AUTOMATIC CAR PARKING SYSTEM USING RASPBERRY PI

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Abstract – In developing countries like India where most of the population is shifting in urban areas, where vehicles are also increasing in a decent amount of numbers. And we know that cities have limited space to park vehicles. This results in traffic in various areas and also becomes time vesting. So to tackle this automatic car parking system using Raspberry Pi is introduced. It provides the status of the availability of slots with the help of IR sensors and the cloud on mobile applications as well as on LCD displays. With the help of an RFID card an authenticated user can use their slots and others can be provided with other available slots.

***Key Words*:** Raspberry pi, IR sensors, Mobile Application, LCD Display.

1. INTRODUCTION

So many things happen when we go to spots like multiplex film lobbies, hotel lodgings, shopping centers, etc. And the main problem that appears at these spots is finding the accessibility of parking spots. In most extreme conditions we have to look into various parking facilities to find a free space for parking. The situation gets worst and more tedious when the parking is far away from the place of work. This condition requires a smart solution to tackle this which includes automation in conventional systems to make it easy to access and maintain. Users can see the availability of slots on mobile applications. This application is integrated with raspberry pi which uses a database that sends real-time data to the app. The user comes across the parking facility by checking the availability of slots. The user is given RFID tags as the unique identity which authenticate the user and allows them to park the vehicle. It is mainly designed for the parking of residential buildings where parking is private and no other person is allowed to park at that slot. Parking facility charges annually for parking in privet slots. By developing this system we are able to control the uses of fuel and time which are wasted in discovering empty parking slots. More fuel consumption can harm the environment by increasing air pollution which is directly causing an increase in global warming.

2. LITERATURE REVIEW

1. Automated smart car parking system using Raspberry Pi 4 and iOS application: - In this project, the execution of an automated car parking framework told by an iOS Application is effectively talked about. The parts utilized for the usage of the framework give proficient yield at different phases of execution. The interfaces set up between different segments give a compelling correspondence over the general working of the framework. Accordingly, the framework working is effective and is suggested for business usage. In the future, certain progressions can be fused according to the prerequisites of the associations executing the framework.
2. Automated Multilevel Car Parking System using Raspberry Pi with ZigBee: - In this project, an automated car parking system makes utilization of Raspberry Pi with ZigBee innovation. Which comprises a model that grants vehicle drivers to effectively find unfilled stopping openings. The proposed model comprises an ultrasonic sensor that senses the nearness of the vehicle and further transmits signals by means of ZigBee to raspberry pi, a PIR sensor for sensing The course of action in the parking area, and a pi camera for recording exercises that happens in the stopping territory ZigBee gadget is interfaced with all sensors furthermore control units to have every one of them in a typical system.

3. BLOCK DIAGRAM

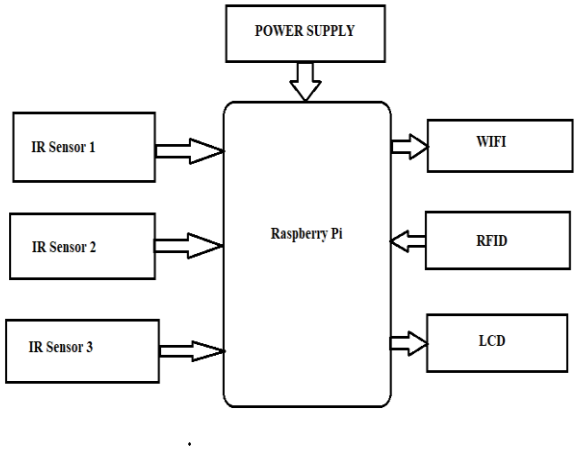

Fig 1: Block Diagram

3.1 DETAILED DIAGRAM DESCRIPTION

In light of this, the framework isn't tedious if the framework is utilized in 5-star lodgings and residential buildings the clients can invest more energy in the inns than in the stopping region. Here we are not utilizing the cameras rather than cameras we are utilizing the sensors to know the accessibility of free spaces. In this framework, there is no harm by the climate conditions or others. The figure shows the parts that are utilized in our proposed framework. The Raspberry Pi 4 is the primary part that is utilized to associate every single other segment, for example, Infrared sensors, RFID, LED, WIFI module, and Power flexibly. An ultrasonic sensor is essentially an electronic gadget that is utilized to distinguish the nearness of objects. Infrared sensors are utilized for the free space discovery that is accessible in the stopping region which is sufficiently quick. The RFID reader module is a gadget that sweeps and assembles the data from the RFID Card. The clients can be ready to see the LED if they can continue with the online data through the WIFI module. The WIFI module is utilized for the correspondence between the proprietors of the stopping territory and the client.

3.2 COMPONENT USED

- **Raspberry Pi**

The raspberry pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting a 64-bit quad-core processor running at 1.4GHz, dual-band 2.4GHz and 5GHz wireless LAN, Bluetooth 4.2/BLE, faster Ethernet, and Poe capability via a separate Poe HAT The dual-band wireless LAN comes with modular compliance certification, allowing the board to be designed into end products with significantly reduced wireless LAN compliance testing, improving both cost and time to market.

Fig 2: Raspberry Pi

- **IR SENSOR**

Descriptions The Multipurpose Infrared Sensor is an add-on for your line follower robot and obstacle-avoiding robot that gives your robot the ability to detect lines or nearby objects. The sensor works by detecting reflected light coming from its own infrared LED. By measuring the amount of reflected infrared light, it can detect light or dark (lines) or even objects directly in front of it. An onboard RED LED is used to indicate the presence of an object or detect a line. The sensing range is adjustable with an inbuilt variable resistor

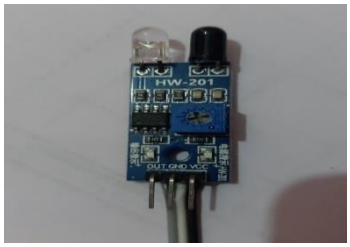

Fig 3: IR SENSOR

- **RFID READER**

The reader is a device that has one or more antennas that emit radio waves and receive signals back from the RFID tag. Tags, which use radio waves to communicate their identity and other information to nearby readers, can be passive or active. Passive RFID tags are powered by the reader and do not have a battery.

Fig 4: RFID READER

- **SERVO MOTOR**

A servomotor (or servo motor) is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity, and acceleration. It consists of a suitable motor coupled to a sensor for position feedback.

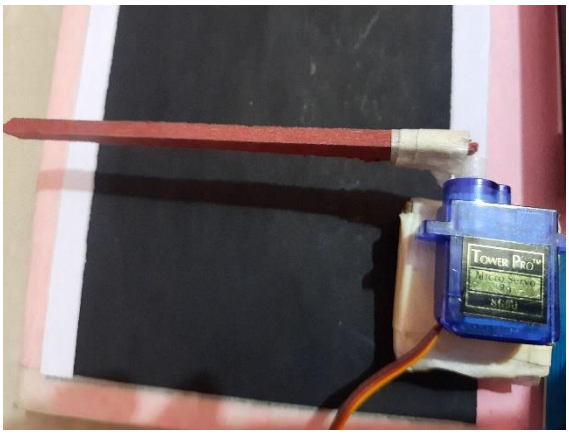

Fig 5: SERVO MOTOR

- **RFID TAG**

RFID tags are a type of tracking system that uses smart barcodes in order to identify items. RFID is short for "radio frequency identification," and as such, RFID tags utilize radio frequency technology.

Fig 6: RFID TAG

4. RESULTS

When raspberry pi is connected to the computer through HDMI and VGA connectors. For Raspberry Pi, there are three ports one port for the mouse pin, one for the keyboard pin and one is VGA Port. After the connection circuit is on. LCD screen and 4 IR sensors and raspberry pi are on. So first Pass is checked by the RFID reader then it checks whether the parking is full or empty. If parking is full then the servo motor is on and it displays that parking is full on LCD as well as on the Android application also. If parking slots are empty, then it displays on LCD and app that parking is available.

CONCLUSIONS

Automation is a step in the right direction for a future fulfilled in the world of transportation. This design provides an effective solution to the common problem discussed. The benefits of an automatic parking system go well beyond avoiding the needless circling of city blocks. It also enables cities to develop fully integrated multimodal intelligent transportation systems.

It can be concluded that with the correct connection of some simple electrical components, it is possible to create an automatic smart and secure car parkingsystem, thus decreasing aimless driving, fuel, and time, as well as making the process of parking considerably simpler.

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