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SAFER SECURE SMART VEHICLE

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Abstract -This paper is fully based on the application of Internet-of-things (IoT) in monitoring the performance of the two-wheeler. we are using a number pattern lock system using arduino to unlock vehicle for security purpose of e-vehicle. It is also used to monitor and display the vehicle battery range and speed on the LCD. Ultrasonic sensors are used to sense the obstacles in front and sides of the vehicle It is clear that an electric vehicle totally depends on the source of energy from a battery.

***Key Words*:** Arduino UNO, raspberry pi 3b+, LCD, LED lights to avoid accident in obstacle detection, Ultra sonic sensor.

1.INTRODUCTION

The **Internet of things** (**IoT**) describes physical objects (or groups of such objects) that are embedded with sensors, processing ability, software, and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks. The field has evolved due to the convergence of multiple technologies, including ubiquitous computing, commodity sensors, increasingly powerful embedded systems, and machine learning. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation),independently and collectively enable the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", including devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers. The IoT can also be used in healthcare systems. There are a number of concerns about the risks in the growth of IoT technologies and products, especially in the areas of privacy and security, and consequently, industry and governmental moves to address these concerns have begun, including the development of international and local standards, guidelines, and regulatory frameworks. The Internet space, IPv6 will play a major role in handling the network layer scalability. IETF's Constrained Application Protocol, ZeroMQ, and MQTT would provide lightweight data transport.

2. SCOPE OF PROJECT

Implementing a new decentralized system .This is a unique method of designing and assembling a lowcost, compact theft control system for an automobile. The work presented demonstrates the initial phase of an embedded car that will be visible in near future. Customized vehicles will not only provide a more interesting drive but also safer one.This project is aimed at improving the security level.

3. MODULE DESCRIPTION

A. Digitalization: *[Unlocking a vehicle through number lock pattern]*

A 4-5digit number combination lock on the vehicles engine start panel, once correct code is entered you click in the locks side button then a panel will open behind the lock, push the ignition button to start your vehicle. After 3 times of Wrong pattern by strangers there will be an alert message to a user through mail.

B. Deduction Process: *[Indication of vehicle interruption]*

Distance measurement of an obstacle in the side of a moving vehicle is required in the current traffic scenario. To measure the distance from obstacle, ultrasonic sensors play a vital role. While vehicle interrupt there will be a indications through LED light (RED light on RIGHT and GREEN light on LEFT)

C. Motion Process: *[controlling the wheel speed depends upon the speed breaker or other obstacle in front]*

The Smart Speed breaker system with IOT which will be surfaced and will show up only if the vehicle speed is higher than permissible limits.
To control lift of the speed breaker Raspberrypi based board are preferred which triggers a motor for surfacing the speed breaker system, for real time control RTC circuit is used.

D.Battery Range: *[shows the vehicle power range and speed]*

Battery management system (BMS) is the crucial system in electric vehicle because batteries used in electric vehicle should not be get overcharged or over discharged. If that happens, it leads to the damage of the battery, rise in temperature, reducing

the life span of the battery, and sometimes also to the persons using it. It is also used to maximize the range of vehicle by properly using the amount of energy stored in it.

4. SYSTEM DESIGN

Overview of number pattern:

This design describes about the digitalization of the number pattern which is display in LCD on front of the vechile. If the password is correct the vechile gets unlocks. If the unauthorized user try to unlock the vechile using the wrong password the vechile automatically send the alert message through email or whatsapp.

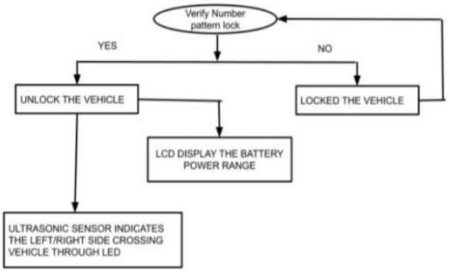

FIG 4.1 DIGITALIZATION OF NUMBER SYSTEM

5. IMPLEMENTATION

EMBEDDED C ARDUINO: [combination of 3 modules]

```
#include <LiquidCrystal.h>
int motor_ena=10;
int in1=11;
int in2=12;

int battPin = A0;
int ledPin1 = A1;
int ledPin2 = A2;
int trigPin1 = 3;
int echoPin1 = 2;

int trigPin2 = 4;
int echoPin2 = 5;

int trigPin3 = 6;
int echoPin3 = 7;
byte bat100 [8] =
{
 B00000, B00111, B01111, B11111, B01111, B00111, B00000, B00000
};
byte bat75 [8] =
{
 B00000, B00111, B01011, B10011, B01011, B00111, B00000, B00000
};
byte bat50 [8] =
{
 B00000, B11111, B11111, B11111, B11111, B11111, B00000, B00000
};
byte bat25 [8] =
{
 B00000, B11111, B00111, B00111, B00111, B11111, B00000,B00000
};
byte batleft [8] =
{
 B00000, B00111, B01000, B10000, B01000, B00111, B00000, B00000
};
byte batright [8] =
{
 B00000, B11111, B00001, B00001, B00001, B11111, B00000, B00000
};

LiquidCrystal lcd(8,9,A5,A4,A3,13);

void setup()
{
 Serial.begin(9600);
 lcd.begin(16,2);
 pinMode(battPin, INPUT);

 lcd.createChar (1, bat100);
 lcd.createChar (2, bat75);
 lcd.createChar (3, bat50);
 lcd.createChar (4, bat25);
 lcd.createChar (5, batleft);
 lcd.createChar (6, batright);

 pinMode(trigPin1, OUTPUT);
 pinMode(echoPin1, INPUT);

 pinMode(trigPin2, OUTPUT);
 pinMode(echoPin2, INPUT);

 pinMode(trigPin3, OUTPUT);
 pinMode(echoPin3, INPUT);

 pinMode(ledPin1, OUTPUT);
 pinMode(ledPin2, OUTPUT);

 pinMode(motor_ena,OUTPUT);
 pinMode(in1,OUTPUT);
 pinMode(in2,OUTPUT);
 digitalWrite(in1,HIGH);
 digitalWrite(in2,LOW);
 analogWrite(motor_ena,255);
}
void firstsensor(){ // This function is for first sensor.
 int duration1, distance1;
 digitalWrite (trigPin1, HIGH);
 delayMicroseconds (10);
 digitalWrite (trigPin1, LOW);
 duration1 = pulseIn (echoPin1, HIGH);
 distance1 = (duration1/2) / 29.1;

    Serial.print("1st Sensor: ");
    Serial.print(distance1);
    Serial.print("cm    ");

 if (distance1 <= 30) {  // Change the number for long or short distances.
   digitalWrite (ledPin1, HIGH);
```

```
  } else {
   digitalWrite (ledPin1, LOW);
  }
}
void secondsensor(){ // This function is for second sensor.
   int duration2, distance2;
   digitalWrite (trigPin2, HIGH);
   delayMicroseconds (10);
   digitalWrite (trigPin2, LOW);
   duration2 = pulseIn (echoPin2, HIGH);
   distance2 = (duration2/2) / 29.1;

     Serial.print("2nd Sensor: ");
     Serial.print(distance2);
     Serial.print("cm    ");

   if (distance2 <= 30) {  // Change the number for long or short
distances.
     digitalWrite (ledPin2, HIGH);
   }
 else {
     digitalWrite (ledPin2, LOW);
   }
}
void thirdsensor(){ // This function is for third sensor.
   int duration3, distance3;
   digitalWrite (trigPin3, HIGH);
   delayMicroseconds (10);
   digitalWrite (trigPin3, LOW);
   duration3 = pulseIn (echoPin3, HIGH);
   distance3 = (duration3/2) / 29.1;

     Serial.print("3rd Sensor: ");
     Serial.print(distance3);
     Serial.print("cm");
  if (distance3 <=30){
   analogWrite(motor_ena,150);
  }
  else{
      analogWrite(motor_ena,255);

  }
}

void loop()
{
  {
  Serial.println("\n");
firstsensor();
secondsensor();
thirdsensor();
delay(1000);
}
  int voltReading = analogRead(battPin);
  int volts = (voltReading/1023)*100;

  Serial.print(volts);
  Serial.print(" ");

  if (volts > 95)
  {
   lcd.clear();
   lcd.setCursor (14,0);
   lcd.write(1);
   lcd.write(3);
  }
  if (volts < 95)
  {
   if (volts > 75)
   {
   lcd.clear();
   lcd.setCursor (14,0);
   lcd.write(2);
   lcd.write(3);
   }
   else if (volts > 50)
   {
   lcd.clear();
   lcd.setCursor (14,0);
   lcd.write(5);
   lcd.write(3);
   }
   else if (volts > 25)
   {
   lcd.clear();
   lcd.setCursor (14,0);
   lcd.write(5);
   lcd.write(4);
   }
   else if (volts < 10)
   {
    lcd.clear();
    lcd.setCursor(14,0);
    lcd.write(5);
    lcd.write(6);
    lcd.clear();
    lcd.setCursor(14,0);
    delay(50);
    lcd.write(5);
    lcd.write(6);
   }
  }
  delay (1000);
 }
```

6. SCREENSHOTS

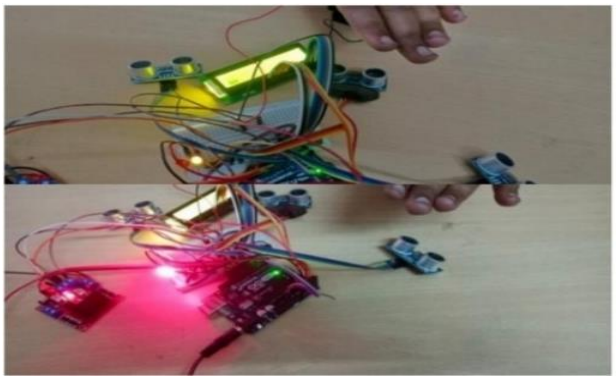

FIG 6.1 DEDUCTION PROCESS

FIG 6.2 BATTERY RANGE

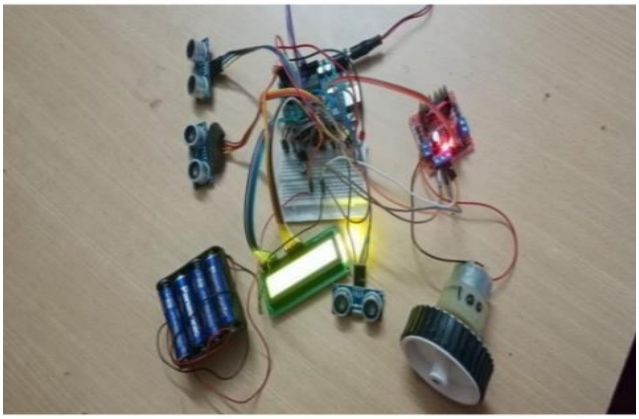

FIG 6.3 OVERVIEW OF 4 MODULES

7.CONCLUSIONS AND FUTURE ENHANCEMENT

This proper deals with a new framework, named Safer Secure Smart Vehicle, that can give the pattern for digital content for users. And it makes the system decentralized which allows any user to preview the control of the vechile . The smart features which eliminate human to operate and eliminates machine error. Using IOT and Rasberrypi technology, this smart vechile has been designed a permanent and immutable record of every safe travel. There may be delay in information transformation and representation of web-application. The system is also reliable to be used in other authorization applications involving robotics, border management, banking security involving ATMs etc. In future further there will be enhancement of this application. Enhancing the system security from unauthorized access is also open issue to develop. While using this electrical vechile there may be pollution free environment and we can safe guard your vechile. This leads to a good technology in future.

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