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IoT Smart Parking System Using Raspberry Pi Barcode and Android App

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ABSTRACT

In this fast-increasing economy, the number of car users is growing exponentially day by day which demands additional parking space in this fast- growing era. The presence of Smartphone's enables customers to choose mobile solutions. The success of IOT has paved the way for integration of mobile, wireless and mobile applications. This paper provides a smart parking system for an IoT-based, mobile device. It offers a complete solution for both the consumer and the owners of the car park. The car park is reserved, the user is approved, the nearest free spot is decided according to car size, car parks are navigated and daily, weekly and monthly accounts are measured. IR sensors are used to decide whether a parking spot is available. With the help of WIFI module, microcontrollers and wireless communication technology a free slot with its position data is transferred to the server and accessed via a mobile app. A scheduling algorithm is used in the next free slot according to the size of the car. The parking lounge owner is able to get a review and can use it to measure the variable parking costs for that time, the weekday and week-ends rates of occupancy and the amount earned for that time. The mobile app provides consumers with flexibility and time savings and a rich experience.

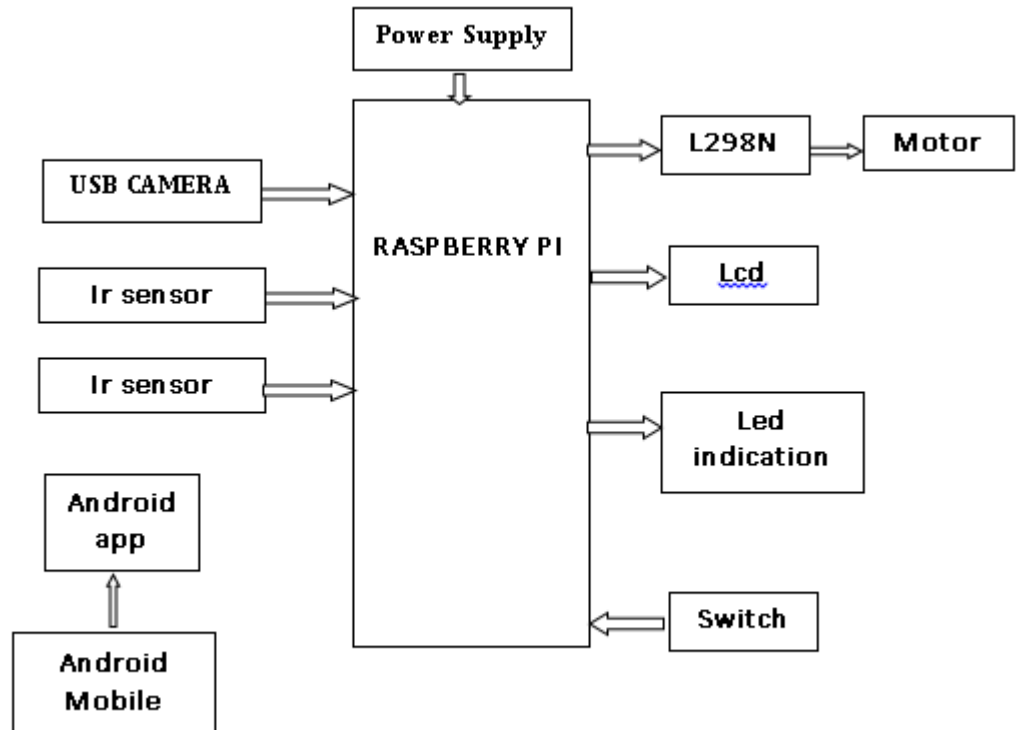
1. Introduction

The difficulties one faces in these plazas are discovering the availability of parking space while visiting different places such as shopping centers, restaurants, multifaceted cinemas. It becomes impossible to find parking space in cities with a large amount of traffic. It waste fuel, time and drives traffic to increase. When all available parking spaces are filled and a vacant spot can't be found, the problem becomes even worse. Different GPS-based navigation solutions will find empty slots. But as parking spaces are open or filled, the framework proposed in this report offers additional details and dynamic updates. Booking for slot booking also offers choice. This solves parking management problems effectively and helps to run smoothly. Multiple technologies including digital image processing, Ultra Sonic Sensor technology and others are used in parking systems. Image processing has low precision and high reliance on light and weather conditions is the key reverse of these detection systems. Since the technology of ultrasonic sensors is more sensitive to temperature fluctuations, this costs much for a wide parking area. And it has more difficulty interpreting reflections from various surfaces. Smart phones nowadays are central to the lives of the people and are now a system that gives consumers the convenience and facility they need. The device in the paper has been designed for tracking real-time information and can be used as an open or multi-level parking area in all types of parking areas. The device designed contains the following

1. With the aid of a LED indicator in the panel, the user can find a vacant slot. The user also can book the desired parking position.
2. System for comprehensive monitoring of slot used or open, including sensors, the Raspberry Pi and the android app.
3. The Android app is updated daily with real-time data handling, and the user's status can be found in the Android app.

The proposed system offers a low consumption parking monitoring system, which is easy to implement and cheap. It can be used both for open and multi-level car parks. Without interfering with routine operations the device can be easily deployed in any area. This device is useful for the driver for detecting the desired slot in a limited time span and saves fuel.

BLOCK DIAGRAM:



It has Raspberry Pi 3, raspberry, ir sensors, switch, LCD, engine, LEDs and a power supply (230V AC). This machine is packed with electricity. The barcode for the identification token reserved for parking is read via the camera. The production is a LED sign that the slot is empty or a book to the user. The Android app is for book access and access to the car park entrance. The lcd is for viewing processing in the computer system and we click on the button when the user leaves the car park.

2. LITERATURE SURVEY

Car parking is hectic these days and takes time. Campus car parking is handled by enhancing the efficiency of the usage of efficient parking space, informing and directing customers of usable parking areas. Fast Response Code is a type of barcode matrix with details about the object it is attached to. The QR code consists of black squares on a white background, which can be read by a QR code scanner [1] with various sensors, including Ultrasonic Sensors and IR sensors, available for detecting occupied and unoccupied slots. In this document IR Sensors are linked with Raspberry PI to detect the occupancy of the slots [2] for their accuracy and reliability in any dramatic environmental conditions. The mobile app provides the end-users with an Internet interface to connect to the system. The mobile app is connected to the server via the internet via a protected channel. Mobile applications offer information in real time. The data between the server and the mobile application is transferred.

The Raspberry pi and the mobile application must have an acceptable Internet connection to a specific channel on the server [3].in the mobile app it shows the occupied and vacant parking system for the customer with the help of LED's. in the previous systems it shows the nearest parking system for two and four wheelers. whenever the parking slot can be booked by the customer it shows the occupied symbol in the next user immediately in this SPS(smart parking system).the customer can be able to reserve the parking slots before arriving with his car so it can be reserved by the customer whenever he/she wants to parking the car. The bill can be showed in the LCD display whenever we want to exit from the car parking place we need to pay the sufficint bill as shown in the lcd display and clear the allotted parking space.

3. HARDWARE:

Raspberry Pi unit: -Raspberry Pi has been developed in the UK by the Raspberry Pi Foundation as a single-board device in credit card size. The Python Language is programmed. It acts as the controller for the DC engine, the driver and the IR sensors and also acts as the server for the daily storage of the update information. The Raspberry Pi is attached to every node of the sensor. It functions as the most recent Database status communication device whenever the user requests it. The Raspberry Pi 3 model B is the model used and its specifications are as follows: 1. Chip system (SoC) 2 Broadcom BCM2835. Processor 3 ARM1176JZF-S 700 MHz. IV GPU 4 video heart. RAM's 512 MB.

Sensor Unit: -An infrared sensor is a computer that emits infrared radiation and detects it. Motion can be observed by infrared sensors. In the design indicated the presence of a car is detected using infrared sensors. Data pins of IR sensors are attached to the GPIO Pins of Raspberry Pi. In order to park the car between the sensors, the IR receiver and the IR transmitter are placed before each other. The module is installed in the parking area and each parking space has a sensor node.

L298N:- The motor driver module L298N, developed by ST Company, is a high-voltage dual H-bridge. The voltage is provided by normal TTL levels. H-bridge drivers are used for driving inductive loads, for which speed control, such as DC motors, and Stepper motors are required both forward and reverse.

LCD: -Flat-panel monitor or other electronically modulated optical device utilizing liquid-crystal luminous properties in combined with polarizers are a flat-panel display (LCD). Instead of using a backlight or reflector to create color or monochrome images, liquid crystals do not emit light. Arbitrary or fixed images with small content, which can be displayed or obscured, like prefixed words in a digital clock, are available on LCD. LCDs are available for

showing arbitrary or fixed images. The basic technique is the same unless arbitrary images are composed of a matrix of small pixels, whereas other displays contain larger components. Depending on the arrangement of the polarizer, LCDs may either usually be on (positive) or off (negative).

Android unit: - This module will be installed on the cell phone of the user and the parking slot status will be shown as empty or occupied. Raspberry Pi with different IR sensors is required to be an input for the device. The parking status (empty or full) is determined by the IR sensors. The Raspberry Pi tracks and saves this information in the server database to refresh the parking slot. The requested user may use the Android application to access this information. The parking slot configuration is available over the Internet for the Android app (Raspberry Pi and IR sensors). Users can use the Android app to search their cell phone for parking status.

CAMERA:

High-resolution camera is used to capture barcode images. With so many available cameras, we used a cheap USB or pi-camera with high resolution on the market. Since it is simple to move the images to the computer. The camera records images or video guidance of the user.

4. CONCLUSION

High-resolution camera is used to capture barcode images. With so many available cameras, we used a cheap USB or pi-camera with high resolution on the market. Since photos can be transmitted easily to Hunting in peak hours for parking is a tough task. It raises traffic congestion and contributes to fuel and time wastage. Ultimately, this walking frustrates the driver. The design proposal in the paper alleviates these problems by improvising the parking policy, including with a security feature such as the use of a QR code, the reservation option. The built system also gives the requested user online information about the occupancy or vacancy of the parking lot. Upon reaching the parking room, the user can pre-book the appropriate slot, using the DC engine, when QR code is scanned the stop bar will open. A note is sent to the customer 15 minutes before he/she enters the car park. Options such as extended time or cancelation on the android app are given to the customer. The consumer is sailed from the door to the slot when he enters the intended parking area. These data are modified on the server simultaneously. This simplifies and simplifies the parking process. Apparatus. The camera records images or video guidance of the user.

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