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I0T BASED SMART ATTENDANCE TRACKING SYSTEM

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Abstract: Attendance management is on essential process in educational institutions and organizations ensuring that students or employees attend classes or meetings regularly. Traditionally, attendance. management was done manually which was a tedious and time-consuming task. However, with the advent of technology model attendance management systems have been developed, utilizing 1oT-based smart attendance tracking systems. This paper presents an IOT-based smart attendance racking system that utilizes fingerprint, RFID technology. Nodemcu. Arduino Uno, and an own server to automate the attendance process "The system is designed to increase efficiency, reduce errors, and save time by eliminating the need for manual attendance tracking. The fingerprint and RFID technology are wed to authenticate the identity of the student or employee. while the Nodemcu and Arduino Uno are responsible for sending attendance data 10 the own server.

Index Terms - Smart Attendance, IoT, RFID, GSM, Arduino.

I. Introduction

Attendance management is a crucial aspect of educational institutions and organizations, ensuring that students or employees attend classes or meetings regularly. However, traditional attendance management methods have been manual and often error-prone, leading to inefficiencies in the attendance tracking process. With the advent of technology, modern attendance management systems have been developed, utilizing IoT- based smart attendance tracking systems. These systems provide an automated and efficient way to track attendance, reducing errors and saving time. The IoT-based smart attendance tracking system is a modern attendance management solution that uses a combination of technologies such as fingerprint, RFID, Node MCU, Arduino Uno. and an own server to automate the attendance process. The system is designed to increase efficiency, reduce errors, and save time by eliminating the need for manual attendance tracking. The fingerprint module is used to authenticate the identity of the student or employee. providing an accurate and secure way of identifying individuals. The RFID technology is used as an alternative for students or employees who cannot use fingerprint authentication, allowing for more flexible attendance tracking. The Node MCU and Arduino Uno are responsible for communicating attendance data to the own server. The Node MCU is a low-cost Wi-Fi module that can be easily integrated into IoT projects. It provides a simple way to connect IoT devices to the internet, allowing for the transfer of data between devices and servers. The Arduino Uno is a microcontroller board that provides an interface between the hardware components of the system, allowing for the collection and processing of data.

The own server is responsible for storing and processing attendance data, generating reports and analytics for the user. The server is highly secure, ensuring that the attendance data is protected from unauthorized access or tampering. The system is also scalable, making it suitable for educational institutions and organizations of all sizes. Overall, the IOT- based smart attendance tracking system provides a reliable and efficient solution for modern attendance management. It eliminates the need for manual attendance tracking reduces errors, and provides a secure and scalable way to track attendance. The system is cost-effective and user-friendly, making it an ideal solution for schools, colleges, and organizations that want to automate their attendance tracking process.

II. Literature Survey

[1] An RFID attendance and monitoring system for university applications is a technology that utilizes radio frequency identification (RFID) technology to manage and track attendance in real-time. This system typically consists of RFID readers and tags, a database management system, and software applications for monitoring and reporting attendance data. The technical details of such a system involve configuring the RFID readers and tags, designing the database schema, implementing algorithms for real-time attendance tracking, and developing software interfaces for attendance reporting and analysis.

[2] An RFID attendance system with face detection using ESP32 cam module is a specific implementation of the RFID attendance system with face detection. The technical details of this system involve configuring the ESP32 cam module, integrating it with the RFID readers and tags, and implementing the face detection algorithm using software libraries such as OpenCV. Additional technical considerations include designing the database schema to store both RFID and facial recognition data, optimizing camera placement and lighting conditions, and ensuring data privacy and security.

[3] The RFID Attendance System with Arduino Uno, RTC Module, and LCD Module is a popular application of Radio Frequency Identification (RFID) technology in the field of attendance tracking. The system uses an Arduino Uno microcontroller to control the through SMS; negatives include a complex system and challenging data management.

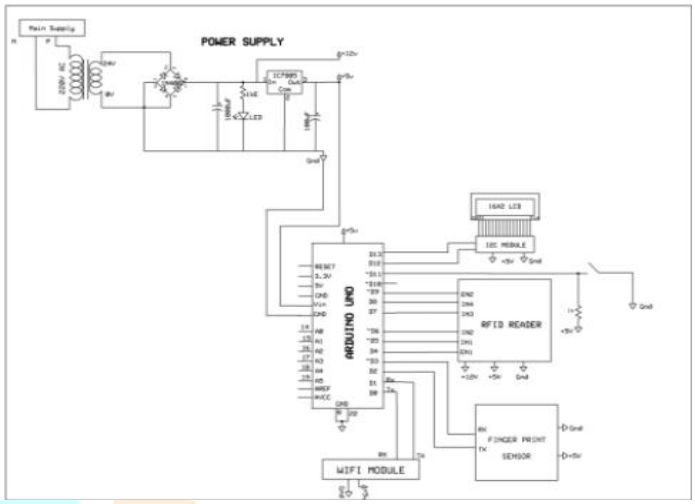

Fig.1. Block diagram

III. Existing System

RFID system used to monitor the attendance in an institution. There are also several projects and existing models that uses barcode for this attendance tracking. Smartphones can also be used for this purpose but, it seems there are chances to make fraudulent access in the system. Many types of the research proposed video and image based automated monitoring where it's not economically feasible, the posture of the student and sometime it may fail when there are two or more students with similar facial features. There are all offline based Attendance system.

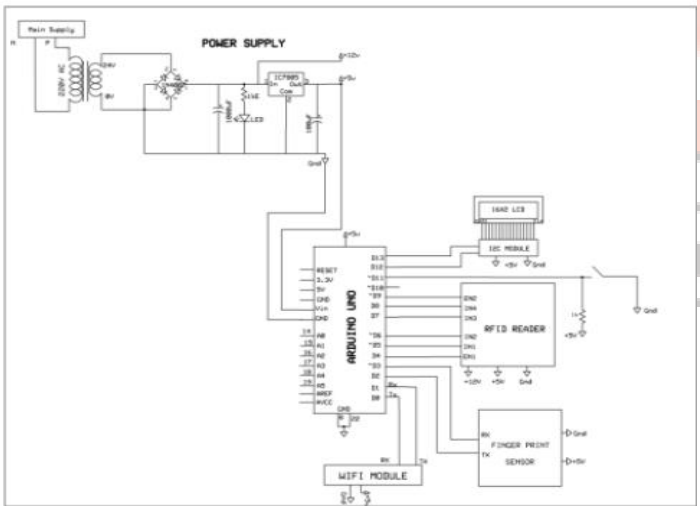

Fig.2. Circuit diagram

IV. Proposed System

The proposed IOT-based smart attendance tracking system is designed to automate the attendance tracking process. improving efficiency, accuracy, and security. The system will utilize a combination of technologies such as fingerprint and RFID authentication, Node MCU, Arduino Uno, and an own server to track attendance. The fingerprint module will be used to authenticate the identity of the student or employee, while the RFID module will be used as an alternative for students or employees who authentication. cannot Both use modules fingerprint will be connected to the Arduino Uno, which will act as the interface between the hardware components of the system.

The Nodemcu will be used to connect the system to the internet, allowing attendance data to be communicated to the own server. The own server will be responsible for storing and processing attendance data. generating reports and analytics for the user. The server will be highly secure, ensuring that the attendance data is protected from unauthorized access or tampering.

The proposed IOT-based smart attendance tracking system will work as follows

- .Student or employee authentication: When a student or employee arrives at the attendance tracking point, they will need to authenticate their identity using either the fingerprint or RFID module. Attendance data acquisition: The Arduino Uno will receive the attendance data from the fingerprint or RFID module and store it temporarily.
- Data transmission to Node MCU: The Arduino Uno will communicate with the Nodemcu using serial communication and transmit the attendance data.
- Data processing and storage: The Node MCU will receive the attendance data and communicate it to the own server using the internet. The server will process the data and store it in a secure database.
- Analytics and reporting: The own server will generate analytics and reports, providing the user with real- time attendance data for individual students or employees, as well as classes, courses, or departments.

- Alert and notification: The system will generate alerts and notifications if any student or employee is absent. allowing administrators necessary action.

V. Software and hardware Requirements

The system will utilize a combination of technologies such as fingerprint and RFID authentication, Nodemcu, Arduino Uno, and an own server to track attendance. The proposed IOT-based smart attendance tracking system is designed to automate the attendance tracking process. improving efficiency, accuracy, and security.

COMPONENTS LIST:

- Power supply system
- Arduino Uno
- Nodemcu
- Finger Print sensor
- RFID Reader and Tag
- LCD Module
- 12C Module

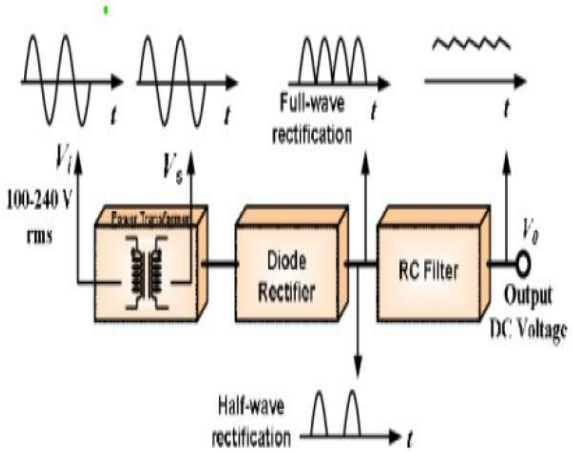

Fig.3. Power Supply System

VI. Arduino UNO

Arduino Uno is a main Brain of the Project. The Arduino Uno is a microcontroller board based on the ATmega328P microcontroller chip. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal oscillator, and a USB connection. The ATmega328P microcontroller has 32 KB of flash memory, 2 KB of SRAM, and 1 KB of EEPROM. The digital input/output pins are grouped into two sets of 8 pins each, with each set capable of being configured as either input or output. The board can be powered either by connecting it to a computer via the USB cable, or by connecting it to a 9-volt battery or an external power supply.

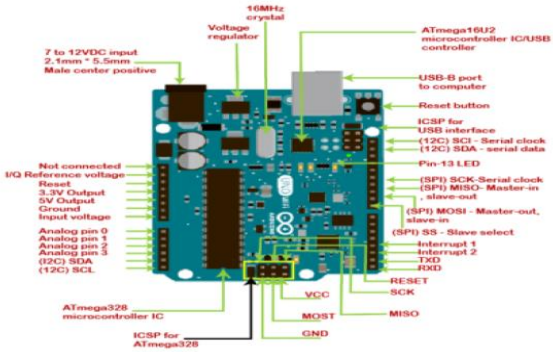

Fig.4. Arduino UNO

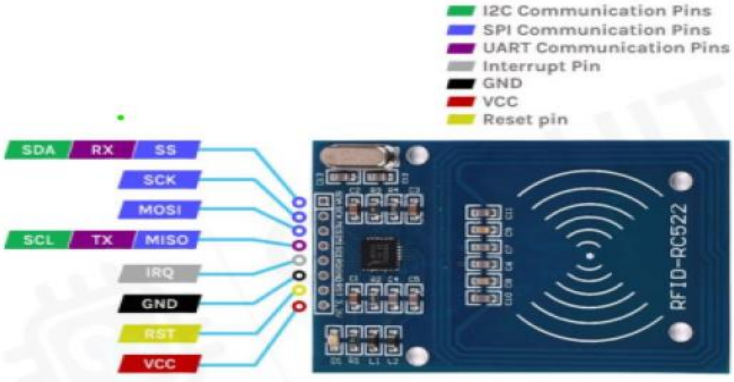

Fig.5.LCD MODULE

VII. Results

The simulation work of this project is done with embedded C to make sure that the logical works in a proper way and brings the correct output the program for the Arduino was implemented using Arduino ide software. Finally, the prototype is developed and set up to transfer instance RFID readings to a webserver via the Internet. The data can be viewed in the server using login id and password.

VIII. *Conclusion*

The proposed IoT-based smart attendance tracking system using fingerprint, RFID, NodeMCU, Arduino Uno, and own server is a highly efficient and secure solution for attendance management. The system utilizes advanced technologies to attendance tracking automate the process, improving accuracy, and eliminating errors. The system is cost-effective, user-friendly, secure, making it and highly an ideal solution for educational institutions and organizations of all sizes. With real-time analytics and reporting. the system provides administrators with valuable insights to improve student or employee attendance. Overall, this system represents a significant advancement in attendance management, providing a highly reliable and efficient solution that meets the needs of modern organizations.

IX. *References*

[1] In the 2019 issue of the IEEE Journal of Selected Areas in Communication, Soumil Nitin Shah and Abdelshakour Abuzneid presented a smart attendance system based on loT and RFID technology.

[2] The International Journal of Science, Engineering and Technology Research (IJSETR) published a paper in 2010 by A. Kassem, H. Hamad, Z. Chalhoub, and S. El Dahdaah, which detailed an attendance and monitoring system utilizing technology specifically designed university applications. RFID for university application.

[3] The International Journal of Recent. Technology and Engineering (URTE) published a paper in July 2019 by G.T. Bharathy, S. Bhavanisankari, T. Tamilselvi. and G. Bhargavi. The paper, titled "Analysis and Design of RF Filters with Lumped and Distributed Elements." focused on the development of RF filters utilizing both lumped and distributed elements. The paper was published in Volume 8, Issue 285, and spanned pages 38-42, with an ISSN of 2277-3878.

[4] In 2013, D. Mane published a paper titled "Importance and Analysis of RFID in Attendance System" in the International Journal of Emerging Science and Engineering (ESE), which discussed the significance and examination of RFID technology in attendance systems.

[5] In 2009, Z. Al-Shammari presented a paper titled "Developing a technology attendance tool based on CAMTS and CARS to improve student attendance at university classrooms" at the 3rd International Conference on Signals, Circuits, and Systems (SCS) in Madeline. The paper spanned pages 1-3 of the conference proceedings.

[6] The 7th International Conference on Smart Structures and Systems (ICSSS) held in Chennai, India in 2020 featured a paper by G.T. Bharathy, V. Rajendran, T. Tamilselvi, and M. Meena. The paper, titled "A Study and Simulation of Spectrum Sensing Schemes for Cognitive Radio Networks," presented a study and simulation of different spectrum sensing schemes for cognitive radio networks.

[7] In the November 2015 edition of the International Journal of MC Square Scientific Research, B. Thangalakshmi and G.T. Bharathy published a paper titled "Review of Cognitive Radio Network." The paper solely authored by them provided an overview of cognitive radio networks and spanned pages 10-17 in volume 7, issue 1. 8. In the May 2016 edition of the International Journal of Emerging Technology in Computer Science.

[8] Cognitive Radio Network.' The paper. which focused on the use of matched filter detection for spectrum sensing in cognitive radio networks, spanned pages 151-154 in volume 22, issue 2.

[9] The 17th International Conference on Electronics, Circuits, and Systems in 2010 featured a paper by A. Kassem, M. Hamad, Z. Chalhoub, and S. EI Dahdaah titled "An RFID Attendance and Monitoring System for University Applications. The paper presented an RFID-based attendance and monitoring system designed for use in universities.

[10] In the January 2013 edition of the ICSI International Journal of Computer Science Issues, Sumita Nainan, Romin Parekh, and Tanvi Shah published a paper titled "RFID Technology Based Attendance Management System." The paper discussed the use of RFID technology for managing attendance.

[11] The 2nd Workshop on Recent Trends in Telecommunications Research (RTTR) in 2017 featured a paper by H. K. Nguyen and MT. Chew titled "RFID-Based Attendance Management System The paper discussed an attendance management system that used RFID technology.

[12] The International Journal of Advanced Research in Computer Engineering & Technology dJARCET) published a paper in its April 2016 issue by Mahesh Sutar. Mahesh Patil, and Sachin Waghmare tided "Smart Attendance System Using RFID in IoT." The paper discussed the development of an attendance system that used RFID technology within the context of the Internet of Things (IoT).

[13] The 5th NAFOSTED Conference on Information and Computer Science (NICS) 2018 featured a paper by Van-Dung Hoang, Van-Dat Dang, TienThanh Nguyen, and DiemPhuc Tran that proposed a solution for monitoring systems that combined RFID tags and facial recognition technology.

[14] Sri Vignesh PSS and Bhaskar M. presented a paper on an automated classroom attendance system that uses RFID and pose invariant face verification at the International Microelectronics, Conference Computing, Communications (MicroCom) in January 2016. on and

[15] Sri Madhu BM, Kavya K, and Devansh presented paper on an automatic attendance management system based on IoT at the IEEE International Conference on Current Trends in Computer. Electrical. Electronics, and September 2017 Communication.