MINI-PROJECT REPORT

AUTOMATIC CAR PARKING SYSTEM USING ARDUINO

BE-ECE II/IV MINIPROJECT 2021-22

ECE-C

D. Ajay	1602-20-735-122
R. Sanjana	1602-20-735-157
S. Sathwika	1602-20-735-159

Content:

Introduction:

In the 21st century finding a free car parking slot has become a mind-numbing process, especially for people who travel in the morning to work or are following their daily routine, they find it highly difficult and challenging to get a parking slot for their cars. Moreover, the parking slots are never user-friendly and provide no logical data about the availability of the spot unless the user visits it manually.

These kind of problems are faced regularly by every individual because the factor of uncertainty is very high and there are not many possible solutions in existence for solving the issue that may benefit the users by saving their time or keeping their mental state happy and carefree.

In our ever populating cities and districts to find parking space is becoming increasingly difficult as traffic increases. Drivers have to go back and forth desperately looking for parking spaces wasting their valuable time, fuel consumption with increased likelihood of causing accidents. With the help of wireless network technology we propose remote parking monitoring and automated guidance which will help save a lot of time.

In the existing system we can see that some supervision is required for the parking system and it not fully automated. The driver has to make sure that the car is parked in a spot without disturbing the convenience of others. In most cases the main problem is finding the spot and trying to secure the spot for parking which in turn leads to increased stress level for the person driving the car.

Moreover, the relative analysis of the data is structural to the implementation of the parking procedure. Nowadays, in this busy world it's really hard for a person to find a spot for parking. The current parking system doesn't give the user a specified parking slot inside the area. Parking in general in a long and time-consuming process and we hope to provide a solution to alleviate this problem.

Literature survey:

A smart parking system, where drivers can view, select, and book available parking before arriving at the parking lot. Reservations in advance save 3-5 seconds, which will reduce the queue at the entrance. CCTV cameras are used to monitor parking areas and are accessible to drivers, with the proposed system allowing drivers to be confidence about available parking before arriving at their destination. The dedicated CCTV network produces less than 300ms of video streaming that provides real-time monitoring for users. (Andriana etal., 2018) [3]. Main programming used here are PHP7, database MySQL and web serverApache2.The use of Internet of Things (IoT) in the parking lot will help vehicle users become aware of the availability of parking via smartphones. This IoT-based parking system is created by using controllers, sensors, servers and cloud Controllers and sensors will be placed on the ceiling of each parking slot to detect the presence of a car. The server collects the sensor results and stores them in the Cloud. System test is performed by installing three sensors and server in the parking lot. This test consists of the measurement time required for data transmission and the success rate of data transmission from parking lot to the Cloud. Based on the above tests, it is noted that the sensor circuit and Radio Frequency Identification (RFID) can transmit parking lot data without error. The parking lot data transfer accuracy rate is 100 %.

HARDWARE DESCRIPTION:

1. **ARDUINO UNO**
2. **IR PROXIMITY SENSOR**
3. **16X2 LCD I2C**
4. **BREADBOARD**
5. **SERVO MOTOR**
6. **JUMPER WIRES**
7. **USB A-B CABLE**

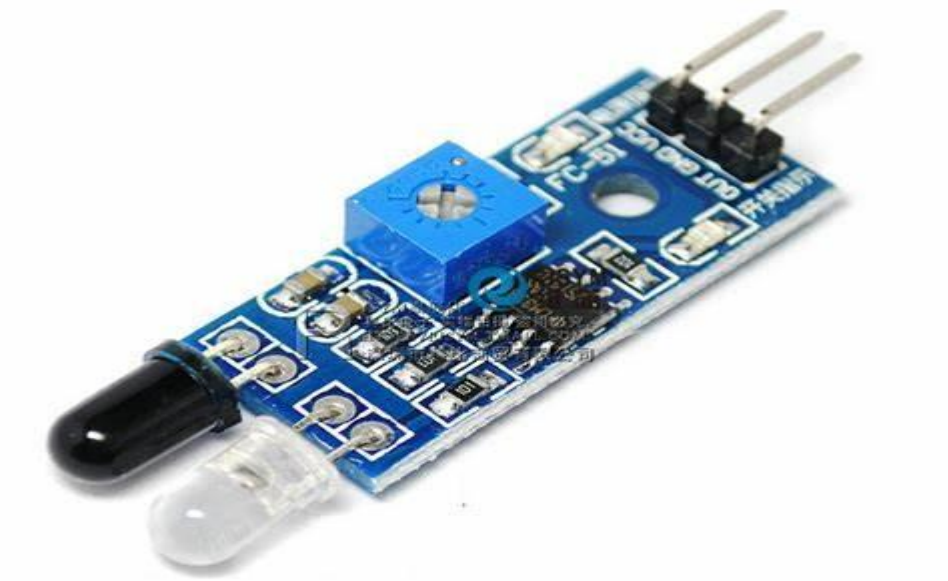
ARDUINO UNO:

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.

IR PROXIMITY SENSOR:

This IR Proximity Sensor is a multipurpose infrared sensor which can be used for obstacle sensing, color detection, fire detection, line sensing, etc and also as an encoder sensor. The sensor provides a digital output.

Active infrared sensors work with radar technology and they both emit and receive infrared radiation. This radiation hits the objects nearby and bounces back to the receiver of the device. Through this technology, the sensor can not only detect movement in an environment but also how far the object is from the device.

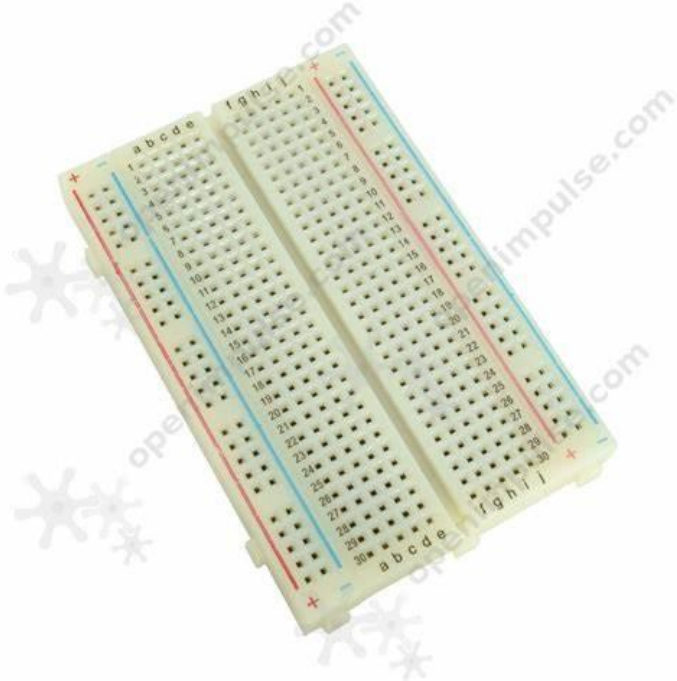


16X2 LCD I2C:

This I2C 16x2 Arduino LCD Screen is using an I2C communication interface. It means it only needs 4 pins for the LCD display: VCC, GND, SDA, SCL. It will save at least 4 digital/analog pins on Arduino. All connectors are standard XH2. 54 (Breadboard type). I2C is short for Inter-IC. And it is a type of BUS. This is designed by Philips semiconductors. I2C is a synchronous, multi slave, multi master packet switched, single-ended serial bus. ie. multiple chips can be connect to the same bus.I2C uses only two bidirectional open collector or open drain lines, Serial Data Line (SDA) and Serial Clock Line (SCL), pulled up with resistors

BREADBOARD:

Breadboards are temporary work boards for electronic circuits. The general shape of a breadboard is shown in Fig. 6.3. Compatible with most breadboards, 24-gauge wire is used to connect circuits; solid wire, not stranded. Sometimes, kits may be available with various colors of fixed lengths to specifically fit breadboards. These are a nice convenience.



SERVO MOTOR:

A servomotor (or servo motor) is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration.[1] It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.

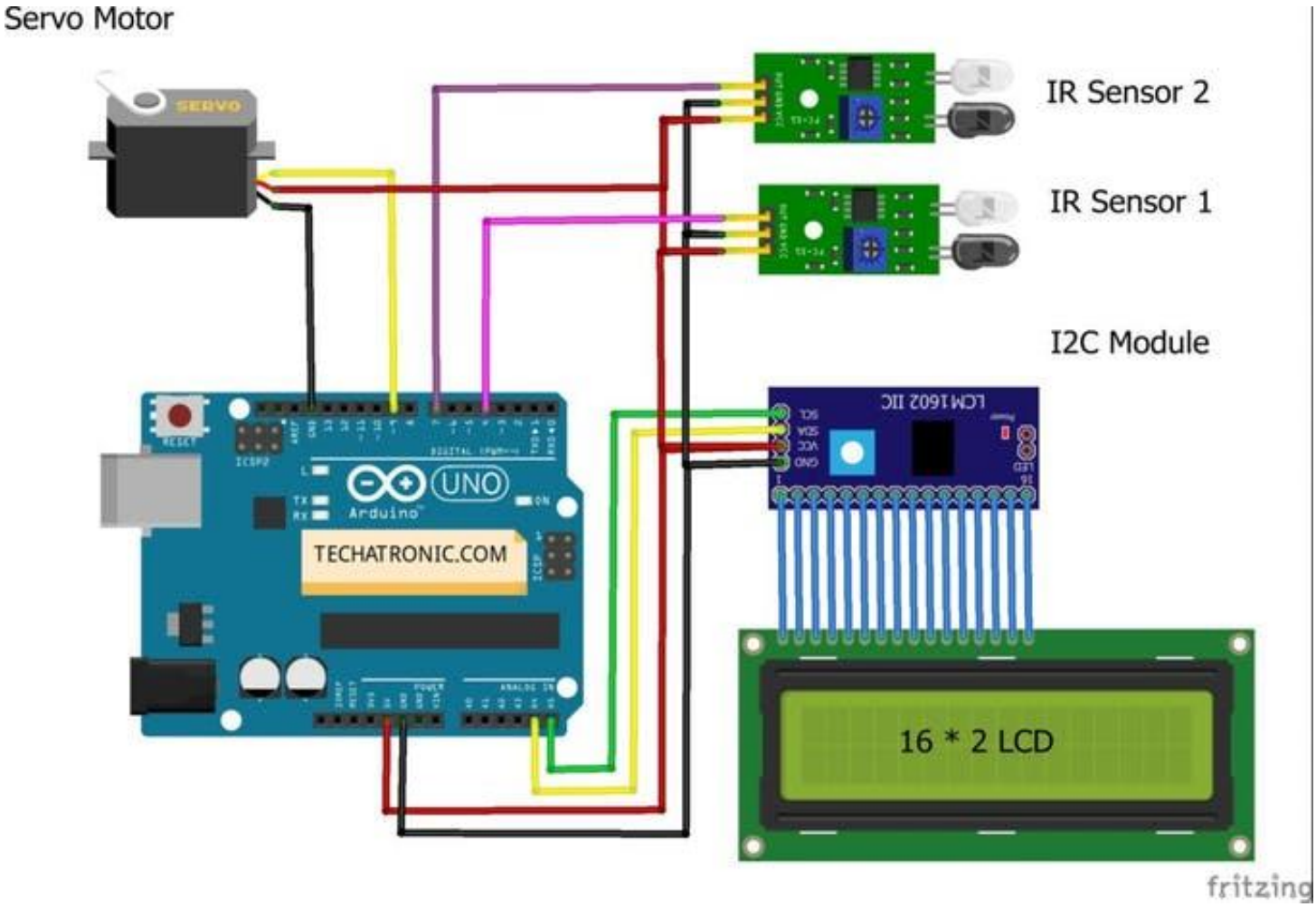
JUMPER WIRES:

A jump wire (also known as jumper, jumper wire, DuPont wire) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

USB A TO B CABLE:

The staple of any USB connection, the DataPro USB A to B cable connects any standard host device (computer, hub, or controller) to any standard peripheral (printer, scanner, external drive).

CIRCUIT DIAGRAM:



CODE:

```
#include <Wire.h>
 #include <LiquidCrystal_I2C.h>
 LiquidCrystal_I2C lcd(0x27,16,2);
 #include <Servo.h>
 Servo myservo1;
 int IR1 = 4; // IR Sensor 1
 int IR2 = 7; // IR Sensor 2
 int Slot = 4;      //Enter Total number of parking Slots
 int flag1 = 0;
 int flag2 = 0;
 void setup()
 {
  lcd.init();
  lcd.backlight();
 pinMode(IR1, INPUT);
 pinMode(IR2, INPUT);
 myservo1.attach(9);
 myservo1.write(100);
 lcd.setCursor (0,0);
 lcd.print("   ARDUINO  ");
 lcd.setCursor (0,1);
```

```
lcd.print(" PARKING SYSTEM ");
delay (2000);
lcd.clear();
}
void loop(){
if(digitalRead (IR1) == LOW && flag1==0){
if(Slot>0){flag1=1;
if(flag2==0){myservo1.write(0); Slot = Slot-1;}
}else{
lcd.setCursor (0,0);
lcd.print("  SORRY :(  ");
lcd.setCursor (0,1);
lcd.print(" Parking Full ");
delay (3000);
lcd.clear();
}
}
if(digitalRead (IR2) == LOW && flag2==0){flag2=1;
if(flag1==0){myservo1.write(0); Slot = Slot+1;}
}
if(flag1==1 && flag2==1){
delay (1000);
myservo1.write(100);
```

```
flag1=0, flag2=0;

}

lcd.setCursor (0,0);

lcd.print("  WELCOME!  ");

lcd.setCursor (0,1);

lcd.print("Slot Left: ");

lcd.print(Slot);

}
```

ADVANTAGES:

* There is a greater sense of security due to the fact that patrons do not actually walk to and from their own space.

* It is highly feasible for extremely small sites that are unable to accommodate a conventional ramped parking structure.

* There is high parking efficiency (i.e. sf/space and cf/space).

* There is no need for driving while looking for an available space.

* Emissions are greatly brought down and reduced.

* The patrons wait for their car in a highly controlled environment.

* There are less chances for vehicle vandalism.

* There is a minimal staff requirement if it is used by known parkers.

* It is possible that the retrieval time is lower than the combined driving/parking/walking time in conventional ramped parking structures.

* There is an easier facade integration since there are no ramping floors or openings in exterior walls.

APPLICATIONS:

- Used for parking system in any place.
- Shopping malls
- Commercial office
- Visitors place
- Railway stations
- Bus stops
- Theaters

FUTURE SCOPE:

The Automatic parking system based on Slot availability is implemented using the hardware application. Using the slot availability method we can check the number of parking slot available. It is an efficient one for solving parking problems, which overcomes the traffic congestion also provides automated billing process. This work could be further extended as a fully automated system using multilayer parking method. Safety measures such as tracing the vehicle number face recognition of the drivers so as to avoid theft & automatic billing process can also be designed. We plan to expand the tests on the real time environment where the users can have the "Automatic Parking" system in their handheld devices.

Conclusion:

The main reason for parking systems is there is a lack of parking spaces in metropolitan cities. This due to the cities was developed a long time back when cars were considered a luxury. But due to various factors, cars have moved from a luxury owned by 1% to a necessity that the medium class owns, which is around 40% to 60%. Hence traditional parking solutions would not hold today.

REFERNCES:

Automatic car parking system project Using Arduino - Arduino Project Hub

(550) Arduino Car Parking System - YouTube

Tajudeen Olawale Olasupo, Member, IEEE, Carlos En- rique Otero, Senior Member, IEEE,Luis Daniel Otero, Senior Member, IEEE, Kehinde Olumide Olasupo, Member, IEEE, and Ivica Kostanic "Path Loss Models for Low-Power, Low- Data RateSensor Nodes for Smart Car Parking Systems" in IEEE Journals