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RFID BASED ATTENDANCE SYSTEM USING ARDUINO

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***Abstract*—Traditional attendance marking methods are time-consuming and prone to errors. This project presents an RFID-based attendance system using Arduino to automate the process. Each student is provided with a unique RFID tag, and the system records attendance in real time when the tag is scanned. The proposed model enhances accuracy, saves time, and minimizes chances of proxy attendance.**

Index Terms— RFID, Arduino, attendance system, automation, database management.

INTRODUCTION

Attendance monitoring plays a crucial role in academic and corporate institutions. Manual attendance systems are inefficient and prone to manipulation. Biometric systems offer alternatives but are costly and require significant infrastructure.

Radio Frequency Identification (RFID) provides a cost-effective and reliable solution. With an Arduino microcontroller at its core, the system reads RFID tags, verifies them, and records the attendance of students automatically. This paper discusses the design, working, and results of the proposed attendance system.

LITERATURE SURVEY

Different attendance systems have been implemented in the past. Manual registers are widely used but inefficient. Biometric systems improve reliability but involve high maintenance. QR code–based systems provide digital solutions but require smartphone support.

RFID-based systems strike a balance between efficiency and cost, providing faster recording with minimal errors. Table I compares various attendance systems.

Table I. Comparison of Attendance Systems

Method	Advantages	Limitations
Manual Register	Simple, low setup cost	Time-consuming, error-prone
Biometric System	High accuracy, secure	Expensive, maintenance heavy
QR Code System	Digital, easy to use	Requires smartphones
RFID System	Fast, cost-effective	Needs RFID infrastructure

PROPOSED SYSTEM

The RFID-based attendance system consists of:

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- **RFID Tags:** Each student is assigned a unique tag.
- **RFID Reader Module (RC522):** Detects and reads the tag ID.
- **Arduino Microcontroller:** Processes tag data and verifies authenticity.
- **Database Interface:** Records attendance into local storage or cloud database.
- **LCD/LED Display:** Confirms scan and attendance status to the user.

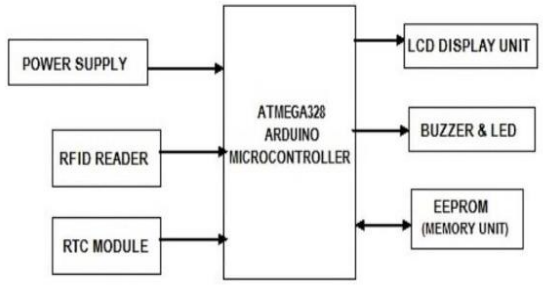

Fig. 1. Block Diagram of RFID-Based Attendance System

When a student places their RFID card near the reader, the Arduino verifies the tag ID against the database. If valid, attendance is marked automatically, and a confirmation message is displayed. Unauthorized tags are rejected.

RESULTS AND DISCUSSION

The prototype was tested with multiple RFID tags assigned to students. The system successfully read tag IDs within milliseconds and updated attendance logs instantly. Compared with manual attendance, time savings were significant—reducing the process from several minutes to just seconds.

The system proved scalable for classrooms and can be extended to corporate offices. Limitations include dependency on RFID card availability and possible system failure in case of reader malfunction.

CONCLUSION AND FUTURE SCOPE

The RFID-Based Attendance System using Arduino offers a reliable, fast, and cost-effective solution to traditional attendance methods. It enhances efficiency, prevents proxy attendance, and provides digital record-keeping.

Future Scope: Future enhancements may include GSM/IoT integration to notify parents or administrators, biometric-RFID hybrid systems for higher security, and cloud synchronization for centralized monitoring.

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