

REPORT- INT404



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TOPIC- Intelligent Vehicle Parking

Abstract

Intelligent Parking Service is a part of Intelligent Parking Systems .

The searching of parking burn a lot of barrel of the world oil every day. Car parking problem is a major role in congestion of traffic and has been still a major problem with increasing vehicle size in the luxurious segment and also confine parking spaces in urban cities. The rapid growth in the number of vehicles worldwide is intensifying the problem of the lack of parking space. As the global population continues to urbanize, without a well-planned convenience driven retreat from the car these problems will worsen in many countries.

The current unmanaged car parks and transportation facilities make it difficult to accommodate the increasing number of vehicles in a proper, convenient manner so it is necessary to have an efficient and smart parking system. Smart parking management systems are capable of providing extreme level of convenience to the drive.

Localization is a key issue of the navigation system to guide unmanned ground vehicle in an intelligent Space. Intelligent Space is an environmental system. This intelligent Space able to support informative and physical ways. The proposed system includes sensors information fusion, position estimation, path planning and tracking. Camera is used to get image information of the robot. Image processing and FPGA embedded together to identify position and orientation of UGV very correctly and accurately. The proposed architecture works on distributed image processing pixels which causes the amount of data to be transmitted through communication network will be minimum.

Keyword

- Smart Parking System
- Android App
- Sensing Camera
- M2M Services Innovation
- Parking Zone

Introduction

The searching of a parking space in a parking lot in commercial area is a so much frustrating activity for many people. More problem increases with the high growth rate in the registration of new cars worldwide. There are many parking places of modern technologies existing but many drivers don't know about the parking blocks so this is big challenge for us to acknowledge the people about smart parking which will help to save a lot of fuel and systematizing the parking of vehicles.

To overcome from these problems of congestion of traffic and save the fuels from it, the unique step of solution is smart parking.

- The services which the Intelligent Parking System should provide in the future are
 - a. The parking availability information system and parking reservation system should provide advanced navigation services.
 - b. The mobile electric commerce system and a continuously working gate system should collect the toll charges electrically
 - c. An automated navigation system should assist in safe driving.
 - d. An in-facility navigation system should provide the best possible traffic management.
 - e. Provision of effective security for the safety of cars.
 - f. Provision of strong functions for facilitating administrators and managers in management of the parking facility.

2.Need and Benefits Analysis of Smart Parking

- Optimize parking space usage.
- Help traffic in the city flow more freely.
- Guides residents and visitors to available parking.
- Accurately predict and sense spot/vehicle occupancy in real-time.
- Saving money , time and the stress of searching for vehicle parking.
- Smart parking plays a major role in creating better urban environment by reducing the emission of CO₂ and other pollutants.

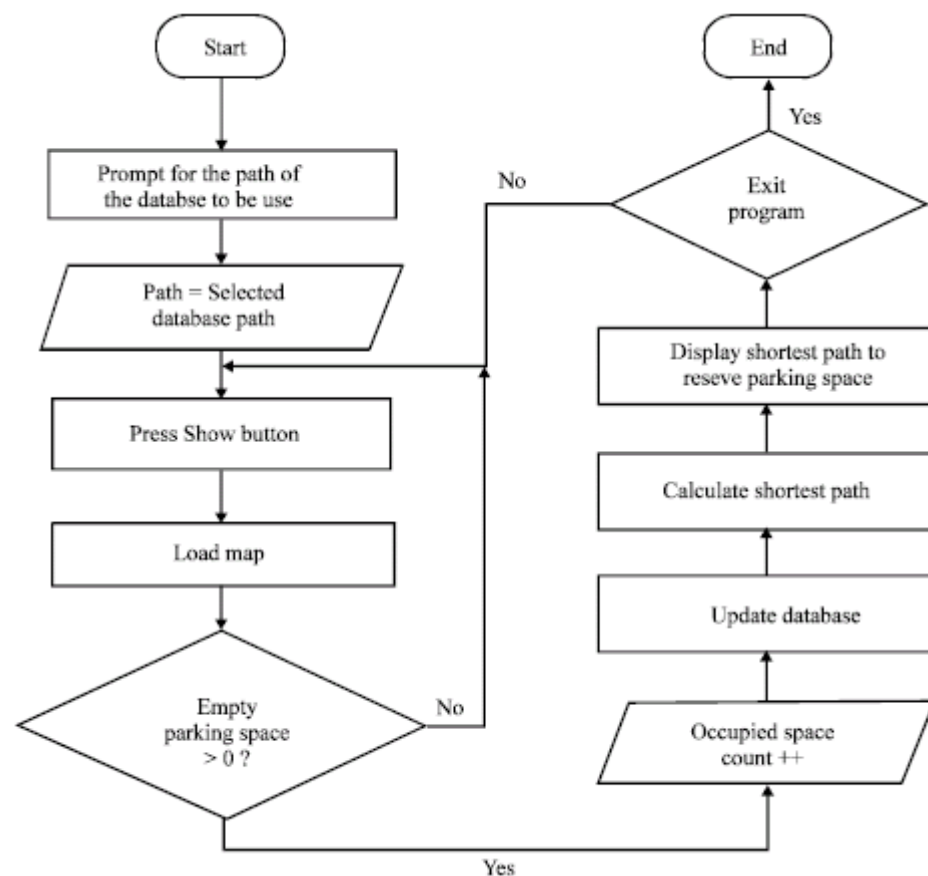
Below is the summary of relevant technique of parking system from internet.

S. No.	Different Technologies	Features	Services Provided
1.	Agent Based	Dynamic Distribution and Complex Traffic Environments	Bargaining, parking guidance and route negotiation etc.
2.	Fuzzy Based	Human-like intelligence and expertise	Intelligent parking methods e.g. parallel parking and perpendicular parking etc.
3.	Wireless Sensor Based	Low cost implementation with lower power consumption	Detection and monitoring of the parking facility etc.
4.	GPS Based	Real time location based information and guidance towards destination	Provides information about the locality and availability of parking facility
5.	Vehicular Communication	Provision of parking information distribution service for mobile vehicles	Antitheft protection, real time parking navigation service etc.
6.	Vision Based	Good for car searching in large parking lots	Lot occupancy detection, parking space recognition, parking charges collection etc.

1. Methodology

Smart parking helps one of the biggest problems on driving in urban areas, finding empty parking spaces and controlling illegal parking . When deployed as a system, smart parking thus reduces car emissions in urban centre by reducing the need for people to needlessly circle city blocks searching for parking. It also permits cities to carefully manage their parking supply. Smart parking systems typically obtain information about available parking spaces in a particular commercial area and process available positions for vehicles, it involves using sensors, real-time data collection, and mobile-phone-enabled automated payment systems that allow people to reserve parking in advance or very accurately predict where they will likely find a spot.

Flow chart depicting intelligent parking System



Procedure

The parking should be cleared vision, including the relaxation of time for the extension of parking need. This relaxation should depend on the situation and site of the parking lots. This relaxation of time should be classified according to the saturation of the parking cars on sites or on locality, as blue zone, yellow zone and green zones. These zones show the activity of the moment and saturations of cars. According to the sequences:

- **Blue Zone:** Those zones which are most saturated like railway stations, airports, etc. In this zone, the extension of time limit is strictly prohibited and the relaxation time is only for two hours.
- **Yellow Zone:** Those zones which are saturated at peak hours. In this zone, the extension of time is limited in only peak hours such as commercial areas, markets, malls, etc. Rest of the day, the relaxation time will increase at certain limit with paying extra amount on extension.
- **Green Zone:** Those zones which are slightly saturated or the areas of college, institutes, parks etc. In this zone the extension of time limit is never prohibited and no extra amount is applied on increasing the time of parking.

Result:

- Vehicle Parking System: User Perspective

A simulation of this system is implemented to understand the working of the different type of services such as the parking spot finder, allocation of parked vehicle spots, and locating the parked vehicle. The system is designed to simulate different parking slots across different building for a particular city. This system is intended to allot a single parking slot for a user (vehicle) on the entry of user into the parking bay and provide user with the unique parked vehicle identification number to locate the parked vehicle later. The system maintains at the repository level, the available free slots in a particular floor, the allotting slots, and the slots that are reserved. A reserved slot may mean the parking slot is allotted to a vehicle which has just entered the parking bay, but has not occupied that particular slot, at the current time instance; it can also mean that the slot is reserved for a particular user or vehicle which has not yet entered the system currently.

- Parking System: Administrator Perspective

The system records the empty slots, reserved slots and available slots for every instance of time when a vehicle enters or exits the parking bay. The system also keeps track of all the vehicles that are parked and those that are not parked in the parking bay, thus also helping for the purpose of vehicle tracking. This would facilitate in prevention of theft and misuse of vehicles .

- Vehicle Tracking

The system also plans to output the current position of the vehicle . This could be helpful in vehicular tracking in and around the city. The main achievements of the simulation of the system include addressing the unavailability of an integrated vehicle parking service on a city-wide basis, and locating a parked vehicle only by its respective authorized user. A centralized service helpful even in monitoring the vehicle movement in and around the parking bays and the city as well , there by detecting some of the suspicious movement of vehicles in a particular city. This system would also help record current and past statistics of the number of vehicles active in the city to those number of vehicle parked.

Waiting Times for Entry

Existing systems use the manual generation and allocation of the parking slots to vehicles that enter, or such slots are chosen in a semi-automated manner or by drivers themselves in an unpredictable manner. The new parking system allows for the vehicle to be allotted a designated parking slot while it enters the parking bay based on the sensed OBU present in it. The waiting times of vehicles at the entry of the parking bay at different time instances spanning across different arrival rates of vehicles. This information could be used by the parking uniformly distribute parking loads on each instance, thereby assigning the parking slots accordingly to vehicles that enter the parking bay. This could also be used to regulate the traffic flow of vehicle in and around the parking bay.

Conclusions

In this project we have discussed the methods that can be adopted for intelligent parking system . These systems can counter the parking problems that arise due to the unavailability of a reliable, efficient and modern Parking system. Such parking system can reduce the parking related issues. Such system can help the economic, social and safety based aspects of the society. It also helps in preserving the environment, fuel and time.

The economic analysis can help us find the feasible project so that we can have a better parking system without making the economy suffer. Future work should be done for integrating different technologies together in order to achieve a system which is the most efficient, reliable, secure and inexpensive. The economic analysis should be done both quantitatively and qualitatively. After the economic analysis is done, then the project can be ameliorated.