

# **SMART PARKING SYSTEM**

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## **BONAFIDE CERTIFICATE**

Certified that this project report entitled SMART PARKING SYSTEM is a bonafide work of Vishnu Menon (20BCE1572), Sriharan R (20BCE1767) and Mohan Ram (20BCE1742) who carried out the Project work under my supervision and guidance for **CSE2006-MICROPROCESSOR AND INTERFACING.**

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## ABSTRACT

The main objective of our project is to reduce traffic in parking place. Normally we can see in the multiplexes, cinema halls, large industries, and function halls there is problem they have to go and search which slot is empty and which slot is free, for parking then they need workers to lead them to correct free slots which is a money consumed process. So, to avoid this problem Parking Management System project is implemented.

In this project we have to used Arduino Uno R3, LCD 16 x 2, 10 k $\Omega$  Potentiometer, 10 k $\Omega$  Potentiometer, Ultrasonic Distance Sensors, and a 600  $\Omega$  Resistor. The Ultrasonic Distance Sensors are used to detect any cars approaching the parking lot and to check whether if there are any cars parked in the slots.

Allocation of slots is starting from layer one in a sequential manner done by the Arduino system. This system handles users with the same platform in an one after another manner.

## ACKNOWLEDGEMENT

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We thank our parents, family, and friends for bearing with us throughout the course of our project and for the opportunity they provided us in undergoing this course in such a prestigious institution.

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## **1. INTRODUCTION**

### **1.1 OBJECTIVES AND GOALS**

- Design a working circuit for smart parking system.
- The goal is to make parking of vehicles hassle free and less time consuming.
- Drivers find a free parking space faster, which reduces congestion and various other negative externalities.

### **1.2 APPLICATIONS**

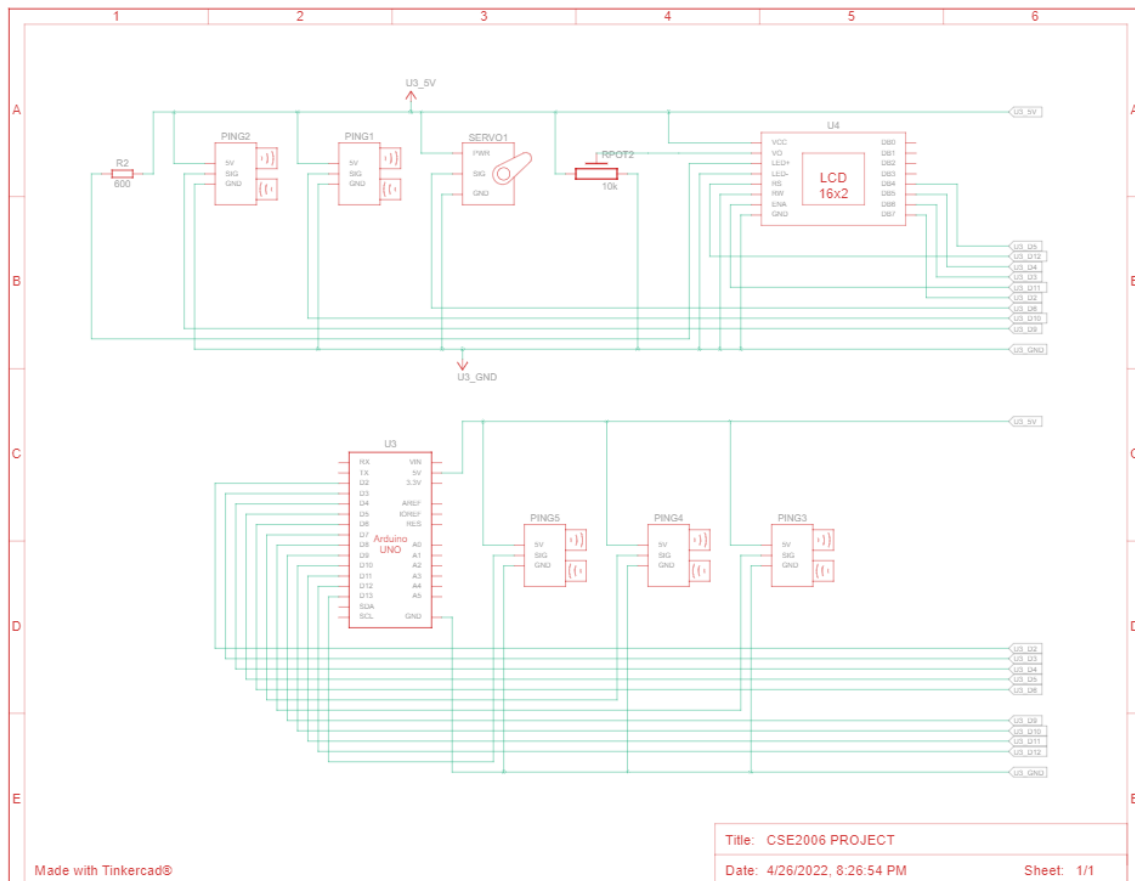
- This system can be used in malls, restaurants, residential buildings, etc.
- It gives real-time car parking information such as vehicle & slot counts, available slots display.

### **1.3 FEATURES**

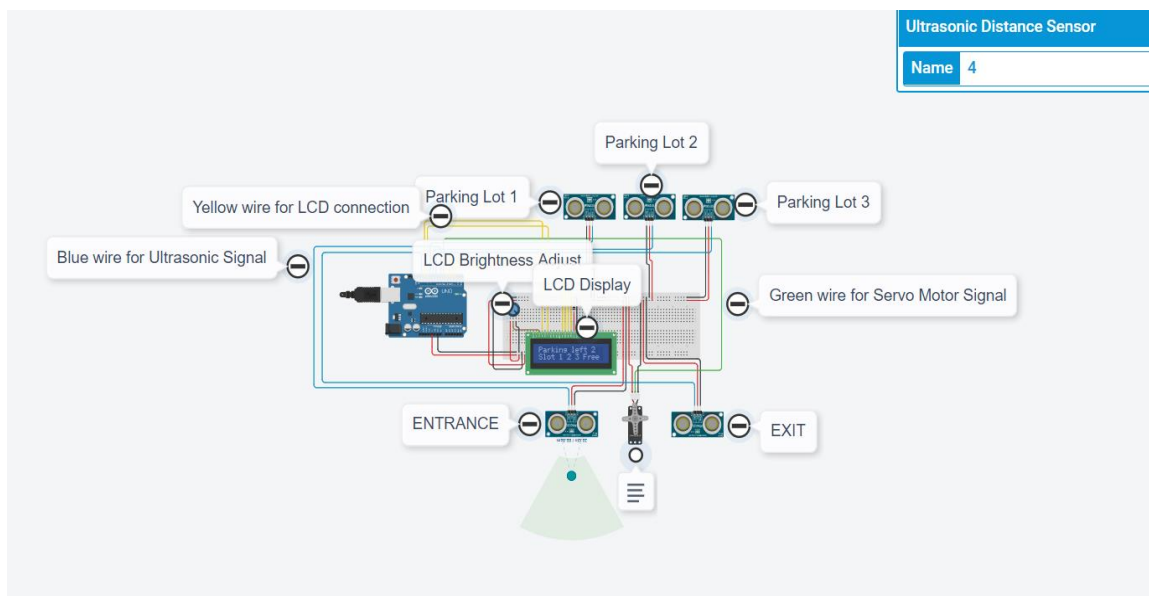
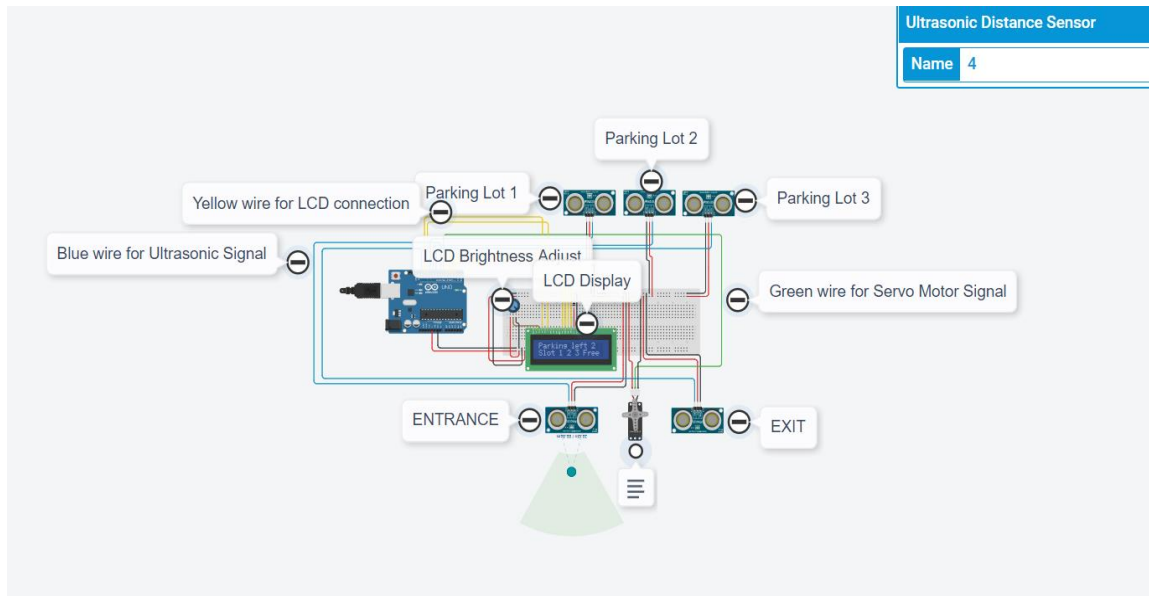
- This system will keep track of the number of vehicles entering and exiting the venue.
- It will also keep track of the number of empty parking spaces left and inform the user of the same.

## 2. DESIGN

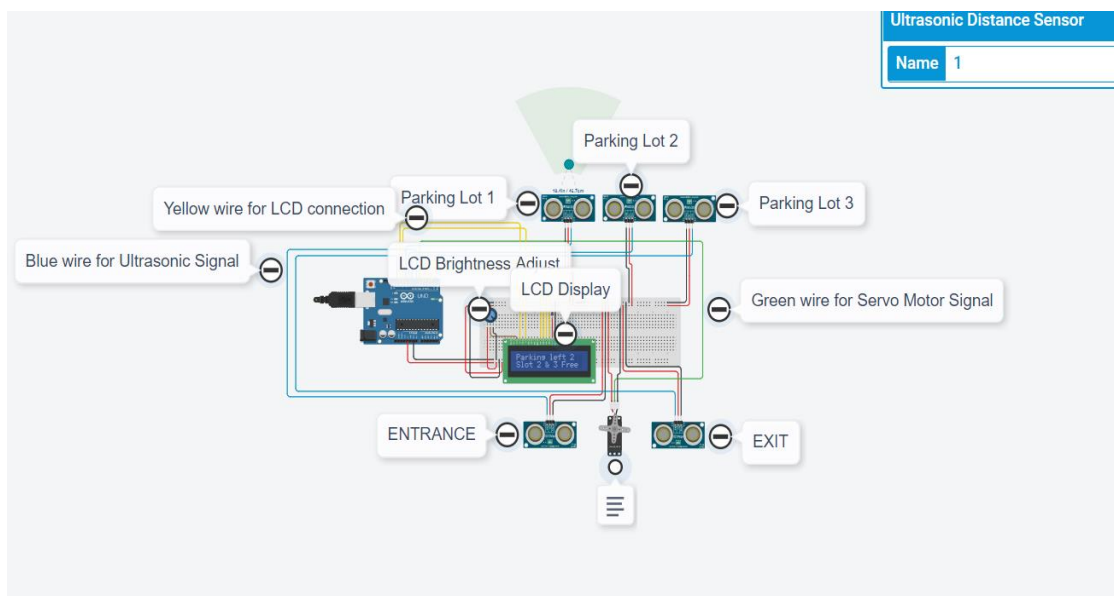
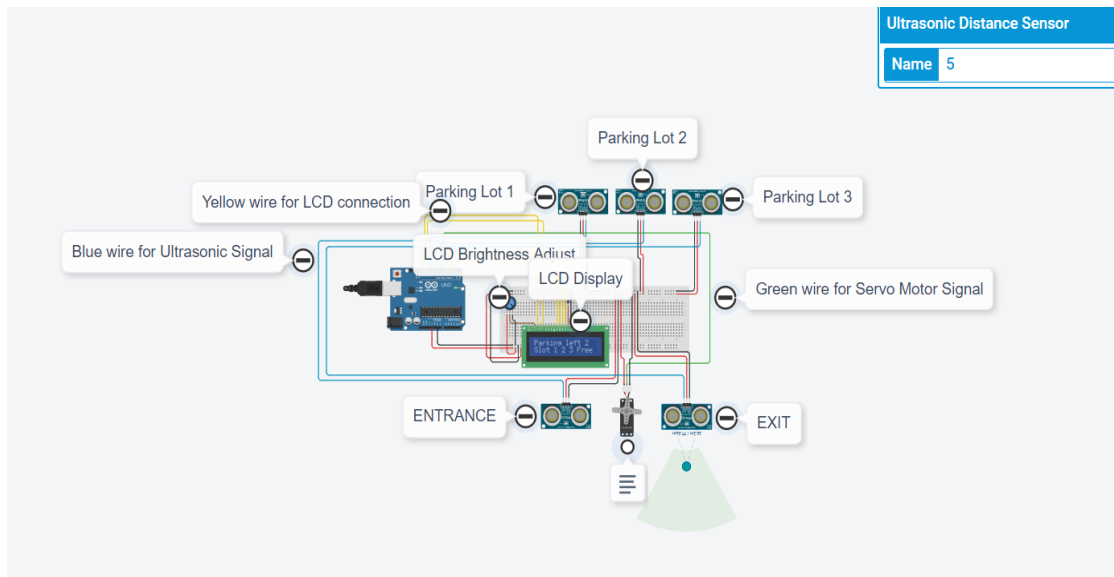
### 2.1 BLOCK DIAGRAM



## 2.2 SNAPSHOTS







## 3. SOFTWARE

### 3.1 CODING AND ANALYSIS

---

```
1  #include <Servo.h>
2
3  #include <LiquidCrystal.h>
4  LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
5
6  #define t1 10
7  #define t2 9
8  #define t3 8
9  #define t4 7
10 #define t5 13
11
12 Servo myservo;
13
14 int distanceThreshold = 100;
15
16 int parkingAvailable = 3;
17 int barrierState = 0;
18
19 void setup() {
20     lcd.begin(16,2);
21     lcd.setCursor(0,0);
22     Serial.begin (9600);
23     myservo.attach(6);
24     myservo.write(0);
25 }
26
27 long readDistance(int triggerPin, int echoPin)
28 {
29     pinMode(triggerPin, OUTPUT);
30     digitalWrite(triggerPin, LOW);
31     delayMicroseconds(2);
32     digitalWrite(triggerPin, HIGH);
33     delayMicroseconds(10);
34     digitalWrite(triggerPin, LOW);
```

```

35   pinMode(echoPin, INPUT);
36   return pulseIn(echoPin, HIGH);
37 }
38
39
40 void loop()
41 {
42   float d1 = 0.01723 * readDistance(t1, t1);
43   float d2 = 0.01723 * readDistance(t2, t2);
44   float d3 = 0.01723 * readDistance(t3, t3);
45   float d4 = 0.01723 * readDistance(t4, t4);
46   float d5 = 0.01723 * readDistance(t5, t5);
47   //get all sensor readings in centimeters
48
49   Serial.println("d1 = " + String(d1) + "cm");
50   Serial.println("d2 = " + String(d2) + "cm");
51   Serial.println("d3 = " + String(d3) + "cm");
52   Serial.println("d4 = " + String(d4) + "cm");
53   Serial.println("d5 = " + String(d5) + "cm");
54
55   /* barrierState is used to ensure that the barrier either is
56   closed or open for enter or exit
57
58   So while barrierState is:
59   0   barrier is closed
60   -1  barrier is open for enter
61   1   barrier is open for exit
62   -2  barrier is closed after the vehicle passed the barrier gate (enter)
63   2   barrier is closed after the vehicle passed the barrier gate (exit)
64   */
65
66   if (barrierState == 0)
67   {
68     if (d4<100 && d5>=100 && parkingAvailable>0)
69     {

```

```
70     parkingAvailable -= 1;
71     barrierState = -1;
72     myservo.write(90);
73 }
74 if (d4>=100 && d5<100 && parkingAvailable<3)
75 {
76     parkingAvailable += 1;
77     barrierState = 1;
78     myservo.write(90);
79 }
80 }
81 else if (barrierState == -1)
82 {
83     if (d4>=100 && d5<100)
84     {
85         barrierState = -2;
86         myservo.write(0);
87     }
88 }
89 else if (barrierState == 1)
90 {
91     if (d5>=100 && d4<100)
92     {
93         barrierState = 2;
94         myservo.write(0);
95     }
96 }
97 else if (barrierState == -2)
98 {
99     if (d5>=100)
100     {
101         barrierState = 0;
102     }
103 }
104 else if (barrierState == 2)
```

```

105 {
106     if (d4>=100)
107     {
108         barrierState = 0;
109     }
110 }
111
112
113 //The command below is used to print out the information on the LCD Screen
114
115
116 lcd.setCursor(0,0);
117 if (parkingAvailable == 0)
118 {
119     lcd.print("Parking Full ");
120 }
121 else
122 {
123     lcd.print("Parking left ");
124     lcd.print(parkingAvailable);
125 }
126
127
128
129 if (d1>100 & d2>100 & d3>100)
130 {
131     lcd.setCursor(0,1);
132     lcd.print("Slot 1 2 3 Free");
133     delay(500);
134 }
135 else if((d1>100 & d2>100) | (d2>100 & d3>100) | (d3>100 & d1>100))
136 {
137     lcd.setCursor(0,1);
138     if(d1>100 & d2>100)
139         lcd.print("Slot 1 & 2 Free");
140
141     else if(d1>100 & d3>100)
142         lcd.print("Slot 1 & 3 Free");
143     else
144         lcd.print("Slot 2 & 3 Free");
145 }
146 else if(d1<100 & d2<100 & d3<100)
147 {
148     lcd.setCursor(0,1);
149     lcd.print("Parking Full ");
150 }
151 else if((d1<100 & d2<100) | (d2<100 & d3<100) | (d3<100 & d1<100))
152 {
153     lcd.setCursor(0,1);
154     if(d1>100)
155         lcd.print("Slot 1 is Free ");
156     else if (d2>100)
157         lcd.print("Slot 2 is Free ");
158     else
159         lcd.print("Slot 3 is Free ");
160 }
161 delay(100);

```

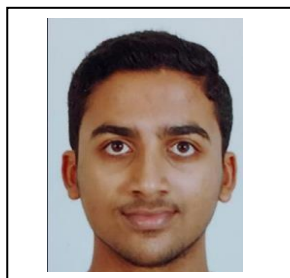
## **4. CONCLUSION**

Adopting parking management system significantly reduces the amount of time consumed in seeking the parking space, renders valuable data upon the availability of the parking area, accurate mapping of the parking space, offers guidance and suggestion for proper vehicle parking. The implementation of the right parking management system is a great investment. It will save costs, time and energy. In addition, our parking management system guarantees that your parking facility will work far more efficiently.

## **5. REFERENCES**

1. <https://microcontrollerslab.com/parking-management-system-microcontroller/>
2. <https://create.arduino.cc/projecthub/electronicprojects/automatic-car-parking-system-project-using-arduino-ba2cb8>
3. <https://www.youtube.com/watch?v=iMAxv32NLeY>

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