

Biometric Attendance System Using Arduino with RFID

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Abstract: The Biometric Attendance System (BAS) is a technological solution designed to automate and streamline the attendance tracking process in various organizational settings. Leveraging advanced biometric technologies, this system aims to enhance accuracy, efficiency, and security in attendance management. The primary objective of the Biometric Attendance System is to replace traditional attendance recording methods, such as manual registers or card-based systems, with a more reliable and tamper-resistant approach.

Key Words: Finger print, Data base, RFID, Sensors

I. INTRODUCTION

In today's fast-paced world, efficient management of attendance is paramount for organizations across various sectors. Traditional methods of attendance tracking, such as manual registers or swipe cards, often fall short in accuracy, security, and reliability. However, with the advancements in technology, the integration of biometrics and RFID (Radio Frequency Identification) has emerged as a game-changer in attendance management systems. This introduction explores the revolutionary fusion of biometric authentication and RFID technology in an Arduino-based attendance system. By leveraging biometric features like fingerprints or facial recognition alongside RFID tags, organizations can streamline attendance tracking, enhance security, and eliminate the loopholes associated with conventional methods. The Arduino microcontroller serves as the backbone of this innovative system, orchestrating the seamless integration of biometric sensors and RFID readers. Through this integration, employees or students can authenticate their identity swiftly and accurately, simply by presenting their biometric credentials or RFID cards.

In this introduction, we delve into the key components and functionalities of this biometric attendance system, highlighting its benefits, implementation process, and potential applications across various domains. From corporate offices to educational institutions, the adoption of such advanced attendance systems marks a significant step towards modernization, efficiency, and data integrity in workforce or student management.

II. LITERATURE SURVEY

2.1 Biometric Attendance System Using Arduino With RFID

The purpose of implementing a biometric attendance system using Arduino with RFID integration is to revolutionize traditional attendance tracking methods. By combining biometric features like fingerprints or facial recognition with RFID technology, the system aims to ensure unparalleled accuracy and security in recording attendance. With biometric authentication, each individual's unique physiological or behavioral characteristics serve as their identity, eliminating the possibility of proxy attendance or identity fraud. Integration with RFID adds an additional layer of security, allowing only authorized personnel to access designated areas or record attendance.

2.2 Radio Frequency Identification method

Radio Frequency Identification (RFID) is a technology that uses electromagnetic fields to automatically identify and track tags attached to objects. These tags contain electronically stored information that can be read from a distance using RFID

readers or scanners. RFID systems consist of three main components: tags, readers, and a backend database or system. Tags can be passive, active, or battery-assisted passive, each with its own capabilities and range.

III. EXISTING SYSTEM

Biometric attendance systems represent a prevalent and transformative aspect of modern organizational management. These systems utilize unique physiological or behavioral characteristics of individuals, such as fingerprints, facial features, or iris patterns, to accurately record attendance data. Widely deployed in corporate offices, educational institutions, government agencies, and other sectors, biometric attendance systems offer unparalleled accuracy and security in workforce management. By eliminating the possibility of proxy attendance and identity fraud, they ensure the integrity of attendance records. Additionally, biometric systems streamline the attendance tracking process, reducing administrative burden and optimizing operational efficiency.

IV. PROPOSED SYSTEM

RFID technology serves as a foundational element in proposed systems aiming to revolutionize various sectors through enhanced tracking and management capabilities. In these systems, RFID tags containing unique identification information are attached to objects or assets, enabling automatic identification and tracking through RFID readers or scanners. The proposed system harnesses the power of RFID to optimize processes such as inventory management, asset tracking, and supply chain logistics. By leveraging RFID technology, organizations can achieve real-time visibility into their operations, streamline workflows, and improve efficiency.

The proposed works in the following manner:

- Supply Chain and Logistics: RFID tags on products enable real-time tracking during transportation, enhancing visibility and efficiency.
- Retail Management: RFID tags on merchandise automate inventory tracking and transactions, improving accuracy and reducing labor costs.
- Healthcare: RFID wristbands or tags on patients and equipment enhance safety and streamline workflows by enabling quick identification and tracking.
- Smart Cities: RFID technology facilitates electronic toll collection, parking management, and public transportation access, enhancing mobility and reducing congestion.

4.1 Functionalities

- Biometric Authentication: The system allows users to authenticate their identity using biometric features such as fingerprints, facial recognition, or iris scans. Biometric sensors capture and verify the unique physiological or behavioral characteristics of individuals.
- RFID Integration: RFID technology enables identification and tracking of individuals through RFID tags or cards. RFID readers communicate with the tags to authenticate users and record attendance data.
- Real-time Attendance Tracking: The system records attendance data in real-time as users authenticate their identity using biometric credentials or RFID cards. This provides immediate visibility into attendance records and enables timely monitoring.
- User Management: The system manages user profiles and credentials, including biometric templates and RFID tag information. It allows administrators to add, edit, or delete user accounts as needed.

V. FLOW CHART

5.1. Arduino Board Flow Chart

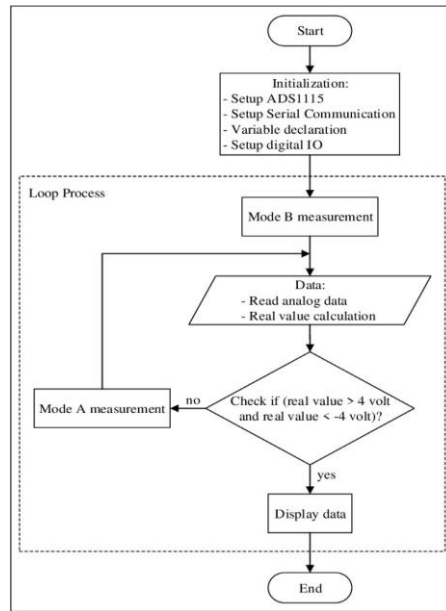


Fig 1:Arduino Board Working

5.1 Biometric Attendance Flowchart

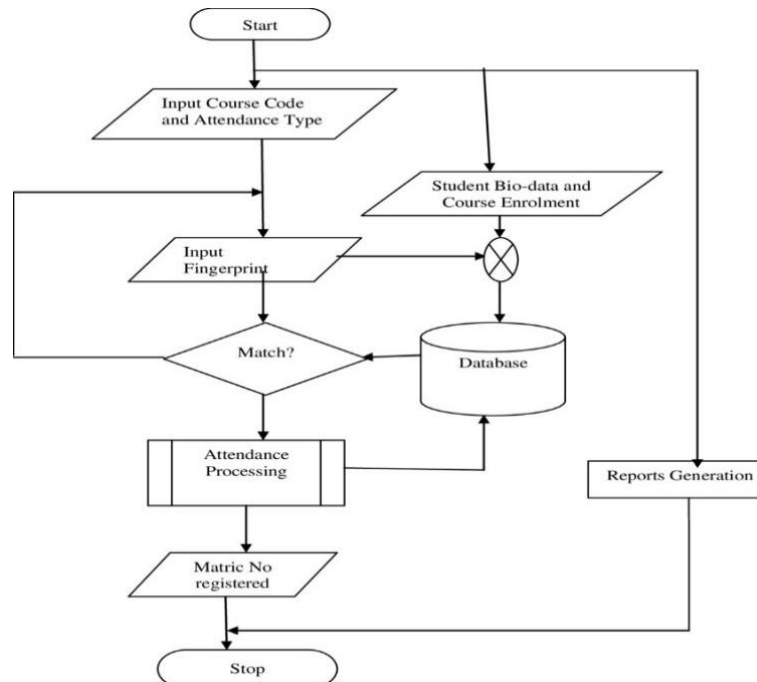


Fig 2: Biometric Attendance Working Flowchart

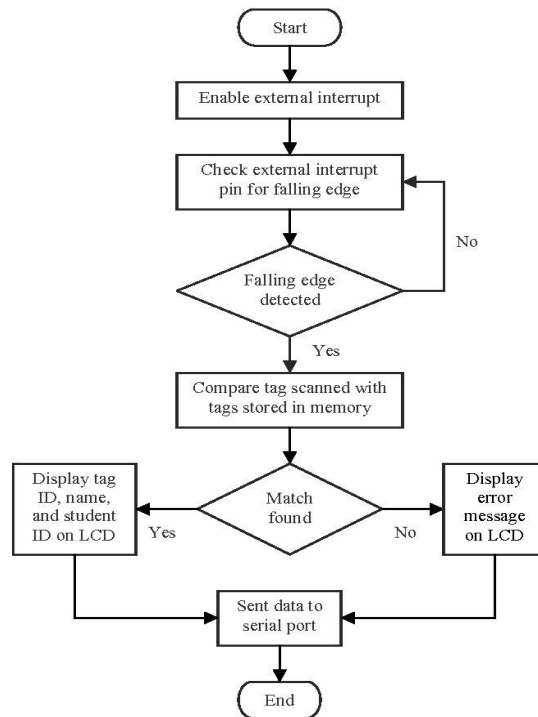
5.2 RFID Flow Chart


Fig 3 : RFID Working Flow Chart

VI. CONCLUSION

In conclusion, the integration of biometric authentication with RFID technology in an attendance system using Arduino offers a comprehensive solution to the challenges faced by traditional attendance tracking methods. By combining the unique physiological or behavioral characteristics of individuals with RFID-enabled identification, this system ensures unparalleled accuracy, security, and efficiency in recording attendance data. Through biometric authentication, users can swiftly and reliably verify their identity, eliminating the possibility of proxy attendance or identity fraud.

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