DESIGN AND HARDWARE IMPLEMENTATION OF DIGITAL CAR PARKING SYSTEM

A Project and Thesis submitted in partial achievement of the necessities for the Award of Degree of
Bachelor of Science in Electrical and Electronic Engineering

By
Name: Lokman shah
ID: 181-33-4561
Name: MD. Siam Rahman Durlov
ID: 181-33-4496

Supervised by
MD. RAHATUL ISLAM UDOY
Lecturer
Department of Electrical and Electronic Engineering
Daffodil International University

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
FACULTY OF ENGINEERING
DAFFODIL INTERNATIONAL UNIVERSITY

November 2021

CERTIFICATION

This is to certify that this project and thesis entitled "**Design and Hardware Implementation of Digital Car Parking System**" is achieved with the aid of the following students under my direct supervision and this work has been completed by methods for them in the laboratories of the Department of Electrical and Electronic Engineering under the Faculty of Engineering of Daffodil International University in partial success of the necessities for the degree of Bachelor of Science in Electrical and Electronic Engineering.

Signature of the Supervisor

Mr. Md. Rahatul Islam Udoy
Lecturer
Department of EEE

Signature of the candidates

Lokman

Name: Lokman shah

ID: 181-33-4561

Durlov

Name: MD. Siam Rahman Durlov

ID: 181-33-4496

Dedicated to

Our Parents

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

IR	Infrared Ray
LCD	Liquid Crystal Display
DC	Direct Current
PWM	Pulse Width Modulation
VCC	Voltage Common Collector
GND	Ground
LED	Light Emitting Diodes
AC	Alternating Current
PVC	Poly Vinyl Chloride
MC	Micro Controller
SM	Servo Motor
SPI	Serial Peripheral Interface
SRAM	Static Random Access Memory
IIC	Internal Investigation Command
LDR	Light Dependent Resistor

LIST OF SYMBOLS

V	Voltage
A	Ampere
f	Frequency
RW	Read/Write
RS	Register
A	Anode
K	Cathode
E	Enable

ACKNOWLEDGEMENT

Most importantly, we give gratitude to Allah. At that point we might want to accept this chance to offer our gratefulness and thanks to our project supervisor **Md. Rahatul Islam Udoy, Lecturer** of **Department of EEE** for being committed in supporting, spurring and managing us through this project. This project can't be finished without his valuable direction and helps. Additionally much thanks for giving us occasion to choose this project.

We likewise need to convey on our gratefulness to **Professor Dr. M. Shamsul Alam, The Dean of Faculty of Engineering** for his guide, support and consistent consolation.

Aside from that, we might want to applaud our whole companions for sharing knowledge; data and causing us in creating that project an accomplishment. Likewise a debt of gratitude is in order for lending us a few instruments and supplies.

To our adored family, we need to give them our most profound love and much obliged for being useful and in addition to their inspiration and consolation during our investigations in this University.

ABSTRACT

This project has indicated the idea of a digital car parking system. Everything in the advanced world is going programmed, we have assembled a method which can consequently detect the entry and exit of vehicles through the entryway and afterward show the quantity of vehicles in the parking area. This mechanized vehicle parking system lessens the time taken to check the place for vehicles by showing the accessible spaces for parking on a LCD display by utilizing infra-red (IR) sensors introduced at the entrance and exit. Automatic gate opens if parking slots are empty and if a vehicle appears in front of the parking gate. If the parking slot is full and a car appears in front of the gate, the park's gate will not open automatically. In this case, the display will show “Slots are full, Slots are not available” This project is created utilizing ATmega328 microcontroller.

CHAPTER 1

INTRODUCTION

1.1 Introduction

With the remarkable change in vehicles, discover a parking around mortal been an incredible employment in our days. Along these lines, the group utilization of two diver's kind of parking administrations system in particular: The machinelike parking framework and the Marshaling Parking Method [1]. The Marshaling Parking Grouping is a recognize of parking whereby officials are needed to be on make to demonstrate to drivers where there is a slot usable. The machine vehicle parking gathering is a sort compose of parking that is intended to help the utility and directors of the parking state which is either putting screens to illuminate drivers regarding the size of spot impending [2].

1.2 Objectives

This report begins by presenting the automatic vehicle parking technique and furthermore how it is an enormous decent to drivers and administrators. The program likewise gives an outline a usable writing in the motorization theater. After which it workforce at that point imparts a chance and furthermore reasserts all the parts of the alternative. A situation has been assembled to give a clearer staff on what the cast is generally. Later on, in the assessment, the Arduino structure is clarified and that present be exploited as the part for this assignment.

1.3 PROBLEMS STSTEMENT

Today most of the car parks claim individual's start to hunt for release area to explorer their car. This leave effort problems when it is too umpteen cars and it makes them symptom their reading and push [5]. One of the factors that pay to this difficulty is because of deficiency of information that acknowledged at parking lot. So, one method has to be decoration to understand this parking job which move portion the entity program criteria.

Today, Parking Substance and Counseling (PGI) method jazz been put into exercise in Collection, Federated Nation, Nippon and Dishware [6]. Classify of cars on the means is multiplicative time parking spaces are decorous increasingly meagre. Unremarkably during

train interruption or holiday, the book of cars that use the parking area in the shopping thickening transmute higher compared to during excavation day. This testament straighten the parking location prettify full for them to hitch for the escaped place parking in the shopping knotty. This is experience consuming and fill instrument transmute writer short. Also, that, there are also problems of the parking grapheme which are situated far from the ingress divided or the scheme or end. This situation makes the drivers to determine the near parking set as they do not impoverishment to posture far. As the furnish soprano is ready gain time, users testament try their finest to foreclose their vehicle push. At the spot time, they period at the entering gross before they can effort the blank parking area. So the users give improvidence their reading and drive to conceptualize a people type.

1.4 Scopes of Research

Parking areas are serious to develop in the Port. A large portion of the period, driver will know to wander around for in some cases before they can be beneficial to pick up a simple grapheme. Consequently, with this examination, driver can without much of a stretch like if there is a gettable parking and furthermore where the set is. An Arduino Nano outfitted with sensors personnel be used as the rachis to effectively body the programmed vehicle parking gathering.

1.5 Methodology

The project was implemented with Arduino Nano, LCD Display, IR sensor, servo motor and potentiometer. In addition to IR sensors, we have also used 7 IR sensors, 2 entry and exit gate and 2 servo motors in special parking slots. When a car or vehicle enters or exits, the IR sensor sends the signal to Arduino and Arduino drives the servo motor and this is like how when an IR sensor in a parking slot sends signals to Arduino and Arduino sends 1 or 0 signals. Automatic gate opens if parking slots are empty and if a vehicle appears in front of the parking gate. If the parking slot is full and a car appears in front of the gate, the park's gate will not open automatically. In this case, the display will show “Slots are full, Slots are not available”.

CHAPTER 2

LITERATURE REVIEWS

2.1 Introduction

This part will take at various themes acceptable to the accepted method. Three novel kinds of stopping structures will be analyzed which are: Automated Parking System, Semi-Automated Parking System and Parking Marshal System. The points will be discussed in the particular solicitation that it has been referred to.

2.2 Digital Car parking system

Digital parking services have usually been vital by way of permitting drivers to safely depart their vehicle whilst they can go on to their each day activities. Mostly the data supplied collectively with practice carried out with the aid of the clever parking gadget has been extraordinarily beneficial via helping drivers to locate a reachable space. Intelligent transport systems are superior functions which are developed to enhance the nice of transport and additionally efficaciously attain different consequences primarily based on the transport system. Intelligent transport Systems offers methods to manipulate visitors and additionally automobile parking through the use of quite a number superior method. Looking at our world today, a lot of superior structures are developed and additionally executed.

2.3 Literature Survey

Too several cars, too specified reciprocation and there is no enough parking part. This is the status which is seen in most of the metropolitan cities today. Grouping breaks on roaming on area searching for a parking locating to accommodate their vehicles especially at edge hours of dimension. Author than half of the foregathers meet are experience in the cities. So, the cities evolve reached noise of its abidance. As grouping uses vehicles for transferal so there is significant identify of vehicles exists for people bathroom. Most of the moment fill drop their meticulous dimension on searching parking lots to parcel their vehicles. Thus, congestion occurs in the interchange crowding in the citified areas thus people are symptom term in searching the parking area abnormally to common their vehicles. Alternate crowding caused

by container is an implacable problem at a shape assesses and it has been measurement exponentially [3]. Car parking job is an activity helper and has been, console a mark problem with expanding vehicle filler in the sensualist figure and confined parking spaces in citified cities. Searching for a parking site is a sub program (and oft prophylactic) trait for many material in cities around the quality. This awaits poet most one meg barrels of the humankind's oil every day. As the world aggregation continues to modify, without a well-planned, convenience-driven locomotive from the car these problems faculty [4].

2.4 Advantages of Digital Car Parking System

The vehicle proprietor, the parking administrator and furthermore the climate profits by it, While actualizing the Digital Parking System. When taking a gander at the parking administrator, the future parking example can without much of a stretch be anticipated from the data assembled from the Smart Parking System. The parking cost can likewise be founded on the data get to improve the association benefits. When taking a gander at the climate, the degree of contamination can be diminished by diminishing the air contamination noticeable all around. The measure of time spent to discover a parking is decreased coming about to the efficient and furthermore fuel utilization. The vehicle proprietors additionally advantage from the System on the grounds that the framework consequently shows parking space accessible which straightforwardly lessens the measure of vehicle make a trip and an opportunity to look for an accessible spot. With data gave by the framework, vehicle drivers can undoubtedly try not to leave that is full and find the parking which is empty. The quantity of illicit left vehicles is likewise decreased. Likewise, the gridlock is diminished. Different favorable circumstances that accompany the Smart Parking System is that it gives wellbeing, security. These preferences make it simple for the clients. Some more points of interest can be efficient and productivity in space and neighborly climate in the parking.

2.5 Safety and Security

Drivers don't have to contribute energy checking out searching for an open spot rather they can direct move to an available space which is either showed up on the load up, exhibited by the sensor or showed up in their convenient depending upon the sort of leaving structure being completed, while utilizing a vehicle parking method. Cruising all over searching for stopping can be dangerous considering the way that drivers don't have a full obsession making the rounds considering the way that their consideration is on seeing an open spot. In this manner, showing up at a leaving opening absolutely makes it straightforward for drivers and besides wipes out strain and frustration which assembles security around the vehicle leaving. The leaving system also screens the driver's' vehicles which in like manner constructs prosperity.

2.6 Summary

In some parking framework, for example, the transport line parking, customer doesn’t need to be stressed over how to stop or where to stop. They should simply to lead up the vehicle at a specific place and vehicle will be helped through the transport line to a free space. This framework can contain more at any rate 40% a greater number of vehicles than what an ordinary vehicle parking would contain. This framework eliminates the need of vehicle proprietors to move around the parking searching for space to stop and climbing steps or the activity of recollecting where they left their vehicle. Despite the fact that this framework is known to be exorbitant in term of upkeep, and different costs, this framework just gives proficient space around.

CHAPTER 3

The system component

3.1 Introduction

In this section, we have talked about different parts that will be expected to make this "Automatic Car parking system".

3.2 Components

Automatic Car parking system has the following main components are

i. Arduino Nano
ii. SG90 Servo Motor
iii. 16*2 LCD display
iv. Potentiometer
v. IR module
vi. power supply Adapter 9V 2A
vii. Bread Board
viii. PVC Board
ix. Jumper wire

3.2.1 Arduino Nano

The Arduino Nano is tiny, finished, and breadboard-obliging board reliant on the ATmega328. It requires a DC power jack, and works with a Mini-B USB interface instead of a standard one [5].

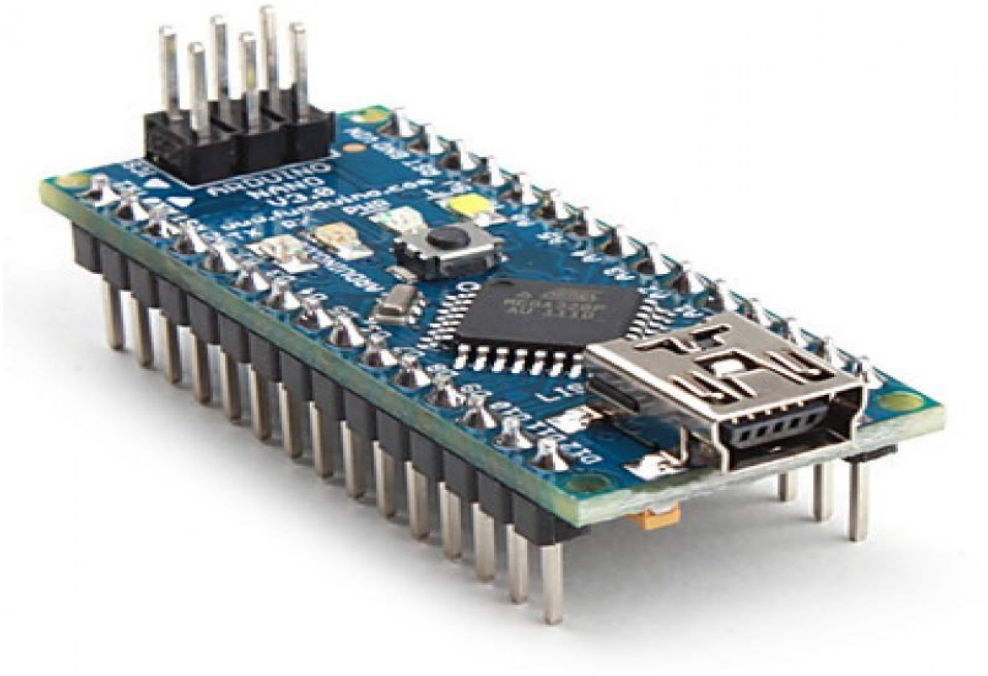

Fig. 3.1 Arduino Nano

3.2.1.a Pin Description of Arduino Nano

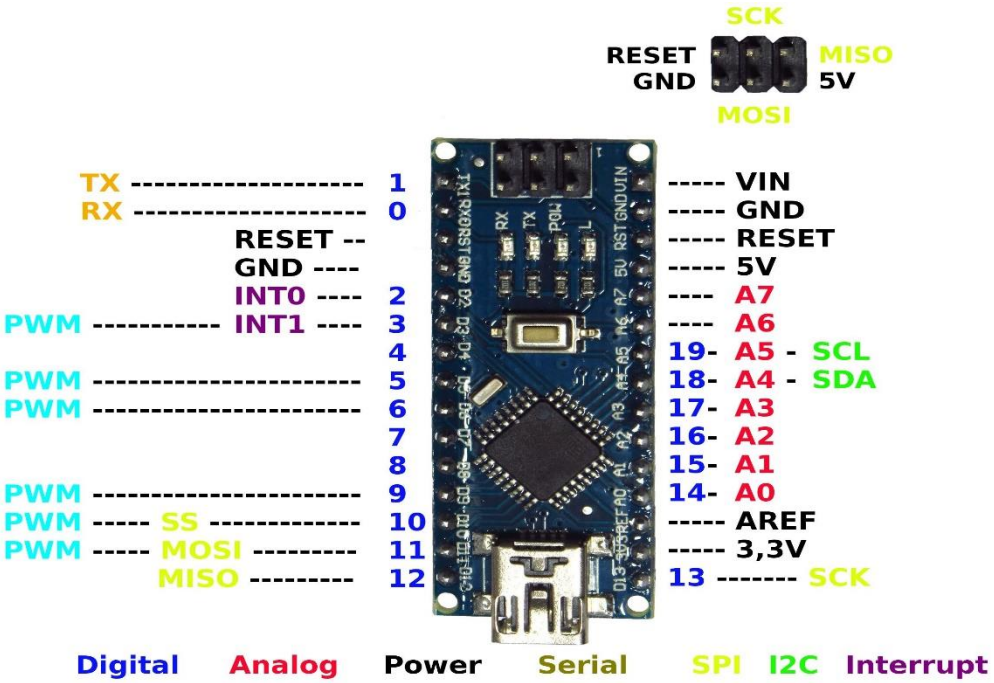

Fig. 3.2 pin configure of Arduino Nano

Table 3.1 Pin Configure of Arduino Nano

Pin Cateory	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	Vin: Input voltage to Arduino when utilizing an outside force source (6-12V). 5V: Regulated force supply used to control microcontroller and different segments on the board. 3.3V: 3.3V inventory created by ready voltage controller. Most extreme current draw is 50mA. GND: Ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A7	Used to measure analog voltage in the range of 0-5V
Input/Output Pins	Digital Pins D0 - D13	Can be used as input or output pins. 0V (low) and 5V (high)
Serial	Rx, Tx	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.
SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13	Used for SPI communication.

	(SCK)	
Inbuilt LED	13	To turn on the inbuilt LED.
IIC	A4 (SDA), A5 (SCA)	Used for TWI communication.
AREF	AREF	To provide reference voltage for input voltage.

3.2.1.b Arduino Nano Features

Table 3.2 Features of Arduino Nano

Microcontroller	ATmega328P – 8-bit AVR family microcontroller
Operating Voltage	5V
Recommended Input Voltage for Vin pin	7-12V
Analog Input Pins	6 (A0 – A5)
Digital I/O Pins	14 (Out of which 6 provide PWM output)
DC Current on I/O Pins	40 mA
DC Current on 3.3V Pin	50 mA

Flash Memory	32 KB (2 KB is used for Boot loader)
SRAM	2 KB
EEPROM	1 KB
Frequency (Clock Speed)	16 MHz
Communication	IIC, SPI, USART

3.2.2 SG90 Servo Motor

Servo motor which is high force engines which are usually utilized in mechanical technology and a few different applications because of the way that it's anything but difficult to control their turn. Servo engines have an equipped yield shaft which can be electrically controlled to turn each degree in turn. For control, not at all like ordinary DC engines, servo engines for the most part have an extra pin aside the two force pins (Vcc and GND) which is the sign pin. The sign pin is utilized to control the servo engine, turning its shaft to any ideal point.

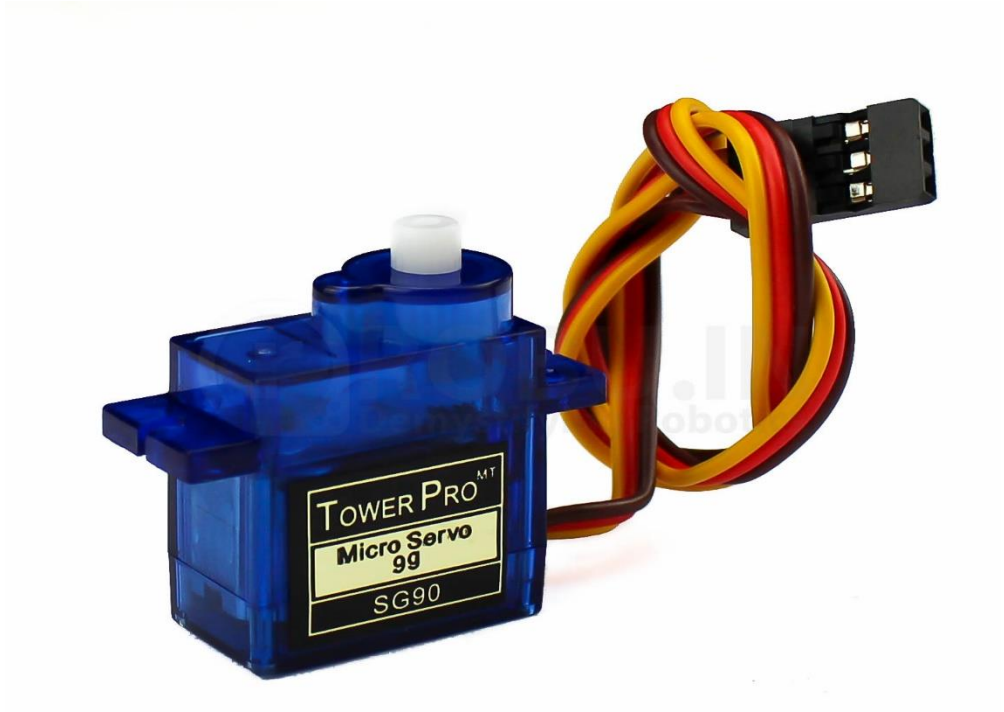

Fig. 3.3 SG90 Servo Motor

A servo with low and high power may rotate approximately 180 degrees (90 degrees in each order), as well as standard and other modest types. To control these servos, you may use any servo code, device, or library. It's great for soft feet that need to get around without having to construct an engine and crank on the transmission, and it fits in a little place. The gadget can accommodate three horns.

3.2.2.b SG90 Servo Motor Pin Description

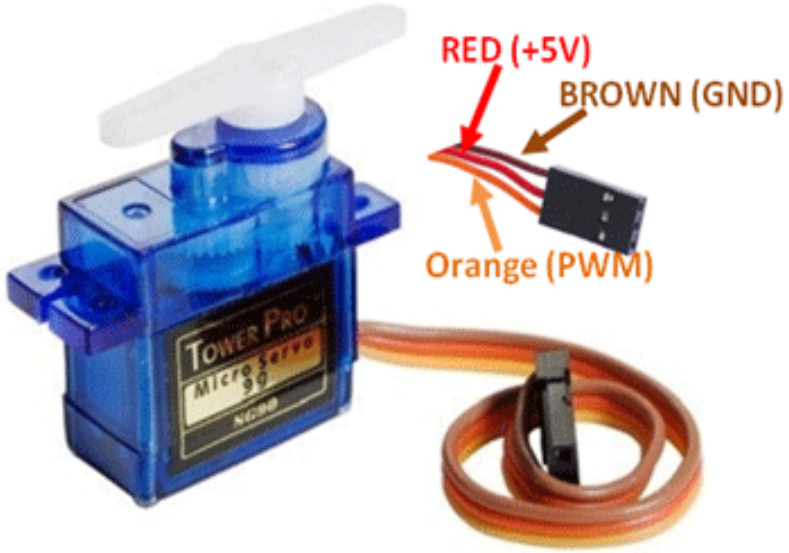

Fig. 3.4 SG90 Servo Motor Pin Description

3.2.3 16×2 LCD Display

Fig. 3.5 16×2 LCD Display

A Liquid crystal display (LCD) is a level showcase that utilizes the light tweaking properties of fluid presentation. They are regular in buyer gadgets, for example, video players, gaming gadgets, timekeepers, phones, PCs, adding machines and so forth A (16x2) LCD board comprises of 16 columns and 2 lines. It can show up to 16 characters in 2 lines.

3.2.3.a 16×2 LCD Display Pin Description

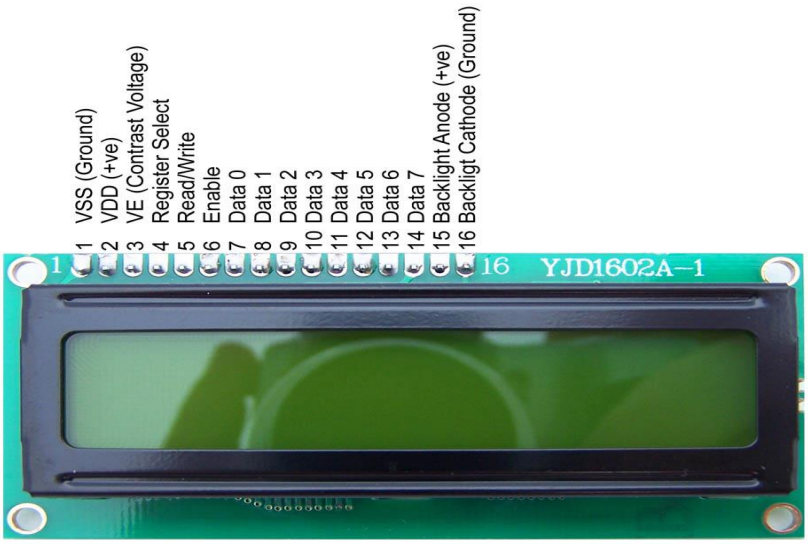

Fig. 3.6 16×2 LCD Display Pin Description

GND should be connected to an Arduino ground.

VCC is the energy that provides the display for which we interface the 5 volt pin with the Arduino.

Vo controls the separation and magnificence of the display. Using an essential voltage divider with a potentiometer, we can make a good compliment to the separation.

RS pin allows the Arduino to tell the display whether it is sending orders or the data. This pin is basically used to isolate commands from the data.

When an RS pin is set to LOW, for example, we send requests to the display (such as moving the pointer to a specified place, clearing the presentation, putting the exhibit away, and so on.) We also communicate data / nodes to the display when the RS pin is set to HIGH.

The R / W (Read / Write) pin to the display is to control whether you are scrutinizing information from the LCD or creating data for the LCD. Since we are essentially using this display as OUTPUT device, we will tie this pin LOW. This forces it into WRITE mode.

Pin E (Enable) is used to engage the presentation. Which suggests that when this pin is set LOW, the display doesn't respond to what's new with R / W, RS, and the data carrier lines; when this pin is set to HIGH, the display takes care of the moving data.

The pins D0-D7 (Data Bus) transfer the 8-digit data we deliver to the presenter. For example, if we want the 'A' character to be displayed on the display, we'll set these pins to 0100 0001.

The backdrop lighting of the display is controlled by the A-K (Anode and Cathode) pins [6].

3.2.4 Potentiometer

The ever-changing potentiometer can open multiple faces marked with icons. Consider pot capacity and changing resistance. Connect the VCC to the line, to the next GND and the voltage between the pins will vary from 0 to VCC depending on the pot. Locate the ADC and microcontroller and obtain support from the charger. This pot has a 10K stand. See the documentation for the book in style.

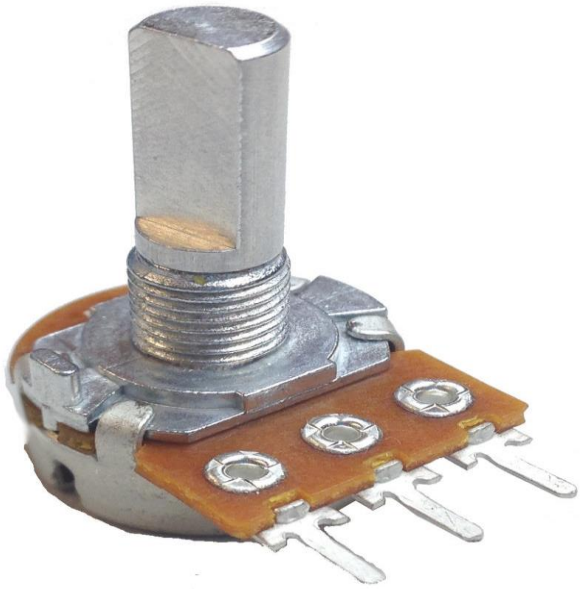

Fig. 3.7 Potentiometer

3.2.5 IR Sensor Module

Infrared sensor device is a combination of two infrared sensors. One is the Infrared Transmitter and the other is the Infrared Beneficiary. Infrared transmitter generates infrared light through drive light. This infrared light is specially emphasized that when reflected back when infrared

beneficiaries are affected by any obstacle or light. until then these infrared receivers avoid sensory input to systems and individuals in this area. Undoubtedly, it can be understood from an area of 2 to 30 cm, and the exposure is 350. These infrared sensors have been used to disable sensor modules in many applications, for example, in the automotive industry, for the automotive industry and for safety purposes, among others [7].

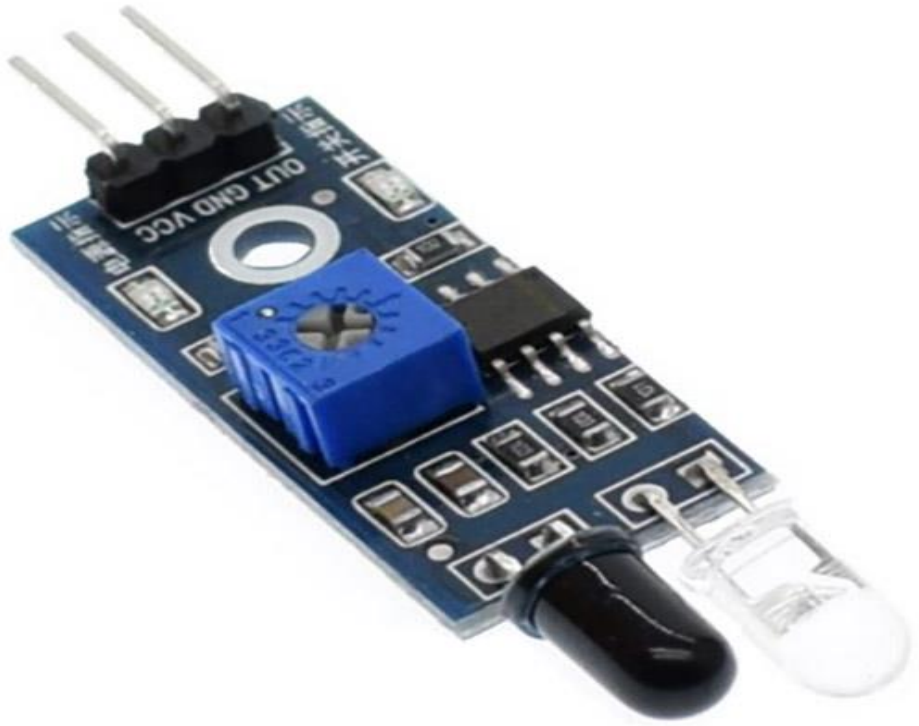

Fig. 3.9 IR Sensor Module

3.2.5.a IR Sensor Module Pin Configuration

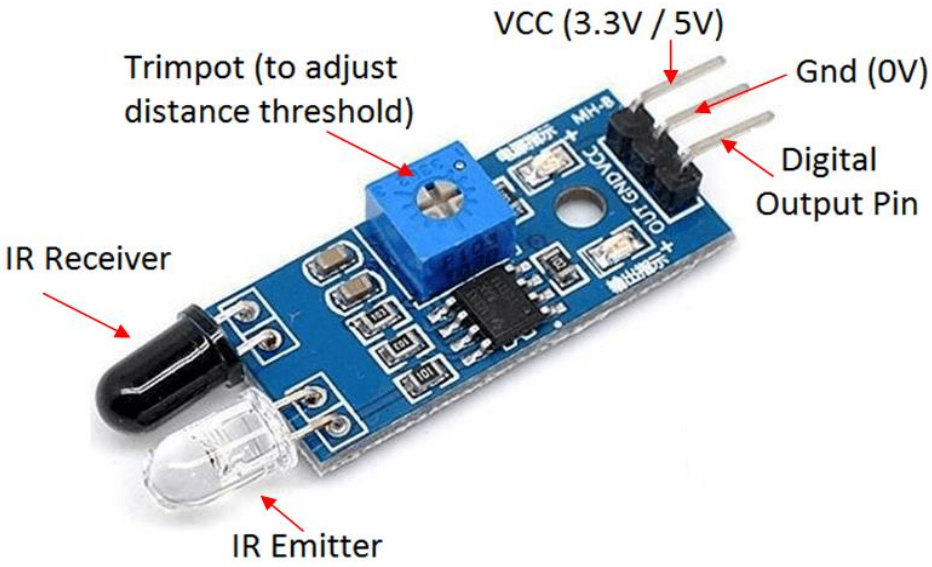

Fig. 3.10 IR Sensor Module Pin Configuration

This device contains three VCC, GND and V external sensor blocks. At the 3.3 VCC pin voltages are applied to convert the 3.3 to 5 Volts DC sensor and the ground pin is recorded with the input ground. The pin 5 is for this sensor, which is connected to the controller and its intentions to submit when there is a block in front of this sensor. Furthermore, it also contains various fragments, for example, an IR Drove Maker that emits infrared light, an IR receiver that receives light after an accident at any point, and a Power Drove that is turned on by this sensor is filled by a distance specialist. However, the customer can change the compass or distance sensor without greatly increasing the extent of the resistance of the potentiometer by extending or decreasing. The ultimate hindrance is the idea that it is the impediment that moves around.

3.2.5.b Working Principle of IR Sensor Module

The functioning concept of infrared interference devices is startling when considering the technique with IR transmitters and IR receivers. As a result, there are these critical functions and impacts. An IR transmitter generates infrared light during reporting periods. After making contact with the item, some of the infrared light that is reflected back to the IR emitter. As a result, an infrared beam is emitted by an IR receiver.

The section has been shown to glow, and its power is dependent on it. The infrared closure is established as the output. When the resistance of this component is increased, the power is

compared to the voltage source again, and vice versa. When he tries to leap over it, he will reach out. Similarly, when the temperature drops, resistance lessens, and seeding increases. The voltage Vout pin produced by this module is received by the operator.

3.2.6 Power supply Adapter

This AC/DC Power Adapter plan with a level US fitting to 5.5mmx2.1mm Male attachment and long link. It works at AC100V to AC240V 50/60HZ and yield DC 9V/2A with a 5.5x2.1mm focus positive barrel jack. It turns out extraordinary for any gadget with the DC 9V/2A force supply.

Fig. 3.11 power supply Adapter

Input voltage: 100~240V AC
Rated Frequency: 50~60Hz
Output Voltage: 9V
Max Output Current: 2A

3.2.7 Bread Board

Breadboard this is a small system for a small toy with equipment, as well as check the circuit plan. Many digital components and electronic circuits can be connected by inserting a connector or terminal into the socket and then creating a connection via wires where appropriate.

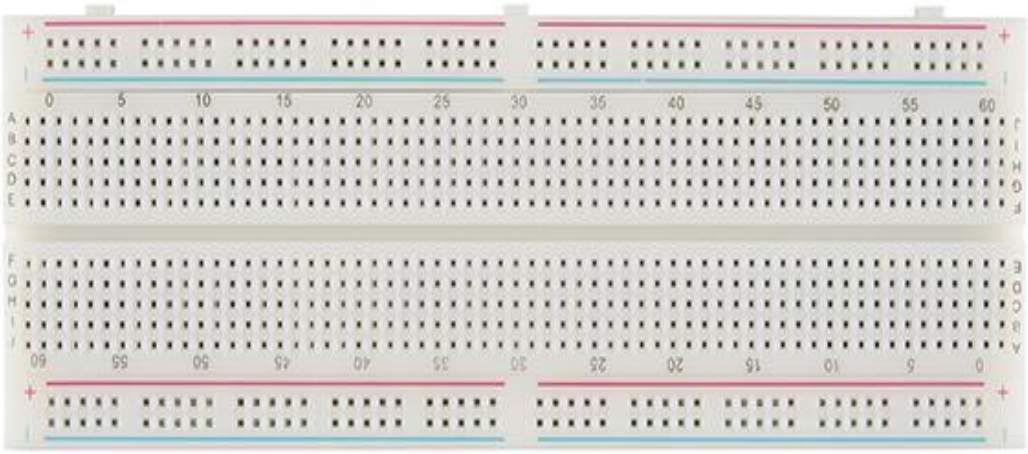

Fig. 3.12 Bread Board

3.2.8 PVC Foam Board

PVC foam board is a feather light, extended unbending PVC froth sheet that is utilized for an assortment of uses including signs and shows, display corners, photograph mounting, inside plan, thermoforming, models, model making and substantially more. It very well may be effectively sawed, stepped, punched, cut, sanded, bored, screwed, nailed, or bolted. It tends to be fortified utilizing PVC cement. It properties incorporate brilliant effect opposition, exceptionally low water ingestion and high erosion obstruction.

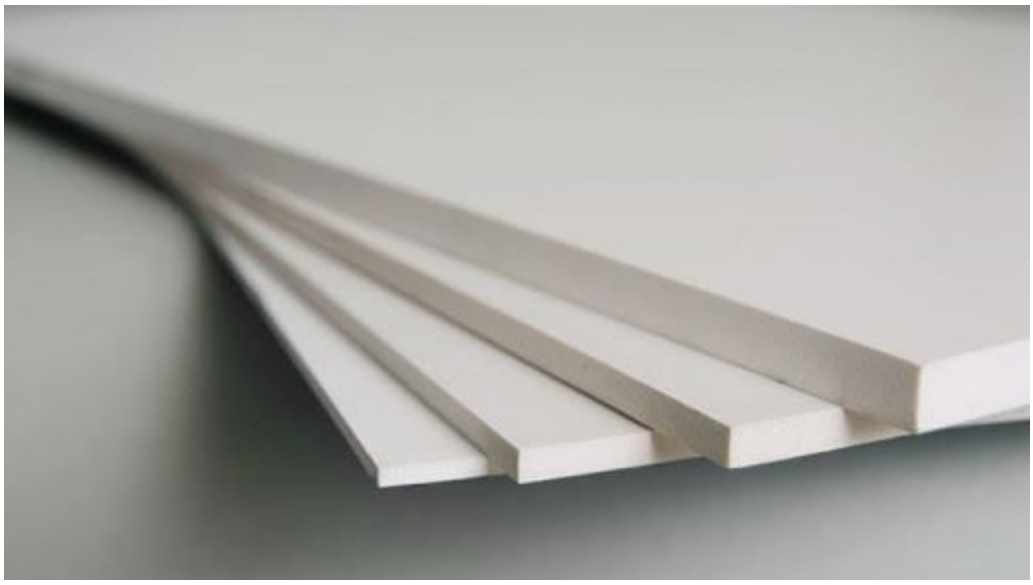

Fig. 3.13 PVC Foam Board

3.2.9 Jumper wire

Simple cables with connection pins on both ends are known as jumper wires that it may be used to link two components without requiring an official connector. Jumper wires are commonly used in circuits and other prototype devices to make it easier to swap out circuits quickly.

Fig. 3.14 Jumper wire

3.3 Summary of the Chapter

Digital Car Parking means to give proficient method of leaving to drivers no doubt. The system is adaptable to be utilized by the two executives. The vehicles enter and exiting the parking slots can be followed least mistakes. The measure of parking installment can be recovered by the administrator productively.

CHAPTER 4

HARDWARE DEVELOPMENT

4.1 Introduction

This section portrays the strategies executed in a Smart Car making calculations. The primary topics talked about in this part are the manner by which this undertaking streaming programming. The portrayal hardware connection data:

4.2 Block Diagram Connection

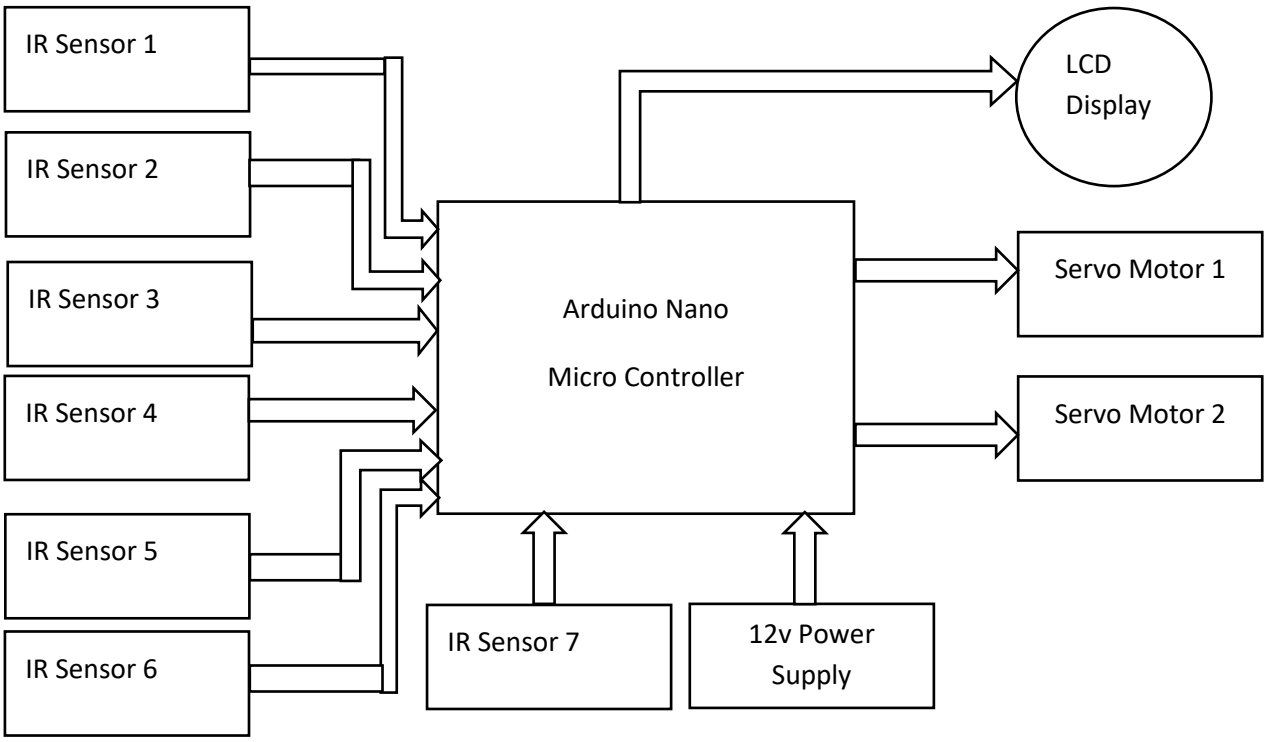

Fig. 4.1 Block Diagram Connection

The upper block diagram consists of an Arduino Nano, power supply, IR sensor, servo motor and LCD display. A 12 volt adapter has been used as the power supply and that 12 volt has been stepped down through a five volt IC. 7th IR sensor has been used in block diagram through which the presence of any vehicles has been determined. The SG90 servo motor is used in the block diagram. The gate is automatically opened and closed by this servo motor. 2*16 LCD display has been used where all the value outputs are shown.

4.3 Project Flowchart

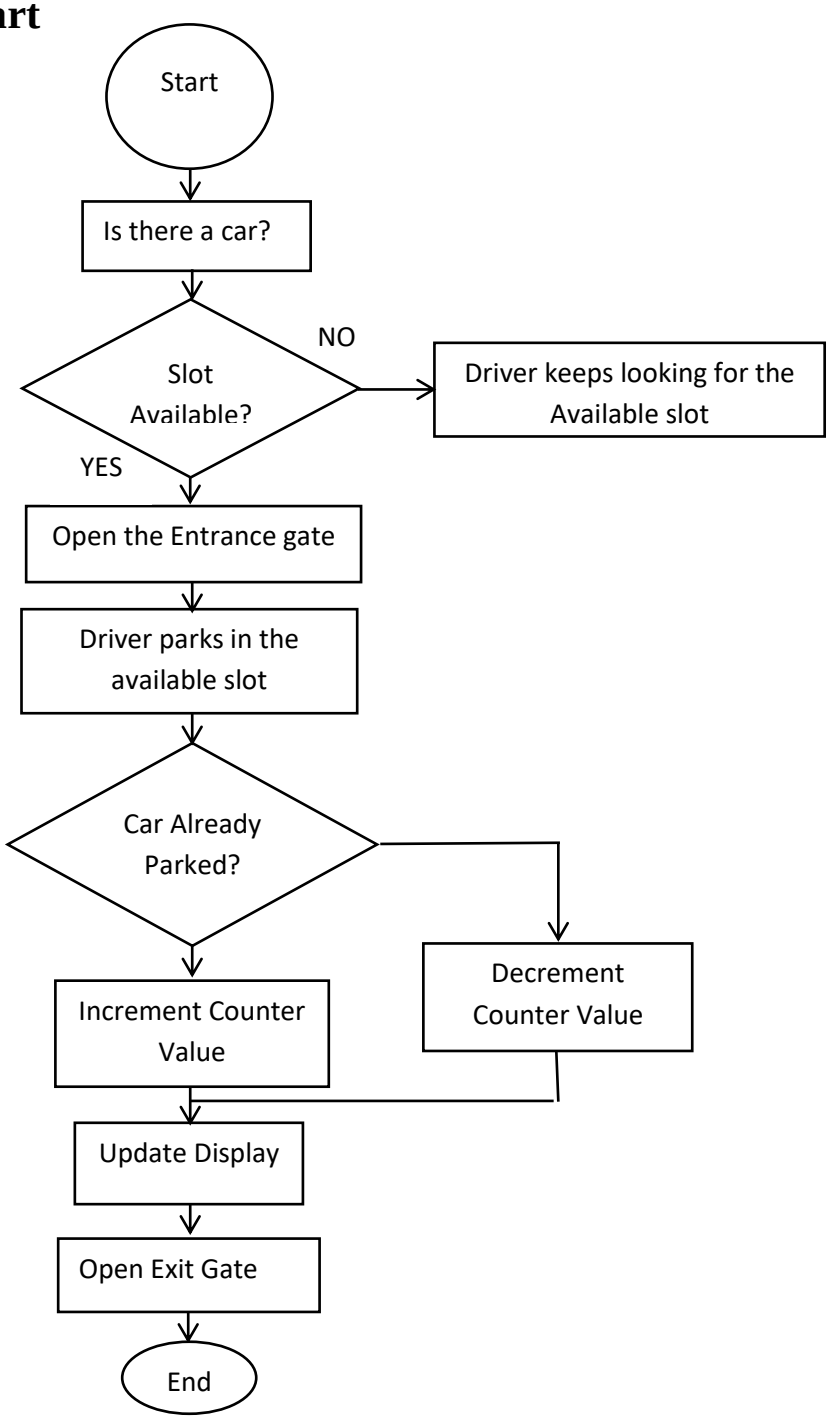

Fig. 4.2 Project Flowchart

Once the flowchart starts, there is a decision-making option first. The IR sensor of gate will detect whether any car is available at the gate. If a car is available, it will go to the next step and if a car is not available, it will go back to the start. If the slot is available, the gate will open automatically and if not, the gate will not open. However, the driver is looking for. Then the driver will be able to park in the available slot. Then if the car is already parked, the number of cars will increase and if the car leaves the park, the number of cars will decrease. Then the gate will open and all the outputs will be displayed. Then go to the end option and all the activities will end.

4.4 Hardware Connection Schematic

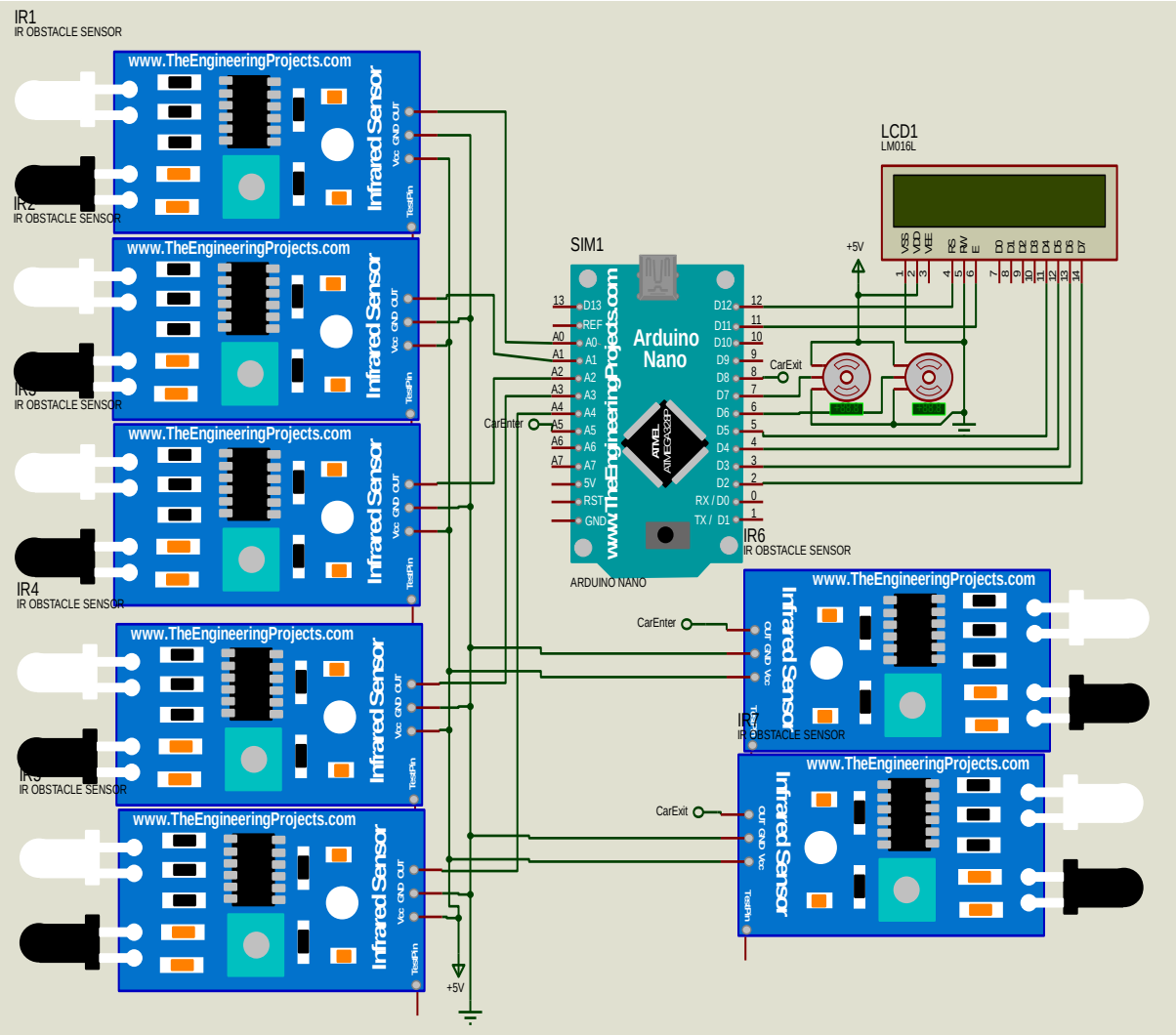

Figure.4.3 Schematic for digital car parking system.

A number of components have been used in the circuit, notably the IR sensor, the Arduino Nano and the LCD display. Seven IR sensors have been used that are connected to the Arduino Nano. Two IR sensors are used for exit and entrance gates and five IR sensors are used for slots. IR sensor has three pins like one ground, one VCC pin and the other output pin. These three pins are connected to the Arduino Nano. Objects are usually detected through these sensors. Two servo motors have been used at the exit and the entrance gate. Through which the gate is automatically opened and closed. A total of three pins of the servo motor. One ground pin, one VCC and the other control. These three pins are connected to the Arduino Nano. A 2*16 LCD display is used in the circuit where all the outputs are shown. The display has four data pins, VCC pins, ground pin and RW, etc. connected to the Arduino Nano. The condition of the entrance and exit, the condition of the slot available are all shown on the display.

4.5 Summary of the chapter

After complete al the errand as per this part our deice will prepared to play out the fundamental basic thing of this section to fabricate the calculation that we utilized in our gadget. Along these lines, the principle object of this section was to comprehend the algorithm and the connection outline that we utilized in our device.

CHAPTER 5

RESULTS AND DISCUSSIONS

5.1 Introduction

In this part will be present all the outcomes and estimation and significant discussions. After completing the task, we run investigate the Digital Car Parking. During the effectively try period we become an end on Digital Car Parking.

5.2 Final Result

The digital parking system is made up of three major components: an Arduino Nano, a servo motor, and a parking sensor. The microcontroller and Arduino Nano, both of which are utilized by the ArduinoIDE programming language, are the system's most notable features. The number of parking spots is displayed on the LCD. Using the module IR sensor and an Arduino command, enhance the technique to open it. LCD When the Arduino receives the signal from the IR sensor module, the DC motor assists in opening the door, however the Arduino will only receive the signal from the IR sensor module when using the code provided by. At the exit, there should be a parking attendant. The IR sensor module is used by the user to update the channel information on the LCD at the door.

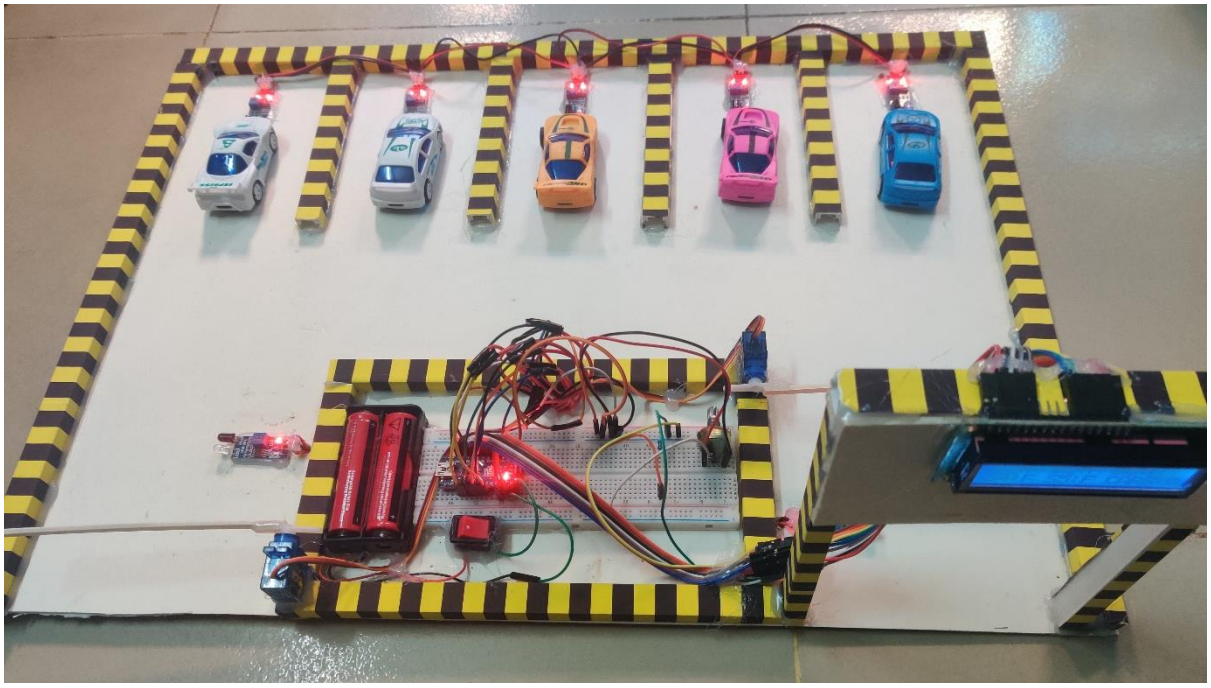

Fig. 5.1 Front side of Output Result

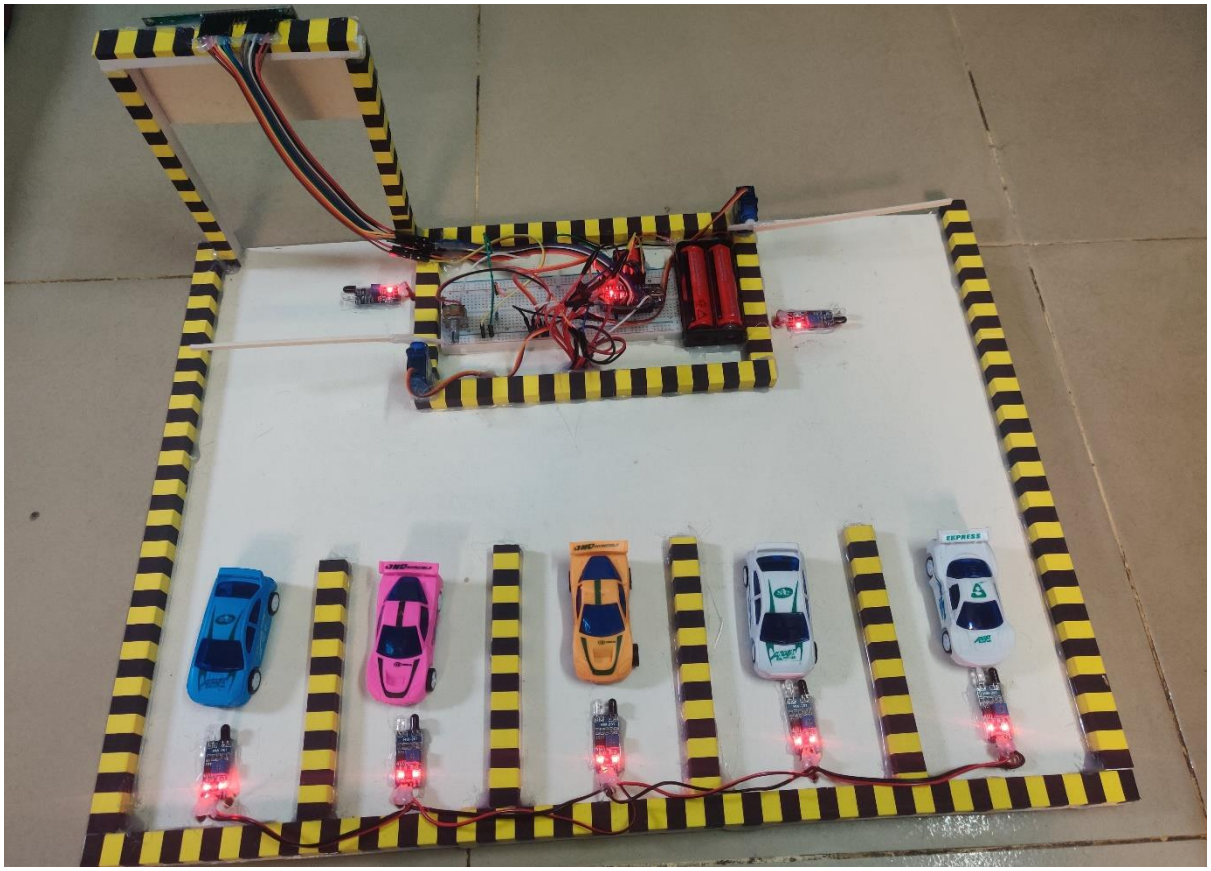

Fig. 5.2 Back side of output result

Fig. 5.3 Top side of output result

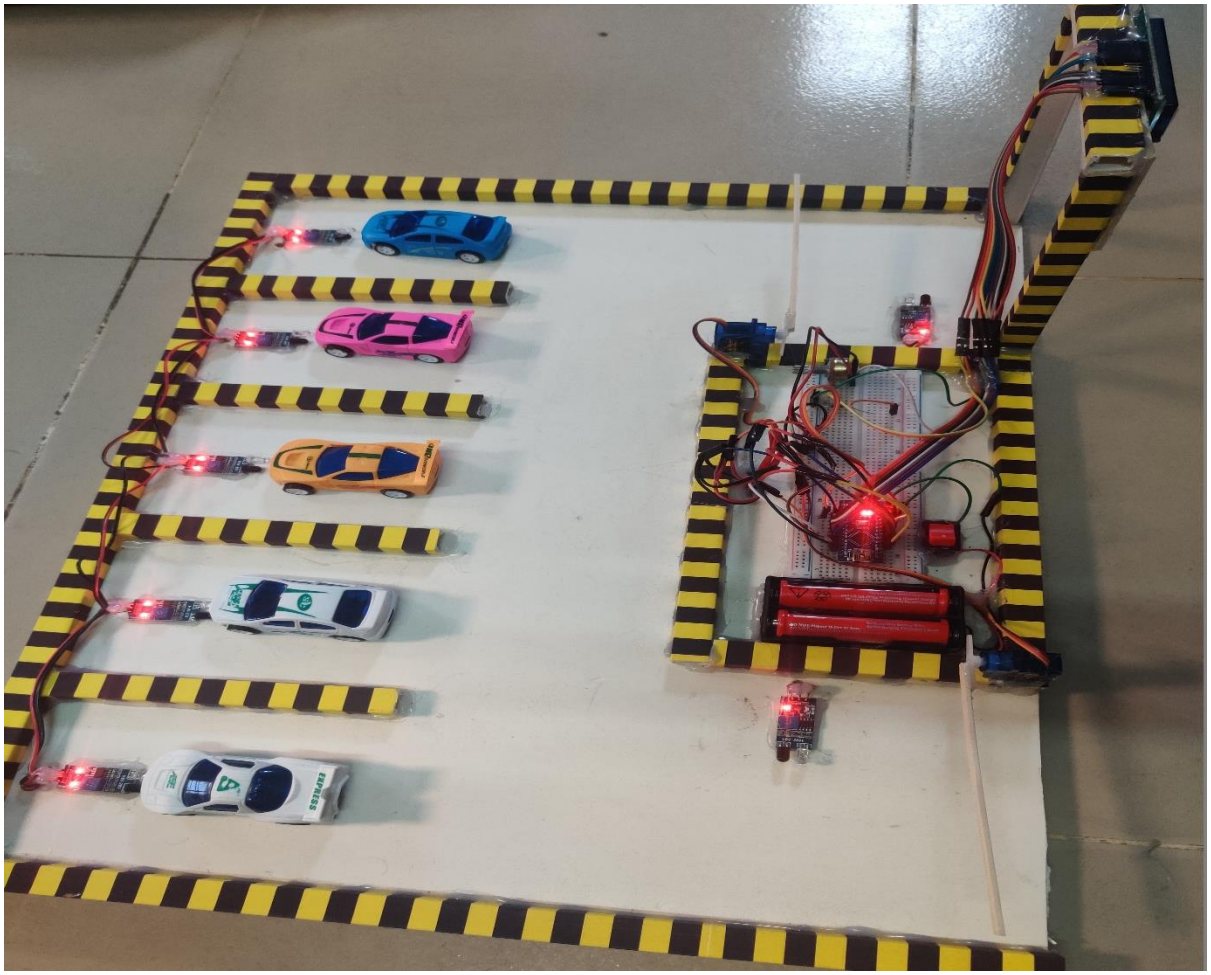

Fig. 5.4 left side of output result

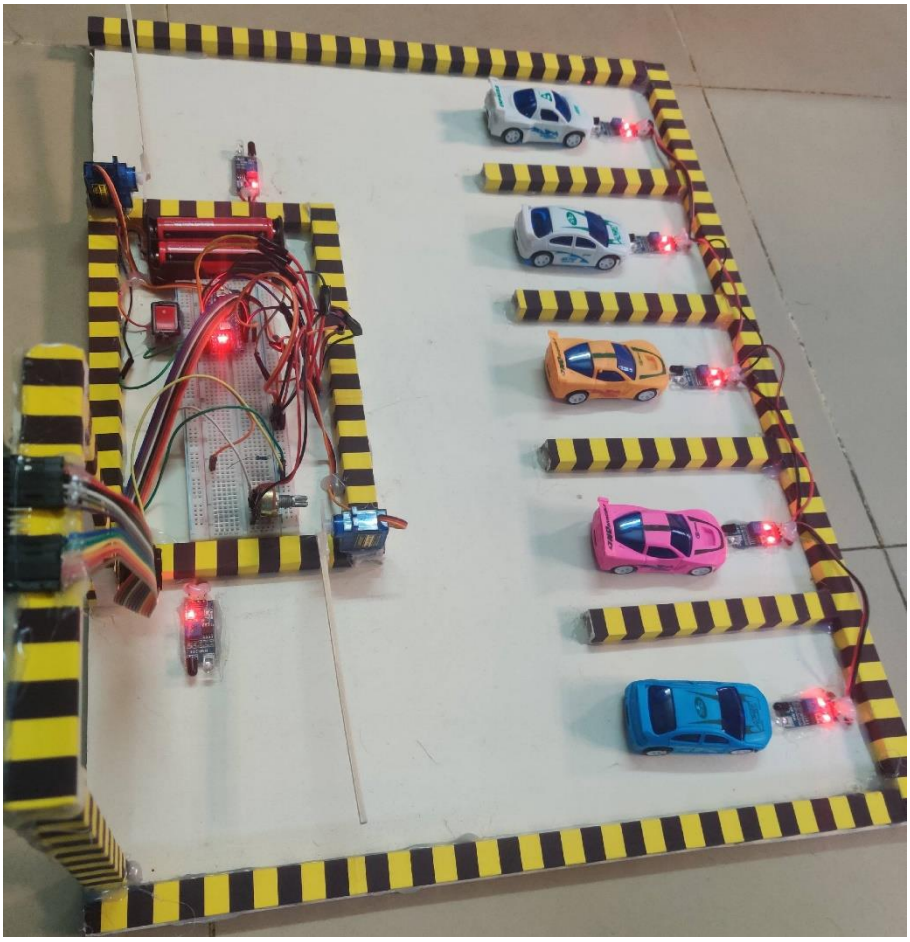

Fig. 5.5 Right side of output result

5.3 Discussion

The system can be victimized at all places founder from worker to the postindustrial sectors. The simplicity in the utilization of line helps it to be victimized by a plumping determine of people, because fill with little knowledge of instrumentality can also use it without coat any job. This Automated car parking method enables the parking of vehicles and thusly reduces the reading assumed to stop the location to be misused by displaying the mar where the area for parking is gettable on an LCD representation by using IR sensors at the entry.

5.4 Summary

In this chapter has discussed the result and discussion. With our project, we became fruitful to demonstrate with regarding the objectives of the project. At last, finishing this chapter the task is prepared to use. We briefly discuss and show the result of our experiment.

CHAPTER 6
CONCLUSIONS

6.1 Conclusion

Our project guarantees to discover free parking areas for public. When parking area is discovered to be unfilled it is distinguished utilizing ultrasonic sensors which report it further. We accomplished this by programming the sensors and Arduino. Pushing the information to page gives us plain yield which shows accessibility of parking places. The task focuses on quick outcomes so anybody can undoubtedly discover place for parking and save time in doing as such. As Arduino is the most recent innovation, utilizing it offers uniqueness to our project.

6.2 Limitations of the Work

The device requires excessive protection as every sensor need to work exact to grant effectively in working. High energy dissipation is recorded thru every sensor.

6.3 Future Scopes

a. The automatic parking fee system would allow grouping to distance without currency. It provides drivers with Also, as it would restrain the trait 2nd, long queues, antagonism, template and activity the efficiency of the parking plot.

b. The canny parking management method can be applied for skim and ship and fleet management.

c. For residential and housewifely parking grouping the maneuver can be interfaced with Domicile Mechanization method which can interact the varied residence appliances by sensing whether the human is inbound or departing from the parking space.

References

[1] Fariza Norbaya R. Yusnita and Norazwinawati Basharuddin. Intelligent parking space detection system based on image processing. International Journal of Innovation, Management and Technology, 3(3), June 2012

[2] D. Sorna Shanthi K. K. Dhivyabharathi. Appearance based approach car parking slot detecting system with android application. International Journal of Advanced Research in Computer Engineering and Technology (IJARCET), 4(3), March 2015.

[3] Muhamad Abdul Shukur B Othman, "Smart Parking System," Tesis, UTHM, 2007/2008.

[4] Nandyal, S., Sultana, S., & Anjum, S. Smart Car Parking System using Arduino UNO

[5] https://components101.com/microcontrollers/arduino-nano

[6] https://www.thingbits.in/products/standard-lcd-16x2-display

[7] https://microcontrollerslab.com/infrared-obstacles-avoidance-sensor-module-interfacing-with-pic-microcontroller/

[8] https://www.irjet.net/archives/V6/i3/IRJET-V6I3805.pdf

APPENDIX

```
#include <LiquidCrystal.h>
#include <Servo.h>
const int rs = 2, en = 3, d4 = 4, d5 = 5, d6 = 6, d7 = 7;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

int pk1 = A0;
int pk2 = A1;
int pk3 = A2;
int pk4 = A3;
int pk5 = A4;

int parking1;
int parking2;
int parking3;
int parking4;
int parking5;

int led1 = 12;

Servo myservo;                  //servo as gate
Servo myservos;                 //servo as gate
int EnterServoPin = 8;
int ExitServoPin = 9;

int countYes = 0;
int carEnter = A5;              // entry sensor
int carExited = 10;             //exi sensor
int pos;
int pos1;
```

```
int ldr = A7;
int ldrLed = 13;

void setup() {
  Serial.begin(9600);
  lcd.begin(16, 2);
  lcd.print("Starting...");
  delay(2000);
  lcd.setCursor(0, 0);
  lcd.print("Digital Car");
  lcd.setCursor(0, 1);
  lcd.print("Parking System");
  delay(2000);

  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Presented by");
  lcd.setCursor(0, 1);
  lcd.print("Lokman Shah");
  delay(2000);

  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Md. Siam Rahman");
  delay(2000);
  lcd.clear();

  lcd.setCursor(0, 0);
  lcd.print("Supervisor");
  lcd.setCursor(0, 1);
  lcd.print("Md Rahatul Islam");
  delay(2000);
```

```
  lcd.clear();

  pinMode(pk1, INPUT);
  pinMode(pk2, INPUT);
  pinMode(pk3, INPUT);
  pinMode(pk4, INPUT);
  pinMode(pk5, INPUT);

  pinMode(led1, OUTPUT);
  pinMode(ldr, OUTPUT);
  pinMode(ldrLed, OUTPUT);
  pinMode(EnterServoPin, OUTPUT);
  pinMode(ExitServoPin, OUTPUT);
  digitalWrite(EnterServoPin, LOW);
  digitalWrite(ExitServoPin, LOW);

  myservo.attach(ExitServoPin);      // servo pin to D6
  myservos.attach(EnterServoPin);       // servo pin to D7
  pinMode(carExited, INPUT);    // ir as input
  pinMode(carEnter, INPUT);     // ir as input
  myservo.write(0);
  myservos.write(0);
  delay(5);
}

void loop() {

  int ldrValue = analogRead(ldr);
  // Serial.println(ldrValue);
  if (ldrValue >= 300)
  {
    digitalWrite(ldrLed, LOW);
```

```
}
else
{
  digitalWrite(ldrLed, HIGH);
}

int carEntry = digitalRead(carEnter);      // read ir input
if (carEntry == LOW) {                  // if high then count and send data
  countYes++;                          //increment count
  if (countYes >= 6)
  {
    countYes = 5;
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Car Full");
    lcd.setCursor(0, 1);
    lcd.print("Slot Unavailable");
    delay(3000);
    lcd.clear();
  }
  else
  {
    lcd.clear();
    digitalWrite(led1, HIGH);
    Serial.print("Car Entered = " ); Serial.println(countYes );
    lcd.setCursor(0, 0);
    lcd.print("Car Entered");

    for (pos = 0; pos <= 90; pos += 1) {       // change servo position
      // in steps of 1 degree
      myservos.write(pos);
      delay(5);
```

```
    }
    while (digitalRead(carEnter) == LOW);
    delay(3000);

    for (pos = 90; pos >= 0; pos -= 1) {       // change servo position
      myservos.write(pos);
      delay(5);
    }
    digitalWrite(led1, LOW);
    lcd.clear();
  }
}

 int carExit = digitalRead(carExited);            //read exit ir sensor
 if (carExit == LOW) {                      //if high then count and send
  countYes--;                             //decrement count
  if (countYes <= -1)
  {
    countYes = 0;
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("No Car");
    delay(3000);
    lcd.clear();
  }
  else
  {
    digitalWrite(led1, HIGH);
    lcd.clear();
    Serial.print("Car Exited = " ); Serial.println(countYes);
    lcd.setCursor(0, 0);
    lcd.print("Car Exited");
```

```
    for (pos1 = 0; pos1 <= 90; pos1 += 1) {          // change servo position
      // in steps of 1 degree
      myservo.write(pos1);
      delay(5);
    }
    while (digitalRead(carExited) == LOW);
    delay(3000);

    for (pos1 = 90; pos1 >= 0; pos1 -= 1) {        // change servo position
      myservo.write(pos1);
      delay(5);
    }
    lcd.clear();
    digitalWrite(led1, LOW);
  }
}

 //First Slot Checking
 parking1 = digitalRead(pk1);
 if (parking1 == LOW)
 {
   lcd.setCursor(0, 0);
   lcd.print("S1:F");
   //Serial.println("Slot1");

 } else {
   lcd.setCursor(0, 0);
   lcd.print("S1:E");
 }
 delay(100);

 //Second Slot Checking
```

```
parking2 = digitalRead(pk2);
if (parking2 == LOW)
{
  lcd.setCursor(5, 0);
  lcd.print("S2:F");
  //Serial.println("Slot2");

} else {
  lcd.setCursor(5, 0);
  lcd.print("S2:E");

}
delay(100);

//Third Slot Checking
parking3 = digitalRead(pk3);
if (parking3 == LOW)
{

  lcd.setCursor(10, 0);
  lcd.print("S3:F");
  //Serial.println("Slot3");

} else {
  lcd.setCursor(10, 0);
  lcd.print("S3:E");

}
delay(100);
//Fourth Slot Checking
parking4 = digitalRead(pk4);
if (parking4 == LOW)
```

```
 {
   lcd.setCursor(0, 1);
   lcd.print("S4:F");
   //Serial.println("Slot4");

 } else {
   lcd.setCursor(0, 1);
   lcd.print("S4:E");

 }
 delay(100);

 //Fifth Slot Checking
 parking5 = digitalRead(pk5);
 if (parking5 == LOW)
 {
   lcd.setCursor(5, 1);
   lcd.print("S5:F");
   //Serial.println("Slot5");

 } else {
   lcd.setCursor(5, 1);
   lcd.print("S5:E");
 }
 delay(100);
 lcd.setCursor(10, 1);
 lcd.print("CARS:");
 lcd.print(countYes);
}
```