International Journal of Engineering Research and Applications *www.ijera.com*
ISSN: 2248-9622, pp. 42-46

RESEARCH ARTICLE OPEN ACCESS

Implementation of Vehicle Monitoring and Accident Detection System Using Iinternet of Things

Madhukara S
Dept. of ECE, SJCIT, Chickballapur, India

Varsha Singh V
Dept. of ECE, SJCIT, Chickballapur, India

Veena M
Dept. of ECE SJCIT, Chickballapur, India

Vidya V
Dept. of ECE, SJCIT, Chickballapur, India

Vidyashree M
Dept. of ECE, SJCIT Chickaballapur, India

Abstract— The Internet of Things (IoT) makes our world as possible as connected together. Nowadays we almost have internet infrastructure wherever and we can use it whenever both in private and public sectors. Automobiles are interested in IOT applications to increase the safety of vehicles and the human lives. This paper describes the ignition, theft, monitoring and accident detection of the vehicle. Theft detection and vehicle tracking systems have recently used by GPS and GSM modules. We incorporated technology such as face recognition based on a vehicle theft tracking and detection system. It provides a comprehensive solution to all problems. The Open CV Python Module was used to perform real-time face identification and detection. Face recognition has the potential to solve a variety of issues. By recognizing faces using a camera and comparing them to their data, they may be checked. The picture of the person attempting to start the vehicle will be automatically sent to the owner. This device protects the vehicle from theft while also allows users to monitor theft data and transmit information to a nearby police station. After ignition of vehicle, it checks for drunk and drive cases by using gas sensor MQ-3 whenever the alcohol is detected the vehicle system will turn off. IR senser is used to detected obstacles this should be display on lcd and buzzer will give alert sound for the driver. If incase the speed of the vehicle increases above the limited speed then speed of the vehicle reduces automatically by giving alert sound this is done by using h bridge and for the alert buzzer is used. Whenever the vehicle met with an accident automatically and immediately alert message will send to the nearby hospital and call for the family members.

Keywords—Arduino UNO, Ultrasonic sensor, Accelerometer sensor, IR sensor, Gas sensor, Python module.

I. INTRODUCTION

The Internet of Things (IoT) is the interconnection of uniquely identifiable embedded computing devices within the existing Internet infrastructure. Typically, IoT offers advanced connectivity of devices, systems, and services that goes beyond machine-to-machine communications (M2M) and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is implemented in nearly all fields of automation enabling advanced applications like a Smart Grid. The term things in the IoT refers to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with built-in sensors, or field operation devices that assist fire-fighters in search and rescue. Current market examples include thermostat systems and washer/dryers that utilize Wi-Fi for remote monitoring.

It is recognized that cities are becoming increasingly crowded in terms of visitors, inhabitants and vehicles. The increase in the number of vehicles has led to an increase in traffic, which has led to an increase in the number of road traffic

accidents. A recent World Health Organization (WHO) report showed that every year 1.35 million people die and 50 million people get injured.

The Internet of Things (IoT) can be used to produce an automatic notification and response to the scene. A signal from an accelerometer and a GPS sensor are automatically sent to the cloud and from there, an alert message will be received by whoever is subscribed to that car. The signal will indicate the severity of the accident and the GPS location. The ambulance will use the GPS coordinates to get to the scene quickly. When there is a car accident someone has to actively seek help such as calling 911 for emergency services. There is no automatic notification to the police, ambulance, friends, or family.

A novel Internet of Things-based accident detection and reporting system for a smart city environment. The proposed approach aims to take advantage of advanced specifications of smartphones to design and develop a low-cost solution for enhanced transportation systems that is deployable in legacy vehicles. In this context, a customized Android application is developed to gather information regarding speed, gravitational force, pressure, sound, and location. The speed is a factor that is used to help improve the identification of accidents. It arises because of clear differences in environmental conditions (e.g., noise, deceleration rate) that arise in low-speed collisions, versus higher speed collisions). The information acquired is further processed to detect road incidents. Furthermore, a navigation system is also developed to report the incident to the nearest hospital.

II. METHODOLOGY

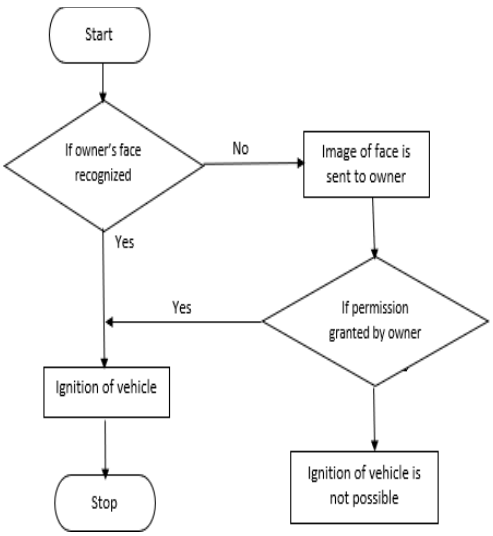

Fig.1 flow chart of face detection

The fig. 1 shows the flow chart of the face detection, in this project we have used python 3.7version for face detecting. If any person trying to start the vehicle, camera captures the image of person. The captured picture compares with the registered face, if it matches then engine start. If not the image of the person is sent to the owner, then he can give access to the person or send a message to police station that his/her vehicle is in risk.

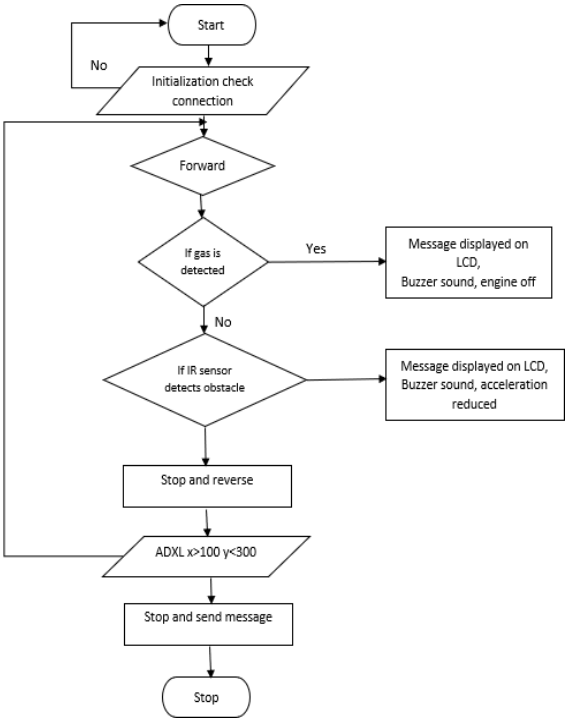

Fig.2 flow chart of vehicle monitoring

The fig. 2 shows the flow chart of vehicle monitoring, The main purpose of this project is to avoid the drunk and drive cases. Many accidents are happened because of the alcohol consumption of the driver. The detection of alcohol is done by using gas sensor MQ-3 such that when the alcohol is detected the vehicle system will turn off. For accident detection, we used ADXL sensor. The sensor is interfaced with Arduino microcontroller. If angle of sensor changes above fixed range or vehicle tilted, then message has sent to nearby hospital with location and also for the related family members. Object is detected by using IR sensor then alert should be given and if object gets closer then engine should stop.

III. BLOCK DIAGRAM

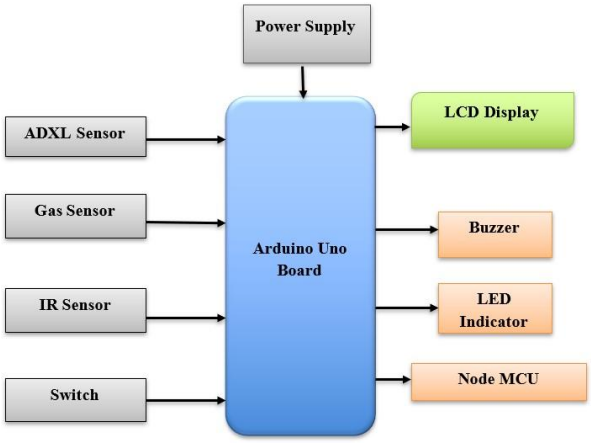

Fig.3 Block diagram

Fig.3 shows that the block diagram of proposed system, in this project, the main board is Arduino Uno. In which all the sensor are connected to this board. ADXL sensor, Alcohol sensor, IR sensor, switch, power supply, LCD display, buzzer indicator and Node MCU are connected to Arduino Uno. ADXL sensor sense if vehicle meet with an accident and send the signals to Arduino. Alcohol sensor is used to sensor the unwanted gases and if the driver is alcoholic. IR sensor is used to detect the obstacle and other vehicle. These three sensors send the signal to Arduino Uno. Here switch is used by driver in emergency situation. When switch is pressed emergency message will be sent to nearby police Station through Node MCU. Whenever switch is used it transmit the signals to Arduino. Buzzer is used to get an alert or beep sound whenever it receives a signal from Arduino. Node MCU is used to send message whenever it receives the signals from Arduino for near hospital or police station and relatives of driver it acts like a Wi-Fi model. LCD display is used to display the condition whenever it receive the signals from Arduino. Power supply is connected to Arduino to charge up the overall model.

IV. HARDWARE AND SOFTWARE SPECIFICATIONS

A. Arduino UNO microcontroller

Arduino Uno is a microcontroller based on 8-bit ATmega328P microcontroller. It also consists of other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 6 analog input pins,
14 digital input/output pins, a USB connection, A Power barrel jack, an ICSP header and a reset button.

B. Node MCU

Node MCU is a low-cost open source IOT platform. It initially included firmware which runs on the ESP8266 Wi-Fi SOC from Espressif Systems, and hardware which was based on the ESP-12 module. Later, support for the ESP32 32-bit MCU was added. It is based on the ESP8266 processor and includes GPIO, PWM, IIC, 1- Wire, and ADC on a single board. Power your development in the fastest way combination with Node MCU Firmware USB-TTL included, plug&play.10 GPIO, every GPIO can be PWM.

C. DC motors

DC motor shows very easy to use and available in standard size. Nut and threads on shaft to easily connect and internal threaded shaft for easily connecting it to wheel.

D. LCD Display

A liquid-crystal display (LCD) is a flat-panel display or other electronically controlled optical device that use the light-modulating characteristics of liquid crystals in conjunction with polarizers.

E. Accelerometer sensor

The ADXL335 is a small, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. It can measure the static acceleration of gravity in tilt- sensing applications, as well as dynamic acceleration resulting from motion, shock, or vibration.

F. Gas sensor

Gas sensor MQ3 is one of the most commonly used sensors in the MQ sensor series. It is a Metal Oxide Semiconductor (MOS) type of sensor. Metal oxide sensors are also known as Chemi resistors, because sensing is based on the change of resistance of the sensing material when exposed to alcohol. So, by placing it in a simple voltage divider network, alcohol concentrations can be detected.

G. IR sensor

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called a passive IR sensor.

H. Arduino IDE

Arduino IDE is an opensource software that is mainly used for compiling the code into the Arduino Module. It is an Arduino software that make's code compilation too easy with no prior technical knowledge. It is easily available for operating systems like MAC, Windows, and Linux that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment.

V. APPLICATIONS

- It can be used in all vehicles.
- Further can be used for vehicle tracking.

- It helps us detect if the driver has consumed alcohol through the alcohol sensor.
- It can be implemented in modern vehicle .

VI. ADVANTAGES

- Maintain safety of human life and prevention from accident.
- Help full in emergency condition like accident, medical emergency.
- Avoids the rash driving, drink and drive.
- Create the awareness for driver about surrounding and vehicle condition.
- Alert message to mobile phone for remote information.
- Monitors all hazards and threats.

VII. RESULTS

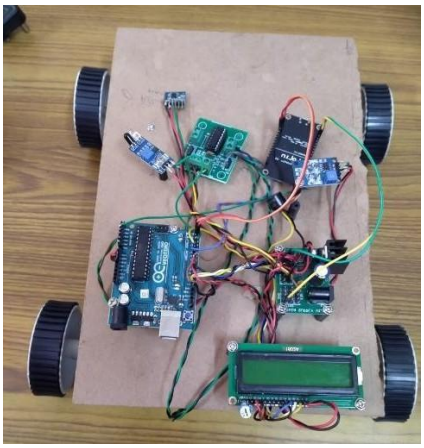

Fig.4 Proposed System

The fig 4 shows the overview of the proposed system.

Fig.5 Message received

The fig 2 shows the results of proposed system. Whenever accident of the vehicle occurred then ADXL sensor sense and sends the message to nearby hospital and relative members of the driver through Node MCU. Gas sensor, detected the alcoholic content and engine stop. IR sensor, detected obstacle then the vehicle stopped and gave the indication through buzzer.

REFERENCES

[1]. Swetha Bergonda, Shruti, Sushmitha and Savita Soma, IoT Based Vehicle Accident Detection and Tracking System Using GPS Modem, International Journal of Innovative Science and Research Technology, Vol. 2, 2017, pp 2021-2025.

[2]. Sneha Singh, Amit Kumar, Mukesh Singh, S.K.Bhatia, Rash driving alert system, IJSDR, Vol. 3, 2018, pp 2455-2461.

[3]. Arif Shaik, Natalie Bowen and Jennifer Bole, Smart Car: An IoT Based Accident Detection System, IEEE Global Conference on Internet of Things, 2019, pp 654-658.

[4]. F. Bhatti, M. A. Shah, C. Maple and S. U. Islam, A novel Internet of Things-enabled accident detection and reporting system for smart city environments, Vol. 19, 2019, pp 2071-75.

[5]. K. Sindhu, Priya Sinha and R. Subhashini, Sandesh Categorized Accident Alerting System Using Bike Gloves, International Conference on Vision Towards Emerging Trends in Communication and Networking, 2019, pp 785-96.

[6]. Daxin Tian, Chuang Zhang, Xuting Duan and Xixian Wang, An Automatic Car

Accident Detection Method Based on Cooperative Vehicle Infrastructure Systems, Vol. 7, 2019, pp 127453-127463

[7]. A.P. Shah, J.B.Lamare, T.Ngyen-Anh and A.Hauptmann, CADP: A novel dataset for CCTV traffic camera based accident analysis,15th IEEE International Advanced Video signal Based Surveillance,2018,pp 1-9.

[8]. Nazia Parveen, Ashif Ali and Aleem Ali, IOT Based Automatic Vehicle Accident Alert System, IEEE 5th International Conference on Computing Communication and Automation, 2020, pp 2589-2600.

[9]. Majd Khaled, Almohsen, Renad khlief alonzi, Taif Hammad Alanazi and Shahad Nasser, Smart Car Seat Belt: Accident Detection and Emergency Services in Smart City Environment, Artificial Intelligence and Data Analytics, 1st International Conference, 2021, pp 109-114.

[10]. S. Kailasam M. Karthiga R.M. Priyadarshini and K. Kartheeban, Accident Alert System for Driver Using Face Recognition, IEEE International Conference on Intelligent Techniques in Control, Optimization and Signal Processing, 2019, pp 1-4.