RFID BASED ATTENDANCE SYSTEM WITH SD CARD STORING

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ABSTRACT

There are so many attendance systems available in market. Finger print based attendance system is most widely used attendance systems. But those are expensive and need maintenance. We want to develop low cost attendance system with storing option. Here we proposed solution like RFID based attendance system with SD card storing.

This project includes RFID (EM-18 module), which is connected to Arduino through UART interface. SD card interface through adaptor through SPI port.

In this project each student have individual RFID cards. These are assigning to student name and roll number. When we swipe first time then Arduino takes as IN and second time swipe takes as OUT. This is nothing but entry and exit. This information will store in SD card. also displaying on16X2 LCD display. For Invalid card buzzer will be ON.

INTRODUCTION

In today's fast-paced and technology-driven world, organizations and institutions require efficient and reliable methods for tracking attendance. Traditional attendance systems, such as manual registers and biometric scanners, often face challenges like time consumption, human errors, data manipulation, and the need for internet connectivity. To overcome these limitations, RFID (Radio Frequency Identification) technology has emerged as a popular solution for automating attendance management. This project, titled "RFID-Based Attendance System with SD Card Storage," aims to provide an automated, standalone, and secure attendance tracking system using RFID technology, an Arduino microcontroller, an SD card module, and a buzzer for real-time feedback.

The system functions by assigning each individual a unique RFID tag, which acts as an identification card. When the RFID card is brought near the RFID reader (EM-18 module), the reader captures the tag's unique ID and sends it to the Arduino Uno for processing. The Arduino then records the user ID, date, and time into an SD card, ensuring data storage without the need for internet or cloud-based services. This approach ensures that attendance records are securely maintained and can be retrieved anytime for verification and analysis. The integration of an SD card module allows the system to function as an independent, self-sufficient unit, eliminating reliance on external databases or computers.

A key feature of this system is the buzzer, which provides instant feedback when an RFID card is scanned. A short beep confirms a successful attendance entry, while a different sound indicates an invalid or unauthorized card. This simple yet effective feature enhances the user experience and ensures that attendance is recorded without errors. Additionally, the system's real-time operation allows for quick and efficient attendance tracking, making it suitable for large organizations, educational institutions, offices, and even secure facilities.

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This RFID-based system is designed for accuracy, efficiency, and scalability. Unlike biometric systems, which may have issues like fingerprint recognition failures due to dirt or improper placement, RFID technology enables a contactless and seamless attendance process. The use of an SD card module ensures that attendance data remains secure, portable, and easy to access, making it an ideal solution for institutions where digital records are preferred over paper-based logs.
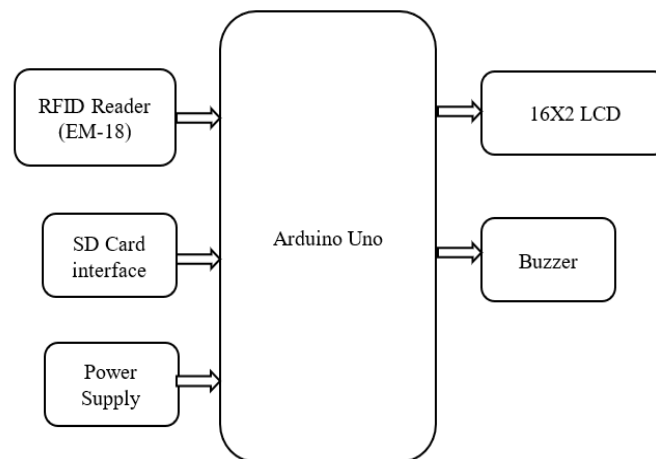

Figure.1 Block Diagram

LITERATURE SURVEY

- Ali et al. (2015) developed an RFID-based attendance system using a microcontroller and database storage. The system allowed automated attendance tracking but required internet connectivity for database access, making it less suitable for offline environments.

- Patel et al. (2017) proposed an RFID-based attendance system integrated with cloud storage, allowing real-time monitoring and remote access. However, reliance on internet connectivity posed challenges in areas with poor network coverage.

- Sharma et al. (2019) implemented an RFID system with GSM alerts to notify users of their attendance status. While this added a security layer, GSM-based notifications increased operational costs.

- Kumar et al. (2021) demonstrated a similar approach using Arduino and an SD card module, which recorded RFID logs in CSV format for easy data processing. This method allowed for quick data retrieval and analysis.

- Traditional attendance systems rely on manual registers, paper-based logs, and biometric scanners. While these methods have been widely used, they come with several drawbacks. Manual systems are time-consuming, prone to errors, and difficult to manage for large institutions. Biometric systems, such as fingerprint scanners, offer improved accuracy but often face issues related to hygiene, environmental factors, and false rejections due to dirt or skin conditions.

PROPOSED SYSTEM

The proposed RFID-based attendance system with SD card storage offers an efficient and automated solution for attendance tracking, replacing manual methods with an RFID reader that scans unique RFID tags assigned to individuals. The microcontroller processes the scanned data and stores it directly on an SD card in a structured format, such as CSV or text files, allowing for easy retrieval and analysis. Unlike traditional systems, this solution operates independently without requiring continuous internet access or a direct computer connection, ensuring data security even in offline conditions. Additionally, RFID tags contain unique identification numbers, eliminating the possibility of proxy attendance while significantly reducing human errors and expediting the attendance-taking process. The use of an SD card for storage ensures that records remain secure and can be easily accessed or transferred for further analysis.

This system is cost-effective, requiring minimal hardware components such as an RFID reader, microcontroller, and SD card module. Compared to biometric systems, it consumes less power and demands less maintenance, making it a practical and sustainable solution. Furthermore, the system has the potential for future enhancements, such as cloud storage integration or IoT-based real-time monitoring, offering scalability and flexibility. By implementing this RFID-based attendance system, organizations such as schools, colleges, offices, and other institutions can achieve a more reliable, efficient, and secure method of attendance tracking while minimizing costs and maintenance requirements.
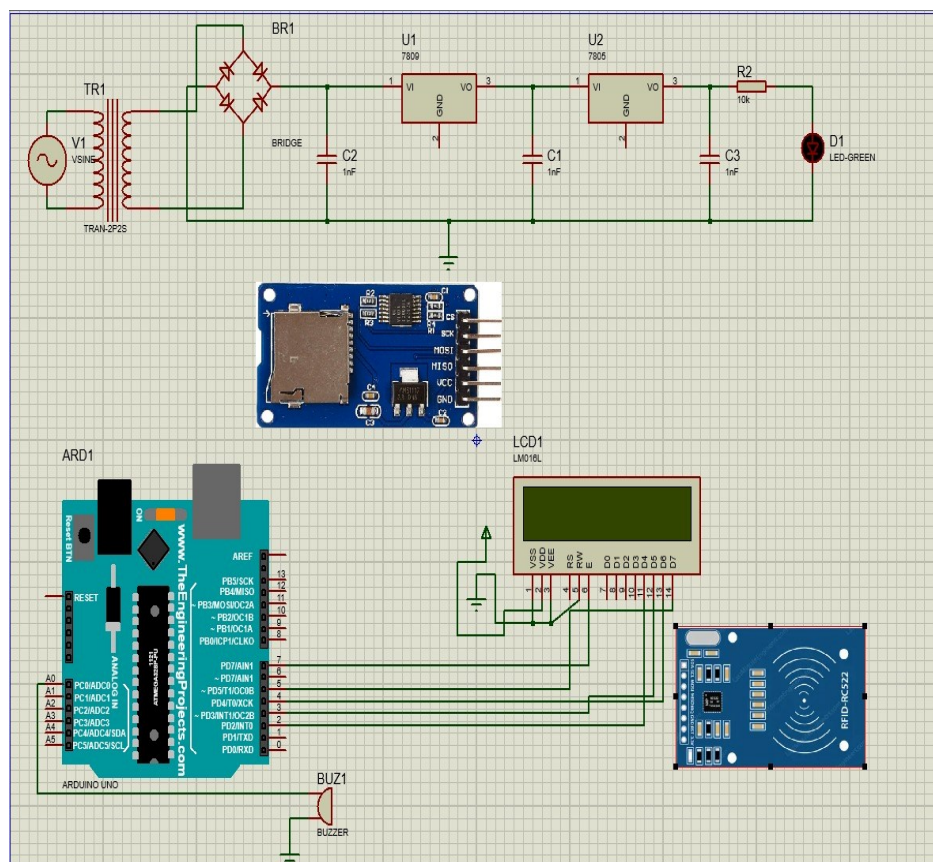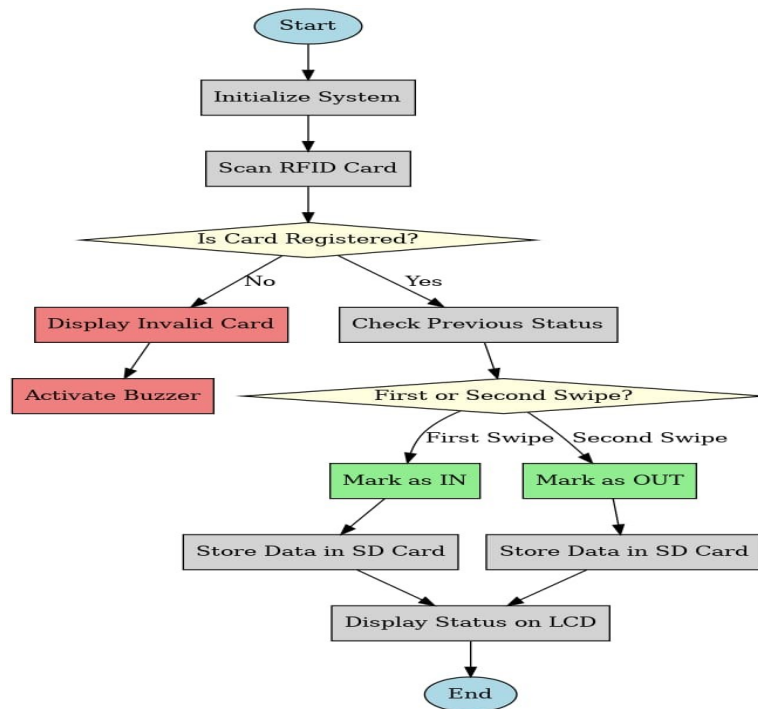

Figure.2 Schematic Diagram

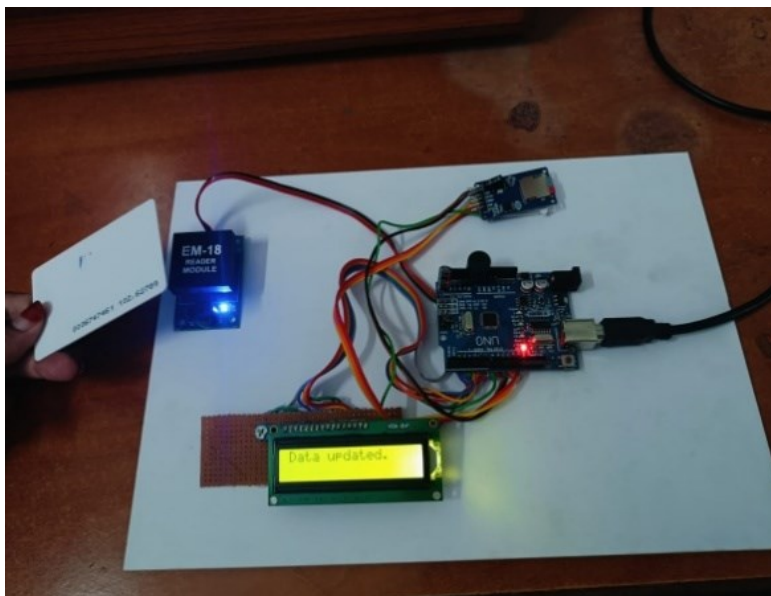Figure.3 Flow chart

RESULTS

Fig 6.1: Card is scanned

Figure.4 Student data is updated

Working: When RFID card is placed near the RFID reader the system detects the unique card ID.The reader module transmits this ID to the Arduino for processing. The Arduino compares the scanned card ID with stored

records. If the card is recognized the system updates the attendance data. LCD displays confirmation message that data is updated. If the card is invalid then the buzzer will alert.
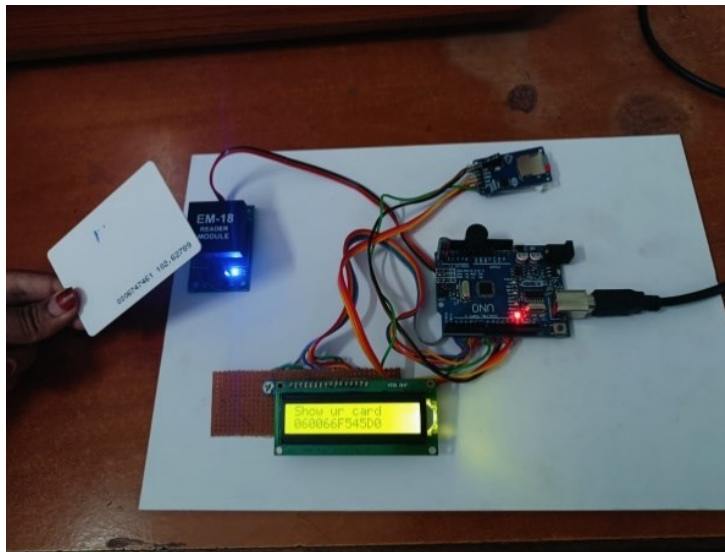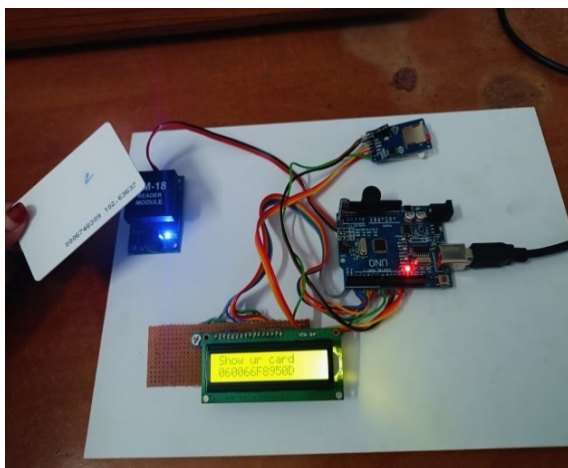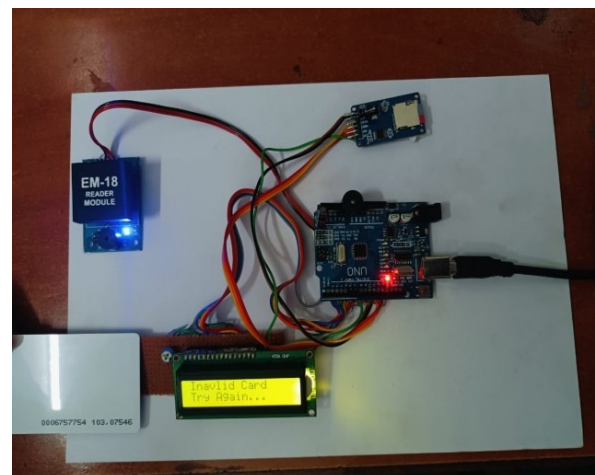

Figure.5 Scan the card

Figure.6 Card 2 is scanned

Figure.7 Card Invalid

Figure.8 Stored student Data

ADVANTAGES

- **Automated and Efficient:** Eliminates manual attendance tracking, reducing errors and saving time.

- **Offline Data Storage:** No need for continuous internet access; data is stored securely on an SD card.

- **Prevents Proxy Attendance:** Unique RFID tags ensure authenticity and eliminate fraudulent entries.

- **Low Power Consumption:** Consumes less power compared to biometric systems, making it energy-efficient.

- **Cost-Effective:** Requires minimal hardware components, reducing overall system costs.

- **Secure and Reliable:** Data remains intact even in offline conditions and can be easily retrieved.

- **Scalable and Flexible:** Can be enhanced with cloud storage or IoT-based real-time monitoring for future improvements.

APPLICATIONS

- **Educational Institutions:** Schools, colleges, and universities can use this system for student and staff attendance.

- **Corporate Offices:** Companies can track employee attendance efficiently without manual intervention.

- **Industrial Worksites:** Helps monitor worker shifts and ensures accurate attendance records in factories.

- **Hospitals and Healthcare Centres:** Can be used to track doctor and staff availability for shift management.

- **Libraries and Research Centres:** Enables easy tracking of visitor logs and researcher attendance.

- **Event Management:** Useful for monitoring attendance at conferences, seminars, and other events.

- **Government and Public Sector Offices:** Helps ensure discipline and accurate records of government employees.

CONCLUSION

The RFID-Based Attendance System with SD Card Storage is an innovative and efficient solution for automating attendance tracking in various environments such as educational institutions, offices, and industries. By utilizing RFID technology, the system offers a seamless and contactless method for recording attendance, reducing the chances of manual errors and proxy attendance. The integration of an SD card for data storage ensures secure and reliable record-keeping, allowing for easy retrieval and analysis of attendance data when needed.This system improves efficiency by minimizing the time taken for attendance marking, especially in environments with a large number of users. The use of an LCD display provides instant feedback on attendance status, while the buzzer alerts users in case of an unregistered or invalid card, enhancing user experience and system security. The modular design of this project makes it adaptable for future improvements, such as cloud storage integration, database connectivity, and mobile app synchronization for remote access.

Overall, this project demonstrates the practical application of RFID technology in attendance management. It provides an automated, accurate, and scalable solution that can replace traditional manual methods, reducing paperwork and improving administrative efficiency.

FUTURE SCOPE

The future scope of the RFID-Based Attendance System with SD Card Storage includes several advancements to enhance its efficiency and functionality. Integrating cloud storage will enable real-time data access and remote monitoring, allowing administrators to track attendance from anywhere. Database connectivity can facilitate seamless data management, making it easier to generate reports and analyze attendance trends. Mobile app synchronization will further improve accessibility, enabling users to check attendance records and receive notifications on their smartphones. Artificial intelligence and machine learning can be leveraged to analyze attendance patterns, detect anomalies, and optimize workforce or student management. Implementing IoT-based connectivity can further automate attendance tracking by integrating with smart devices and access control systems. Overall, these future enhancements will make the system more intelligent, scalable, and adaptable for various applications.

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