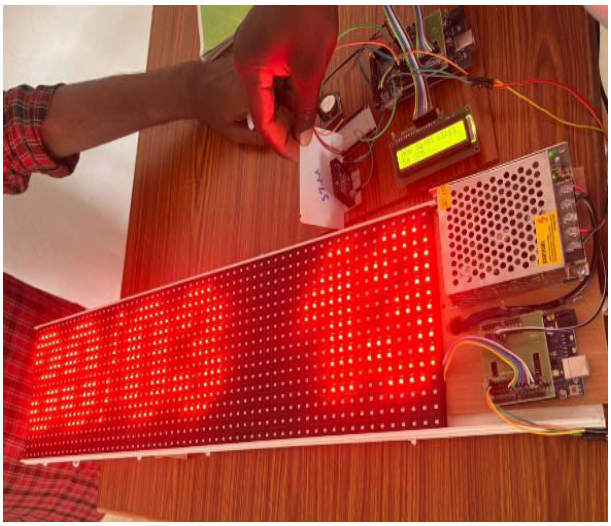

Fig: Facility Monitoring based RFID

The system uses RFID technology to automatically monitor faculty attendance in real time, reducing errors and delays associated with manual methods. Each faculty member is identified through a unique RFID card, and attendance is recorded with date and time using an RTC module. This ensures accurate, transparent, and efficient attendance tracking.

Fig: LCD Display Showing "Already Marked" Monitoring System

This figure shows the 16×2 LCD displaying an "ALREADY MARKED" message when an RFID card is scanned more than once. It indicates that the user's entry or attendance has already been recorded in the system. This feature helps prevent duplicate entries and ensures accurate monitoring and data integrity for authority review

Fig: LCD Display Showing "Time Over" Status in RFID-Based Monitoring System

This figure shows the 16×2 LCD displaying a "TIME OVER" message, indicating that the allowed time for a specific RFID-based activity (such as attendance or authorized access) has expired. The system uses this alert to notify authorities or users about time violations. It helps in real-time monitoring and ensures proper control and discipline within the system.

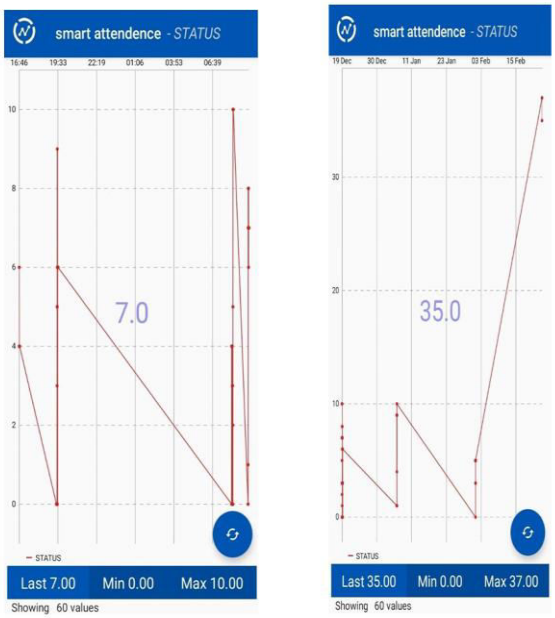

Fig 6: Updated Information Thing View App through IoT

The updated faculty attendance information is displayed in the Thing View app through IoT integration. It allows real-time monitoring of attendance data collected from the RFID system. This ensures easy access, transparency, and efficient tracking of faculty presence from anywhere.

5. CONCLUSION

The RFID Based Intimation to the Authority and Monitoring System using IoT provides an effective and reliable solution for real-time faculty attendance tracking and classroom monitoring. By integrating RFID technology with RTC, , Arduino, and IoT communication modules, the system automates attendance recording while ensuring accuracy, transparency, and accountability. The real-time intimation feature enables higher authorities to monitor faculty punctuality and classroom status instantly, thereby minimizing class disruptions and improving academic management. Additionally, the the proposed system reduces manual effort, eliminates attendance manipulation, and contributes to the development of a smart and efficient educational environment.

FUTURE SCOPE : In the future, the system can be enhanced by integrating IR sensor-based student counting to monitor classroom occupancy in real time. This addition will help track the number of students entering and leaving, improving attendance accuracy and classroom management. It can also enable better analysis of student participation and optimize resource utilization. Further integration with IoT analytics can provide detailed insights for smarter academic planning.

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