

Automatic Gate Control with Vehicle Attendance System

Mr. Rahul N Kadu, Tejas K Waditke, Sudarshan A Kharde, Shivam A Kadu

Department of Electronics and Telecommunication Engineering
Pravara Rural Engineering College, Loni, India

Abstract: *The system aims to improve efficiency and security by automating the process of allowing or denying access to vehicles based on their attendance status. The system utilizes various components such as RFID technology, sensors, microcontrollers, and a database to achieve its functionality. When a vehicle approaches the gate, RFID sensors detect its presence using RFID tag and send the information to the microcontroller. The microcontroller then checks the attendance status of the vehicle in the database. If the vehicle is authorized based on its attendance record, the gate opens automatically to allow entry. Conversely, if the vehicle's attendance status is not satisfactory, the gate remains closed, denying access. The attendance monitoring system keeps track of vehicle attendance using a registration process. Each vehicle's attendance is recorded in the database on web page, allowing the gate control system to make informed decisions about granting or denying access. The attendance records can be updated in real-time, providing a dynamic and accurate system for gate control.*

Keywords: RFID Technology, RFID tag, web page, attendance

I. INTRODUCTION

In today's fast-paced world, efficient access control systems and enhanced security measures have become increasingly vital in various settings such as residential complexes, commercial buildings, and industrial facilities. Manual gate control methods are often prone to errors and can be time-consuming, leading to inefficiencies and potential security breaches. To address these challenges, the development of an Automatic Gate Control with Vehicle Attendance System offers a promising solution.

The Automatic Gate Control with Vehicle Attendance System aims to streamline the process of vehicle access control and attendance management by integrating advanced technologies. This system combines computer vision, machine learning, and RFID (Radio Frequency Identification) technology to automate gate operations and accurately record vehicle entry and exit information.

The primary objective of this project is to create an intelligent and secure gate control system that eliminates the need for manual intervention, reduces administrative workload, and enhances overall security. By leveraging computer vision algorithms, the system can effectively recognize and classify vehicles based on real-time images captured by strategically placed high-resolution cameras. Furthermore, the integration of machine learning techniques ensures high accuracy in vehicle identification and classification tasks.

To enhance security and prevent unauthorized access, RFID tags are affixed to vehicles and drivers. The RFID readers installed at gate entrances detect these tags, enabling the system to verify the authenticity of vehicles and drivers before granting access. By combining the information obtained from computer vision and RFID technologies, the system ensures that only authorized personnel can enter the premises, thereby minimizing security risks. Additionally, the Automatic Gate Control with Vehicle Attendance System incorporates an attendance management module, eliminating the need for manual attendance tracking. The system automatically records the entry and exit times of vehicles and their occupants, allowing for accurate and efficient attendance management. This feature not only simplifies administrative tasks but also provides a comprehensive and reliable record of vehicle movements.

II. RELATED WORK

A. Kumar and P. Gupta, [1] proposed another method of security of human life and property is one of the paramount challenges facing any corporate organization or nation. Security systems are necessary everywhere especially in residential buildings, industrial area and public offices. The need for automatic sliding gates has been on the increase in recent times because it does not require manual operation. The digital sliding gating system described in this work uses the Radio Frequency Identification (RFID) technology for access control.

S. N. Patil et al, [2]The system utilizes advanced image processing and computer vision algorithms to automatically recognize and capture the license plate numbers of vehicles as they approach entry or exit points. The system consists of several components, including cameras strategically placed to capture clear images of license plates, an image processing unit that extracts the license plate information, a database that stores registered license plate numbers, and a decision-making module that determines whether a vehicle should be granted access based on the license plate data.

M. S. Khedkar et al, [3] technology-driven solution that enables the remote control and management of gates or barriers through the integration of Bluetooth and Global Positioning System (GPS) technologies. The system consists of a gate or barrier mechanism, a control unit, Bluetooth-enabled devices (such as smartphones or key fobs), and a GPS module. Each authorized user is provided with a Bluetooth-enabled device that is paired with the control unit of the gate system.

V. P. Chintakunta et al, [4] the integration of RFID technology and GSM-based communication to create a secure and efficient access control solution for gates or barriers. The system consists of a gate mechanism, a control unit, RFID tags or cards, RFID readers, and a GSM module. Each authorized user is provided with an RFID tag or card that contains unique identification information. When an authorized user approaches the gate, they present their RFID tag or card to the RFID reader. The RFID reader captures the identification information from the tag or card and sends it to the control unit for verification. The control unit checks the received information against the authorized user database and, if a match is found, triggers the gate to open, allowing access.

H. S. Shaikh and R. R. Manthalkar, [5] system incorporates IoT devices, such as sensors, cameras, and communication modules, installed at entry and exit points. These devices collect data, including vehicle information and license plate recognition, and transmit it to the cloud for processing and analysis. The cloud-based infrastructure acts as the central hub where data is securely stored and processed. The system utilizes cloud computing capabilities to perform complex computations, such as license plate recognition, vehicle identification, and access permission verification. Additionally, the cloud infrastructure enables seamless scalability, allowing the system to handle large volumes of data and accommodate a growing number of users and vehicles.

III. MATERIAL AND METHODS

Table 1: Technical Specification

Sr. No.	Component Name	Specifications
1	NodeESP32Wi-FiController	Dual-core Tensilica LX6
2	IR Sensor	5VDC, I/O pins- 3.3V to 5V
3	RFID Module	Freq. 125kHzor134kHz.
4	Motor Driver	L293D
5	Bo Motor	3V to 24V or higher
6	LCD Display	16x2

Block Diagram:-

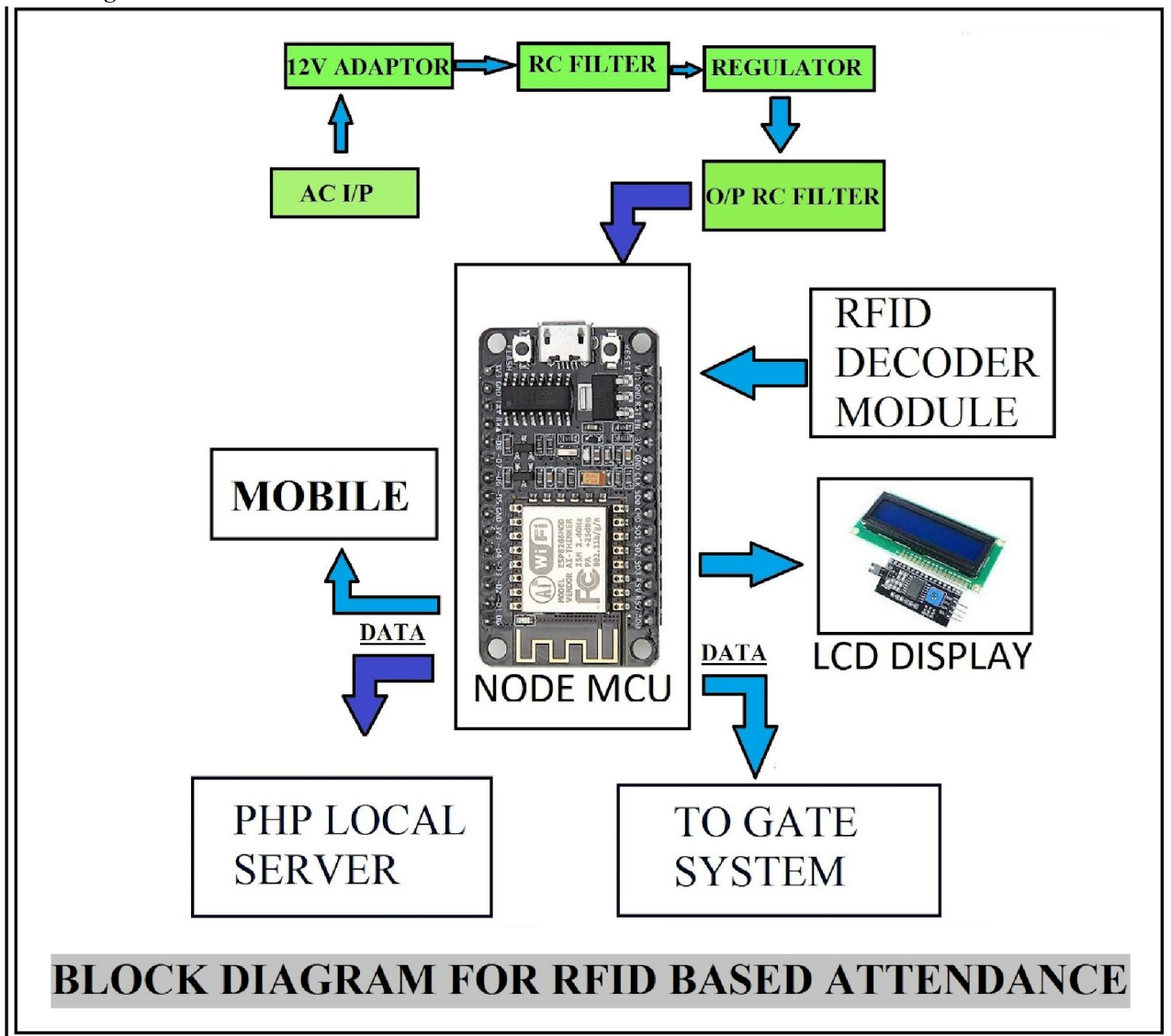


Fig. Block Diagram On Automatic Gate Control With Vehicle Attendance System

Flow Chart :-

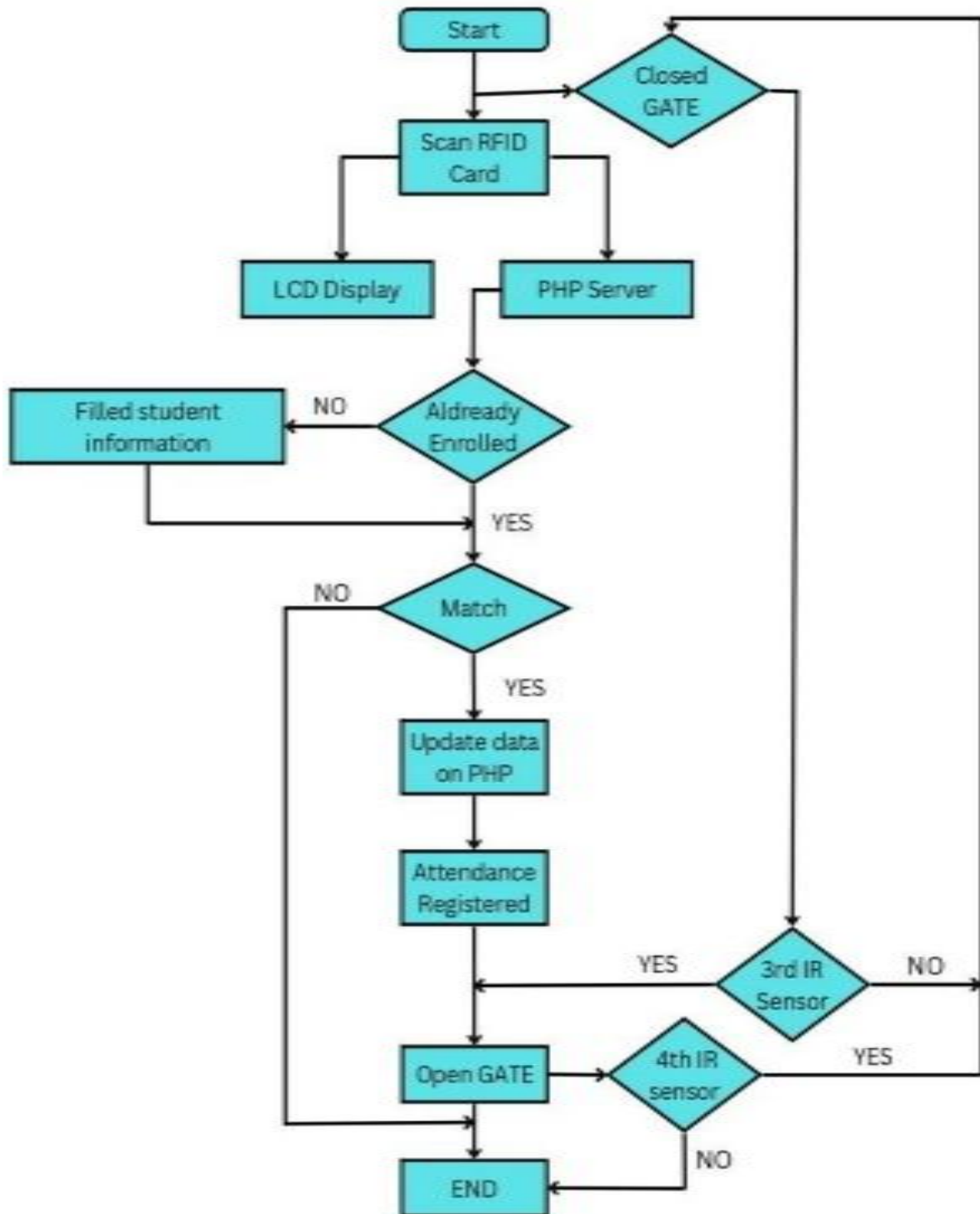


Fig. Flow Chart Of Automatic Gate Control With Vehicle Attendance System

IV. Working

The automated control of gates or barriers in conjunction with a vehicle attendance system. The system is designed to efficiently manage and monitor the entry and exit of vehicles in a particular area, such as a parking lot, residential

community, or office complex. The basic working principle involves the integration of various components, including sensors, a control unit, and a vehicle attendance system.

V. CONCLUSION

The implementation of an automatic gate control system with vehicle attendance offers numerous advantages such as enhanced security, streamlined entry and exit processes, improved efficiency, accurate attendance logging, and increased convenience. These systems provide controlled access to authorized vehicles, automate gate operations, and record vehicle entry and exit times for attendance tracking and analysis. By incorporating RFID technology, these systems ensure that only vehicles equipped with valid RFID tags can gain entry, minimizing unauthorized access and enhancing overall security. They eliminate the need for manual gate control, reducing human errors and delays, and contributing to a smoother traffic flow.

REFERENCES

- [1] A. Kumar and P. Gupta, "Design and Implementation Of Automatic Gate Control System Using RFID And Image Processing" International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) 2018.
- [2] S. N. Patil et al, "Automated Vehicle Access Control System using License Plate Recognition" International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE) 2017.
- [3] M. S. Khedkar et al, "Automatic Gate Control System using Bluetooth and GPS" International Journal of Computer Science and Mobile Computing (IJCSMC) 2016.
- [4] V. P. Chintakunta et al, "Development of an Automatic Gate Control System using RFID and GSM" International Journal of Computer Science and Information Technologies (IJCSIT) 2015.
- [5] H. S. Shaikh and R. R. Manthalkar, "Smart Vehicle Access Control System based on IoT and Cloud Computing" International Journal of Engineering Research and Applications (IJERA) 2020