GENERAL SIR JOHN KOTELAWALA DEFENSE UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE - SOFTWARE ENGINEERING

INTAKE 39

GROUP PROJECT IN HARDWARE – COE1993

GROUP 01

AUTOMATED RAILWAY GATE SYSTEM

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Contribution to the project

CODING

01)

```
bool isGateOpen = false;

int val_near1 =0;
int val_far1 =0;
int val_near2 =0;
int val_far2 =0;

// Set your access point network credentials
const char* ssid = "GG";
const char* password = "GG123456";

// Create AsyncWebServer object on port 80
AsyncWebServer server(80);

String readGate(){
  return String(isGateOpen);
}

void setup() {
  pinMode(ir_near1,INPUT);
  pinMode(ir_far1,INPUT);
  pinMode(ir_near2,INPUT);
  pinMode(ir_far2,INPUT);

  pinMode(D0, OUTPUT);
  // Serial port for debugging purposes
  Serial.begin(115200);
  Serial.println();

}
```

02)

```
isGateOpen = true;
    Serial.println("Gate Close");

    if(digitalRead(ir_far1) ==LOW){
    val_far1 = 1;
    }
    if(digitalRead(ir_near1) ==LOW){
      val_near1 = 1;
    }
    if(digitalRead(ir_far2) ==LOW){
```

```
    val_far2 = 1;
   }
   if(digitalRead(ir_near2) ==LOW){
    val_near2 = 1;
   }

   while((val_far1 == 1 && val_near1 == 1) && (val_far2 == 1 && val_near2 == 1)){
     Serial.println("Gate Open");
     val_far1 = 0;
     val_near1 = 0;
     val_far2 = 0;
     val_near2 = 0;
   }
```

03)

```
  // // default settings
  // // (you can also pass in a Wire library object like &Wire2)
  // status = bme.begin(0x76);
  // if (!status) {
  //  Serial.println("Could not find a valid BME280 sensor, check wiring!");
  //   while (1);
  // }

  // Start server
  server.begin();
}

void loop() {
  // put your main code here, to run repeatedly:
  // val_near = digitalRead(ir_near);
  // val_far = digitalRead(ir_far);
  // Serial.println(val_near);
  // Serial.println(val_far);
  digitalWrite(D0, HIGH);
  isGateOpen = false;

  if(digitalRead(ir_far1) ==LOW){
    val_far1 = 1;
  }
  if(digitalRead(ir_near1) ==LOW){
    val_near1 = 1;
  }
  if(digitalRead(ir_far2) ==LOW){
    val_far2 = 1;
  }
  if(digitalRead(ir_near2) ==LOW){
    val_near2 = 1;
  }
  Serial.print("Far 1 = ");
```

```
Serial.println(val_far1);
Serial.print("Near 1 = ");
Serial.println(val_near1);
Serial.print("Far 2 = ");
Serial.println(val_far2);
Serial.print("Near 2 = ");
Serial.println(val_near2);
delay(1000);

while((val_far1 == 1 && val_near1 == 1) || (val_far2 == 1 && val_near2 == 1)){


  digitalWrite(D0, LOW);

    // Setting the ESP as an access point
Serial.print("Setting AP…");
// // Remove the password parameter, if you want the AP (Access Point) to be open
WiFi.softAP(ssid, password);

IPAddress IP = WiFi.softAPIP();
Serial.print("AP IP address: ");
Serial.println(IP);

server.on("/gate", HTTP_GET, [](AsyncWebServerRequest *request){
  request->send_P(200, "text/plain", readGate().c_str());
});
bool status;

}
```

04)

I learned the basics of Arduino and got an idea about the different sensors and the libraries they use.

I learned how to connect IR sensors to the NodeMCU module.

I learned to link the Wifi modules through a local network.

I learned to develop a code and the logic through our requirements.

05)

We used NodeMCU Wifi modules to develop our automatic railway gate system and C to code Arduino not only cost effectively but also accurately. Therefore, we expect 15 marks for the software.

Contribution to the project

HARDWARE

01)

We used following components for the project.

- (ESP8266) NodeMCU Wifi modules
- IR sensors
- Servo motor
- Jumper wires
    - Male to Male
    - Male to Female
    - Female to Female
- Power Bank
- USB cables
- LEDs
- Bread boards

(We used the power bank as the power supply unit because that was easy to use and easy to recharge without additional cables and components)

I used.

- A Servo motor
- A (ESP8266) NodeMCU Wifi module
- LEDs
- Bread boards
- A USB cable
- Jumper wires

to develop the client circuit unit.

02)

While working with the team members I learned to connect sensors to the NodeMCU.

I learned about how the two NodeMCU modules transfer data among them.

I also got an idea about how to connect the LCD screen(tried to implement) to the Arduino by using all the 16 pins of it and also by the 4 pins by trying it.

Got an idea about the Arduino Uno board and the Mega board.

03)

In the project, the IR sensors will detecting the moving train for the both sides and generate a signal. According to the sensor inputs, the servo motor turning on /off and the black/red LEDs will light.

After the train passed the railway cross safely, the gates will automatically open.

04)

I developed the client circuit unit along with a team member and gave my ideas and helped to make it neater and more successful. So, I hope I deserve nearly 20 marks .

Other tasks I have done

01)

The research area of this project was huge.

We went through many research papers to get an idea about the other similar projects done by the other university students and the inventors.

Rather than the software and hardware development, I researched on the topics such as,

- The technologies other countries using.
- The new devices and sensors can be use.
- The main reasons and rates of the train accidents.
- The comparison of the railroad quality between the Sri Lanka and other countries.

I motivated the team as a member.

I managed the wire lines.

02)

I helped to create the decorations, rail tracks, buildings etc. which we used for the exhibition, to make the outcome more attractive.

I helped to plan the project model more cost efficient but understandable.

I created the presentation which we used for the exhibition.

I presented a part of our project to the lectures and the panel.

I explained and gave an idea about,

- the project
- the project background
- the project functionality

to our senior and junior undergraduates who participated for the exhibition.

03)

With considering my contribution from the researching and the commitment to success our project, I really expect full marks for this area of the project.