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Advanced Rider Assistance System

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ABSTRACT:

Growth in population has led to the growth in technology. people use two wheeler on large number and number of accidents taking place is increasing progressively. Road accidents are unfortunately the most frequent incident cases and overall cause of damage. bike accidents around 1.3 million people die every year. majority of these accidents are because of distraction or the drowsiness of driver. To prevent such accidents we propose a system which alerts the driver and provides safety to the driver.

ARAS prevent the driver from getting diverted which leads to road accidents, the system module on vehicle uses a sensor that alert the user. Even if accident occurs the existing crash sensor detects the sudden vibrations of vehicle thereby triggering air bag circuit that inflates in front of driver, the location will be send as SMS through GSM to existing contacts.

The best feature of ARAS provides security by sending SMS through GSM, where the owner send SMS as LOCK ENGINE, the engine and fuel injector will be switched off and UNLOCK ENGINE will again start the vehicle.

ARAS uses an eye blinking sensor to detect the drowsiness of driver, alerting the driver by a beep sound and vibration. We also include (MQ3) sensor and pressure sensors to switch off the ignition when rider either found to be drunken or not wearing a helmet. By the execution of this project more safety and security are provided to the driver.

KEYWORDS: Aras, GSM, GPS, Arduino, MQ3, HC-SR04,

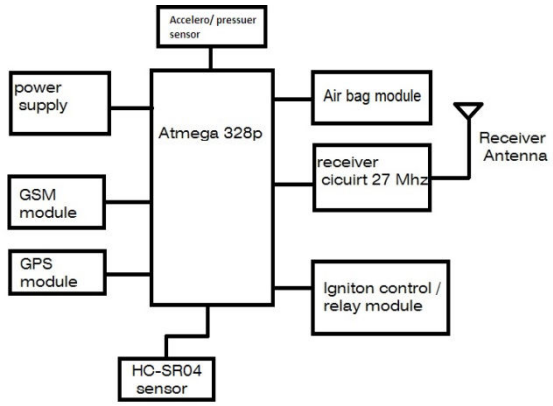
INTRODUCTION:

Growth in population has led to the growth in technology. people use two wheeler on large number and number of accidents taking place is increasing progressively. To prevent such accidents we propose a system which alerts the driver and provides safety to the driver. ARAS prevent the driver from getting diverted which leads to road accidents.

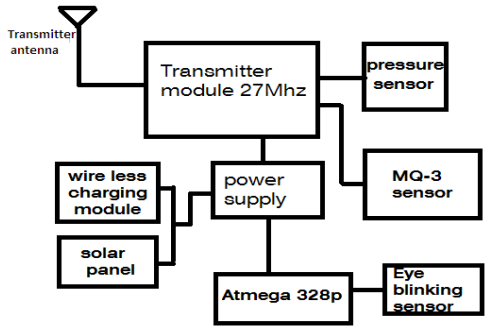
ARAS uses an eye blinking sensor to detect the drowsiness of driver, alerting the driver by a beep sound and vibration. We also include (MQ3) sensor and pressure sensors to switch off the ignition. Even if accident occurs the existing crash sensor detects the sudden vibrations of vehicle thereby triggering air bag circuit that inflates in front of driver. The best feature of ARAS provides security by sending SMS through GSM, where the owner send SMS as LOCK ENGINE, the engine and fuel injector will be switched off and UNLOCK ENGINE will again start the vehicle.

BLOCK DIAGRAM

- **BIKE ECU:**



HELMET ECU:



ARDUINO:

Arduino is an open-source physical computing platform based on a simple I/O board and a development environment that implements the Processing/Wiring language.

Description:

Microcontroller :ATmega328

Operating Voltage : 5V

Input Voltage (recommended) : 7-12V

Input Voltage (limits) : 6-20V

Digital I/O Pins : 14

Analog Input Pin : 6

DC Current per I/O Pin : 40 mA

DC Current for 3.3V Pin : 50 mA

Flash Memory :32KB (ATmega328)

SRAM :2KB (ATmega328)

EEPROM :1KB (ATmega328)

Clock Speed : 16 MHz

Length : 68.6 mm

Width : 53.4 mm

GSM MODULE:

The sim 900A module with RS232 interface is a fully quad band solution in land grid array type which can be installed in purchaser applications.SIM900A supports Transmission of voice, SMS and data instruction with low power consumption, and it can fix in to reduce and compressed demands of custom design. Sim900A can be guided using simple AT commands.

GPS MODULE:

GPS abbreviated as Global positioning system.This is also known as NAVSTAR, that we use was implemented by the military of US and has been fully functional since 1995.

Presently the GPS system is worked by 31 active satellites, inclined 55 degrees to the equator in a space orbit.

ULTRSONIC SENSOR:

Ultrasonic sensor is an electronic device which is used to measure the distance/range to an obstacle by sound waves.

ultrasonic observing is one of the best method to sense vicinity and detect levels with more reliability. The main principle of ultrasonic sensor is high frequency sound pulses at regular intervals.

BUZZER:

Buzzer is also known as Beeper. it is an audio signalling instrument. it is either mechanical, electromechanical or piezo electric/piezo.

The main moto of Beeper is Indication by Alarm to the rider which is operated with 4-8V DC at frequency of 2300hz.

ALCOHOL SENSOR:

An alcohol sensor finds the concentration of alcohol in the air and an analog voltage is an output reading. This sensor can activate at temperature from -10to50 degree centigrade with a power supply is less than 150Ma to 5 V.

currently they are mainly used by traffic police to detect the alcohol concentration users have to blow in the straw for few seconds.

RELAY MODULE:

The relay module is a hardware device with which we can remotely control devices over a network or internet. Relays are used to control many circuits by one signal or to control a circuit by an independent low-power signal.

Relays are used as signal repeaters. Relay is an electromechanical switch which can ON or OFF, it lets the current thorough or not and can be controlled with low voltages provided by the arduino pins.

AIRBAG MODULE:

Air bag control module is generally placed in driver jacket. It monitors the vehicles sensors and stores the information in a temporary file.

The information is then relayed to the air bag sensors and these are expanded during impact. That causes a problem and prevents airbag from expanding when they are most needed and results in dangerous consequences.

PRESSURE SENSOR:

A pressure sensor is a electronic instrument. It is used for pressure measurement of liquids & gases. pressure sensors are designed in dynamic mode for capturing very high speed changes in pressure.

These are mainly used for monitoring in applications. It is also called as pressure transducer, pressure transmitter etc....

PROGRAM CODE:

```
#include <SoftwareSerial.h> // Library for using serial communication

#include <TinyGPS++.h>

SoftwareSerial SIM900(7, 8); // Pins 7, 8 are used as 7tx 8rx used as software serial pins

#define trigPin 13

#define echoPin 12

#define buzzer 6

long duration, distance;

String incomingData;   // for storing incoming serial data

String message = "";   // A String for storing the message

int relay_pin = 10;    // Initialized a pin for relay module


// Arduino gps car accident location tracking system using Neo 6m gps module and sim900A //gsm module.

static const int RXPin = 3, TXPin = 2; //tx3 rx2

 static const uint32_t GPSBaud = 9600;

 int  m = 9740;
```

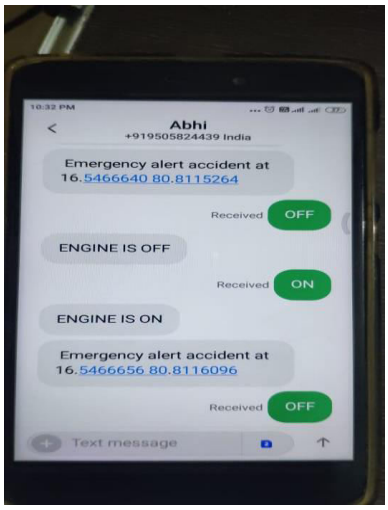
```
 int y = 71;
TinyGPSPlus gps;
 SoftwareSerial ss(RXPin, TXPin); // for gps
 //SoftwareSerial SIM900(7, 8); // for gsm module


   String textForSMS;
   int limits = 4; // limit switch
   String datareal;
   String dataimaginary;
   String combined;
   int raw = 1000000;
   String datareal2;
   String dataimaginary2;
   String combined2;
 void setup()

{
 SIM900.begin(19200);
 Serial.begin(9600);
 pinMode(relay_pin, OUTPUT);   // Setting erlay pin as output pin
 digitalWrite(relay_pin, HIGH);  // Making relay pin initailly low
 pinMode(trigPin, OUTPUT);
 pinMode(echoPin, INPUT);
 pinMode(buzzer,OUTPUT);
 ss.begin(GPSBaud);
 delay(1000);  // give time to log on to network.
 Serial.println(" please wait!");
 pinMode(limits, INPUT);
 digitalWrite(limits, HIGH);
  Serial.println(F("Wellcome BOSS"));
 Serial.print(F("plz wait loading"));
  // set SMS mode to text mode
 SIM900.print("AT+CMGF=1\r");
 delay(100);

 // set gsm module to tp show the output on serial out
 SIM900.print("AT+CNMI=2,2,0,0,0\r");
 delay(100);
 Serial.println();

}

        // sending sms loop for Gps


  void sendSMS(String message)
{
 SIM900.print("AT+CMGF=1\r");                 // AT command to send SMS message
 delay(100);
 SIM900.println("AT + CMGS = \"+919490717368\"");  // recipient's mobile number, in international format
 delay(100);
```

```
 SIM900.println(message);                    // message
to send
 delay(100);
 SIM900.println((char)26);                   // End AT
command with a ^Z, ASCII code 26
 delay(100);
 SIM900.println();
 delay(1000);                                // give module
time to send SMS


}
          // loop for limit switch


 void loop()
{
  //Function for receiving sms
 receive_message();


 // if received command is to turn on relay
 if(incomingData.indexOf("OFF")>=0)
 {
   digitalWrite(relay_pin, LOW);
   message = "ENGINE IS OFF";
   // Send a sms back to confirm that the relay is
turned on
   send_message(message);
 }


 // if received command is to turn off relay
 if(incomingData.indexOf("ON")>=0)
 {
   digitalWrite(relay_pin, HIGH);
   message = "ENGINE IS ON";
   // Send a sms back to confirm that the relay is
turned off
   send_message(message);
 }


digitalWrite(trigPin, LOW);


delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = (duration/2) / 29.1;
if (distance < 70)
{
digitalWrite(buzzer,HIGH);
delay(1000);
} else
digitalWrite(buzzer,LOW);
// GPS loops
   while (ss.available() > 0)
   if (gps.encode(ss.read()))
   displayInfo();
    if(digitalRead(limits) == LOW)
```

```
{
  int la0=gps.location.lat();
  int lo0=gps.location.lng();
  double latitude1 = gps.location.lat()*10000000 ;
  double longitude1 = gps.location.lng()*10000000 ;
  long int la1=latitude1-(la0*10000000);
  long int lo1=longitude1-(lo0*10000000);
  String latitude=String(la0);
  latitude.concat(".");
  latitude.concat(la1)
 String longitude=String(lo0);
  longitude.concat(".");
  longitude.concat(lo1);
  Serial.println(latitude);
  Serial.println(longitude);
  textForSMS = "";
  textForSMS = textForSMS + " Emergency alert
accident at ";
  textForSMS.concat(latitude);
  textForSMS = textForSMS + " ";
  textForSMS.concat(longitude);
  sendSMS(textForSMS);
  Serial.println(textForSMS);
  Serial.println("message sent.");
  delay(1000);
}
  else
  digitalWrite(limits, HIGH);
}
                                    // info to print on serial monitor
void displayInfo()
{
   Serial.print(F("Location: "));
   if (gps.location.isValid())
  {
   Serial.print(gps.location.lat(), 6);
   Serial.print(F(","));
   Serial.print(gps.location.lng(), 6);
   Serial.print(" ");
  }
   else
  {
   Serial.print(F("INVALID"));
  }
  Serial.println();
}
void receive_message()
{
  if (SIM900.available() > 0)
  {
   incomingData = SIM900.readString(); // Get the
data from the serial port.
```

```
    Serial.print(incomingData);
    delay(10);
  }
}

void send_message(String message)
{
  SIM900.println("AT+CMGF=1");    //Set the GSM Module in Text Mode
  delay(100);
  SIM900.println("AT+CMGS=\"+919490717368\"");  // Replace it with your mobile number
  delay(100);
  SIM900.println(message);   // The SMS text you want to send
  delay(100);
  SIM900.println((char)26);  // ASCII code of CTRL+Z
  delay(100);
  SIM900.println();
  delay(1000);
}
```

RESULT:



CONCLUSION:

Finally we are going to conclude our project is mainly to prevent accidents by making riders should follow the traffic rules to rider must wear helmet, eye blinking sensor which is used to activate automatically when the rider going to inactive stage. vehicle will automatically off when the rider taken alcohol. we can lock engine when the vehicle going to theft through SMS by rider mobile. we can also provide air bag for safety to the rider. Its alerts the rider when obstacle comes. among all these we need some power, we are providing that power through wireless charging.

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