Automatic Multilevel Car Parking

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Abstract: **This paper has shown the concept of automatic car parking system, which can automatically sense the entry and exit of the cars, number of cars displayed on the LCD. This automated car parking system reduces the time taken to check the space for the vehicles. In this paper we use the Infrar-red sensors which are placed on each of the floor, to sense the cars. The system is developed using 89S52 microcontroller.**

Keywords: **8051 Microcontroller Embedded Systems, Keil, Proteus.**

I.   INTRODUCTION

There has been some problems related car parking issue which are : How to control the number of the car inside it, monitoring the movement of car in/out side of the parking lot, to check whether there is a place inside for more cars or not and the safety to park [1]. The microcontroller serves as a programming tool to run the whole operation, to reduce the cost in terms of requirement such as job opportunity and to increase security. Moreover, this system is faster, flexible and can meet the market requirement [2]. The aim of this paper is to solve these problems by designing a system to control the parking area using a microcontroller.

II.   METHODOLOGY

In this paper, "Automatic Car Parking System", we have built a system which will automatically sense the entry and exit of cars through the gate and then display the number of cars on the LCD. In this paper we have taken a model of eight number of car parking system. A microcontroller has been used to sense the movement of cars and check whether there is a capacity for cars to park [3]. We use two dc motors, one is for gate and other is for lifting the lifter carrying the car. Gate is open when motor is rotated clockwise and closed when motor rotated in anticlockwise. It is also possible to open a gate when any car enters in the parking lot or close the door when a car exits from it. We use 8 Infra-red sensor, which are mounted as two on each floor. We built a project with a Parking of two floor. Simultaneously, it will display the number of cars present in the parking lot on a LCD screen and opens the gate if there is a space for the car to park. When all the spaces are occupied then LCD displayed NO vacant space and the gate is not open. The sensing of entry and exit of cars is done through infrared transmitters and receivers. The infrared transmitter is mounted on one side and the receiver is placed directly against the transmitter [4]. When a car arrives, the infrared beam is blocked by the car and the receiver is devoid of infrared. message is sent to the microcontroller according to it the car is parked. The procedure for the exit of cars is much similar to that of entry. We use RFID card[6] and RFID card reader. Whenever the car get enter in the parking area it must show the card to the card reader and detect the card. Then the gate is open car enter into the parking area ,gate is closed after some delay.

i.   Hardware:

Our Car parking system is composed of microcontroller (89s52), IR sensors, DC motors, 16X2 LCD, Buzzer. The detailed hardware composition is shown in figure 1.1
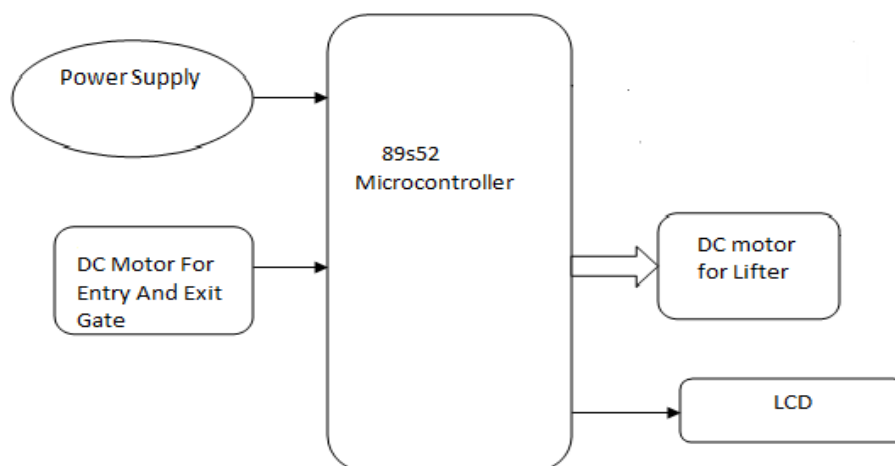
Figure 1.1 Block Diagram

a) Microcontroller:

The microcontroller used in the paper is 89S52. This part is the heart of the car parking system . It checks for the entry and exit of car. It continuously polls the pins from where we receive the signal from the sensor. When it detects the car from the entry gate then it checks whether there is any vacant space in the parking lot or not [4]. If there is vacant space then it opens the door and the motor is rotated clockwise after some time it rotates anticlockwise the gate is closed.

b) Display Unit LCD:

LCD makes this instrument user interface friendly by displaying everything on the display. It is an intelligent LCD module, as it has inbuilt controller which convert the alphabet and digit into its ASCII code and then display, this LCD will display the total number of cars ,empty space and no vacant space [5].

Fig. 1.2 LCD display

c) DC motor:

DC motor is used to open and close the gate. Two DC motor is used, one is for entry and exit the cars and other is for lifting the lifter carrying car [5].

d) IR sensors:

8 IR sensors are used. Two on each floor. These IR sensors is used to sense the cars. One is transmitter and the other is receiver [1].

e) Power Supply:

In this paper we use 5 volt regulated power supply. For this purpose we use one step down transformer with full wave rectifier circuit. In the rectifier circuit we use two diode as a full wave rectifier. One 1000 microfarad capacitor as a filter capacitor to convert pulsating dc into smooth dc. Output of the rectifier is not regulated. So for regulated power supply we use IC7805 as a regulator. Output of the 7805 regulator is connected to the one led with resistance in series. LED work as a power indication circuit [5].

III.   RESULT

Case1 A lift mechanism is used to park the car on the first floor which is implemented using motor. Motor is rotated clockwise it stops when it reaches on the first floor. A car is parked on the first floor according to the priority basis. It shows in the Figure 1.3

Case 2 When all the cars parked on the first floor then the lifter moves on the second floor which is implemented using motor. A motor is rotated clockwise it stops when it reaches on the second floor. A car is parked on the first floor according to the priority basis.it shows in the Figure 1.4

Case 3 When all the cars parked on the first floor as well as second floor i.e no space is available, then it displays no space. It shows in the figure 1.5.

Figure.1.3 When Space Is Available On First Floor

Figure 1.4 When Space Is Available On Second Floor

Figure 1.5 When No Space Is Available

IV.   CONCLUSION

Automatic multi-stored car parking system is very good substitute for car parking area. This Automated car parking system enables the parking of vehicles and thus reduces the time taken to check the space to be used by displaying the spot where the space for parking is available on an LCD display by using IR sensors at the entrance. This Automatic Car Parking enables the parking of vehicles-floor after floor and thus reducing the space used.

V.   APPLICATIONS

- Public Parking
- Airports
- Hotels, Malls
- Apartments
- Office buildings

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