

REVIEW WORK ON IOT BASED SMART PARKING SYSTEM USING QR- READER

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Abstract

The concept began with identity communication tools based on the Internet of Things. The device can be tracked, controlled or monitored from a remote computer via the Internet. It is developing the current intelligent parking system and network architecture based on the Internet of Things. This proposed a system to help users automatically find a free parking space at the lowest cost based on the new performance metrics to calculate user parking costs, taking into account the distance and the total number of free spaces in each parking lot. We use this cost to offer a solution to find a free parking space at the request of the user and to offer a solution to suggest a new parking lot when the current parking lot is full. The simulation results show that the algorithm improves the probability of successful parking and minimizes the user waiting time. We have successfully implemented the proposed system in the real world as well. Recently, the concept of smart cities has become popular. Thanks to the development of the Internet of Things, the idea of a smart city seems feasible. In the field of IoT, consistent efforts are being made to maximize the productivity and reliability of urban infrastructure. The IoT addresses issues such as traffic congestion, limited parking spaces and road safety. Introducing an IoT-based intelligent parking system integrated into the cloud. We also describe a high-level view of the system architecture here. Towards the end, a full description of how the system works, demonstrating the correctness of the proposed model.

1. INTRODUCTION

The It is causing day-to-day problems in traffic management and parking arrangements due to the increasing number of vehicles. With the development of traffic management systems, an intelligent parking system has been created to reduce the cost of hiring people and making optimal use of resources for car park owners. Currently, the general method of finding a parking space is manual, where the driver usually finds a place on the street for luck and experience. This process takes time and effort and, in the worst case, can lead to not finding a parking space if the driver is driving in a dense city. The alternative is to find a pre-determined, high-capacity car park. However, this is not an optimal solution because the parking lot can usually be far from the user's destination. In recent years, research has used vehicle-to-vehicle and vehicle-infrastructure interactions with the support of various wireless networking technologies such as Radio Frequency Identification (RFID), Zigbee, Wireless Interference Network, and the Internet. The purpose of this study was to provide the driver with information about nearby parking spaces and to book a few minutes in advance using supported devices such as smartphones or tablets In addition, the services will use the ID of each vehicle when booking a parking space. However, the current intelligent parking system does not provide an overall optimal

solution for finding available parking space, does not solve the problem of load balancing, does not provide economic benefits, and does not plan a denial of service. problems and take advantage of significant advances in technology, the Internet of Things (IoT) has revolutionized many areas of life as well as intelligent parking system (SPS) technology. The present study proposes and develops an efficient cloud-based SPS solution based on the Internet of Things. Our system builds each parking lot as an IoT network, and the data, which includes the vehicle's GPS location, the distance between the parking spaces, and the number of free spaces in the parking spaces, is transferred to the data center. The data center serves as a cloud server to calculate the cost of a parking request, and these costs are frequently updated and available to vehicles on the network at any time. SPS is based on a number of innovative technologies and can automatically monitor and manage car parks. Furthermore, in the proposed system, each car park can function independently as a traditional car park. This research also implements a wireless prototype system prototype on an open source physical computing platform based on QR code reading technology and using a smartphone that provides a communication and user interface for both the control system and the vehicles to verify the proposed feasibility. system.

2. LITERATURE SURVEY

There • Y. Geng and C. G. Cassandras, „A new „smart parking“ system based on Optimal resource allocation and reservations,” in Proc. 14th Int. IEEE Conf. Intell. Transp. Syst. (ITSC), Oct. 2011, pp. 979–984.

We propose a novel “smart parking” framework for a urban situation. The framework allots and holds an ideal parking spot in view of the driver's cost work that joins vicinity to goal and stopping cost. Our approach fathoms a blended whole number straight programming (MILP) issue at every choice point defined in a period driven grouping. The arrangement of each MILP is an ideal designation in view of ebb and flow state data and is refreshed at the following choice point with a certification that there is no asset reservation conflict and that no driver is ever allotted an asset with a cost work higher than this present driver's ebb and flow cost work esteem. In light of recreation results, contrasted and uncontrolled stopping procedures or cutting edge direction based frameworks, our framework decreases the normal time to find a parking spot and the stopping cost, though the general stopping limit is all the more efficiently used. We additionally depict full usage in a carport to test this framework, where another light framework plan is proposed to ensure client reservations.

• Y. Geng and C. G. Cassandras, „New „smart parking“ system based on resource allocation and reservations,” IEEE Trans. Intell. Transp. Syst., vol. 14, no. 3, pp. 1129– 1139, Sep. 2013.

We propose a novel “smart parking” system for an urban environment. The system assigns and reserves an optimal parking space based on the driver's cost function that combines proximity to destination and parking cost. Our approach solves a mixed-integer linear programming (MILP) problem at each decision point defined in a time-driven sequence. The solution of each MILP is an optimal allocation based on current state information and is updated at the next decision point with a guarantee that there is no resource reservation conflict and that no driver is ever assigned a resource with a cost function higher than this drive's current cost function value. Based on simulation results, compared with uncontrolled parking processes or state-of-the-art guidance based systems, our system reduces the average time to find a parking space and the parking cost, whereas the overall parking capacity is more efficiently utilized. We also describe full implementation in a garage to test this system, where a new light system scheme is proposed to guarantee user reservations.

• X. Zhao, K. Zhao, and F. Hai, „An algorithm of parking planning for smart parking system,” in Proc. 11th World Congr. Intell. Control Autom. (WCICA), 2014, pp. 4965–4969.

There are such a variety of vehicles on the planet and the quantity of vehicles is expanding quickly. To reduce the stopping issues brought on by that, the brilliant stopping framework has been produced. The stopping arranging is a standout amongst the most critical parts of it. A compelling stopping arranging technique improves the utilization of stopping assets conceivable. In this paper, we display a practical technique to do stopping arranging. We change the stopping arranging issue into a sort of direct task

issue. We take vehicles as occupations and parking spots as operators. We take separates amongst vehicles and parking spots as expenses for operators doing tasks. At that point we outline a calculation for this specific task issue and take care of the stopping arranging issue. The technique proposed can give convenient and efficient control data to vehicles for a continuous brilliant stopping framework. At long last, we demonstrate the viability of the technique with investigations over some data, which can mimic the circumstance of doing stopping arranging in this present reality.

- **L. Mainetti, L. Palano, L. Patrono, M. L. Stefanizzi, and R. Vergallo, ,,,Integration of RFID and WSN technologies in a smart parking system,“ in Proc. 22nd Int. Conf. Softw., Telecommun. Comput. Netw. (SoftCOM), 2014, pp.z 104– 110. pp.z 104–110.**

Brilliant Parking System (SPS) in light of the incorporation of Ultra-High Frequency (UHF) Radio Frequency Identification (RFID) and IEEE 802.15.4 Wireless Sensor Network (WSN) advancements is introduced. The framework can gather data about the inhabitation condition of parking spots, and to direct drivers to the closest empty parking space by utilizing a tweaked programming application. Such application likewise influences a NFC-based e-wallet framework to enable clients to pay for the stopping charge. Moreover, a product application in view of RESTful Java and Google Cloud Messaging (GCM) innovations has been introduced on a Central Server with a specific end goal to oversee ready occasions (e.g. inappropriate utilization of a saved space or termination of the obtained time). In such a case, it quickly illuminates the activity cops through an Android portable application, which has been outlined specially appointed for the considered situation. A proof-of-idea has exhibited that the proposed arrangement can meet the genuine necessities of a SPS.C. Shiyao, W. Ming, L. Chen, and R. Na, "The exploration and actualize of the wise stopping reservation administration framework in view of ZigBee **innovation**,"

- **C. W. Hsu, M. H. Shih, H. Y. Huang, Y. C. Shiue, and S. C. Huang, ``Veri_cation of smart guiding system to search for parking space via DSRC communication," in Proc. 12th Int. Conf. ITS Telecommun. (ITST), 2012, pp. 77_81.**

- **D. J. Bonde, R. S. Shende, K. S. Gaikwad, A. S. Kedari, and A. U. Bhokre, ``Automated car parking system commanded by Android application," in Proc. Int. Conf. Comput. Commun. Inform. (ICCCI), 2014, pp. 1_4.**

The android application generates automatic parking and un-parking 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. Our proposed system presents an autonomous car parking 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.

- **M.Caliskan, A.Barthels, B,Scheuermann in 2007[3] addresses the issue of automation and modernization of car parking management by proposing a Car Parking Framework (CPF), and assessing its relevance with respect to the engineering and economic efficiency.**

The proposed framework is based on the integration of WSN and RFID technologies and builds around a modular approach to enable a variety of services. These include driver guidance, automatic payment, parking lot retrieval, security and vandalism detection. Its partial implementation as a lab prototype is also described in this paper, where some modules have been tested and evaluated by real experiments. Smart parking solutions that are closely related to the one proposed in this paper have been presented. These solutions use a single wireless mote per parking lot, which is outfitted with a sensor for vehicle detection. The sensor can be a magnetic sensor, an ultrasonic sensor, an optical sensor, etc. When a car is in sensing field of some sensor (a parking spot), the sensor status will change and a signal will be transmitted to the connecting mote. The latter processes the incoming signal to decide about possible detection[3].

- **Felix Richter , Sergio Di Martino ,Dirk C. Mattfeld in 2014 [4] proposed Temporal and spatial clustering for a parking prediction service.** An approach to learn models of parking availability from historic data on a back-end, in order to save these models within in-vehicle navigators, to predict future parking availability. In particular, investigation was focused on getting a better insight on what is the most suitable spatio-temporal representation of parking availability.

3. EXISTING WORK

The system comes from the idea of the IoT. The system uses a WSN of RFID technology to monitor car parks. The RFID reader calculates the percentage of free parking spaces in each parking lot. The use of RFID facilitates the low cost implementation of a large system. The system provides a mechanism to prevent disputes in the parking lot and helps minimize the time wasted searching for a parking space. After logging in to the system, the user can select a suitable parking space. The information about the selected parking space is confirmed to the user by notification. The system then updates the status of the parking space to a "pending" status, during which time the system does not allow other users to reserve it. If, after a certain waiting time, the system determines that no car is parked at that location, it changes the status to "available". The system updates the status of the WSN node (the status of the parking spaces) when a new car joins the system. Therefore, the status of the entire parking system is always updated in real time. The system helps to map the parking time of each parking space in real time and supports the business with hourly parking fees.

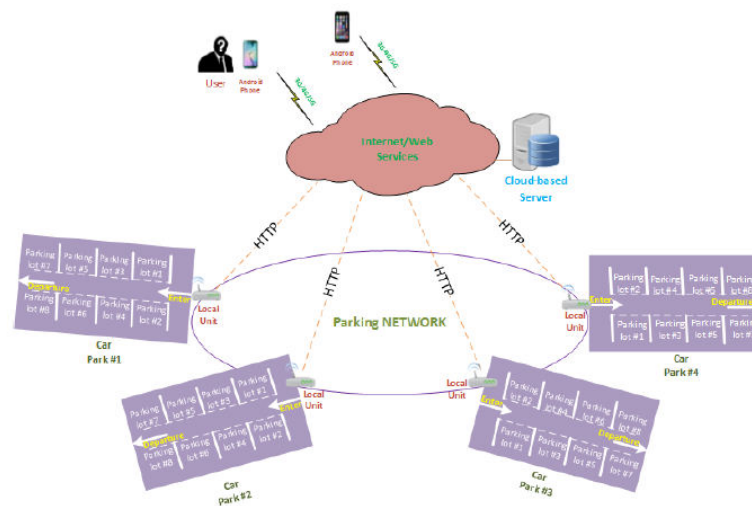


Fig 3.1 Architecture of existing system

4. System Architecture

Cloud-base server: This is a Web entity that stores the resource information provided by local units located at each car park. The system allows a driver to search and find information on parking spaces from each carpark without the need to directly access the local server node by directly accessing the cloud-based server.

Local Unit: This unit is located in each car park and stores the information of each parking space, as shown in

Fig.3.2. The local unit includes the following:

1. **Control Unit:** This is an Arduino module, which is connected using an RFID reader. The card reader authenticates the user information and then displays this information on the screen. If the information of the RFID tag or card is correct, the Arduino module will control the opening of the door for the vehicle to enter. The Arduino module connects with the cloud server through an Internet connection to transfer data from the local car park to the cloud server database.
2. **Screen:** This displays information on the capacity of the local car park, the total current percentage of free spaces, the status of the RFID tag check, the user card when entering, and a mini map of the local car park.
3. **RFID Tag or ID Card:** This is used to check and authenticate user information and calculate the percentage of total free spaces in each car park.
4. **Software Client:** This is an application software system. Running on Android operating system, the users will install it on their smartphones and use it to reserve parking spaces. The users access the system via 3G/4G mobile connections.

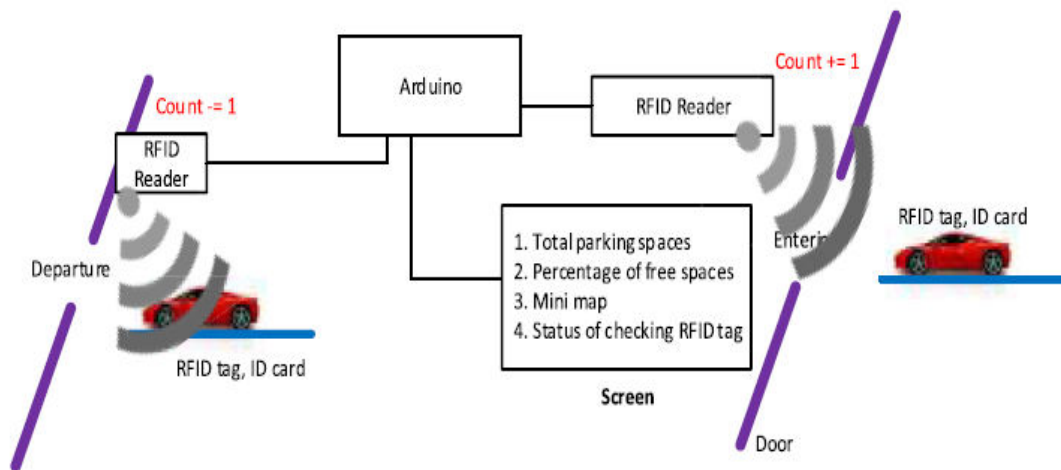


Fig. 3.2 Local Unit

5. CONCLUSION

This study proposed a parking system that improves performance by reducing the number of users who cannot find a parking space and minimizing the cost of moving to a parking space. Our proposed architecture and system have been successfully simulated and implemented in a real situation. The results show that our algorithm significantly reduces the average parking latency of users. The simulation of our system reached the optimal solution when most vehicles successfully found a free parking space. The average waiting time for service in each car park will be minimal and the total time for all vehicles in each car park will be reduced. The concept of smart cities has always been a dream for humanity. In the last few years, great progress has been made in the implementation of smart cities. The Internet of Things and the growth of cloud-based technologies have created new

opportunities for smart cities. The focus of building smart cities has always been on smart parking facilities and traffic management systems. In this article, we address the issue of parking and present an intelligent parking system integrated into an IoT-based cloud. The system we propose provides real-time information on the availability of parking spaces in a parking lot. Users from remote locations were able to reserve a parking space for them using our mobile app. The efforts made in this project aim to improve the city's parking facilities and thus the quality of life of the population.

In our future study, we will consider the security aspects of our system and implement our proposed system on a large scale in the real world.

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