Smart Autonomous Car Parking For the Modern Vehicles

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Abstract. The objective of intelligent car park management is to use advanced sensing & monitoring technology to maximize parking areas within large car parks and make car parking easy for passengers by transferring these to accessible parking spaces. An effective and insightful way to simplify parking infrastructure operations by utilizing the Internet for parking technologies. The IoT gives wireless connectivity to the device, which helps the customer control the parking area's capacity. With the rising in automobile numbers in metropolitan areas, the main issue confronting road congestion is. This paper aims to solve the question. Typically the customer expends his time and energy to pursue the limited room accessible in a particular car park. The user is told of the parking detail. Therefore, it is reduced the waiting period of the customer searching for a car park. RFID technology is used to prevent car fraud.

Keywords: Car parking, RFID, IoT, Analytics, Arduino.

1. Introduction

Internet of Things (IoT) is used for computer communications. IoT serves as a medium for storing data from remote locations by using devices that could be managed or tracked over the Internet [1]. Versions of IoT of web-enabled systems that gather data from the natural environment with processors, detectors & other communications equipment [2]. The system could be controlled and tracked via internet-connected computers. Smart City uses information, communication, and technology to enhance the population's efficiency and productivity to help accelerate people's quality of life [3]. IoT, the Mechanization and Computational Modelling Web are the new technologies which drive smart cities. The principle of the Internet of Things (IoT) was introduced by applications to exchange identity [4&5]. Devices may be registered, controlled or supervised by remote computers linked to the Internet. IoT extends the Web's use to provide access & provide enough network devices and online objects. In IoT, the two common terms are "internet" and "things."
The intelligent parking system's key aim is to minimize the time taken to find the parking areas and minimize gasoline use [6]. The payment method in the car park and user accounts on the slots will be introduced through the mobile application. The broad free parking room control of developed nations such as India faces problems. Conventional parking control technologies utilize sensors and other contact devices, which do not interact with open-ended or closed-end parking solutions [7]. The smartphone device used to locate a parking spot uses GPS but does not precisely identify a free parking spot by utilizing the Google Map API. Poor precision, light and environmental conditions are the main disadvantages of parking space detection systems [8]. This research uses IR sensors to locate the empty slot in the smartphone apps' technique to find parking.

2. Literature Survey
A device that utilizes Google map software was introduced by smart parking. In the cloud are processed ultrasonic instruments and data obtained. The Android device chart offers easy-to-use details on the empty location [9][10]. Every slot has an LED indicator that allows one to locate one's proper car park. Google introduced an IOT-based parking network that enables the customer to reserve the car park. The present parking location is located for smartphone use. In this IR sensor network, a location is empty and appears at the entrance and the exit door. The RFID tag has been given to encourage an individual to access the car park. If the individual is permitted to signal, the car door opens automatically. Raspberry Pi & Arduino is used by specialized CAR Parking System to locate free seats; this device also uses a reservation web server & GPS Google Maps. The consequences are seen in the diagram. A powerful car park system with IR sensors, authentication by the RFID tag, is suggested. For coordination, ZigBee is used. Smart parking device based on Android. The App receives details about the vacant parking space available [11].

In the MYSQL folder, user information is saved. The LED reveals that there are vacant or full parking areas. The camera catches the vehicle's numerical plate and adjusts the picture to see if the car is not a licenced consumer car.[12-13].The Embedded device has an automated parking framework and utilizes the android and windows apps utilizing an optimized and sensor network. In this device, the Raspberry PI sensor is used to locate an empty slot parking communications. V2I( Vehicle To Infrastructure) is used to supply the driver with the user identification status, which contains the parking request for approval[14]. The connectivity of automobile services (I2V) is required for the reserve car park application and shows instructions. JSON file used to change info. QR Technology is used to search the data, which helps one view the car park's location for safety purposes [15].

A pay-by-phone scheme was introduced for privacy security. One will pay for the parking scheme by mobile. The mobile program is implemented using the mode of payment by credit card. One should sign new users and contact the new user to buy new e-coins on the Network list. Per e-coin has a slot period for parking. On-board vehicle parking officer queries via RFID question. The Smart Parking Navigation Program provides parking advice and details. The program offers driver details and parking space access through internet VMS.

3. Proposed System
Proposed method brings the solutions with IoT wireless connectivity to the device which helps the customer to control the parking area's capacity. With the rising in automobile numbers in metropolitan areas, the main issue confronting road congestion. Typically the customer expends his time and energy in pursuit of the limited room accessible in a particular car park. The user is told of the parking detail. Therefore, it is reduced the waiting period of the customer searching for a car park.
The Figure 1 shows a block diagram of the proposed system, which constitutes IR sensors, RFID reader modules, and GSM modules are operated by a controller with an external power source. The parking area contains Arduino devices with an IR sensor, which consists of three sections. Using these tools, the consumer connects with the parking location. Without the aid of an RFID token, the customer cannot access the parking lot. The second portion includes online services focused on cloud, which function as a mediator between the customer and the parking area. Parking area available will configure the cloud accordingly. The server administrator administers the cloud infrastructure and may even verify availability by the customer. The consumer side is the third component. Based on availability through SMS via the GSM module, the consumer gets a notification.

4. Results And Discussion

There is a major rise in the demand for smart parking services, which helps drivers access the parking space quickly. There is no space allocation and space slot accessible tracking in the current network of today's country. The new program was a tracking device focused on the perception that measures the number of accessible car parks in the city by considering the amount of input and output cars that require time and energy. Figure 2 shows a simulation image of the system.
Figure 2: Simulation image of the system

The next usable device was a sensor network utilizing ultrasonic sound waves to sense vehicles' movement. A two-tier parking scheme came into being using the idea of car parks. The paper helps to have the parking zone linked to the planet, minimizing the time that may be economical for the consumer. This paper helps in reducing car theft. This paper decreases the vehicle's overall fuel energy used while searching for the ride.

5. Conclusion

Intelligent community ideas were only a sight. In recent years, progress has been made in rendering the intelligent city vision a fact. New opportunities in terms of smart cities have been generated through the advent of internet things and cloud technology. The cornerstone of the construction of intelligent cities was still smart parking. The device provides a real-time operation and parking space detail. This article increases consumer reliability in locating a convenient car park. The rising traffic congestion issue can be solved. Typically the customer expends his time and energy in pursuit of the limited room accessible in a particular car park. The user is told of the parking detail. Therefore, it is reduced the waiting period of the customer searching for a car park. In order to prevent car fraud, RFID technology is used.

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