

Wireless Blackbox using Sensors and GPS Module

Resu Prasanna¹, M Sai Priya², M Neshvitha Vani³, R Tulasi⁴ and D kirtana⁵

¹⁻⁴Students, Vignana Bharathi Institute of Technology, ECE Department Hyderabad, Telangana, India
Email: resuprasanna810@gmail.com, munu.saipriya@gmail.com, neshvitha18@gmail.com, tulasiragula432@gmail.com

⁵Associate Professor, Vignana Bharathi Institute of Technology, ECE Department, Hyderabad, India
Email: dubasikirtana@gmail.com

Abstract— In olden days there are no much vehicles people used to travel by horses and camels, bullock carts etc .In other countries people travel by ships. As new generation had evolved there been many developments in transportation there were aircrafts, cars, buses etc. Due to this transportation became very easy for people to travel. And also it became dangerous as many accidents are taking place. Aircrafts had crashed and many people injured, so there one person who assigned to investigate about this incident he is David Warren. While he is listening to music he got an idea what if there is a recorder in flight which record the flight conditions when an accident is occurred. There comes the blackbox which became popular in 1960s.

Index Terms— SIM800 GSM module,DTH11 Sensor, Arduino Nano, GPS module, SMS alert, Buzzer, ADXL335 sensor .

I. INTRODUCTION

Nowadays technology is growing at faster speed, people are addicted to a luxurious life everyone is having their own vehicles. Especially if there are four members in a house everyone is having their own vehicles. Cars are more often used by everyone as it is luxurious and reflects their status. As of growing population while people are travelling there are many accidents taking place. It occurs due to various factors, including a wide growing population, increase in urbanization, and the rising number of vehicles on the road. And also people travel after consuming alcohol, people may fall asleep while driving which leads to an accidents. After doing many researches we come up with an idea of wireless blackbox using sensors and GPS module. In this paper we introduce how the people can be saved from the accidents occurred with the help of system called wireless blackbox. This system works based on the gps module and including sensors one is DTH11 and ADXL335 accelerometer module. Gps locates the person while he is driving. That means the persons exact location. The two sensors give the information about the accident occurred and around atmosphere.

II. LITERARY SURVEY

N Watthanawisuth.2012[1], In this the author used an MEMS accelerometer and GPS tracking system. This system sends a message to the family member that an accident is occurred please help them ,with the help of gps tracking system.

C Mohamedaslam·2016[2], In this research the author creates a smart vehicle system that contains a wireless blackbox, seat belt sensor and also a eye blink sensor. These sensors are used to detect speed of vehicle when an

accident occurs it sends message to relatives of family member.

Duradundi B. Madihalli.2020 [3], In this paper author used The main component we used is microcontroller, the an alcohol sensor and GSM module. This sensor detects whether the driver is drunk or not. The author also used gyroscopic sensor which indicates the accident is about to occur by movement of tilt in steering.

Baballe, M. A., M. Cavas. [6] , “Design and Simulation of personal computer base Walls Crossed Security System against Intrusion Using PIC Microcontroller”, International Journal of Engineering Science Invention, March 2019.

III. PROPOSED MODEL

Our main aim is to save the life of the injured person in an vehicle accident. We develop a system named wireless blackbox using sensors and GPS module. The name itself tells us we use various sensors and GPS tracking system ,with these sensors and gps system we can know when an accident occurs. Suppose if a person is driving a vehicle and got into accident if it is small accident then no problem but when a person is about to die who knows that, there is a person who is dying, his/her life will be in danger .So to save the injured people we develop this system. In this a sensor named DHT11 sensor is used it gives the information about temperature and humidity when an accident is occurred. And also we used an ADXL335 accelerometer module this sensor detects when an accident occurs during driving. Along with this a GPS tracking module is used it gives us the information about the location of the driver. Suppose if an accident occurs this sends the location of person where he met with an accident. Figure 1 Block diagram microcontroller we used is Arduino Nano. This microcontroller takes the information from gps module,DHT11 sensor and ADXL335 accelerometer. Here GSM module is used, in this an LED is present which starts blinking when an accident occurs, also a sim is inserted which sends a message to the respective family member saying that a person is injured please help them.

IV. SYSTEM ARCHITECTURE

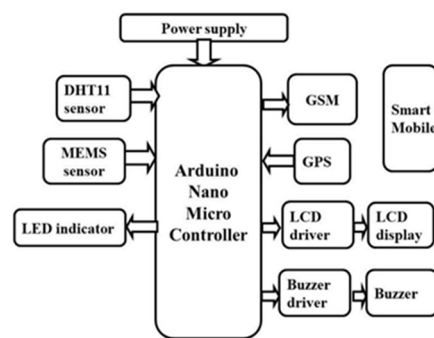


Figure. 1. Block Diagram Wireless Blackbox

V. HARDWARE

Setting up Arduino Nano and connecting components: Users need to configure the Arduino Nano and connect the components according to the provided instructions. Users need to configure the GSM module to send SMS alerts to predefined phone numbers when motion is detected.

A. *Arduino Nano*: It is a microcontroller board, When a powersupply is given to this board all devices connected to this get activated. Serial communication is possible with this board, that means longer distances communication is possible. It has a USB connection and reset button.



FIGURE. 2. Arduino Nano

B. *SIM800 GSM MODULE*: A communication device that enables the Arduino Nano to send SMS alerts to predefined phone numbers.



Figure. 3. Gsm Module

C. *GPS Module*: It is a tracking system which detects the location of the person while driving vehicle.



FIGURE. 4. GPS Module

D. *LCD 16*2 I2C*: 16x2 LCD (Liquid Crystal Display) with I2C. It is used to display the output. This displays an accident alert and values of longitude & latitude.



FIGURE. 5. LCD 16*2 I2c

E. *MEMS ACCELEROMETER SENSOR ADXL335*: It is a device which detects when an accident is about to occur. When the steering of the vehicle is about to tilt it indicates the chances to occur the accident.



Figure. 6. Mems Accelerometer Sensor Adxl335

F. *HUMIDITY SENSOR DTH11*: DTH11 sensor, is a humidity sensor which detects the humidity and temperature when an accident takes place. It provides a digital signal output that can be read by a microcontroller.

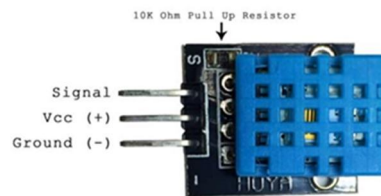


Figure. 7. Dth11 Sensor

VI. SOFTWARE DESCRIPTION

A. *Express PCB*: Express PCB typically refers to a PCB (Printed Circuit Board) design software called Express PCB. Express PCB is a user-friendly software tool that allows individuals and small businesses to design and order custom PCBs for electronic projects. We design the PCB by selecting components on the board and connecting

them with routing tools. After that we check the errors by design rule check(DRC) and fix this errors. Generate Gerber files these files contain the information needed for manufacturing the PCB. Express PCB offers a service for ordering PCBs directly from within the software.

B. Arduino IDE: Arduino IDE is used for compilation part. IDE is abbreviated as Integrated development. This application supports many operating systems. Example windows, linux etc.

VII. EXPERIMENTAL RESULTS



Figure. 8. Resulted Output When Accident Detected (Live Link)

VIII. CONCLUSION

Summary of the project objectives and achievements: The project aimed to design and develop a Wireless Blackbox using sensors and GPS module to overcome accidents and save the people in time. This system has sensors which detects the accident and also with the help of temperature sensor we will know how the accident occurred. This System is already used in many vehicles but it can also be used in bikes mainly in the upcoming 5G generation there won't be network issues for receiving messages. This system can be modified by using IOT.

FUTURE SCOPE

We can extend this project by adding drowsiness detection to prevent the road accidents. We can extend this project by adding health monitoring to this project. We can extend this project by adding fingerprint sensor to this project for vehicle accessing. This device can be improved by using various sensors. With the help of IOT, these devices can be used in buses etc in upcoming years. Which becomes great solution for injured one during vehicle accident.

REFERENCES

- [1] Bergasa L. M, J. Nuevo, M. A. Sotelo, R. Barea, and M. E. Lopez, (Mar. 2006) "Realtime system for monitoring driver vigilance," IEEE Trans. Intell. Transp. Syst., vol. 7, no. 1, pp. 63–77.
- [2] Chung-Cheng Chiu, Min-Yu Ku, Hung-Tsung, Chen Nat, (June 2007) "Motorcycle Detection and Tracking System with Occlusion Segmentation," Image Analysis for Multimedia Interactive Services. Santorini, vol. 2, pp. 32-32.
- [3] Devi M. S and P. R. Bajaj, (Jul. 2008) "Driver fatigue detection based on eye tracking," in Proc. IEEE ICETET, Nagpur, Maharashtra, India, pp. 649-652.
- [4] Gang Xiong, Senior Member, IEEE, Xisong Dong Member, IEEE, Dong Fan, Fenghua Zhu, Member, IEEE, Kunfeng Wang, and Yisheng Lv, (March 2013) "Parallel Traffic Management System and Its Application to the 2010 Asian Games," IEEE Trans., vol. 14, no. 1.
- [5] Lu M, W. Chen, X. Shen, H.C. Lam and J. Liu, (August 2007) "Positioning and tracking construction vehicle in highly dense urban areas and building construction sites," Automation in Construction, vol. 16, issue 5, pp. 647-656.
- [6] Manuel Fogue, Piedad Garrido, Francisco Pietro J. Martinez, Juan-Carlos Cano, Carlos T. Calafate, and Manzoni, (Sep 2012) "Accident Magazine. Detection," IEEE 2012) "Automatic Vehicular Tech.
- [7] Rigas G, C. D. Katsis, P. Bougia, and D. I. Fotiadis, (Jun. 2008) "A reasoning based framework for car driver's stress prediction," in Proc. Med. Control Autom. Conf., Ajaccio, France, pp. 627–632