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Design & Development of an Automatic Car Parking System in Crowded Places

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Abstract
In this paper, the design & development of an automatic car parking system is designed & developed in crowded places. The smart car parking project aims at providing a confusion free and easy parking. This project helps the drivers of the cars to park their vehicles with minimum wastage of time with accurate information of the availability of the space to park. Thus, we designed a "Smart Parking System Project" to overcome this problem. This project helps the car's driver to park their car with minimum wastage of time with accurate information of the availability of the space to park. The difference between our project of automated car parking systems is we hope to minimize human interaction as much as possible and make the parking area fitted with sensors that will help us execute a safe and efficient way of parking. Hence, we aim to provide a completely safe and automated experience that is robust and can be implemented in real time and hopefully be implemented as the general norm for parking systems in the future. The work presented here is the mini-project work of the second sem students of electronics & communication engineering department of Dayananda Sagar College of Engg., Bangalore.
Keywords – Car, Automatic, Parking, IoT, Sensor.

1. Introduction to the work

At the point when IoT is increased with sensors and actuators, the innovation turns into an occurrence of the more broad class of digital physical frameworks, which likewise incorporates advances. For Example, keen networks, virtual power plants, brilliant homes, astute transportation and shrewd urban communities [1]. Among the difficulties that confront in everyday life one of most unavoidable test is parking the car wherever people go. As our need expands our setting out increments however because of extreme increment in utilization of vehicles and increment in populace this project confront the intense assignment of parking car especially amid busiest hours of the day. Amid pinnacle hours the majority of the saved parking zone gets full and this leaves the client to scan for their parking among other parking area which makes more movement and abandons them with no sign on accessibility of parking spot. To defeat this issue there is certainly a requirement for composed parking in business condition [2]. To outline such parking there need to assess reservation of parking space with ideal parking spot which relies upon cost and time. However, this project compose the time driven grouping strategy which takes care of the issue of parking utilizing opening assignment technique [3].

2. Problem Statement

In these modern days finding car parking is a big issue in congested cities. There are too many vehicles on the road but not enough parking spaces. One of the biggest problems is when we enter a

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parking area then we realize that there are no empty parking slots to park our cars. Important time. Another biggest problem is after entering in a big parking area we confused to find the empty parking slot to park our car [4]. Sometimes maybe we all have been facing these two problems that wasted our important time. That's why we need efficient parking management systems in all parking areas that will provide confusion-free and easy parking. This smart parking system project consists of Arduino, two IR sensors, one servo motor, and one LCD display. Where the Arduino is the main microcontroller that controls the whole system [5].

3. Objectives of the mini-project work

In this section, the objectives of the mini project are presented in a nutshell as 4 in no. Our objective is to create a prototype which can be implemented in real life which can do the following [6].

- Reduce the time and inconvenience of locating an available parking space.
- Other design goals of smart parking systems include: simplifying the process of the parking system, ensuring the driver to be hassle-free, to increase the parking revenue and to reduce traffic congestion [16]
- This system helps to organize the parking lot and makes it easier for the driver to reach the slot before-handedly knowing which space is vacant.
- It enhances the security with simplifying parking system and it also creates energy efficient by using efficient management

4. Proposed Methodologies Adopted

Hardware & Software tools used in the mini-project:

- Two IR sensors
- LCD display
- Arduino IDE 1.8
- Servo motor
- Arduino UNO
- Toy car
- Power supply

5. Methodology

- Also, an LCD display is placed at the entrance, which is used to show the availability of parking slots in the parking area [7].
- After entering the car into the parking area, when it will occupy a slot, then the display shows this slot is full [15].
- If there is no empty parking slot then the system displays all slots are full and does not open the gate [8].

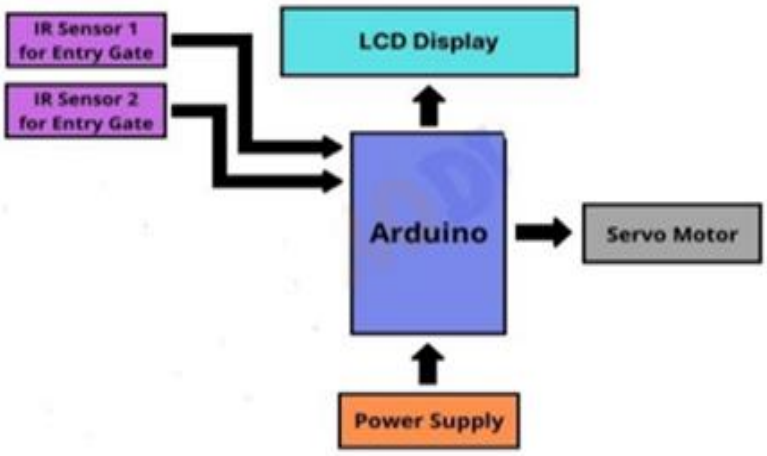

Fig. 1 : Overall block-diagram of the mini-project work

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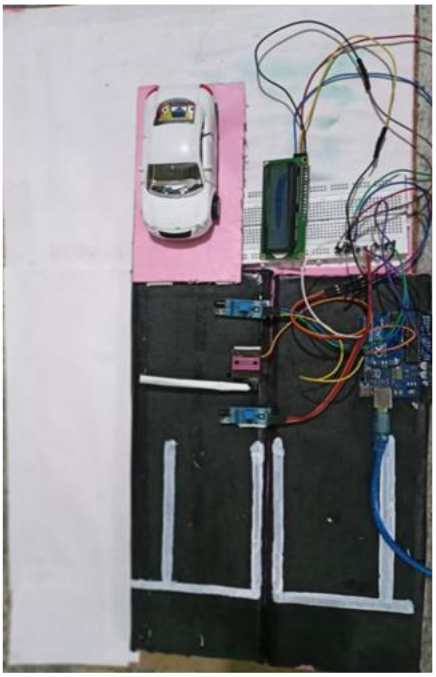

Fig. 2 : Hardware design of the automatic car parking system developed as a mini-project

Fig. 1 gives the information about the components used and how each of them are connected, whereas the Fig. 2 gives the information about the flow of signals and the response given by the system. The overall hardware module of the developed system is shown in the Fig. 3 [9].

6. Results and discussions

The results or the outcome of the mini-project work could be summarized as follows [14] – Firstly, the outcome of this mini-project work is the users can see the status for the availability of the free space outside the parking on a 16×2 LCD. Secondly, it displays slot availability in LCD at the main entrance. Thirdly, to provide an automatic service for car parking, this is one important outcome of the mini-project work [10].

7. Conclusions

The design & development of an automatic car parking system is designed & developed in crowded places and is presented in this paper. The smart car parking project aims at providing a confusion free and easy parking. This project helps the drivers of the cars to park their vehicles with minimum wastage of time with accurate information of the availability of the space to park.

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