Multilevel Automated Car Parking with IR Security System

Gandhi Priyanka R. 1 Shaikh Parvin G. 2 Suryavanshi Nilaxi D. 3 Abuwala Priyanka S. 4

1,2,3,4Department of Electronics & Communication Engineering
Government Engineering College, Bharuch, Gujarat, India

Abstract— Automatic Car Parking System enables the parking of vehicles, floor after floor and thus reducing the space used. In the modern world, where parking space has become a very big problem and in the era of miniaturization, it is become a very crucial necessity to avoid the wastage of space in modern, big companies and apartments etc. In places where more than 100 cars need to be parked, this system proves to be useful in reducing Wastage of space.

Key words: Automatic Car Parking System, Introduction to 8051 Microcontroller

I. INTRODUCTION

In normal condition when cars reporting for parking more or less match the retrieval request. As a car reports at the reception, the system controller acknowledges receipt of the car, checks availability and allots a platform carrier and displace and direct the client to the entry point at the ground level.

The client following the instructions drives the car on to the allotted platform Carrier, parks, and walkway along. Repeated until the slat conveyer is full.

In this project “multilevel automatic car parking with IR card security system” we are going to design system which works on the basis of microcontroller as well as IR card, which will work smartly compared to commonly used system.

II. BLOCK DIAGRAM

![Block diagram](image)

Fig. 1: Block diagram

III. METHODOLOGY

A display is provided at the ground floor which is basically a counter that displays number of cars in each floor. It informs whether the floors are fully filled with the cars or is it having place in a particular floor or not. There is facility of lift to carry the car to up and down. Movement of Lift is controlled by stepper motor. An indicator with a green and red LED is kept in all the floors to indicate whether the lift is busy or is it ready to take the car up or down. If the red LED glows that means the lift is already engaged and the person has to wait for the green LED to glow. In this project we have provided three floors of a building for car parking. Maximum storage capacity of each floor is given as ten. Storage capacity can be changed according to the requirement.

Anyone can enter to first or second floor. The third floor in this model is for VIP’s only. Therefore when VIP’s are to be entering they are expected to enter their password and they will be taken to the third reserved floor. The password will be of 4 digits. The processor checks for the password entered and if it is found to be wrong, a siren is heard. In this particular model 10 passwords are stored. So when a password is entered, the processor checks for it and it is compared with 10 passwords. It indicates whether it is the correct one or not.

When the car enters the lift, the LDR detects its presence and sends a signal to glow RED LED indicating that the lift is busy. It also sends a signal to motor which makes the motor to rotate. After RED LED glows the lift will take the person and the car up to the floor where the space for parking is available. (For VIP it will be the third floor). When the lift reaches the first floor, the processor compares the filled amount to that of the already fed capacity of that floor, and if it finds that the first floor is fully filled, it goes to the second floor and thus the procedure stops here. As soon as a car is placed in a particular floor, the display counter at the ground floor increments as to indicate the floor capacity has decreased by one. After the lift places the car in a particular floor, it comes back to its normal position and that time, the motor that drives it , also stops. Now processor sends signal to glow GREEN LED indicating that lift is free.

When a person needs to come down from a particular floor to ground floor, he is expected to focus the headlight onto the LDR placed in that floor. Now sensor section sends signal to motor that the lift has to be send back to that particular floor and sends a signal to glow RED LED indicating that the lift is busy. As soon as the lift reaches that particular floor car should come inside the lift, the display counter at the ground floor decrements by one as to indicate the floor capacity has increased by one. Lift comes back to its normal position and that time, the motor that drives it , also stops. Now processor sends signal to glow GREEN LED indicating that lift is free.

If there no parking taking place, the processor carries out the job according to the following priority:-

1) It checks whether any password is entered.
2) It checks whether any car is entered to lift.
3) It checks whether any car headlight is pressed in front of LDR placed in each floor.
A. Hardware Description:

1) Introduction to 8051 Microcontroller:

The first task faced when learning to use a new computer is to become familiar with the capability of the machine. The features of the computer best learned by studying the internal hardware design, also called the architecture of the device, to determine the type, number, and size of the registers and other circuitry.

The hardware is manipulated by an accompanying set of program instructions, or software. One familiar with hardware and software, the system designer can then apply the microcontroller to the problems at hand. In this project we make use of microcontroller.

The 8051 microcontroller generic part number actually includes a whole family of microcontrollers that have numbers ranging from 8031 to 8751.

Following are the main sections in this model.
- Display section
- Keyboard, indicator & Beeper section
- Lift & motor section
- Sensor section
- LCD section

2) Display Section:

This section displays the floor number along with the number of cars which has been already parked in that particular floor. So whenever a car is ready to either come down or go up, the program either decrements the count or increments the count automatically according to the going up or coming down of a car. Display section is done by interfacing with 8255 (PP) of 8051. Here 3 ports of 8255 are connected to three 7-segment display.

3) Keyboard, Indicator & Beeper:

In this section, 12 switches are connected in matrix form and it has three LED’s, RED, GREEN & YELLOW. The person, needed to enter the password has to wait until the GREEN LED glows and when it glows, he has to press the “START” button first. This time the RED LED glows. Then the person has to enter the password. As soon as it is entered, the
program checks it with the already stored passwords. If it is correct, YELLOW LED glows. If the entered password is wrong, beeper starts beeping signifying the incorrectness of the password entered. Circuit diagram of keyboard is shown below.

Fig. 5: Keyboard section

The indicator section contains 2 LED's, RED & GREEN which are present in all the floors. RED LED signifies that the lift is presently busy and shall not entertain any car to enter but if GREEN LED glows, it suggests that the lift is ready and the car can enter the particular floor. Beeper and LED's are connected to port C upper of 8255.

One more advantage of beeper is that; when a person tries to enter the lift irrespective of finding the display section to be FFF (means the floors are already filled), program sends a signal to Beeper section and it starts beeping indicating that he is not supposed to enter the lift since all the floors are already filled.

4) Lift and Motor Section:
In lift section, there is a light beam and LDR to know whether a car has entered the lift or not. When the GREEN LED of indicator section glows, that means the lift is ready for the car to enter. When the car enters the lift, the light beam falls on LDR present in the lift gets cut and it gives a signal that a car has entered the lift. Then program decides which floor lift has to go and gives a signal to motor section.

Fig. 6: Motor section

5) Sensor Section:
Sensor section contains LDR's. These LDR's are connected to each floor to give information if any car has to come down. When a person needs to come down from a particular floor to ground floor, he is expected to focus the headlight the car onto the LDR placed in that floor. When light falls on LDR its resistance decreases. Hence IC 555 triggers and gives a signal. Program identifies that signal and gives a signal to motor section.

Fig. 7: sensor section

6) LCD Section:
In this project LCD is used to display some messages which is useful to car owners. Here 2X16 LCD (Liquid Crystal Display) is used. This is used to display messages like

B. Welcome to Car Parking System
Lift Is Busy Please Wait
Please Enter Your Password:

Fig. 8: LCD section

IV. CONCLUSION

From this project we are solving the space problem, traffic jam problem and successfully park the car,
V. FUTURE EXPANSION
Here we are using microcontroller. It can be implemented using PLC.

VI. ACKNOWLEDGMENT
It is an honor and pleasure to express our heartfelt gratitude to those who helped us and also contributed towards the preparation of this project. We are indebted to our guide Prof. Kamlesh H Gavit, whose invaluable guidance and timely suggestion and constructive encouragement inspired us to complete the project in the present form. We express our thanks to the Library of Government Engineering College, Bharuch which is a source of such invaluable information and of course the Internet facility of the same.

REFERENCES
[1] Programming customizing the 8051 Microcontroller by Myke Predko, Tata McGraw Hill