RTO Dashboard for Vehicle Accident Reporting and Rescue System by Using IOT

Anandhan R [1], Chanukya E [2], Gokulkannan S [2], Shanthini P [2]

[1]*Assistant Professor, Adithya Institute of technology, Coimbatore-641107, Tamil nadu, India.*

[2]*Student, Adithya Institute of technology, Coimbatore-641107, Tamil nadu, India.*

Corresponding Author: edemchanukya3@gmail.com

Abstract: - Many intelligent and autonomous systems have been invented in recent years as a result of rapid technological advancement. Nowadays, people rely heavily on technologies that operate in an automated or semi-automated manner to make lives easier and more comfortable. So, this project will provide an optimum solution to this drawback as indicated by this task when a vehicle meets with a mishap quickly Vibration sensor is utilized to recognizes the mishap and furthermore send the data to the server. Arduino super regulator sends the alarm message through the IOT and GPS. Then, at that point, the vital move can be initiated in the wake of affirming the area at time. A real-time alert will be sent to the nearest police station and traffic control server. The closest emergency vehicle administration will likewise be informed of the mishap's area through the web. The whole framework will altogether work on the brief coordination of vital activities following a mishap. In the field of IoT, objects impart and trade data to offer high level clever types of assistance to clients.

Key Words: ***Ardunio Nano (Atmega), GPS module, Ultrasonic sensor, Accidental place, Arduino IDE. Dashboard.***

I. INTRODUCTION

There are many dangerous roads in the world like mountain roads, narrow curve roads, T roads. In these some mountain roads will be very narrow and they contain so many curves. For example, Kinnaur road in Himachal Pradesh, Zoji La Pass in the Himalayas, the Road of Death Bolivia, Fairy Meadows Road (Pakistan) [1]. Some roads have tight curve with steep climbing. In such kind of situation, the driver of the vehicle is not able to see the vehicle coming from other side and this can be a cause of accident at mountain roads/hill roads [2]. The main motive of this project is to find the accident spot of any place and make alert to family member through the GPS and GSM network. Accident detection and prevention system contains ultrasonic sensor for sensing objects and passing information to the Arduino nano.

Manuscript revised May 03, 2023; accepted May 04, 2023. Date of publication May 06, 2023.

This paper available online at www.ijprse.com

ISSN (Online): 2582-7898; SJIF: 5.59

LED is connected Arduino nano which will blow as Red after detection of object and it will alert the driver coming from the other side [3]. The GPS based vehicle Accident identification module contains GSM module and a GPS module connected to the Arduino Uno. GSM is used to establish cellular connection and GPS is used to trace the position of vehicle. Now-a-days it is thought to know that an accident has occurred and to locate accidental spot. There is no system available in the market for identification and intimation regarding an accident in previous. This project presents an automotive location finding system of accidental spot using GPS and GSM-SMS services.

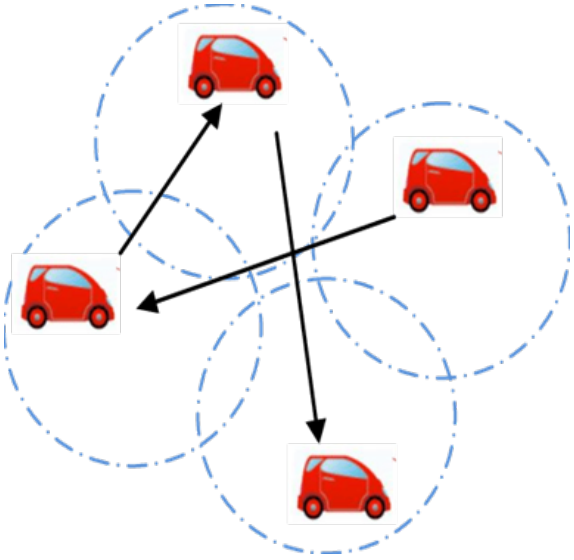
II. VEHICULAR AD-HOC NETWORK (VANET)

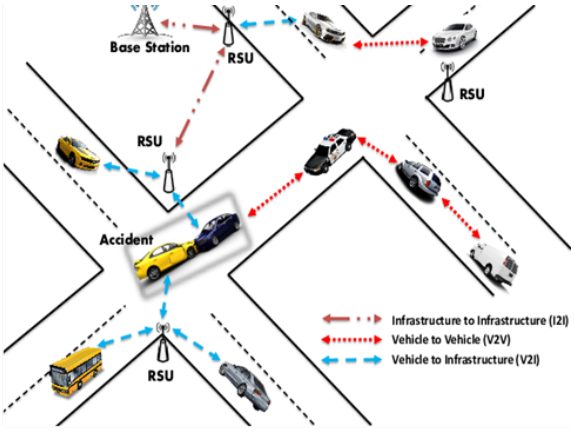
Vehicular ad-hoc network is an emerging area in networking. It is a subset of Mobile ad-hoc networks. Vehicular ad-hoc network that provides Vehicles to Vehicles (V2V), Rode-side Unit to Rode-side Unit(R2R) and Vehicles to rode-site Unit (V2R) communication. In recent years, more accident cases are found significantly. Due to this, roads are found to be more congested and busier. With the help of dedicated short-range communication (DSRC) VANETs establishes communication between various vehicles which are changing their direction frequently.

Vehicles directly communicate with different vehicles and send information regarding traffic jams, warning messages with road-site unit (RSU) which is fix equipment in roads.
VANET is a part of Mobile Ad–hoc network so, all nodes move dynamically within the network area and communicate with each other in single hop or multi hop by utilizing the road-site unit (RSU). VANET is one of the main types of mobile ad hoc networks (MANETs). From the high-level perspective, they are the same. However, some characteristics are specific for the VANETs that make them not similar to the MANETs. Compared with the other classes of mobile ad hoc networks, VANETs have unique characteristics. The main characteristics of the VANETs are as follows: heterogeneous communication range, mobility of the vehicles, geographically constrained topology, time varying vehicle density, frequently disconnected network, dynamic topology, and the vehicles being the components that build the network. The VANET routing protocols need to be designed considering factors such as the security, mobility and scalability of vehicular communication.

The goal of VANET architecture is to allow the connection between vehicles or between vehicles and fixed road side units leading to the following three possibilities.

Vehicle-to-Vehicle (V2V) ad hoc network: allows the direct vehicular communication without relying on a fixed infrastructure support and can be mainly employed for security, safety and dissemination applications.





2.1 Internet Of Vehicles (IOV)

The Internet of Vehicles is a network of connected cars, smartphones and wearables, roadside units, and a network of networks. The Internet of Vehicles relies on vehicle-to-vehicle (V2V), vehicle-to-human (V2H), and vehicle-to-infrastructure (V2I) connectivity. With IoV, every vehicle serves as a hub for both people and various IoT devices that are part of the traffic infrastructure. It influences transportation, manufacturing, energy, software, and other sectors.

Fig.1. Internet of Vehicles environment

2.2 Future of IOV Technology

As self-driving technology will soon be necessary for all automakers, presenting a $556 billion opportunity by 2026, IoV applications and solutions will only gain pace with time. Traditional OEMs are getting ready for innovation by transforming into IT-driven companies. Some automakers like General Motors and Volkswagen are opting for their own IoV software development in the fields of ADAS and networking systems. Other top automotive market players are partnering with tech giants like IBM, Google, Bosch, and Tencent.

Telecom companies are also taking their place in the Internet of Vehicles' future. Given that, new business models are emerging.

2.3 Vehicular Communication Diagram

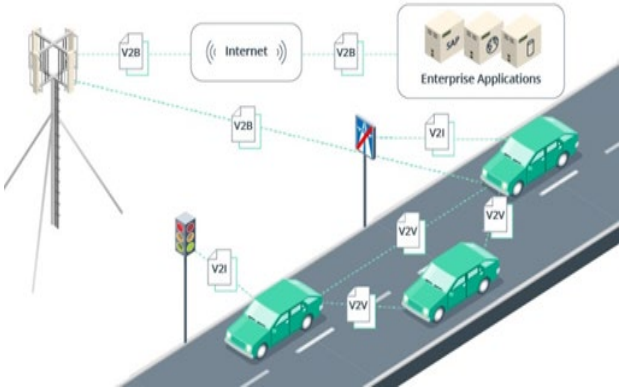


Fig.2. Vehicular communication diagram

2.4 Benefit From the Internet of Vehicles

- *Enhanced safety:*

Human mistakes, namely distracted driving, are the primary cause of car accidents. IoV safety technology will ensure healthy driving habits, predict problems, detect possible collisions, track drivers' health, and more

- *Cost saving and lifecycle revenue:*

Both governments and individual users benefit from optimized city infrastructure and traffic management as well as safer roads and decision-making based on properly gathered and analyzed data. More than that, IoV makes way for the wider adoption of carsharing services and autonomous driving, which is a serious budget-saver for people and cities.

III. Results and Discussion

Our proposed system works as follows; In this project we intend to integrate software and hardware blocks to develop a working model for VANET Based Vehicle accident Detection and Rescue system.

The proposed has divided into three phases which are:

- Speed and Accident Detection,
- Location Tracking, and
- Notification Sending.

The proposed system mainly designed in order to avoid accidents and to alert the drivers about the speed limits for safe traveling. An effective solution is provided to develop the intelligent vehicle which will operates on safest speed at critical zones and monitor various parameters of vehicle in-between constant time period and will send this data to the base unit is explained in this paper. Controlling the vehicle speed automatically in real time is very difficult. So, in order to avoid those difficulties, instead of controlling the vehicle speed automatically, this research paper succeeded in alerting the driver about the speed limits and detecting the critical area. The entire system is control and the advantage of small volume and high reliability.

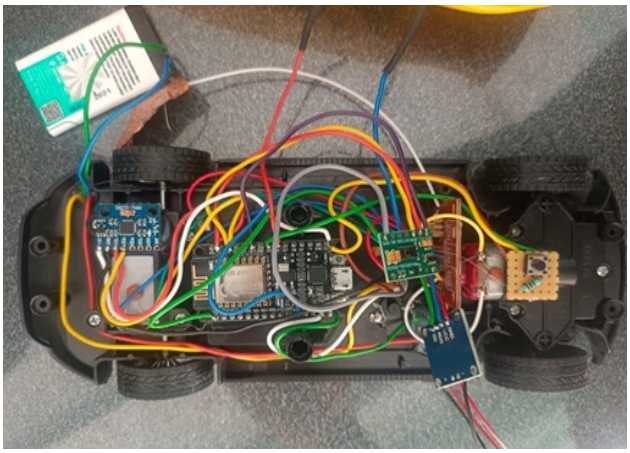


Fig.3. Hardware Proto type Model

IV. Conclusion

The proposed detection system works frequently whether there is an accident, over speed or not and reports the incident to OBU and predefined emergency services and family in case of an accident. The system classifies accidents into four classes i.e., collisions, rollovers, fall-offs, and no accidents, so that the best possible rescue operations can be undertaken. Five training variables namely change-in-altitude, pitch, roll, speed and, absolute linear acceleration ALA is used as input variables to train and test the system. If someone wants to reduce the time of automatic notification after the incident or compare the system with other automatic notification systems, every delay should be as short as possible whether it is algorithm's execution time or time taken in notification. But this work focuses on reducing overall reporting time using technology, compared to just manual reporting or non-reporting of an incident. To the best of our knowledge, our system is the only one of-a-kind system that classifies speed and accidents as collision, rollover, fall-off, and no-accident. Although system is highly accurate and have several advantages over other systems.

REFERENCES

[1]. Ahmet Can Altunisik, Alemdar Bayraktar, and Baris Sevim, "Operation modal analysis of a scaled bridge model using EFDD and SSI method", (2012), Indian Journal of Engineering & Materials Sciences, Vol. 19, pp.320-330.
[2]. WHO, "World Health Statistics 2014: A Wealth of Information of Global Public Health," Geneva, 2014.
[3]. WHO, "Global Status Report on Road Safety 2018: Summary," Geneva, 2018.
[4]. E. B. Lerner and R. M. Moscati, "The Golden Hour: Scientific Fact or Medical 'Urban Legend'?" Acad. Emerg. Med., 2001.
[5]. R. Sánchez-Mangas, A. García-Ferrrer, A. De Juan, and A. M. Arroyo, "The probability of death in road traffic accidents. How important is a quick medical response?" Accid. Anal. Prev., 2010.
[6]. M. A. Razzaque, M. Milojevic-Jevric, A. Palade, and S. Cla, "Middleware for internet of things: A survey," IEEE Internet Things J., 2016.
[7]. G. Ponte, G. A. Ryan, and R. W. G. Anderson, "An estimate of the effectiveness of an in-vehicle automatic collision notification system in reducing road crash fatalities in South Australia," Traffic Inj. Prev., 2016.
[8]. Y. Chung and W. W. Recker, "A Methodological Approach for Estimating Temporal and Spatial Extent of Delays Caused by Freeway Accidents," IEEE Trans. Intell. Transp. Syst., 2012.
[9]. F. Aloul, I. Zualkernan, R. Abu-Salma, H. Al-Ali, and M. Al-Merri, "IBump: Smartphone application to detect car accidents," Comput. Electr. Eng., 2015.
[10]. F. Bhatti, M. A. Shah, C. Maple, and S. Ul Islam, "A novel internet of things-enabled accident detection and reporting system for smart city environments," Sensors (Switzerland), 2019.
[11]. A. Shaik et al., "Smart Car: An IoT Based Accident Detection System," in 2018 IEEE Global Conference on Internet of Things, GCIoT 2018, 2019.