iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** I **Month of publication:** January 2018

DOI: http://doi.org/10.22214/ijraset.2018.1326

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue I, January 2018- Available at www.ijraset.com

Survey – Driverless Vehicle Parking Manager Based on IOT

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Abstract: A Smart vehicle parking system which provides an optimal solution for parking problem in metropolitan cities, malls, multiplex theatres etc. Due to rapid increase in vehicle density especially during the peak hours of the day, it is a difficult task for the drivers to find a parking space to park their vehicles. The aim is to resolve the above mentioned issue which provides the Smart Parking system that is vehicle parking manager based on Internet of Things (IoT) technology. An android application is created for the customer, whose details are constantly updated by the server location. It also includes some features like unique identification for each vehicle, display of available parking slots and possibility of making reservations etc.
Keywords: Internet of Things, Android Application, Smart Parking System, QR code.

I. INTRODUCTION

Now a days trying to find a vacant parking space is difficult in large public places such as metropolitan cities, malls, multiplexes, shopping complexes etc especially on weekends and public holidays. This process is also creates traffic congestion as well as accidents in cities. So there will be time and fuel consuming. Also this problem may causes drivers to get frustrated and eventually improper parking will appears. Available parking slot is very limited for places like office building and shopping complex. This problem is very common now in this world. There are many systems which provides the availability parking slot for the drivers. Thus, this provide the graphic user interface which will show the available parking slot and the location of it. Furthermore the drivers will have a chance to pick the preferred parking. There are several methods employed for the vehicle parking. The concept of new vehicle parking manager solves the parking issues by using mixed integer linear problem. The disabled person can park the vehicle at specially designed locations. Parking is an expensive process in terms of either money or the time and effort spent. That is the problem of finding parking slots for vehicles is observed in malls mostly on public holidays. It has been observed that a considerable amount of time gets wasted. Also it is a difficult process. Vehicle parking manager is a concept where the technological solutions are designed to overcome these issues. To solve this issues by using the concept Internet of things. The concept of Internet of Things (IoT) started with things with identity communication devices. The Internet of things (IoT) is the network of physical devices, vehicles, and other items embedded with electronics, , actuators, and network connectivity also enable these objects to collect and exchange data. IoT technologies can help organizations to reduce the cost through improved process efficiency and productivity. With improved tracking of devices using sensors and connectivity, they can benefit from real-time insights and analytics, which would help them, make smarter decisions.

II. LITERATURE SURVEY

There are several methods employed for the vehicle parking. The concept of new smart parking solves the parking problem by using mixed integer linear problem. The disabled person can park the vehicle at specially designed locations. Automatic parking and UN parking with the help of android applications.

Yanfeng Geng and Christos G. Cassandras proposed the concept of smart parking system based on optimal resource allocation and reservations. Drivers access the system via cellular phone or internet. a new concept for a “smart parking” system. This system explicitly allocates and reserves optimal parking spaces to drivers. It uses the concept of mixed integer linear problem. Drivers who are looking for parking spots send requests to the DPRC. Driver Processing Request Centre gathers driver parking requests Cars location keeps track of driver allocation status and sends back the assignment result to drivers. A request is based on parking costs and walking distance between a parking spot and the drivers actual destination. It also contains the driver’s basic information such as license number, current location and car size. An assigned parking space is send back to each driver via the DPRC. If the driver is satisfied with the assignment he has the choice to reserve that spot. Once reservation is made the driver still has opportunities to obtain a better spot. The PMRC [Parking Resource Management Center] then updates the corresponding parking spot from vacant to reserve and ensures that other drivers have no permission to take that spot. Parking Resource Management Centre collects and

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updates all real time information and disseminates it via internet. If a driver is not satisfied with the assignment or he fails to accept it for any other reason he has to wait until the next decision point. The mixed integer linear problem solves problems at each decision point. The requirements of the system are: first, the allocation centre has to know the status of all parking spots, the location of all vehicles, issuing requests and traffic situations. Current sensing technologies make monitoring implemementable. Second is effective wireless communication between parking vehicle and the parking allocation centre. Third is the centre must be able to implement a reservation that guarantees a specific parking spot to a driver. This is achievable through existing wireless technology interfacing a vehicle with hardware that makes a spot accessible only to the driver who has reserved it. A softer scheme is use a red/green light system placed at each parking spot, where red indicates that the spot is reserved and only the vehicle assigned to it may switch it back to green. If any "folding barriers and obstacles that emerge from and retract to the ground under a parking spot are wirelessly activated by the device on-board vehicles similar to mechanisms for electronic toll systems.

Internet of things and mobile communication platform for disabled parking space management proposed by Lambros Lambrinos and Aristotle's Dosis. It is the system designed and developed based on the principles brought forward by IoT and smart cities initiatives. It integrates sensors and Smartphone's along with wireless and mobile communications to provide for better utilization and management of parking spaces allocated for use by people with disabilities. When we go through a city during rush hours when traffic is at its peak, all parking spaces are already occupied. A person with disability is trying to access city centre but he did not find any disabled parking slot. There are drivers who occupy disabled parking slots without having the right to do so. Even in some cases there are violators who have fake documents displayed on their window screen. The aim of the disassist is to enhance the parking experience from the perspective of people with disabilities. In this system the parking management organized as parking bays. The parking bays can be on street and off street. In on street, the Parking bays are found on the roadside. In off street, different categories of parking loads are ranging from single areas to large multi-storey car parks. Monitoring parking spaces are not only for checking fee payments but also for calculating availability and reporting such information to drivers for searching vacant spaces. Parking reservation can be implemented relatively easily in controlled areas that can theoretically enforce reservations and hence guarantee the availability of the reserved space. In open spaces actions such as user verification and reservations are more difficult to accomplish. When a reservation remains valid and charging must start when vehicle actually arrives at the parking location. The parking space locations are displayed on a map allowing drivers to navigate to these locations. The level of information is related to its vehicle capacity and hourly fees. A real advantage is provided by those that report current availability and reservations. A significant number of people suffer from temporary or permanent disabilities. A special permit called a disabled badge is to be issued to these people. They can park at specially designed locations. These special parking spaces are near to shops amenities and public administration offices. In these the designed badge must be displayed on their window screen. This enables the visual verification of the vehicles entitlement to be parked at the designated places. The interaction between the user and the system are described as follows: first is a android application through which an SMS message to indicate the parking slot the user. Second is an application running on a smart phone that is used to obtain parking location information as well as real time availability information. The application will provide users to verify the parking slot they have parked at and obtain reservation for a vacant slot. Third is a dedicated device that follows IoT and communicate automatically with the rest of the infrastructure in order to authenticate the user and verify the parking slot occupied. Various improvements to the system concentrating on reservation enforcement will ensure for reservations for future time period.

Ivan Ganchev and Mairtin O' Droma proposed cloud based intelligent car parking services for smart cities. In this the IoT sub system includes sensor layer, communication layer and application layer. The primary goal of the intelligent car parking system is to find, allocate and reserve the best available car parking lot for a user who is driving a car in a particular area and to provide instructions for reaching this lot. Sensor layer detecting the car lot occupancy. A car parking lot detection method is proposed based on automatic threshold algorithm. An infostation based multi-agent system facilitating a car parking locator service is proposed. An access control system for reducing the waiting time proposed. At the application layer, an information centre provides cloud based service. An IOT management centre administrates the smart city via an IOT integrated service portal. A number of business services explore interfaces to the sensor layer. These includes a car parking locator service, car parking supervision service, car parking information service, GIS and GPS services, vehicle license patrolling, vehicle tracking service. At the communication layer various wireless technologies provide connection between the application and the sensor layer based on the ABC&S(Always Best Connected and Best Served Communication paradigm. A 3-tier infostation based network architecture could be provided in this layer to enable" anytime -anywhere - anyhow communication" among smart cities. Different sensing technologies could be utilized at the sensor layer such as Radio Frequency Identification (RFID), laser, infrared, radar, ultrasonic, CCTV, acoustic. RFID used for embedded parking solutions. CCTV with video image processing for detecting the status of parking lots. Communication layer

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includes3G, 4G, ZigBee, Wifi, wiMax, V2X,WSN, VANET. 3G/4G communication module used for car's tracking and tracing. Parking meter is an optimal element needed only for paid car parks. The architecture consists of a cloud tier, mobile apps tier, OSGI web servers tier. Cloud tier provides data storage and computing resources for the car parking service. It stores available car parking lots, car's location, user's location, profiles etc. The recent data is usually stored in Hadoop's Hbase it support real time queries. The OSGI web server acts as bridge between mobile application tier and cloud tier. Considering the great number of web applications running in this tier, it should support the deployment of new or updated application without stopping or restarting the web server. The OSGI provides an environment to modularize web applications into bundles. The bundles are registering itself in its environment. A distributed collecting system collects web server's log data and sends them to the cloud. In the mobile application tier, the first version of the car parking mobile application is developed for android mobile phones. When a user enters into a city an automatic request is sent by the application to a OSGi car parking web server asking for available car parking lots. The server finds the best available car parking lots for this user based on their preferences specified in the user profile. Driving directions are returned to the user along with a detailed map.

Automated car parking system commanded by android application introduced by D.J.Bonde. The android application generates automatic parking and unparking with the help of commands of an android application. The system reduces the human intervention to the minimum by automating the process of car parking. When we visit various public spaces like shopping malls, five star/seven star hotels, multiplex cine halls many problems relating to the availability of parking spaces. Most of the times we need to traverse through multiple parking slots to find a free space for parking. The proposed system presents an autonomous car parking system that regulates the number of cars that can be parked in a given space at any given time based on the parking space availability. When a car arrives at the entrance, it will be stopped at the main gate and the driver be boards the car. Using the android application on his android device, the user commands the Parking Control Unit to check the status of available parking slots, through an SMS. On receiving this command, a search for free slot is carried out and corresponding information is provided to the user by means of SMS. If the availability of parking space is confirmed, the user commands the car to the designated slot. The car traces its path to the entrance of the parking area. The required details of parking slot are communicated through the car control unit. For retrieval purpose the user commands un park through android application. After receiving this SMS the car begins to trace back path to the entrance where the car driver is waiting. The proposed architecture consists of a car control unit and parking control unit. It has four modules, first is interfacing LCD with atmega32 microcontroller. It is used for displaying the status of parking. Depending on the status LCD counter is incremented or decremented. Second is, interfacing GSM Sim 900 with atmega 32 microcontroller. GSM means global systems for mobile communication. The GSM is used for sending and receiving of SMS from parking control unit. Third is, interfacing the RF module with atmega32 microcontroller. RF stands for radio frequency. The purpose of using this module is to communicate data from parking control unit to the car control unit. Fourth is android application which serves as a GUI for the users to send the messages through their android devices. The buttons like "check my status, get my car" are displayed on their android device. User can select the choice according to availability of parking. Samiksha Nagmote, Pallavi Mane introduces a concept of "a proposed automatic car parking system based on android". It overcomes the limitation of automated car parking system. In automated parking system there is no security for the reservation. Anyone who knows your number then can take the car easily. The user can pre-book a slot in the area he desires if it is available for some hours prior to his expected arrival. This will help to reduce the load on the administrator. The user can search the parking area through the android application and pre book that slot. Payment services are made available using Google. The proposed system is based on client- server architecture. The client pre-books a parking spot by giving their vehicle number. For the processing at first step, user needs to install "park me "application on his android based device. After installation the icon of the app will display on the home screen of the user's device. Then the user has to register his details with the application for the first time. This is one time registration. The user has to enter details such as name, address, gender and mobile number. All the data will be stored on server. The next step is selection of locations for parking. In this the client is provided with multiple parking locations. Client has to select one of the locations where he desires to park the vehicle. Based on the availability parking slots will be displayed on client's device. Color coding is used to indicate the empty or reserved spot. If the required space is available then the client can proceed for further process. Otherwise he can terminate the entire process or change the location. After successful reservation a confirmation message is send back to the client's device. The parking at crowd places can be handled through this parking system.

In various systems have been done to ensure smoothness of traffic in car park areas. From manual implementations used in the old systems, they have evolved into fully automated, computerized systems. Car park entrances are controlled by barrier gates whereby parking tickets are used extensively for access purpose. With the growth of technology, these systems have been simplified in many ways. RFID technology could be utilized for entering and exiting the vehicle in parking areas. Using this approach,

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queuing time for getting the entrance ticket as well as payment upon exiting could be completely eliminated. But this method does not solve the problem of users having to search for available parking slots. One of the ways to address this issue is by displaying the number of available parking spaces at each floor of the parking area using the LCD display. Another way is by mounting indication lights on top of each parking lot to inform the users on parking availability. The drawbacks of these methods are that although the searching time is reduced, users will still need to circle around to look for the empty spaces. In some places, users can book their parking spaces online. All they need to do is to log in into the specified website for the reservation. In other areas, users can actually check the availability of parking spaces using the Global Positioning System and reserve the parking space via website or mobile phones. Another technology in smart parking system is that the users are actually guided to the empty parking spaces by the arrow indicators located at the ceiling. The users need to make the parking reservation first via online and will receive the confirmation code through SMS. In this method users can just reserve their parking places using the SMS without having to go online. They will receive the password to enter the parking area as well as the lot number for parking once their reservation is confirmed. Should they exceed the time to reach the parking area, the password will expire and they will be notified through SMS. The main advantages of the system are Enhanced security due to password requirement and System can be used and applied anywhere due to ease of usage. Also some disadvantages are there Cost of implementation is high, GSM feature creates bottlenecks and the microcontroller will have to take a lot of load which can crash the system.

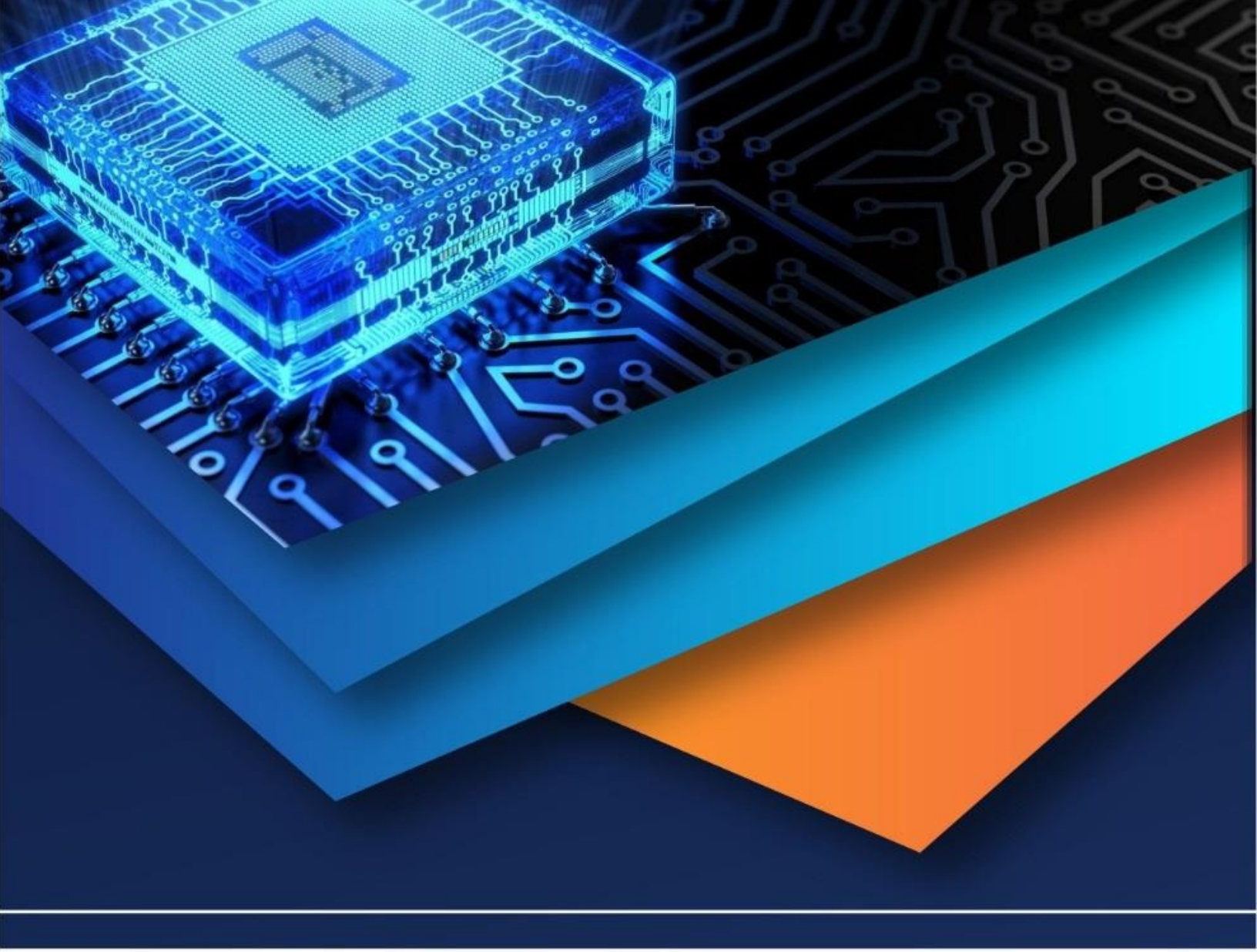
III.CONCLUSIONS

While implementation of the proposed smart parking techniques reduces the waiting time. It also saves fuel for drivers when searching the availability of the parking space. It reduces the environmental pollution. The parking problem can be handled easily at crowd places. The parking space can be effectively utilized. The people with disability can park the vehicle in a specially designed location. So these people can easily park the vehicle in the spot. An intelligent parking system will select the best available parking space. People who use android application will park and unpark vehicles by using android commands. So while using smart parking system, parking can handled through a well thought plan. It helps the users to find availability of parking spot and the user can reach the place within the time slot. So the client will get a better parking facility during rush hour.

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