Smart vehicle parking using GPS system

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Abstract

The present invention relates to vehicle parking system that detects the unoccupied slot for parking the vehicle remotely. The objective of the invention is to help the user to find a Parking spot in vicinity. There is always a problem that when we visit a new place and are unaware of the proper parking place for our vehicle. This problem can easily be solved with the introduction of this novel system as this system uses the GPS technology to fetch the user's location and then shows all the parking spots near the user. Now the user can select the parking place and, if the space is available, then the user can decide whether to pre-book the parking or as for spot booking. This will help person to find the parking spot quickly. This will also helps reduce the Traffic Congestion for Parking.

Keywords- Global processing system (GPS), parking slot, security module, pre-booking.

Introduction

With the rapid increase in automobiles, it has become very difficult to search for a parking slot for parking a vehicle[1]. Due to heavy traffic the driver not only wastes time but also wastes fuel in looking for a vacant parking place. There are various parking slots that charge high money from the driver to park their vehicle. According to the data it is predicted that about 75% of vehicles do not have parking slot within a town due to which they have to park their vehicles at the road side[2],[3]. The parking of vehicle at the road side is not safe and may result in traffic congestion. Therefore, it is necessary to design an electronic based automation system that can detect the vacant parking slot and alert the user regarding the same[4],[5],[6].

This paper proposes a novel system that is capable of detecting the vacant parking slot remotely and helps the user to park the vehicle. A smart vehicle parking system comprises of a global positioning system for providing a direction the vacant parking slot to the user, a smart phone with installed software for displaying and monitoring the vacant parking slot. There is always a problem in finding a parking spot when we

visit a new place and we don't know the proper parking place. This problem can easily be solved with the introduction of this software as this software uses the GPS technology to fetch the user's location and after that it shows all the parking spots near the user. This system consists of two parts, one for real time monitoring of the vehicle and second for wirelessly detecting the parking slot to allow the user to park his/her automobile in the vacant slot. It is very cheap and eliminates the wastage of time and fuel that the user would have spent otherwise in searching for a vacant parking slot.

Literature Review

Conventionally, if the driver wants to park the vehicle while going to market, hospital or any shopping centre, then the driver has to search for an appropriate parking area and park the vehicle. And if the driver does not get any vacant space then he/she has to wait for vacant parking slot or park the vehicle beside the road. Therefore, to eliminate these problems, various systems were introduced that allow the user to reserve the space for parking [6],[7]. According to the developed system during peak hours of traffic, the driver can book a parking slot without going to the parking areas remotely by GPS system[8]. The existing art only serves the purpose of reserving the space for parking the vehicle and does not serve the purpose of monitoring the vehicle after parking. Therefore, there is a need to develop a system that serves a purpose of detecting and monitoring the vehicle completely.
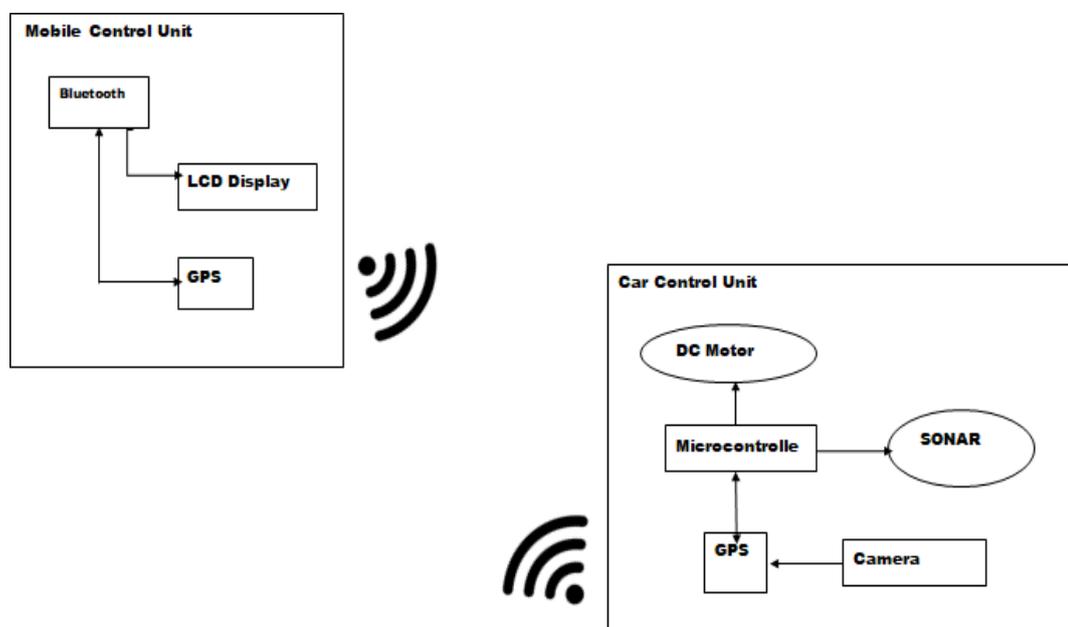
Proposed system

Figure.1 Architecture of Proposed System

The Figure 1 shows the architecture of smart vehicle parking system. It comprises of two parts:

i)   Mobile control unit

The mobile control unit includes an LCD unit, bluetooth and GPS module. The LCD unit activates bluetooth and displays the location of vehicle parking through Global Processing System (GPS). The bluetooth is used to connect the display unit and GPS wirelessly for real time monitoring of the parked vehicle. If user wants to check the status of available parking slot then the user can do so by simply using smart phone and reserving the parking slot remotely. This will reduce the human effort and prevent the user from wastage of time as well as fuel.

ii)   Car control unit

Car control unit consist of dc motor, microcontroller, GPS and camera. After the vehicle is parked into the parking slot there is a need of security system that can alert the driver in case of changing positon of vehicles in the absence of driver. Therefore, for this purpose a real time monitoring system is developed that shows the positon of the parked vehicle to the driver and alerts the driver in case of changing of positon of vehicle from the original postion.
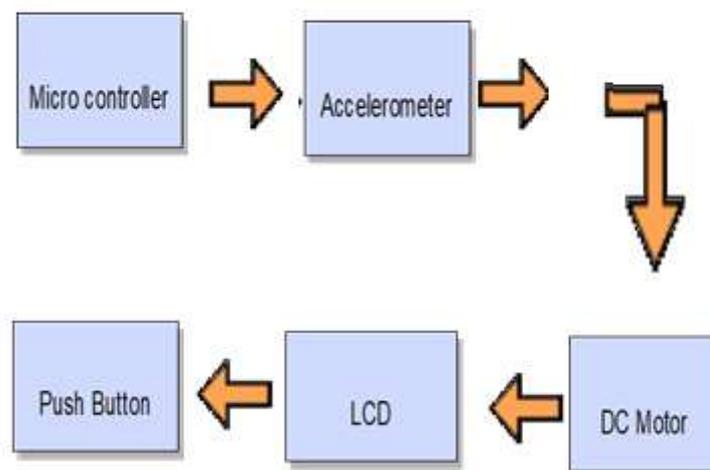

Figure.2 Block Diagram of Proposed System

The proposed parking system has been display in block diagram, which is shown in Figure 2. A microcontroller in association with car controlling unit is used for controlling and monitoring the car, a DC motor is coupled with microcontroller for controlling the speed of car, an accelerometer for monitoring the speed of car, a GPS in association with microcontroller for real time monitoring and positioning of car and a camera installed at the back of the car for capturing the image.

If the driver wants to view the position of parked car then it can be seen with the combination of Smartphone and the camera installed in the car. The GPS of car and

smart phone are activated simultaneously for detection of live positioning of the car as explain through block diagram of car monitoring system using GPS and Smart phone which is shown in Figure 3.
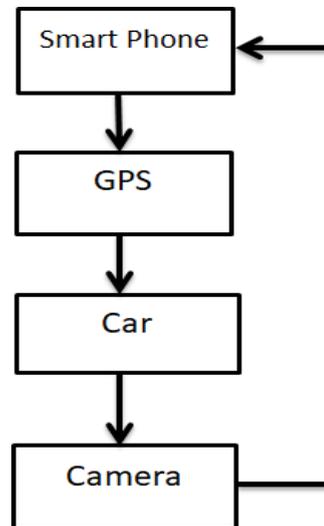

Figure.3 Block Diagram of Car Monitoring system using GPS and Smart phone

Result and Discussion

The camera is placed in the car to capture the view outside the car. It has the capability of video recording with 720 pixels of resolutions; LCD unit is used to display all the captured photos and videos of parked car.
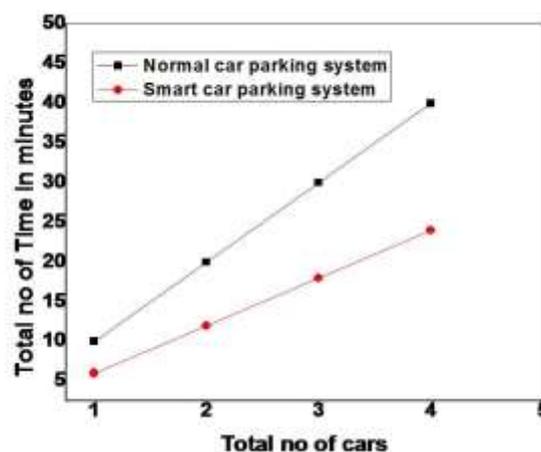

Figure.4 Normal parking system vs. Smart Parking system

The Figure 4 shows the comparison between the normal vehicle parking system and smart parking system. It is observed that the total time taken by smart vehicle parking system is lower than the normal parking system. In the normal parking system, the total time taken by

user to park the no. of cars is more than the total no. of cars. In other words, it can be said that the total time taken by driver to park the car increases with increase in no. of cars thereby consuming more fuel with time. But in case of smart parking system the total time spend by the driver to park the car is less than the normal parking system thereby reducing the fuel consumption. Thus, it is concluded that the novel system not only allows the user to reserve the parking slot but also reduces the wastage of time in searching for the parking slot.

Conclusion

The smart vehicle parking system is designed with the ability to detect the vacant parking slot and allowing the user to reserve the slot for parking the vehicle. The proposed system also provides a real time monitoring system with the ability of monitoring the position of parked car and alerting the user in case the parked car is displaced from its original position. The smart parking system also reduces the total time taken by user for parking the vehicle along with the fuel consumption.

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