Reliable Attendance Monitoring System

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Abstract*: The significance of the proposed research project is discussed along with the acknowledgement finger print and IR SENSORS based attendance system for institution faculty. We focus on the issue that faculty members face because there is no system in place that uses an alert or notification mechanism, such as sending an SMS to a faculty member's mobile phone, to remind them to record their attendance. The main goal of this system is to develop automated attendance notifications based on biometric fingerprint authentication. The system prevents discrepancies related to attendance and burdens on a central repository.*

Keywords: RFID, GSM, attendance system, efficiency, reliability, scalability

I. INTRODUCTION

For employees who have multiple schedules or who engage in a lot of activities outside of the office, the real-time online attendance method is beneficial. The issues brought on by manual system use, such as delays in data management, will be reduced by the attendance system using an online biometric fingerprint system. The aim of the research is to build a fingerprint module and GPS-based online presence system. The main input for the system as well as a security tool and entrance to gain access to the entire system are both provided by the ZFM-20 fingerprint module.

The user's location is determined and sent to the smartphone using a GPS module. The Arduino module in the system will automatically text the parties concerned with the user's location data. Each module functions well, and system testing revealed that the system is reliable when used in accordance with the initial scenario. On an Android smartphone, the user can access the report via SMS, a website, and an app. With an average response time of 1.39 seconds, the fingerprint sensor can locate a fingerprint that has been stored in the database, and GPS can locate locations with an average error of 0.007352% and 0.0003%, respectively.The term "RFID"(or "frequency identification device") refers to emerging technologies that take the form of tags. These technologies have been used in RFID projects, and they are also much more effective. RFID tags are designed to automatically identify radio waves and store information.

They typically include an antenna and a chip which act as the reader and tag respectively. The RFID system comprises two main components: the reader and the tag, which communicate through electromagnetic waves using specialized modules. Embedded systems technology is used in this system to provide an automated ticketing system in railways. Various RFID projects have been implemented and utilized successfully.

II.EXISTING SYSTEM

There are various existing systems for fool proof attendance management that utilize different technologies to automate the attendance recording process while ensuring accuracy and reliability. Some of these systems include:

RFID and GSM Attendance System: This system utilizes RFID technology to read the unique identification code of an RFID tag assigned to the student and GSM technology to transmit the attendance data to the server. The system is cost-effective, efficient, and can be easily implemented in various educational institutions.

Biometric Attendance System: This system uses biometric identification technology, such as fingerprint or facial recognition, to record attendance. The system is efficient and accurate, eliminating the need for manual intervention.

Cloud-based Attendance System: This system utilizes cloud technology to record attendance. The system is accessible from anywhere and can be used for attendance tracking in various educational institutions.

These existing systems have been proven to be efficient and accurate in attendance tracking, providing a fool-proof attendance management solution. However, each system has its limitations, and choosing the right system depends on the specific needs and requirements of the organization.

III. PROPOSED SYSTEM

In essence, the security system is embedded. The term "embedded" refers to software-controlled hardware. Here, a microcontroller that uses software manages all of the physical parts.

The microcontroller is crucial to the functioning of the system. The major goal of the system is to securely identify each person, which necessitates the use of a special product that can distinguish between various people. The new RFID technology makes this possible.

The RFID tag and RFID reader are the two fundamental components of the RFID system. The RFID reader and tag utilised in this system operate at a frequency of 125 KHz.

The information is kept in the internal memory of the microcontroller. This report paints a complete picture of the system's hardware and software. It also offers a broad overview and a thorough explanation of how the system works.

Our proposed system primarily consists of a 20X4 LCD, an RFID reader, an RFID tag, an Arduino uno buzzer, and momentum switches. The student automation system project has been developed as a key application in order to automatically maintain the attendance using RFID.
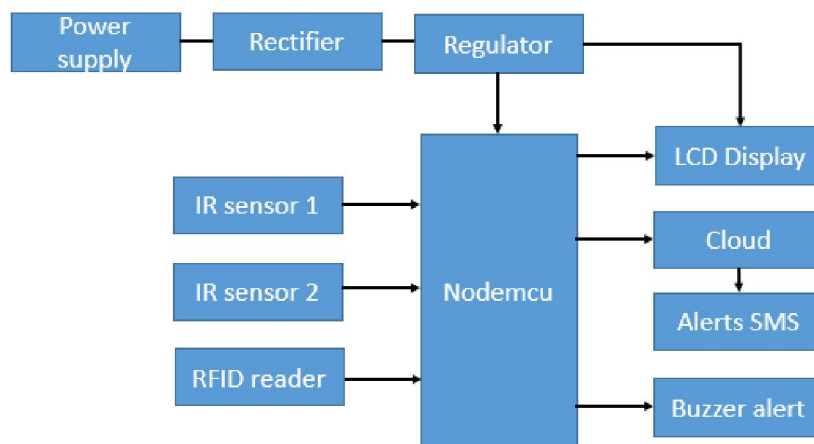

Fig. 1. Block diagram of Reliable attendance system

The LCD display unit initially presents five options to begin the process.

These are

1: Enrollment

2: Attendance

3: Deleting All Records

4: Results

Therefore, in our suggested model, enrolling students first or connecting the database to their ID card details before beginning attendance taking is required. Student and employee information is first saved to the database during enrolment. The student may then sign up for attendance. To save the candidate's attendance, we used the device's EPROM memory.

IV. HARDWARE DESCRIPTION

IOT (Internet of Things):

The term "Internet of Things" (IoT) refers to using the Internet to access and manage commonly used equipment and gadgets.
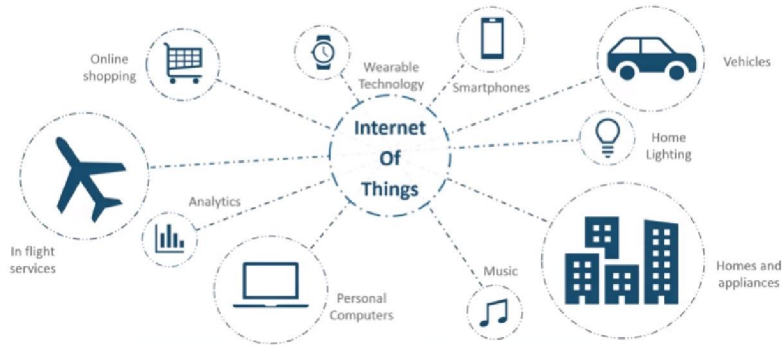
Fig. 2. Technology of Internet Of Things (IOT)

Our IoT tutorial covers all IoT-related topics, including introduction, features, advantages and disadvantages, ecosystem, framework for making decisions, architecture and domains, biometrics, security cameras, door unlocking systems, devices, etc.

Embedded Devices (System) in (IoT):

When learning about the Internet of Things or developing IoT projects, understanding embedded devices is crucial. The components that make up the special computing system are the embedded devices. These devices might or might not be connected to the Internet.
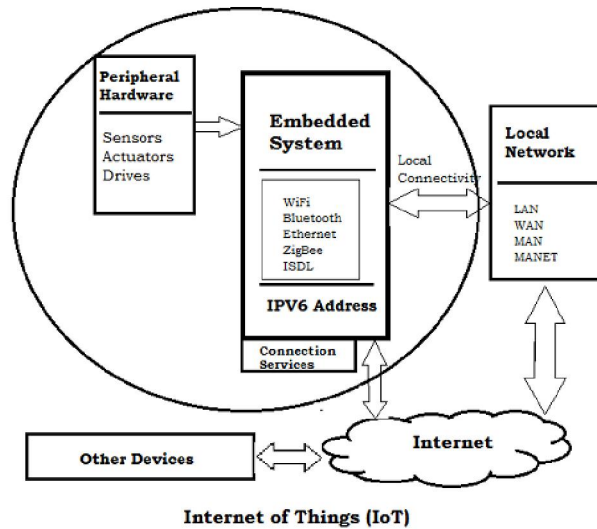

Fig. 3. Embedded Devices (System) in (IoT)

Typically, a single application is used to run an embedded device system. The ability to connect to the internet and communicate with other network devices allows these devices to do so.
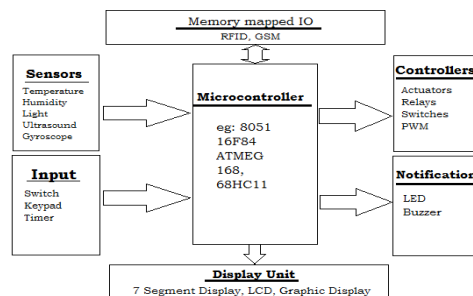
Embedded Devices Hardware:

Fig.4. Embedded Devices Hardware

The embedded system can be either a microprocessor or a microcontroller type. These two varieties each have an integrated circuit (IC).

A microcontroller from the RISC family, such as the Motorola 68HC11, PIC 16F84, Atmel 8051, and many others, is the most important part of the embedded system. The internal read-write memory of these microcontrollers is the key feature that sets them apart from microprocessors like the 8085. The following lists the fundamental system architecture and embedded device components.
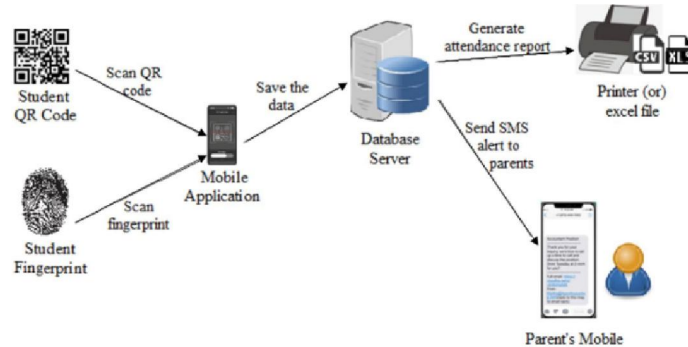
Embedded System Software:

Fig. 5. Embedded System software

The language platform serves as the foundation for the embedded system, which uses devices for its operating system and is primarily used for real-time operations. Electronics like cars, phones, modems, appliances, etc. are

made with embedded software by manufacturers. An 8-bit microcontroller running lighting controls is a simple example of an embedded system. Additionally, it might be challenging software for aircraft, process control systems, missiles, etc.
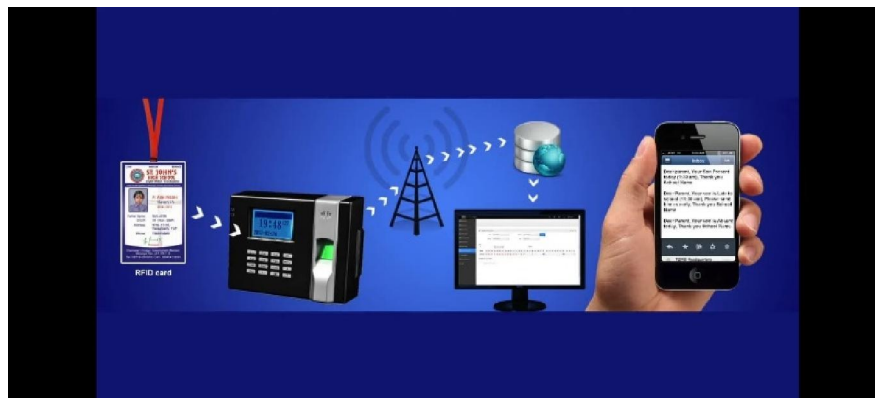

Fig.6.message sending through the IOT

V. METHODS OF IMPLEMENTATION

RFID (Radio Frequency Identification) and GSM (Global System for Mobile Communications) are two popular technologies used in smart attendance systems. Here's an overview of how they work and how they can be implemented:

RFID-based attendance system:

RFID is a wireless technology that uses electromagnetic fields to identify and track tags attached to objects. In an RFID-based attendance system, each student or employee is given an RFID tag that contains unique information. When the tag comes within range of an RFID reader, the reader captures the information and sends it to a central database. The system then checks the information against the student or employee database to record attendance.

Implementation:

To implement an RFID-based attendance system, you will need RFID readers and tags. The readers can be fixed at entrances or classrooms, and the tags can be attached to student or employee ID cards. You will also need software to manage the attendance data and generate reports

GSM-based attendance system:

GSM is a standard for digital cellular networks used for voice and data communication. In a GSM-based attendance system, students or employees use their mobile phones to send an SMS message to a designated number to mark their attendance. The system then captures the information and sends it to a central database.
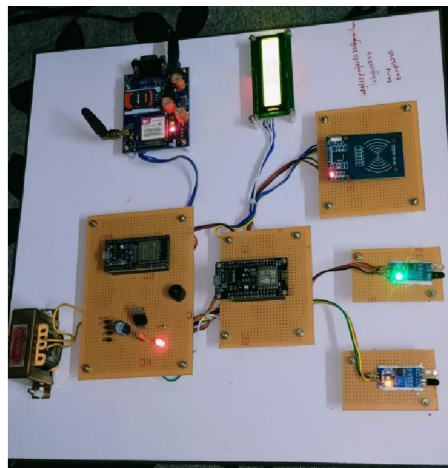

Fig.7. Reliable attendance monitoring system device

Implementation:

To implement a GSM-based attendance system, you will need a designated phone number and a SIM card. The system can be set up to receive SMS messages from students or employees who send a specific keyword to the designated number. You will also need software to manage the attendance data and generate reports.

Both RFID and GSM-based attendance systems have their advantages and disadvantages. RFID is more secure and accurate, but it can be more expensive to implement. GSM-based systems, on the other hand, are more cost-effective, but they may not be as reliable if there are connectivity issues or if students or employees forget to send their SMS messages. Ultimately, the choice between these two technologies will depend on the specific needs and requirements of the organization implementing the attendance system.

VI. RESULT AND ANALYSIS

Fig.8. Attendance will be noted in Google sheet

A smart attendance system is an automated solution that uses technology such as biometrics, RFID, or facial recognition to record attendance data accurately and efficiently. The result and analysis of a smart attendance system would depend on various factors such as the technology used, the implementation, and the goals of the organization.

Here are some potential results and analysis that could be derived from a smart attendance system:

Accurate attendance tracking: One of the main benefits of a smart attendance system is its ability to accurately record attendance data. This means that there is less room for errors, and organizations can rely on the data to make important decisions.

Time-saving: A smart attendance system can save time by eliminating the need for manual attendance tracking. This can free up staff members to focus on other tasks.

Improved productivity: By automating attendance tracking, a smart attendance system can improve productivity by reducing the time and effort required to track attendance manually.

Cost-saving: A smart attendance system can potentially save costs by reducing the need for manual data entry and reducing errors.

Data analysis: A smart attendance system can provide valuable data that can be analyzed to gain insights into attendance patterns and trends. This information can be used to improve attendance management and identify areas for improvement.

Privacy concerns: Some people may have concerns about the use of biometric data or facial recognition technology in a smart attendance system. It is important for organizations to address these concerns and ensure that the system complies with relevant privacy laws and regulations.

Overall, the result and analysis of a smart attendance system would depend on the specific implementation and the goals of the organization. However, if implemented correctly, a smart attendance system can provide numerous benefits, including accurate attendance tracking, time and cost savings, and valuable data analysis.

VI. ACKNOWLEDGMENT

VII. CONCLUSION

The created system is an IOT that is a component of a minutiae-based fingerprint recognition and authentication system. The technique extracts a fingerprint's local characteristics, which are based on minute points in a template. Both the registration and verification processes include matching templates. The majority of administrative tasks are reduced, human error is reduced, proxy punching is avoided, time-related issues are resolved, and attendance records are updated and maintained.

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