Automatic Accident Detection and Rescue System

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Abstract-- **The rapid growth of technology and infrastructure has made our lives easier. The advent of technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. Our project will provide an optimum solution to this draw back. According to this project when a vehicle meets with an accident immediately Vibration sensor will detect the signal and sends it to Microcontroller. Microcontroller find the location coordinates of accident spot using GPS and sends the alert message including geographic allocation coordinates through the GSM Module to ambulance unit. So the rescue team in the ambulance can immediately trace the location by putting geographical location coordinates in Google earth application or any other Geographic location finder application. After conforming the location of accident spot the ambulance unit will starts its rescue operation. This system also controls the traffic signals in the path of ambulance and helps ambulance to reach hospital in minimum time.**

Keywords– **Arduino Uno, Servo motor, GSM module, GPS, Control Unit.**

I.   INTRODUCTION

The population of the world has been increasing, with China and India being the two most densely populated countries. Road traffic has also been getting more and more congested, as a higher population and increased business activities result in greater demand for cars and vehiclesfor transportation. Thisincreased vehicle density leadsto many road accidents. In road accident due to lack of emergency services people lose their lives. The main aim of this project is a scheme to detect accident, location and provide a smooth flow for ambulance to reach hospital in time in emergency. In proposed system the unit installed in vehicle automatically informs accident to the prep programmed numbers of rescue team of ambulance. In this system vibration sensor and GPS tracking system are used. When accident occurs, this system sends short message to rescue team in the ambulance via GSM modem. From these location coordinates accident can be determined. So the rescue team in the ambulance can immediately trace the location by putting geographical location coordinates in Google earth application or any other GPS viewer application. After conforming the location of accident spot the ambulance unit will starts its rescue operation. If there is no serious threat to anyone`s life, then the alert message can be terminated by the driver by a switch provided in order to avoid wasting the valuable time of the medical rescue team. At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual.

II.   LITERATURE SURVEY

Bankar Sanket Anil, Kale Aniket Vilas, Prof. S. R. Jagtap paper taitled " Intelligent System for Vehicular Accident Detection and Notification" This paper presents a system which gives an idea about what can be done to provide medical help and other facilities after the accident as soon as possible. A flex sensor and accelerometer can be used to detect an accident, while the location of the accident will be told to desired persons, such as the nearest hospital, police, and owner of the vehicle through SMS sent using GSM modem containing coordinates obtained from GPS along with the time of the accident and vehicle number. The camera located inside the vehicle will transmit real-time video to see the current situation of passengers inside the vehicle. Published in year 2014.

Sanjana. K.R, et. Al paper taitled "An Approach on Automated Rescue System with Intelligent Traffic Lights for Emergency Service" They proposed a framework which will naturally identify street mishaps utilizing sensors, advise them to close by crisis administrations and family members through GSM. It is completely computerized, finds the mishap spot utilizing Google guide, and controls the traffic lights, assisting with arriving at the emergency clinic in time. Published in year 2015.

Chunxiao Liao, et. Al paper taitled "Shrewd Traffic Accident Detection System Based on Mobile Edge Computing" This paper proposes a savvy car crash location framework dependent on Mobile Edge Computing with vicinity, low idleness and processing, and vehicle recognizable proof. Our framework uses basic cell phones to get increasing speed and distinguishes pictures indicating mishap scenes primarily at servers if there should arise an occurrence of bogus positives, acknowledging computerization of mishap identification and advising environmental factors and divisions like clinics and branches of transportation progressively. Published in year 2017.

NajiTaaib Said Al Wadhahi, et. Al paper taitled "Mishaps Detection and Prevention System to decrease Traffic Hazards utilizing IR Sensors" This paper is utilizing IR sensors and Arduino Uno innovation. The framework has two stages Accident Detection and Accident Prevention. The recognition eliminate is conveyed utilizing IR sensors that could

recognize and alarm the individuals by sending SMS utilizing GSM module that contains predefined numbers and mishap area utilizing GPS module.
 Second Phase, Accident counteraction is done utilizing IR sensors by notice the driver about the neighboring vehicles when the separation between them is past the edge esteem. In year 2018.

Nicky Kattukkaran et. Al paper taitled " Intelligent Accident Detection and Alert System for Emergency Medical Assistance" This system aims to alert the nearby centre about the accident to supply immediate medical care. The attached accelerometer within the vehicle senses the lean of the vehicle and therefore the heartbeat sensor on the user's body senses the abnormality of the heartbeat to know the seriousness of the accident. Thus the systems will make the choice and send the knowledge to the smartphone, connected to the accelerometer and heartbeat sensor, through Bluetooth. The Android application on the mobile phone will be sent a text message to the nearest medical center and friends. The application also shares the exact location of the accident that can save time. Published in year 2017.

Arif Shaik et. Al paper taitled "Keen Car: An IoT Based Accident Detection System" This paper portrays the plausibility of furnishing a vehicle with innovation which will recognize a mishap and promptly ready crisis staff. When there is an auto collision somebody needs to effectively look for help, for example, calling 911 for crisis administrations. There is no programmed warning to the police, emergency vehicle, companions, or family. The Internet of Things (IoT) are frequently wont to deliver a programmed notice and reaction to the scene. A sign from an accelerometer and a GPS sensor is consequently sent to the cloud and from that point, an alarm message will be gotten by whoever is bought in to that vehicle. The sign will show the seriousness of the mishap and the GPS area. The rescue vehicle will utilize the GPS directions to get to the scene rapidly. In year 2018.

III. METHODOLOGY, COMPONENTS AND BLOCK DIAGRAM

- In this project has three units called Vehicle Unit, Ambulance Unit and Hospital Unit.
- In vehicle unit the vehicle has crash sensor according to that   sensor the main Arduino Controller will operate.
- crash sensor is used to detect the accident, when the crash sensor detects the accident that time the GPS and GSM modules will activated and send a message or call to that nearest hospital or authorized person which is already saved in the program.
- Traffic signals will work based on ambulance gives signal to traffic lanes.

- GPS module is used to identify the exact location of accident and it will send notification message to that authorized person.
- wifi is used send Notification message and call to that authorized person only when the accident happens.
- If accident occurs using the GSM module we are sending notification message to authorized person.
- Accident is detected by the crash sensor.
- Arduino UNO is the main controller used in the vehicle unit.
- Using the GPS the location will be send to authorized person.
- In Ambulance unit Node MCU ESP8266 is the main controller we used.
- It has inbuilt Wi-Fi to access the internet.
- Using LCD display the patient data is displayed.
- Through internet doctors or hospital personnel's can monitor the patient condition.
- Our project based on four main modules: Sensor, Controller, Hospital, Ambulance and traffic module.
- Sensor acts as a trigger that senses the location of the accident place and sends notification to the main controller.
- GSM module with a GSM is used here because to send message to that authorized person.
- GPS module is used to identify the accident location and send notifications to authorized person.
- Sensors are used to identify the patient condition and doctors or hospital personnel's can easily monitor the patient.
- Blynk app is used to monitor the patient condition. Blynk is a open source and free app available in play store. Everyone can download and use it easily.
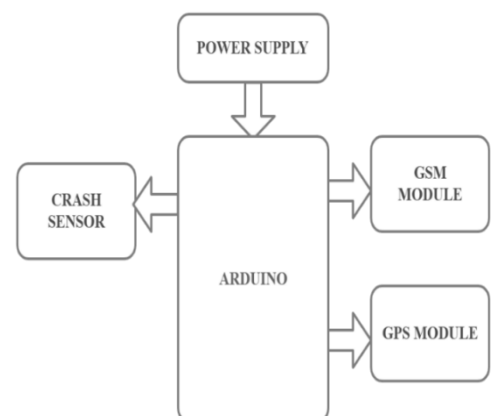- We can monitor the patient condition through internet.
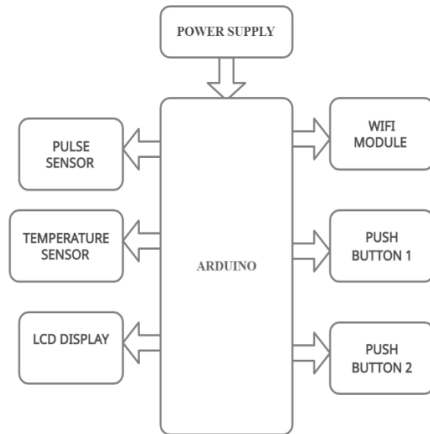

Fig.1: Block diagram of vehicle unit

Fig.2 : Block diagram of ambulance unit

Fig.3: Block diagram of traffic signal unit
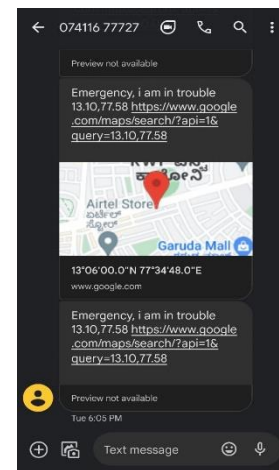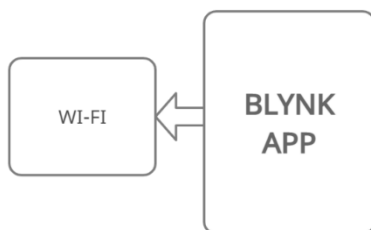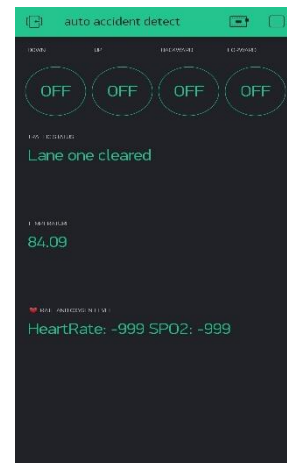

Fig.4: Block diagram of hospital unit

IV.   RESULTS

This system will be able to detect the location of accident spot automatically & accurately, and realizing the automation of information transmission. Consequently, it will save the people form wasting their time in searching of location and lives of the victims of accident. This system will send the information to the main controller is sent relatively

and the traffic unit is also controlled by the ambulance unit in order to reach the accident spot in time and from accident spot to hospital without delay. Such functions can be useful for "help" and "safety", of humans and society.

Fig.5: Parameter displayed on LCD
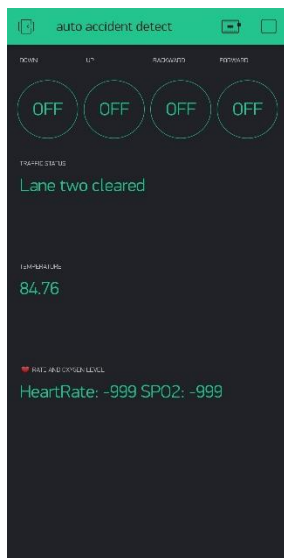

Fig.6:Alert message

Fig.7&8:Blink app

V. CONCLUSION

The design and development of Automatic Accident detection and rescue system which is based on vibration sensor using GSM and GPS are demonstrated in this proposed model. Accident spot and location can be detected automatically & precisely. Consequently, it will prevent the wasting of time in searching for the location of the accident. The result section proved that this system could automatically detect accident and able to sends the information to the main controller. Then based on the information main controller sends the ambulance unit to accident spot without any delay.

VI. REFERENCES

[1] Al Wadhahi, N.T.S., Hussain, S.M., Yosof, K.M., Hussain, S.A. and Singh, A.V., 2018, August. Accidents Detection and Prevention System to reduce Traffic Hazards using IR Sensors. In 2018 7th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO) (pp. 737-741). IEEE.

[2] Kota, V.K., Mangali, N.K., Kanakurthi, T.K., Kumar, A.R. and Velayutham, T., 2017, March. Automated accident detection and rescue system. In 2017 International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET) (pp. 1437-1441) IEEE.

[3] Sanjana, K.R., Lavanya, S. and Jinila, Y.B., 2015, March. An approach on automated rescue system with intelligent traffic lights for emergency services. In 2015 International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS) (pp. 1-4). IEEE.

[4] Khalil, U., Javid, T. and Nasir, A., 2017, November. Automatic road accident detection techniques: A brief survey. In 2017 International Symposium on Wireless Systems and Networks (ISWSN) (pp. 1-6). IEEE.

[5] Anil, B.S., Vilas, K.A. and Jagtap, S.R., 2014, April. Intelligent system for vehicular accident detection and notification. In 2014 International Conference on Communication and Signal Processing (pp. 1238-1240). IEEE.

[6] S. P. McGrath, I. M. Perreard, M. D. Garland, K. A. Converse, and T. A. Mackenzie*, "Improving Patient Safety and Clinician Workflow in the General Care Setting With Enhanced Surveillance Monitoring,"* IEEE J. Biomed. Heal. Informatics, vol. 23, no. 2, pp. 857–866, 2019, doi: 10.1109/JBHI.2018.2834863.

[7] P. W. Digarse and S. L. Patil*, "Arduino UNO and GSM based wireless health monitoring system for patients,"* Proc. 2017 Int. Conf. Intell. Comput. Control Syst. ICICCS 2017, vol. 2018-Janua, pp. 583– 588, 2017, doi: 10.1109/ICCONS.2017.8250529.

[8]S. Nubenthan and K. Ravichelvan, *"A wirelesscontinuous patient monitoring system for dengue; Wi-Mon,"* Proc. 2017 Int. Conf. Wirel. Commun. Signal Process. Networking, WiSPNET 2017, vol. 2018- Janua, pp. 2201–2205, 2018, doi: 10.1109/WiSPNET.2017.8300150.

[9] S. Marathe, D. Zeeshan, T. Thomas, and S. Vidhya, *"A Wireless Patient Monitoring System using Integrated ECG module, Pulse Oximeter, Blood Pressure and Temperature Sensor,"* Proc. - Int. Conf. Vis. Towar. Emerg. Trends Commun. Networking, ViTECoN 2019, pp. 1–4, 2019, doi: 10.1109/ViTECoN.2019.8899541.

[10] R. Karthikamani, P. S. Y. Prasath, M. V. Sree, and J. Sangeetha, *"Wireless patient monitoring system,"* Int. J. Sci. Technol. Res., vol. 8, no. 8, pp. 1081– 1084, 2019.

[11] M.Shamim Hossaina Ghulam Muhammad *"Cloud-assisted Industrial Internet of Things (IIoT) – Enabled framework for health monitoring"*

[12] Shyamal Patel *"A review of wearable sensors and systems with application in rehabilitation"* Journal of Neuro Engineering and Rehabilitation Northeastern University.

[13]S. M. Riazul Islam UWB Wireless Communications Research Center, Inha University, Incheon, Korea The Internet of Things for Health Care: A Comprehensive Survey.

[14]Suhas Kale and C. S. Khandelwal *"Design and implementation of real time embedded tele-health monitoring system"* international conference on circuits, power and computing technologies, 2013.

[15]V. Tripathi and F. Shakeel, *"Monitoring Health Care System Using Internet of Things - An Immaculate Pairing,"* 2017 International Conference on Next Generation Computing and Information Systems (ICNGCIS), Jammu, 2017, pp. 153-158.