

AUTOMATED VEHICLES PARKING SYSTEM BASED ON IOT

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Abstract

Efficient and smart way to automate the management of the parking system that allocates an efficient parking space using internet of things technology. The IoT provides the device with wireless connectivity, and the user can keep track of the parking area's availability. With the rise in the population of automobiles in metropolitan cities, the major problem faced is road congestion. The aim of this paper is to address this issue. In general, the consumer is wasting his time and effort in looking for the availability of free space in a given parking area. The parking information is sent via notification to the customer. The waiting time for the user to look for parking space is thus reduced. To deter car theft, RFID technology is used.

Keywords: Cloud computing, IoT, Parking, Vehicles.

I. INTRODUCTION

The concept of the Internet of Things (IoT) started with things with identity communication devices. The devices could be tracked, controlled or monitored using remote computers connected through the Internet. IoT extends the use of the Internet providing the communication, and thus inter-network of the devices and physical objects, or 'Things'. In IoT, "internet" and "things" are the two popular terms. The Internet means a huge global network of linked servers, computers, tablets and mobiles that use protocols and connection mechanisms that are used globally. The Internet makes it possible to send, receive, or communicate information. There are various uses and definitions for items in English. The dictionary sense of 'Thing' is a word used, if we do not want to be exact, to refer to a physical entity, an event or concept, circumstance or operation[1]. In general, IoT consists of an inter-network of devices and physical objects, and a variety of objects can collect data at city locations and interact with units in the processes and services that handle, receive, organize and evaluate data. It provides a vision where things (wearable, watch, alarm clock, home devices, surrounding objects) become intelligent and function alive by sensing, computing, and interacting through embedded small devices that communicate by communication with remote objects or individuals. Cloud computing's flexible and versatile design enables developers to build and host their apps on it. As a network where all sensor data can be processed and accessed from remote locations, the Cloud serves as a great partner for IoT. These factors

contributed to the amalgamation of both technologies, leading to the emergence of a new Cloud of Things technology (CoT). In CoT, things (nodes) can be accessed, monitored and managed through the cloud from any remote location. Any number of nodes may be added or removed from the IoT scheme on a real-time basis due to high cloud scalability[2].

The ideal of creating a Smart City is now becoming possible with the emergence of the Internet of Things. One of the key issues that smart cities relate to car parking facilities and traffic management systems. It is often difficult for drivers to find an accessible parking spot in today's cities, and it continues to get more difficult with an ever growing number of private car users. This situation can be seen as an incentive for smart cities to take steps to increase the productivity of their parking services, thus reducing search time, traffic congestion and road accidents[3]. Parking and congestion issues can be solved if drivers are able to be told in advance about the availability of parking spaces at and near their expected destination. Recent developments in the development of low-cost, low-power embedded systems are helping developers create new Internet of Things applications. Following the advances in sensor technology, many modern cities have chosen to deploy different IoT-based systems for monitoring purposes in and around cities.

A new survey conducted by the International Parking Institute shows that the number of innovative ideas related to parking systems has increased. There are currently several parking systems that enable residents to provide real-time information about the parking spaces available. Such systems require efficient sensors to be deployed in the parking areas for monitoring the occupancy as well as quick data processing units in order to gain practical insights from data collected over various sources. People usually choose vehicles such as cars or cabs to go shopping in shopping centers, markets, hotels or theatres for their convenience in a region that has a high population density or metropolitan areas. Searching for a parking space to park their vehicles in a densely populated area in search of a nearby parking space that absorbs both time and fuel[4]. There is also a technological requirement that will allow the registered user access to the parking slot. Mobile applications will allow the individual to register for the service, and when the time of arrival and the area is specified, applications will locate the free parking space and inform the user of the free parking space with the free parking slot location coordinates. By making online payment via application by using their credit or debit card, users can book parking slots.

Cloud computing and IoT have witnessed large evolution. Both the technologies have their advantages; however several mutual advantages can be foreseen from their integration. On the one hand, by exploiting the limitless capacities and resources of the Cloud, IoT can overcome its technical limitations such as storage, processing and electricity. On the other hand, with the use of IoT, the Cloud can also expand its scope to communicate with real-world entities in a more distributed and dynamic way. Basically, in order to cover all the complexities and functionalities required to operate the application, the Cloud serves as an intermediary between items and applications. Some of the factors that contributed to the Cloud and Cloud amalgamation are below[5].

Storage Capacity: The IoT consists of a large number of sources of information (things) that generate enormous quantities of unstructured or semi-structured data. As a consequence, IoT calls for vast volumes of data to be obtained, accessed, analyzed, visualized and exchanged.

Cloud offers infinite storage space, low-cost, and on-demand, making it the easiest and most cost-effective solution to deal with IoT-generated data. It is possible to access and visualize the data stored on the Cloud from anywhere via regular APIs.

Computation Power: There are minimal processing capacities for the devices being used under IoT. The data in general, the selection from different sensors is transmitted to more efficient nodes where it can be aggregated and processed. The IoT computing needs can be met by the use of limitless computational resources and the Cloud on-demand model. IoT systems can conduct real-time data processing with the assistance of cloud computing, thereby enabling highly responsive applications[6].

Communication Resource: IoT's basic functionality is to connect with IP-enabled devices

Each other via a dedicated hardware package. Cloud computing provides inexpensive and efficient ways to connect, monitor and manage devices all over the internet. IoT systems can track and manage stuff on a real-time basis through remote locations through the use of built-in applications.

Scalability: The cloud offers a modular IoT solution. It allows resources to be increased or decreased in a dynamic manner. When cloud integration is given, any number of "things" could be added or subtracted from the system. In conjunction with the demands of items and applications, the cloud allocates capital.

Availability Resource: The cloud offers a modular IoT solution. It allows resources to be increased or decreased in a dynamic manner. When cloud integration is given, any number of "things" could be added or subtracted from the system. In conjunction with the demands of items and applications, the cloud allocates capital[7].

Interoperability: The use of devices that are heterogeneous in nature includes IoT. As a result of compatibility problems, these devices can have different hardware or software configurations. In an IoT environment, ensuring interoperability between these devices becomes very difficult. The Cloud helps to solve this problem by offering a shared interface for communicating and interacting with different devices. In a format that is appropriate to them, devices are allowed to share and exchange data.

Once the driver has parked its car in the selected slot it needs to confirm its occupancy. This very situation is portrayed in which the driver has to specify its presence. This function is introduced so that in a specific parking slot, only a genuine driver can park his vehicle. In the next 30 seconds after parking his vehicle, if a driver fails to confirm his occupancy, an alarm will begin to ring leading the authorities to realize that a car was parked in the wrong spot. If, by any chance, a real driver fails, he can avoid the warning by verifying his occupancy at any time.

II. CONCLUSION & DISCUSSION

An IOT based advance parking system which has been designed with several physical devices to check the availability parking slot. Mobile applications allow the user to locate and choose a slot for parking online, guide from entrance gate to reserved parking slot. The proposed

system reduces the effort of drivers as well as time to search parking space. Prototype system is built for multi storage parking space. A user can select the parking slot for vehicles in advance, instead of waiting in a parking area, where the parking availability is shown on smart phones. Vacant parking slots are verified by using Infra-Red (IR) sensors. For each parking slot the IR sensor is used. The infra-red sensor detects the car in infra-red waves reflected and covers a short distance. IR sensor generates a signal of IR light which is emitted with the help of an emitter. Collected data will be transmitted via the GSM module to transfer the data to the microcontroller and results are displayed on the LED screen.. The output from the microprocessor depends on the measurement of intensity of light and based on that when allocation of slot is done. On the other hand, the output from microprocessors is changed into format of text and transmitted to the smart phones through a designed Android application. Now parking details are provided to the users and can select the suitable slots to reserve.

III. REFERENCES

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