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Smart Parking System

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ABSTRACT

The smart parking system is considered beneficial for the car park operators, car park patrons as well as in environment conservation The industrialization of the world, increase in population, slow paced city development and mismanagement of the available parking space has resulted in parking related problems. Finding a vacant parking space is a common problem in most urban cities which especially occurs in popular and well travelled places like shopping complexes, stadiums and other well travelled areas or tourist attraction spots. Intelligent Parking Service is a part of Intelligent Transportation Systems (ITS). There is a dire need for a secure, intelligent, efficient and reliable system which can be used for searching the unoccupied parking facility, guidance towards the parking facility, negotiation of the parking fee, along with the proper management of the parking facility. This paper reviews different Intelligent Parking Services used for parking guidance, parking facility management and gives an insight into the economic analysis of such projects.

Keywords : Intelligent Transportation Systems; Fuzzy Logic; Wireless Networks

I. INTRODUCTION

Car parking problem is a major contributor and has been, still a major problem with increasing vehicle size in the luxurious segment and confined parking spaces in urban cities. Searching for a parking space is a routine activity for many people in cities around the world. Smart parking helps one of the biggest problems on driving in urban areas; finding empty parking spaces and controlling illegal parking. The industrial growth of the world is reflected by the increase in the number of automobiles on the streets throughout the world, which has caused a lot of parking related problems.

1.1 Literature Survey

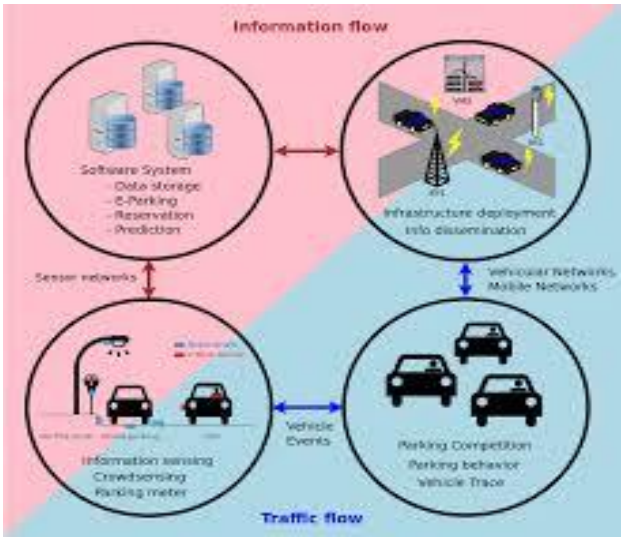
Car parking system is a system that is used to help managing cars in parking area in other to avoid congestion and arrange cars in an allocated position. Intelligent Parking Service is a part of Intelligent Transportation Systems (ITS). Certain big cars are not able to fit into the normally available parking spaces. Hence there is a need for a system; which can take all relevant information into consideration, for finding the parking vacancy. The objective of such technologies is the reduction of the burden on driver, improvement of the traffic capacity, and provision of reliable and secure car functions. In the last fifteen years, academic research on outsourcing smart parking systems has evolved rapidly, growing so fast that, to date, there has been scant opportunity for the research community to take a collective breath and complete a global assessment of research activities. 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. In this system a new smart parking system is implemented for cities. This system assigns and reserves a parking space for a user (driver) based on the users distance from the parking area and parking cost and also ensures that the overall parking capacity is effectively utilized. The

information is provided to the driver over the internet. The systems provide the location of the available car park spaces based on the driver's current location in intended area or his final destination. Global Positioning system is used to trace the driver's route to the parking destination, after the parking space is reserved. This results in traffic congestion as multiple users are being directed toward the same parking area at the same time. Smart Parking system designed proposed a mechanical model with an image processing facility. The car would be parked with the use of lift at multiple levels. Also, image processing is used to capture the number plate and store in database for comparison to avoid illegal car entry.

II. SMART PARKING SYSTEM

Smart Parking solutions are designed to provide drivers an ultimate solution on their journey from the beginning to end without searching for parking, cost, travel time etc. This advantage comes by paying marginal fees to the smart parking service providers. To change a culture which has been existing for several centuries is a humongous task. Parking has always been an at the moment affair with direct cash exchange. The inclusion of technology in this method is a change in culture which will take the time to establish. Smart Parking is one of the most adopted and fastest growing smart city solutions across the world. Airports, universities, shopping centers and city garages are just a few entities that have begun to realize the significant benefits of automated parking technology.

2.1 Fuzzy Logic Based

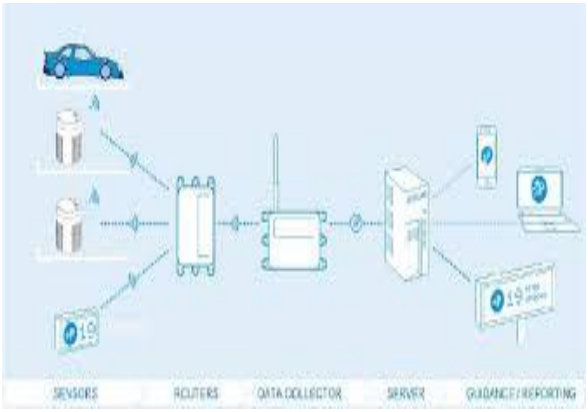


The system is made more efficient with the information provided as the drivers are able to avoid car park that are fully occupied and locate the vacant parking spaces using the fuzzy logic controller. The parking guidance and information system consists of four components namely, information disseminating mechanism, information gathering mechanism, control centre and telecommunication networks being used are over come using the fuzzy controller and e-booking access. This smart parking system can be exploited to predict the future parking space using e-parking. If there is a process resulting from the human error, then a system which supports theoperator; safely and efficiently is presented in . The system works by

1. Detecting
2. Motion Planning, and
3. Supplying information

Fuzzy theory is used for building the support knowledge and heuristics of the high-level expert human. The method discussed in gives a car the capability to independently drive on different types of roads. It also envisions movements like reverse, parallel parking and three point turns. For automatically getting a functioning car control system, this approachuses a self-training system which benefits from human skills.

2.2 Wireless Sensor Based System



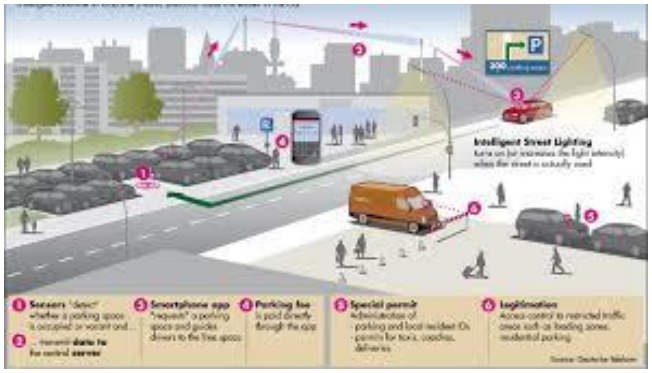
Wireless sensor networks module

·Collect sensor data

·Check parking slot state in real-time

·Send Parking slot information to embedded web server

smart parking has been focused due to the development of indoor position technology. There are several smart parking systems for garage. But there are two major problems in these systems. The first one is the detection of parking space occupation, and the second one is space navigation. To solve these two problems, we propose a smart parking system combining Wi-Fi and wireless sensor network. In this system, geomagnetic sensors are used to detect the occupation of parking spaces, and Wi-Fi is used for navigation. A prototype system has been developed.



2.3 Gps Based System

Parking has become a serious problem in cities due to the increasing no.of private vehicles. With the emerging problem the current system will not be able to handle the situation as they do not provide any information about the available parking space. The GPS based parking is cost effective and easy to use. The system will enhance the scalability using the coordinates for the parking. The detection of available parking space is done by using the coordinates. The primary purpose of this paper is to demonstrate the development of GPS based parking system which can be used to determine the location of available parking spaces and provide feedback on the current location

2.4 Vision Based Systems

It is very frustrating if the driver is running out of time and looking for a vacant spot in a huge parking lot. If the driver is notified in advance of how many parking spaces are available in each parking lot, he or

she would not have to waste time looking for a vacant space. It will help them easily find a vacant space without wasting time and fuel. Most of the users may not know what the exact name of the parking lot and where the specific parking lot is located. This system will somehow inform via GPS (Global Positioning System) to the user. With the development of this technology, this system will be able to relay the GPS information to the user's smart phone, and a vehicle GPS will be able to accept the information via Bluetooth.

III. ADVATAGES OF SMART PARKING SYSTEM

1. Reduced traffic
2. Reduced pollution
3. Enhanced User Experience
4. Integrated Payments and POS
5. Increased Safety
6. Real-Time Data and Trend Insight
7. Decreased Management Costs
8. Increased Service and Brand Image
9. Secutiry from theft and car damages
10. Simple structure, simple operation

IV. DISADVANTAGES OF SMART PARKING SYSTEM

1. It achieves wireless technology with limited options of connecting to particular device only
2. It does not know who the driver in the car is, checks only the key placed
3. Node-to-node implementation requires more time
4. The use of RFID increases the cost

V. SCOPE OF SMART PARKING SYSTEM

In some of the parking areas are lacking such facilities and hence fail all the security norms necessary to park a vehicle. By looking such a huge concern it is highly required that each and every parking areas should be well equipped with high tech parking control systems, that nevertheless lasts the best. These innovative parking control systems not only make a bright choice but also allow you to pay the right price without getting any worry. Parking control system has been generated in such a way that it is filled with many secure devices such as barricades, swing gates, slide gates, parking control gates, toll gates, time and attendance machine, car counting system etc. These features are hereby very necessary nowadays to secure your car and also to evaluate the fee structure for every vehicles entry and exit. Nowadays parking is very important and hence it is necessary for every vehicle owner to park his or her car in a secure designated parking slot available. To escalate this particular system various parking owners have integrated themselves with sophisticated parking control systems, which are high tech and offers full fledged parking services.

VI. BENEFITS ANALYSIS OF SMART PARKING TECHNOLOGY

- ✓ Reduced traffic
- ✓ Reduced pollution
- ✓ Enhanced User Experience
- ✓ Integrated Payments and POS
- ✓ Increased Safety
- ✓ Real-Time Data and Trend Insight
- ✓ Decreased Management Costs
- ✓ Increased Service and Brand Image

VII. CONCLUSION

This paper has proposed a smart parking system. By using a secured wireless system. The result obtained by testing the Park Smart Application is that it is time efficient, one can easily access the parking, do the booking. The parking process is a non-stop and efficient service. In future scope of this project is software could be made for parking management system which could be easily managed and using the android application PAS user can easily find the parking slot

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