



Car Parking System Using IR Sensors

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Abstract- Parking spaces are very important in metropolitan cities. Since the number of car buyers have substantially increased in these years. Therefore there is a urgent need to develop a system that will manage the car parking. In short there is a need I to develop a system which directly indicates which lane is vacant. So this paper's objective is to develop a system to indicate the vacant lane in the parking slots. This involves a system that includes infrared transmitter and receiver in every lane and a led display outside the car parking gate. Parking slots are monitored by the staff of the concerned authority. All vehicles which enter into the parking that leads to waste of time slot. Sometimes it leads to blockage. Condition worsens when there are lanes consisting of multiple parking slots. Use of automated system for car parking monitoring will reduce the human efforts. So a display unit is installed on entrance of parking lot which will show status for all parking slots and for all parking lanes. Empty slot is indicated by the respective glowing LED.

Keywords- Car Parking, Infra-red Sensors, Microcontroller 8051

I. INTRODUCTION

According to statistics the sales of the passenger vehicles increased by 11 percent in the year 2016 as compared to last year. In this paper, we mainly focus on designing a new smart parking system that assists drivers to find vacant parking spaces in a specific parking area. The important objective of this system is to reduce the traffic menace for parking, hence to reduce human effort and air pollution. Main motive is to enhance each parking slot so that it reaches the state-of-art technology. For this purpose each parking slot has been provided a sensor i.e. Infrared sensor that will detect the presence of the car parked in the specific slot. A LCD display will show the status of number of parking slots vacant.

Although many parking system strategies have been developed many parking allocation systems have been developed over the past decade. The main concern is to build such approach that provides an ease to car owners as well as to the parking slot providers.

II. EXISTING SYSTEM

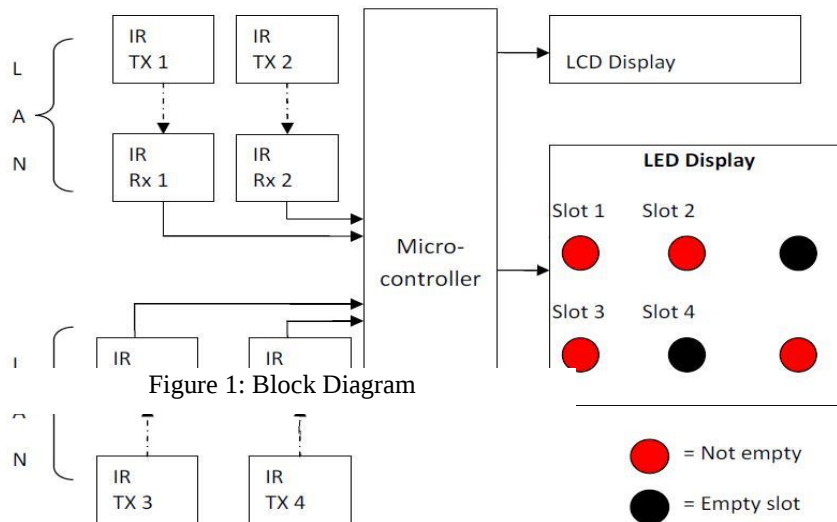
Parking vehicle in empty places in specific parking slots is the basic parking system that is used widely. Rather this never allows the following cars to park to know which parking slots are right now empty.

III. PROPOSED MODEL

The customer enters the parking garage and drives the car into the platform. Further the system analyses the car and which is the nearest car parking slot available. This system makes use of Infra-Red transmitters and Receivers for each parking slot. The IR Receivers are connected to 8051 microcontroller. IR rays are obstructed when a car is

parked in any parking slot. Thus 8051 will come to know that which slot is empty and which slot is full. And in case of LDR, there might be a possibility of the sensor triggering due to headlights of car. For transmitter section system incorporates IR LEDs which will make use of 555 timer IC. Timer IC will generate a frequency of 38 KHz, which will be given to IR LEDs.

Further the car will be parked by the customer at the slot provided. A LCD Display will display about the availability of slots. Addition to this a payment terminal can be established for the customer to pay for parking. So the customer shall be given a ticket or a key with a customized code. As soon as the customer leaves the parking garage from another terminal he will arrive at a platform where customer will make its payment. The system an exit-terminal will use the code from the ticket and accordingly it will issue the payment to the customer.



IV. COMPONENTS

A. IR SENSORS

IR stands for Infrared. Infrared radiation was discovered by William Herschel. These waves are not visible to human eye. In the electromagnetic spectrum, infrared radiation can be found between the visible and microwave section. Infrared radiations typically have wavelength between 0.75 and 1000 μm . They are further classified on the basis of the range i.e. 0.75 to 3 μm is known as near infrared radiation and region between 3 and 6 μm is mid-infrared radiation. Moreover this wave proves to be useful to detect a nearby object. Some benefits of using IR sensors are low power requirements, simple circuitry and their portable features. With respect to car parking it can easily detect presence of cars in the parking spaces.

B. LCD DISPLAY

A LCD display will be used for the purpose of showing the status of empty parking slots. According to which the owner of the car will park the car on desired slot. This will provide an ease to the searching of empty slots.



Figure 2 : LCD display showing empty slots

C. LED

LED lights will be installed at every parking slot indicating its current status. For empty parking slot it will be green color and for occupied parking slot it will be red color. This will provide a quick indication for the car owners to find an empty slot easily.

V. PERFORMANCE METRICS

In order to evaluate the performance of the strategies incorporated in smart parking systems, we introduce the following metrics.

A. Walking Distance

Walking distance is basically the distance from a driver's selected parking space to the destination. This is the main factor that reflects the willingness of drivers when selecting parking spaces. The driver commonly wants to choose the closest parking slot.

B. Traffic Volume

The amount of traffic is generated by parking searching. This factor is not negligible and associated with the traffic congestion and air pollution. This smart parking system is designed to reduce the traffic volume caused by parking searching, as well as satisfy the requirement of drivers.



Fig. 2: Representative diagram of car parking

VI. ADVANTAGES OF THIS MODEL TO THE CUSTOMERS

- No need to search for parking space.
- No need to walk around the parking area.
- Environment friendliness (no need to roam around the parking area)
- Saves Time.
- Provides a good parking experience.
- No need to worry about any theft or damage.

VII. ADVANTAGES OF THIS MODEL TO THE PROPERTY OWNERS/ MUNICIPALITIES

- Provides the maximum usage of space available.
- Consistent parking experience.
- Increases public safety.
- Money saving infrastructure (since maximum space is utilized)
- No need to deploy man power.

VIII. HARDWARE AND SOFTWARE REQUIREMENTS

A. Hardware

- Microcontroller 8051
- Motor

•LED Display

•IR sensors

B. Software

- Keil 8051 Microcontroller Development Tools

IX. CONCLUSION AND FUTURE SCOPE

A successful implementation of this project will prevent mess in the parking slots. Thus it can be widely used in malls and business buildings where large number of people can share a parking area. This automated parking system will reduce time-wastage, long queues, tension and increase the efficiency of the parking system. As the Smart Car Parking System does not require any manpower there are minimum chances for errors. In addition to this it increases safety and provides a hustle-free environment.

X. APPLICATIONS: -

Parking system in shopping malls and airports. It can be used in industries, commercial offices, and educational institutes etc.

XI. REFERENCES

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