



Smart Parking Using QR Code

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Abstract *Parking in major cities, particularly with dense traffic, directly affects the traffic flow and people's life. PARKING is an expensive process in terms of either money or the time and effort spent for the "free spot chasing." Current studies reveal that a car is parked for 95 percent of its lifetime and only on the road for the other 5 percent. If we take England as an example, on average a car was driven for 361 hours a year according to the British National Travel Survey yielding about 8404 hours in which a car would be parked. Now where would you park your car for these very long hours? Cruising for parking is naturally the first problem caused by the increase of car owners globally.*

I. INTRODUCTION

It is common that individuals have difficulties to park their cars. For instance, it's becomes complicated for drivers to search out vacant parking areas on the spot, and navigation help isn't accessible once world Positioning System (GPS) doesn't work well at the same time. As a consequence, parking difficulties end in unnecessary driving around eye to merely search for an parking space using automobile. This thus, on the one hand, causes additional dioxide emissions and and on other side the setting of town scheme. It is very true that once many of us are at the same time searching for the parking places in a very downtown space at peak rush hours. On the other hand, it will additionally increase the chance of traffic accidents once the drivers ought to get for the sparking areas whereas driving. Additionally the, unpredictable parking things build it troublesome for the folks to set up their quality. All of those decrease the fashionable town scheme expertise, and became a big challenge within the development of future intelligent transportation systems (ITS).

Parking areas are found to be quite masses in some places and really rare to find out in others. Valuation policies had complex vital role within the whole parking handiness for many years. Here comes the necessary question: can we get the additional parking areas or we would like high level parking management? We tend to believe that the motivation behind this work is regarding higher parking management with honest and the profitable valuation policies. Consistent with the previous historical knowledge, the costs are inflated and reduced proportion to the expected utilization. Though dynamically dynamic parking costs will balance the provision and demand for the parking and increase the overall utilization, it support the historical knowledge and statistics which cannot be correct enough to possess the accurate result.

II. LITERATURE SURVEY

According to literature survey after studying different IEEE paper, collected some related papers and documents some of the point discussed here:

1) Mathematical Formulation of a Deterministic Parking Reservation System (PRS) With Fixed Costs

AUTHORS: K. C. Mouskos, J. Tavantzis, D. Bemstein and A. Sansil

A problem faced in the major metropolitan areas, is the search for the parking space that results in tremendous loss in productivity time, excess pollution, and the driver frustration. The most traditional methods utilized to search for parking are signs to parking lots, the variable message signs that continuously update the number of available parking spaces at the specific parking lots, the route planning algorithms from an origin to a specific parking lot, as well as disincentives to the use of personal automobiles through the parking pricing and strict enforcement of the parking violations. An

innovative methodology to address at least the partially the search for parking is through a parking reservation system. In this paper, a mathematical formulation was presented for performing the parking space assignment to the users based on the minimization of the system wide parking cost subject to the assignment constraints and the parking slot capacity constraints. The problem can be solved with any commercially available solver and it can be shown to yield the binary integer solutions.

2) Cruising for parking

AUTHORS: Donald C. Shoup

Suppose the curb parking is free but all the spaces are occupied, and the off-street parking is expensive but is immediately available. In this case, you can cruise to find an curb space being vacated by a departing motorist, or pay for the off-street parking right away. This paper presented that a model of how drivers choose whether to cruise or to pay, and it predicts the several results: you are more likely to cruise if the curb parking is cheap, off-street parking is expensive, fuel is cheap, you want to the park for a long time, you are alone in the car, and you place a low value on the saving time. The model also predicts that an charging the market price for the curb parking—at least equal to the price of the adjacent off-street parking—will eliminate the cruising. Because of the government sets the curb parking prices, planners and elected officials strongly influence drivers' decisions to cruise. The failure to charge the market rates for curb parking congests traffic, pollutes the air, wastes the fuel, and causes accidents. Between 1927 and 2001, studies of the cruising in congested downtowns have found that it is taken between 3.5 and 14 min to find out a curb space, and that between the 8 and 74 percent of an traffic was cruising for the parking.

3. Understanding drivers' perspective on parking guidance information

AUTHORS: Yanjie Ji, Weihong Guo, Phil Blythe, Dounan Tang, Wei Wang

Parking guidance and information (PGI) systems are thought to enable an more efficient control and an management of the traffic and the use of the available car park in the urban areas. Despite the installation of PGI systems in many cities and their operation for an number of years, the levels of usage of the PGI remain much lower than which was expected. To guide the investment and the operational decisions, this study was examined that the existing PGI systems from the drivers' perspective. The results show that the PGI is not effectively used and often ignored by the drivers because of the inaccurate or out-of-date nature of an information it is displaying. Habitual behavior also played an important role in the choices of the vehicle park. However, the results of the research also show that there is an desire for more accurate, dynamic and the personalized parking information through the different means at pre-trip stage and the en-route stage.

4. Effects of Parking Availability Information on System Performance: A Simulation Model Approach

AUTHORS: Yasuo Asakura and Masuo Kashiwadani

The main objective of the paper was to evaluate the effects of the different types of the parking availability information on the system performance using a simulation model. The model consists of the three sub-models; demand, performance and the information of service models. The model was designed to describe the dynamic interaction between the demand and system performance and it is possible to examine time to time fluctuation of the driver's parking choice decisions aid the resulting congestion in the car parks. The model can distinguish the difference of an driver parking choice behavior between with and without the availability of information, aid to compare the effects of the different types of the availability information. Numerical examples are calculated to aid that it was found the difference of the effects among the information types depends on an congestion level of an system.

5. Smart Parking Systems and Sensors: A Survey

AUTHORS: G. Revathi, V. R. Sarma Dhulipala

In this paper, they explore an concept of the smart parking system and their categories. The classifications of the various existing systems was explained. The parking system handles the different technologies, and the categories of those techniques was given. The functions of the nodes in the wireless sensor networks are separated.

6. Intelligent Parking Reservation Service on the Internet

AUTHORS: K.Inaba, M. Shibui, T. Naganawa, M. Ogiwara, N. Yoshikai

The intelligent parking service was an important part of ITS (Intelligent Transportation Systems) in which the parking facilities are conceived in terms of various new functions that they can provide. This service would not simply manage the internal operation of the parking facility. Rather, it should be designed to be compatible with a wide range of aspects that are intertwined with parking facilities. One of the features of the system developed in NTT is a parking reservation service that allows drivers to reserve the parking spot through an Internet when parking the space is available. The system enabled the motorists to find the available parking spaces at their destinations easily and quickly by using an Internet. When used together with the smart card, the system can provide the motorists with the recognition and payment services. This paper depicts that the service concept of the intelligent parking reservation systems and the overview of the prototype developed in NTT. In this paper, they have discuss an intelligent parking system which provides the parking lot of reservation service by the Internet, and they show some output of feasibility studies.

7. Auction-based Parking Reservation System with Electricity Trading

AUTHORS: So Hashimoto, Ryo Kanamori, Takayuki Ito

Parking reservations can reduce an amount of the time lost by the drivers searching for the parking spaces near their destination. For the development and planning of the smart cities with the electric vehicles, it is important to control the parking spaces as places for charging and the power management with the Vehicle-to-Grid systems. This research study aimed an parking based on auction reservation system that included the electricity trading, and the uses simulation combined with an driver parking duration model to evaluate it. The driver parking duration model is constructed using the actual parking data that can estimate these parking times after the parking fees have changed.

8. CAR PARKING SYSTEM AN ANDROID APPROACH

AUTHORS: NIKHIL PALDE ,CHHAYANAWALE , SUNITAKUTE

Now days with the increase in vehicle production and world population, more and more spaces and facilities are required. In this paper , a new parking system called car parking system an android approach is proposed to assist driver to find vacant spaces in a parking in a shorter time. Different technologies are reviewed and compared to determine the best technology for developing this system. This system uses IR sensors to detect the presence of vehicle in parking slot and display the vacant slot. They create the separate application on the smart phone and by using this application they find shorter and easier path to reach the destination with the help of Bluetooth module. Features of car parking system an android approach includes vacant parking space detection, display of vacant parking slots and give direction on smart phone application to move toward vacant parking slot. This paper also describes the use of a parking system in proper and efficient manner from the entrances into a parking area until the finding of a vacant parking slot. This prototype of car parking system an android approach will help car owners to improve their facilities inside car parking area to effectively guide car driver to vacant parking slot inside car parking area. This system was designed in two floors and each floor contains three parking slots and they can extend it as per our requirements. This system architecture defines the essential design features such as location of sensors, required number of sensors and LCD display board.

9. IoT BASED SMART PARKING SYSTEM

AUTHORS: ABHIRUPKHANNA,RISHIANAND

The concept of the smart cities has gained an great popularity. Many efforts are being made in the field of IoT in order to maximize the productivity and the reliability of the urban infrastructure. Problems such as, the traffic congestion, limited car parking facilities and the road safety are being addressed by the IoT. In this paper, they present an IoT based cloud integrated smart parking system. The proposed Smart Parking system consisted of an on-site deployment of an IoT module that is used to monitor and signalize the state of availability of each individual parking space. A mobile application was also provided that allows an end user to check an availability of the parking space and book an parking slot accordingly. The paper also describes an high-level view of the system architecture. At the end, this paper discussed the working of the system in form of an use case that proves the accuracy of the proposed model .

10. Smart Car Parking Management System Using IoT

AUTHORS: AniketGupta ,SujataKulkarni , VaibhaviJathar

Proliferation in the number of the vehicles is leading to problems of the vehicles parking at an appropriate place of especially the car parking. This indirectly leads to the traffic congestion. This is because of the fact that current transportation infrastructure and the car park facility are unable to cope up with the arrival of an large number of an vehicles on the road. To alleviate the fore mentioned problem, authors proposed an Smart Parking Management System that helps the users to automatically find an free parking space with an smaller amount. Smart Parking involves use of the Ultrasonic sensor, Arduino Uno, ESP8266-01 Wi-Fi Module, Cloud server. The IOT based new parking platform enable to connect, analyze and automate the data gathered from an devices and execute the smart parking possible. Smart parking would enable the vehicle occupancy, monitoring and managing of available parking space in the real-time that reducing the environmental pollution. Proposed system provides optimize usage of the parking space and get an considerable revenue generation.

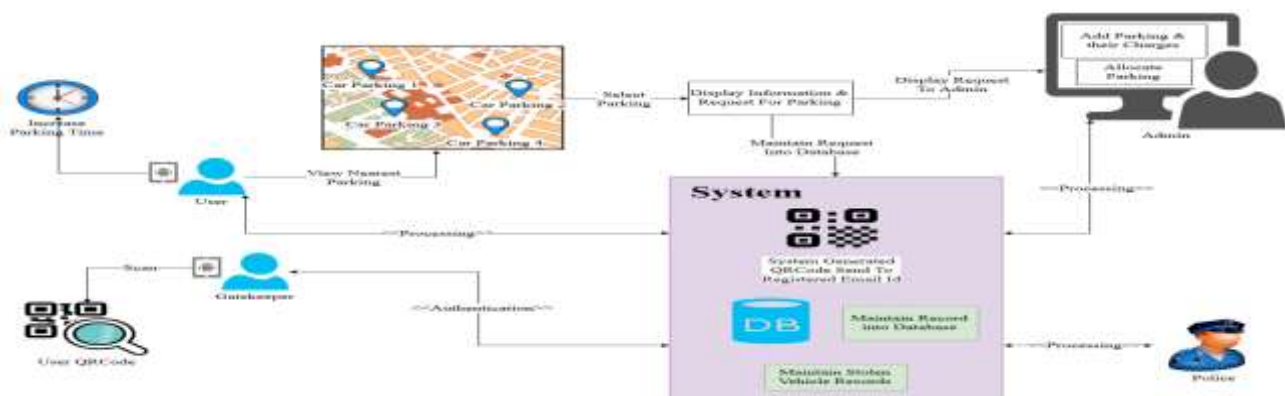
III. PROPOSED SYSTEM

We present a new smart car parking system, named Smart Parking System using QR Code, with static resource scheduling, dynamic resource allocation and pricing models, to optimize the parking system for both parking managers and drivers. The contributions of our work include: 1) increasing parking resource utilization, 2) increasing parking revenue, 3) improving parking experience of drivers by lowering cost, parking spot searching and walking times. Our work is different from the one in where a dynamic resource allocation model was proposed. The main limitations of that model are that only reservation for limited period of time (e.g., few minutes) was allowed, fixed price was used and revenue was not taken into account and only a single choice of destination was considered. Whereas our model allows a driver to reserve a parking space for any time in future, the revenue is considered and new pricing models are introduced. We combine parking reservation and pricing models to overcome the parking problems.

ADVANTAGES

1. Time Management.
2. Cost Effective.
3. Increasing parking revenue

IV. SYSTEM DESIGN



V. CONCLUSION

We have proposed Smart Parking Using QR Code, a new smart parking system which is based on MILP model that yields optimal solution for dynamically and statically allocating parking resources to parkers—providing flexible reservation options. The new concepts introduced in this are the combination of real-time reservations with share-time reservations. We also have proposed pricing policies for both static and dynamic reservations that maximize the profit from parking. Extensive simulation results indicate that the proposed system significantly cuts the total effective cost for all parkers.

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