Rfid Based Intelligent Smart Car Parking System UsingIot

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Abstract - Nowadays the number of vehicles is increasing day by day. We are facing a parking problem with the advancement in technology. The population in urban cities is dense due to which lots vehicles are running on road leads to the parking problem, traffic problem. The world is facing the new challenges of vehicle parking. It is observed that one million vehicles consume oil an daily basis. Methods: This system, intelligent smart car parking system is developed using sensor circuit, RFID and IOT RFID used here to detect the car detail, Adjustable IR proximity sensor is used to find the presence of the car and all details are accessed from remotely through IOT. An automatic real-time system for automated vehicle parking is proposed. This system has been implemented with the help of Internet Of Things (IOT). Finding: This system help user to find parking space availability with the help of internet of thing s(IOT) technology by providing parking free space information. RFID and IOT which can detect the available parking spaces, thereby saving time for people. Moreover, the parking area management is more efficient as it minimizes the limitations of the conventional system in which the users have to access a web application that to automatically alert them when the status of parking space changed. Additionally, the data can be applied to the management and planning such as analyzing the number of vehicles daily to compare with the number of parking space to determine parking space to determine whether it is sufficient or not in order to appropriately improve and provide more parking spaces.

Index Terms - ESP-32 Microcontroller , Indictive Proximity Sensor, IOT , RFID Module , Buzzer , Servo Motor , LCD Display

I. INTRODUCTION

RFID Based Intelligent Smart Car Parking Management System Using IOT is a next level idea for future world. When a car comes to the main gate of the parking, the user will use the RFID Tag and scan it over the RFID Reader. The RFID is connected to the ESP-32 which is the controller. The controller will verify the identity of the user and give command to the SERVO MOTOR .This servo motor will open the gate and once the car enters the crosses the gate a sensor will detect the car and send pulse to the controller and so closes the gate a sensor will detect the car and send pulse to the controller and so closes the gate. Also a LCD is connected to the controller which will show which slot of the parking is vacant and occupied so to direct the user. So once the car enters in and vacant spot is avaliable and the car reaches near the slot an INDICTIVE PROXIMITY SENSOR mounted over the slot which will detect the car and send signal to the ESP-32 which is in 0's and 1's which will tell that the slot is occupied and also to the LCD Display Now if a car is willing to go out or check out then at first the INDUCTIVE PROXIMITY SENSOR will detect it and send the signal in 0's and 1's.Now once the car reaches the exit gate, an another IPS senser is mounted just before the gate. This will intern help the controller to send and open the exit gate . Once the car pass the gate, the gate will automatically close. There is one more thing that is, the parking is an IOT based parking system so we can use an app or website to see if any slot is vacent or occupied by just going to the site and seen if a slot is empty. The page will have data of the parking area and have empty and occupied slots with numbers .And as it is IOT based so one can see which slot is empty just by seating at home or in the car itself without looking for the LCD.

II. LITERATURE SURVEY

Feng Yuan Wang et.al Presented a paper in 2019 titled 'Mechanical Parking System' that consisted of a rotary mechanism that allowed all the cars to travel in rotary motion. Cars were loaded and unloaded with the rotary motion of all cars. This system was preferable for 8to 12 cars. Advantages were that it was easy to operate andeasy parking of the vehicle was achieved. Limitations were that all cars need to be rotated to access one car, high initial cost and high maintenance and Complicated Structure.

Dharmini Kanteti, et.al published paper titled 'Smart Parking System for Commercial Stretch in Cities' in 2020 They developed a Smart Parking System. In their model pre- registered IP cameras would capture the vehicle registration number and then they proceed without interruptions. Their details like parking time estimate, their place of visit etc. would be recorded. For pre-registered users, the amount would be deducted frome-wallet and then the users would be notified. A similar pricing system would be followed for new users but the payment would be offline. The disadvantages were that the system could serve all the parking requests but beyond the number of 80 it couldn't accommodate more cars since the parking became full.

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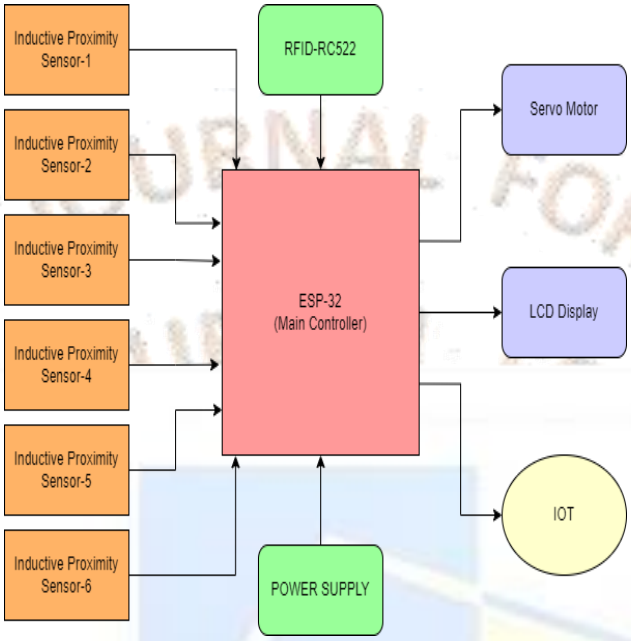
Robin Grodi, Danda et.al Present a paper in 2019 titled 'Smart Parking Occupancy Monitoring and Visualization system for smart cities'. had done work on how the vehicle will occupy in the particular allocated place. RFID sensors detected the presence of a vehicle or other objects in the allocated slot. Once a vehicle was detected, the system needed a way to notify drivers or a parking spot being occupied. The disadvantage was that, the parking place would be detected only to the nearby places and there was no GPS sensor to search the parking slots from

III. PROPOSED DIAGRAM



RFID Tag:

RFID refers to wireless system comprised of to two components: tags and reader There are three components in every RFID system i.e scanning antenna, transceiver and a transponder. RFID reader or interrogator is when the scanning antenna and transceiver are combined. RFID consist of two types of readers -fixed readers and mobile readers. The RFID reader is also known as a network-connected device that is portable or permanently attached. Radio waves are used to transmit signals that activate the tag.

ESP32:

ESP32 is a created by **Espressif system** with a series of low-cost, low-power system on chip microcontroller with integrated Wi-Fi and dual-mode Bluetooth. The ESP32 not only has build in wifi but also has Bluetooth and Bluetooth low energy. The ESP32 series employs either a Tensilica Xtensa LX6 microprocessor in both dual-core and single-core variations, Xtensa LX7 dual-core microprocessor or a single-core RISC-V microprocessor and includes built-in antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power management modules.

SERVO MOTOR:

The motor that can rotate with great precision is a servo motor . Servo motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. Servo motor is used when you want to rotate an object at some specific angles or distance.Servo motor runs through a servo mechanism.It works on the principle of PWM (Pulse width modulation),that is angle of rotation is controlled by the duration of applied pulse to its Control PIN. So it is basically, servo motor is made up of DC motor which is controlled by variable resistor (potentiometer) and some gears.

LCD Display:

A 20x4 LCD display is very basic module. It is very commonly used in various devices and circuits. Over seven segments and other multi segment LEDs these modules are favoured. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.4 lines with 20 characters per line are displayed by this **20x4 LCD**. Each character is displayed in 5x7 pixel matrix in this LCD. There are two registers in this LCD, they are, Command and Data. This is standard HD44780 controller LCD. No change code is there for interfacing standard 16x2 or 20x4 LCD. 20characters x 4 lines Built-in HD44780 Equivalent LCD Controller Works directly with ATMEGA, ARDUINO, PIC and many other microcontroller kits. 4 or 8 bit data I/O interface Low power consumption.

I2c:

I^2C protocol is used to establish communication between two or more ICs (integrated circuits), hence it is known as inter-integrated circuit(I2C) communication. This is a serial communication protocol that can connect low -speed devices. It is a master-slave communication in which it can connect and control multiple slaves from a single master.

IP (INDUCTIVE PROXIMITY) SENSOR:

An inductive sensor is a non-contact type sensor, helpful in the detection of metallic object. It can sense ferrous as well as non ferrous object. For detecting metal targets approaching the sensor that too without physical contact with the target an inductive proximity sensor is used. Rough classification of Inductive Proximity Sensors is as follows i.e divided into three types according to the operating principle: high-frequency oscillation type using electromagnetic induction, the magnetic using magnet, and the capacitance type using the change in capacitance.

IOT (internet of things):

Physical objects that are collectively embedded with sensors, software, and network are called IoT devices. From smartphones and home appliances to industrial machines and vehicles these devices are used.Data such as temperature, humidity, location, and more are collected and measured by the sensors embedded in IoT devices. To improve operations, reduce costs, and enhance overall performance this data is used.The data collected by IoT devices is processed and analyzed using software, because of which devices are able to perform actions and make decisions based on the information they gather.IoT devices can communicate with each other and with other systems through network connectivity such as Wi-Fi, Bluetooth, and cellular networks. This is to exchange data and work together to achieve common goals.The use of this IoT technology has the potential to improve efficiency, convenience, and productivity in various applications such as transportation, healthcare, agriculture and manufacturing also to create new opportunities for innovation and business growth.

IV. CONCLUSIONS

The problems of a efficient streamlined management of parking spaces are essentially addressed in this project. A welcome message and information about the availability of parking space is displayed in this system. By using of this system, there would be a significant reduction of the cost incurred to hire personnel in order to control the traffic in the parking lot and traffic congestion problem will be solved by faster check in and check out. If this project is successfully implemented then it'll result in less traffic and chaos in crowded parking spaces like in malls and business buildings where many people share a parking space. As the Smart Car Parking System Requires. The development results are also beneficial for the users such as the administrators, executives and other relevant people who can apply the information for planning and management such as to analyzing the sufficiency of the car parking area compared to the actual usage, the need of improvement or the construction of new car parking and the budgeting for construction. All the information will support and help the user to save time. Also the suggested system in this research can be applied to the smart car parking in each area or of each agency as the supportive tool of the management for real-time data storage.

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