RESEARCH ARTICLE OPEN ACCESS

WI-FI BASED RFID ATTENDANCE SYSTEM USING NODEMCU AND DJANGO

Kalanithi.M*, Baraneeswaran.C* , Jayakumar.A*

** Dr.A.Arulmurugan , PhD,

*Student, Department Of Information Technology, AVC College Of Engineering,

Mayiladuthurai(Dt).

Email id: kalanithimarimuthu372@gmail.com

**Head Of The Department, Department Of Information Technology, A.V.C College of Engineering, Mayiladuthurai.(Dt)

Email id: arulmuruganavcce@gmail.com

ABSTRACT :

Wi-Fi based RFID attendance system using NodeMCU describes a technology that combines radio frequency identification (RFID) and Wi-Fi to automate attendance tracking. The system uses NodeMCU, an open-source development board, to read RFID tags and connect to a local Wi-Fi network. When a user scans their RFID tag, the system sends attendance data to a remote server for storage and analysis. The system eliminates the need for manual attendance tracking, reduces errors, and provides real-time data for analysis. This abstract provides an overview of the technology used in the system and highlights its potential benefits. This system aims to improve the traditional attendance recording process by utilizing the advantages of Wi-Fi and RFID technologies. The NodeMCU is programmed to read the data from the RFID reader and send it to the server through Wi-Fi. The web-based interface is used to display the attendance records and manage the system. This system eliminates the need for manual attendance records and reduces errors, making the process more efficient and accurate. The project can be implemented in various organizations such as schools, colleges, and offices. This system utilizes the NodeMCU, a low-cost Wi-Fi-enabled microcontroller, and RFID technology to track attendance of students or employees.

INDEX TERM: NodeMCU, RFID, Attendance, Microcontroller

INTRODUCTION :

A WiFi-based RFID attendance system using NodeMCU and Django is a system that allows employees to clock in and out of work by scanning an RFID tag using a NodeMCU microcontroller board that is connected to the company's WiFi network. The system then logs the employee's attendance data in a Django web application, which can be used for payroll, HR, and other purposes.The system consists of two main components: the hardware component and the software component. The hardware component includes the NodeMCU board, an RFID reader, and an antenna. The RFID reader reads the unique ID of the employee's RFID tag, and the NodeMCU board sends this data to the Django web application over WiFi. The software component includes the Django web application, which receives the attendance data from the NodeMCU board and stores it in a database.

The workflow of the system is as follows:

- An employee approaches the RFID reader with their RFID tag.
- The RFID reader scans the tag and sends the unique ID to the NodeMCU board.
- The NodeMCU board connects to the company's WiFi network and sends the attendance data to the Django web application.
- The Django web application receives the attendance data, validates it, and stores it in a database.
- The attendance data can then be accessed and analyzed by HR or other authorized personnel through the Django web application.

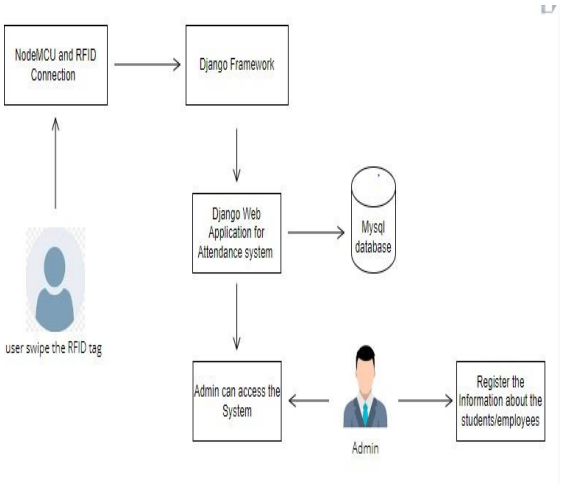
The benefits of a WiFi-based RFID attendance system using NodeMCU and Django include improved accuracy, reduced administrative burden, and increased efficiency. With this system, employees can easily clock in and out of work, and HR personnel can access attendance data in real-time, allowing them to quickly identify attendance patterns and trends.Overall, a WiFi-based RFID attendance system using NodeMCU and Django is a reliable and efficient way to manage employee attendance data in a modern workplace.

KEY NOTES :

A WiFi-based RFID attendance system using NodeMCU and Django is a system that uses radio frequency identification

(RFID) technology to keep track of attendance in a school, university, or workplace setting. Here are some key notes about this system: NodeMCU is an open-source development board that is based on the ESP8266 Wi-Fi module. It can be programmed using the Arduino IDE and is commonly used in IoT projects. RFID is a technology that uses electromagnetic fields to identify and track tags attached to objects. In the case of an attendance system, each person would have an RFID tag that they would swipe or scan to record their attendance. The NodeMCU would be used to read the RFID tags and transmit the data to a Django web application. Django is a Python-based web framework that is commonly used for building web applications. It would be used to store and manage the attendance data collected by the NodeMCU. The system would likely require a database to store the attendance data. Django supports various databases, including PostgreSQL, MySQL, and SQLite. The NodeMCU would need to be connected to a WiFi network to be able to transmit the data to the Django web application. The Django web application would need to have a user interface for administrators to view the attendance data and generate reports. The system could be expanded to include features such as automatic email notifications for absentees, integration with other systems such as payroll or HR, and the ability to track attendance for multiple locations or events.

SYSTEM ARCHITECTURE :



RFID Reader: The RFID reader will be connected to the NodeMCU board, which will read the RFID tags of the students/employees.

NodeMCU Board: NodeMCU is an open-source IoT platform that can be used for WiFi connectivity and microcontroller programming. The NodeMCU board will be used to connect the RFID reader to the internet via WiFi.

WiFi: WiFi will be used to connect the NodeMCU board to the internet, allowing it to communicate with the Django server.

Django Server: A Django server will be used to store and manage the attendance data received from the NodeMCU board. It will also manage the user authentication and authorization for accessing the attendance data.

Database: A database will be used to store the attendance data received from the NodeMCU board. Django supports multiple databases, such as SQLite, MySQL, and PostgreSQL, so you can choose the one that suits your needs.

PERFORMANCE EVALUATION:

Performance evaluation of a WiFi-based RFID attendance system using NodeMCU and Django can involve several metrics to measure its effectiveness and efficiency. Here are some key metrics that can be used for performance evaluation:

Accuracy: One of the most critical metrics to evaluate is the accuracy of the system. The system should accurately track attendance for all students or employees and ensure that no false data is recorded.

Speed: The system's speed in recording attendance can affect its overall efficiency. The system should quickly record attendance without causing any delays or interruptions.

Reliability: The system's reliability in functioning without any downtime or errors is also essential. It should be designed to handle high volumes of traffic without crashing or malfunctioning.

Scalability: The system's ability to handle increasing numbers of users should also be evaluated. As the number of users increases, the system should be able to handle the load without compromising performance.

User-Friendliness: The system's user-friendliness can significantly affect its adoption and effectiveness. The system should be easy to use and understand for both students or employees and administrators.

Integration: The system's integration with other systems and applications should also be evaluated. It should be easily integrated with existing databases or student/employee information systems.

Cost-effectiveness: Finally, the system's cost-effectiveness should be evaluated, taking into account the cost of hardware, software, maintenance, and any ongoing costs.

By evaluating the above metrics, one can determine the effectiveness and efficiency of the WiFi-based RFID attendance system

using NodeMCU and Django. This can help in identifying areas of improvement and optimizing the system's performance for better results.

LITERATURE REVIEW :

[1] "Design and Implementation of Wi-Fi-based RFID Attendance System using NodeMCU" (2019): This paper describes the design and implementation of a Wi-Fi-based RFID attendance system using NodeMCU, which is a low-cost Wi-Fi-enabled microcontroller board, and Django, a high-level Python web framework.

[2] "Development of an Attendance Management System using Wi-Fi based RFID and NodeMCU" (2018): This paper presents the development of an attendance management system using Wi-Fi-based RFID and NodeMCU, which can be used to capture attendance data in real-time.

[3] "A Smart Attendance System based on Wi-Fi and RFID using NodeMCU" (2019): This paper proposes a smart attendance system based on Wi-Fi and RFID using NodeMCU, which can be used in various educational institutions to track attendance of students.

[4] "Real-Time Attendance System Based on Wi-Fi and RFID using NodeMCU and

Django" (2020): This paper presents a real- time attendance system based on Wi-Fi and RFID using NodeMCU and Django, which can be used to automate the attendance- taking process in classrooms or offices.

[5] "Design of Wi-Fi Based RFID Attendance System using NodeMCU and Django" (2021): This paper describes the design of a Wi-Fi-based RFID attendance system using NodeMCU and Django, which can be used to automate attendance-taking processes in various institutions.

[6] "Wireless Attendance System using Wi- Fi and RFID with NodeMCU and Django" (2019): This paper presents a wireless attendance system using Wi-Fi and RFID with NodeMCU and Django, which can be used to track attendance data in real-time.

[7] "Implementation of Wi-Fi based RFID Attendance System using NodeMCU and Django" (2020): This paper describes the implementation of a Wi-Fi-based RFID attendance system using NodeMCU and Django, which can be used to automate attendance-taking processes in educational institutions.

[8] "Design and Development of an Automated Attendance System using Wi-Fi and RFID with NodeMCU and Django"

(2019): This paper presents the design and development of an automated attendance system using Wi-Fi and RFID with NodeMCU and Django, which can be used to capture attendance data in real-time.

[9] "Smart Attendance System using Wi-Fi and RFID with NodeMCU and Django" (2021): This paper proposes a smart attendance system using Wi-Fi and RFID with NodeMCU and Django, which can be used in educational institutions and offices to track attendance data.

[10] "A Study on the Implementation of Wi-Fi Based RFID Attendance System using NodeMCU and Django" (2020): This paper presents a study on the implementation of a Wi-Fi-based RFID attendance system using NodeMCU and Django, which can be used to automate attendance-taking processes in various institutions.

CONCLUSION AND FUTURE ENHANCEMENT :

In conclusion, a WiFi-based RFID attendance system using NodeMCU and Django can play a key role in automating attendance tracking in various settings, including schools, universities, and workplaces. The system's benefits, including improved accuracy, real-time data access, and cost-effectiveness, make it a worthwhile investment for organizations seeking to improve attendance tracking and reduce costs.

However, there are several areas where future enhancements can be made to the system. Some of these areas include:

Improved Security: As RFID cards or tags can be easily lost or stolen, the system's security can be enhanced by implementing stronger security measures, such as encryption or multi-factor authentication.

Mobile Application: A mobile application can be developed to allow students or employees to check their attendance record or receive notifications for any missed classes or shifts.

Facial Recognition: The system can be enhanced by integrating facial recognition technology to identify students or employees as they enter or exit the premises. This can improve accuracy and reduce the need for RFID cards or tags.

Analytics and Reporting: The system can be improved by adding analytics and reporting features that provide insights into attendance patterns and help administrators make data-driven decisions.