Smart Helmet for Safer Driving Using IoT and GPS Technology

Pratiksha S. Supekar

Department of Electronics & Telecommunication Engineering, Amrutvahini College of Engineering, Sangamaner, MH(India)

Madhubala B. Sonawane

Department of Electronics & Telecommunication Engineering, Amrutvahini College of Engineering, Sangamaner, MH(India)

Ashitosh A. Thorat

Department of Electronics & Telecommunication Engineering,Amrutvahini College of Engineering, Sangamaner, MH(India)

Abstract: Everyday around the world a large percentage of people die from road accident. An effective approach is made to solve the problem by using smart helmet. Smart helmet is an idea which makes motorcycle driving safer than before. The working of this smart helmet is very challenging, limit switch is placed inside, which will detect whether the rider worn the helmet or not, if not then the bike will not start. Smart helmet provides help in case of accident by using IoT and GPS technology. Alcohol sensor in helmet will detect the smell of alcohol consumed by rider. In that case also vehicle does not start. Helmet has ultrasonic sensor which detect the backside object. Smart helmet consists of peltire cooler which cools helmet to avoid sweating. An indicator light can be control through helmet movement with the help of accelerometer sensor.

I.Introduction:

There is an alarming increase in the morbidity and mortality due to two wheeler road traffic accidents. This has been matter of great concern globally. In India, it is estimated that one accident takes place after every two minutes. Data from the National Crime Records Bureau indicates that the deaths and injuries increased two and four fold respectively during the period of 1991-2005. Reportedly 98,254 persons were killed in 2005 on Indian road. The occupants and riders of two wheeler vehicles are among the majority to be affected in road traffic accidents. Two wheeler accident have also been shown to have maximum case fatality in accident. Despite of the safety rules made by government, many riders fail to abide by them. The riders in India often bypass the prime rules of wearing the helmet while riding the bike. This leads to fatal injuries to the rider in case of accidents. Apart from manual checking, there needs to be a system that could enforce this rules upon the riders and hence prevent them from bypassing it. One of the prime reason that leads to accidents is "Drunk and Drive". Due to drinking and driving two wheeler riders often get into accident. Almost the 70% of the accidents in our country can be prevented if the riders stop consuming alcohol before riding. The peoples involved in the accidents needs to be taken care of and immediately taken to the emergency room. But there is lag in handling the aftermath of road accidents in the country.

The nearby police station needs to be notified immediately about the accident so that they can be taken to hospitals immediately.

Project is divided into two sections. One is the vehicle module and another one is vehicle module. At first driver need to wear the helmet and then connect it with vehicle module through wire bus. Once the helmet is connected, vehicle can be turn on. Then helmet will measure the amount of alcohol and if alcohol found, then vehicle won't be on. In this case, alert will be uploaded to webpage with GPS coordinated. Similarly, if the temperature in the helmet is high then peltire cooler turn on for rider avoids from sweating. When any object comes to closer than the preset distance then ultrasonic sensor and buzzer will generates beeping sound. Right

and left indicators can be control by moving head slowly in right or left side. In case of accident, alert signal will be uploaded on webpage with GPS location so that family members and authorities can get his/her location and driver will get medical attention as soon as possible.
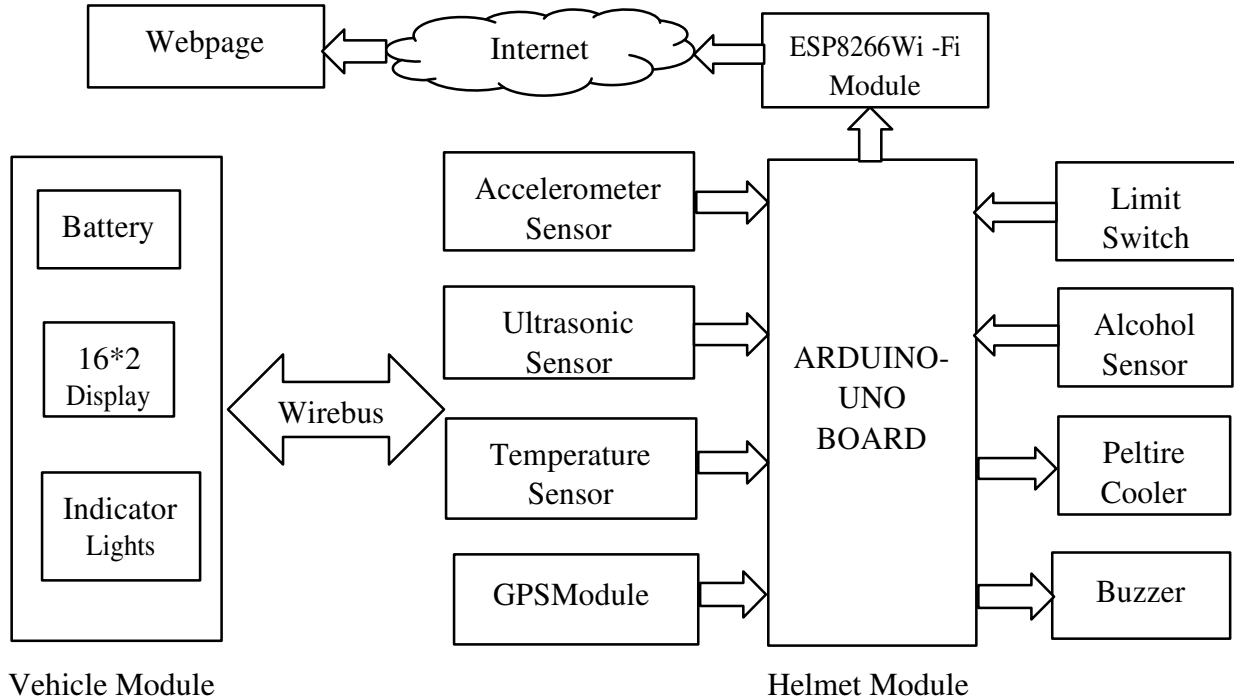
II. Proposed System:

Figure 1.Block Diagram

A. Methodology:

Project is divided into two sections. One is the helmet module and another one is vehicle module. To turn on vehicle, it is necessary to connect the helmet with vehicle using wire bus. At first driver need to wear the helmet and then connect it with vehicle module. Once helmet is connected, the vehicle can be turn on. When driver wears the helmet, limit switch will detect it and give signal to Arduino. Then helmet will measure amount of alcohol using MQ135 gas sensor. If alcohol found, vehicle can't be turn on. In this case, alert will uploaded on webpage. To connect helmet with internet, Wi-Fi module is used. Location can be calculated by using GPS module and given to Arduino. Similarly, temperature sensor will measure the temperature and give it to Arduino. If temperature is high than preset value 38 degree celcius, then peltire cooler will be turn on by Arduino. Ultrasonic sensor will be fitted on backside to detect backside object. When any objects comes too closer than pre-set value 6ft, buzzer will sound beeping 3 times to attract rider's attention. Whereas the ADXL accelerometer module monitor head movement. When the rider tilt his/her head on left side slowly, left indicator will turn on. For turning on right indicator, rider need to tilt his/her head in right side slowly. In case of accident, accelerometer calculates angle which is not regular, Arduino will generate alert signal. Alert signal will be uploaded on webpage with GPS location coordinated. So that family members and authorities can get his/her location and rider will get medical attention as soon as possible.

Algorithm:

Step 1: Start.

Step 2: Initialize the LCD display,Wi-Fi.

Step 3: Check the limit switch.

Step 4: Check the alcohol level.
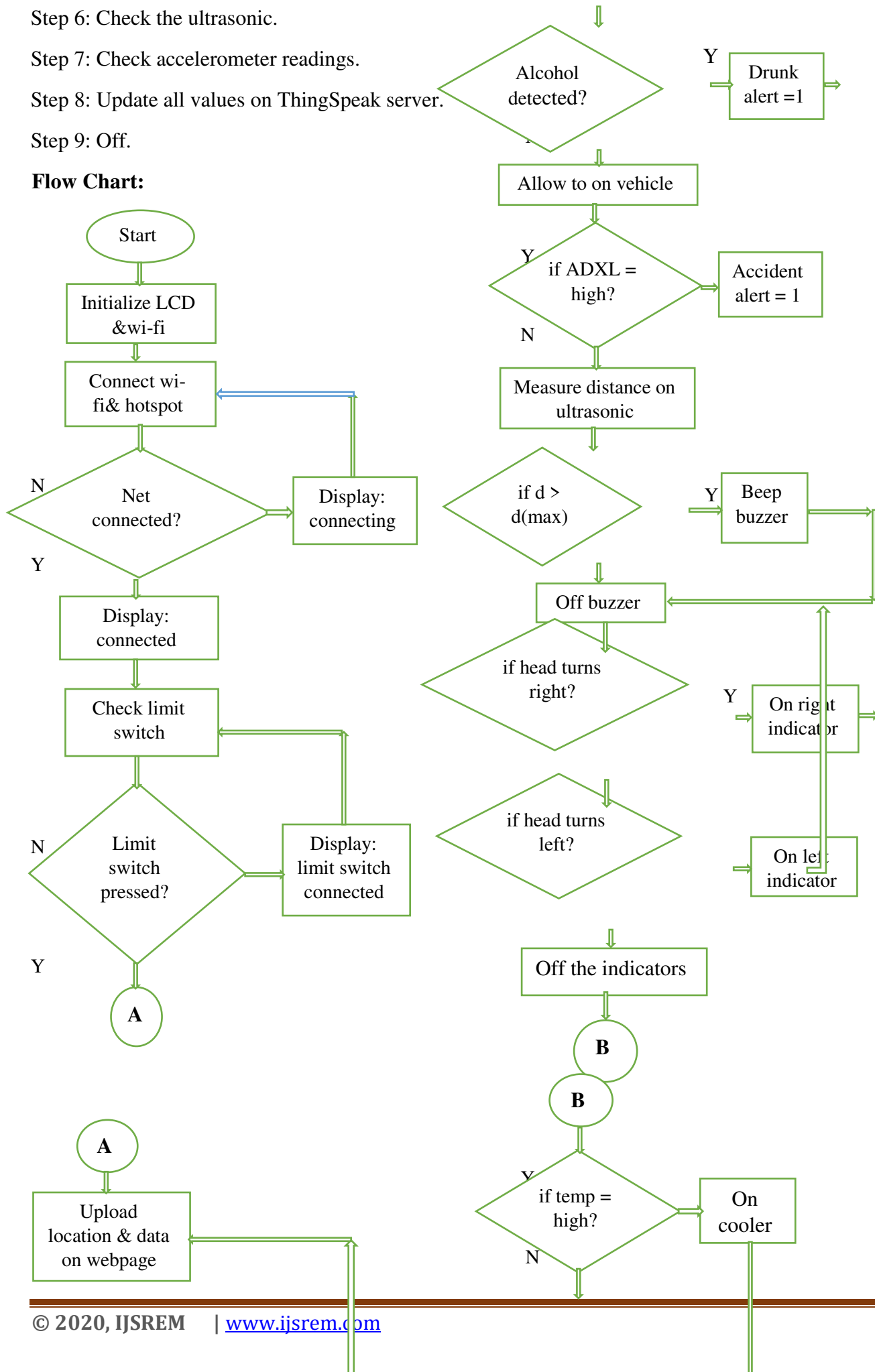
Step 5: Monitor the temperature.

Step 6: Check the ultrasonic.

Step 7: Check accelerometer readings.

Step 8: Update all values on ThingSpeak server.
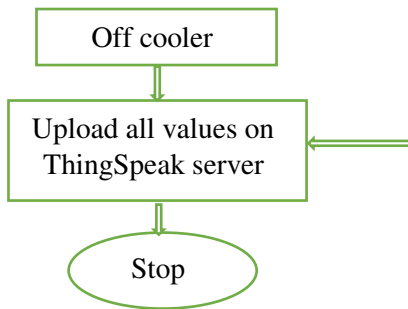
Step 9: Off.

Flow Chart:

Figure 2. Flow chart

IV. Results and Discussion:

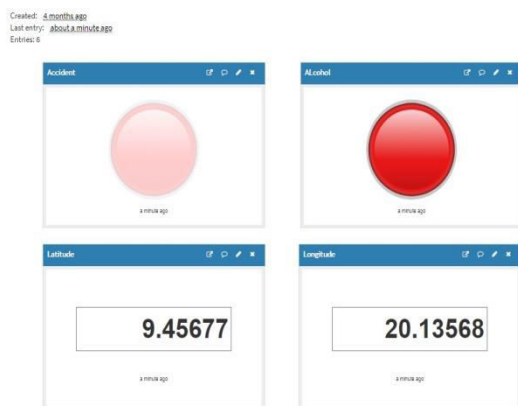The smart helmet operates on GPS technology.

Figure 3. Smart Helmet
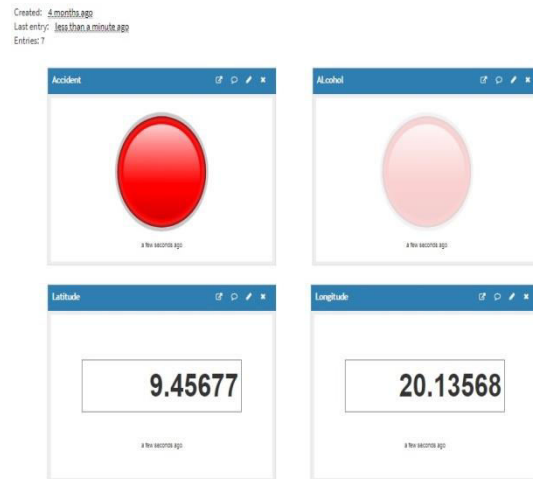

Figure 4. Webpage result for high alcohol detection

Figure 5. Webpage result for accident detection

V. Conclusion:

The designed smart helmet ensures the safety of the rider by making it necessary to wear helmet, and also ensures that the rider hasn't consumed alcohol. If any of these prime safety rules are violated, the proposed system will prevent the biker from starting the bike. The system also helps in efficient handling of the aftermath of accidents by sending location of the biker to webpage. This ensures that the victims get proper and prompt medical attention, if he/she met with an accident.

Acknowledgement:

References:

1. R.Nazik, A,Tariq, S.Murawwat, S.Rabbani, "Accident Prevention and Reporting System Using GSM(SIM900D) and GPS(NMEA 0183)" Dept. of Electrical Engineering, Lahore College for Women University, Lahore, Pakistan, Accepted 30 July 2014.

2. D.Kumar, S.Gupta, S.Kumar, S.Srivastava, "Accident Detection and Reporting System Using GPS and GSM module" Dept. of Electronics and Instrumentation Engineering, Galgotias College of Engineering and Technology, Greater Noida, India, Volume 2, Issue 5 May 2015.

3. N.Sane, D.Patil,S.Thakare, A.Rokade, "Real Time Vehicle Accident Detection and Tracking Using GPS and GSM Module", International Journal of Recent and Innovation Trends in Computing and Communication, Volume 4, Issue 4 April 2016.

4. C.Prabha, R.Sunita, R.Anita, "Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modem", Assistant Professor, Dept. of ECE, Bellari Institute of Technology and Management, Bellari, Karnataka, Volume 3, Issue 7 July 2014.

5. Jennifer William, Kaustubh Padwal, Nexon Samuel,AkshayBawkar, SmitaRukhande, "Intelligent Helmet", International Journal of Scientific and Engineering Research, Volume 2, Issue 3 March 2016. National Crime Records Bureau.
   Accidental deaths and suicides in India. New Delhi: Ministry of Home Affairs. Government of India 2016.