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IOT BASED ACCIDENT DETECTION & ALTERING SYSTEM

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***Abstract*—** Now a days, a major part of the accident is due to the uneven interruptions. Speed is one of the reasons for most of vehicle accidents. Hope this project will provide the solution for this drawback. If emergency services get the accident information in time, then many lives could have been saved. If a vehicle meets with an accident, the vibration sensor and ultrasonic sensor detect the signal and sent it to the ARM 7.The term paper is helpful in detecting the accident and alerting the authorized persons by sending the geographic location. In this project, an email will be sent by capturing the accident images using wireless webcam.Hope this term paper will provide the solution for this drawback. If emergency services get the accident information in time, then many lives could have been saved.

I.INTRODUCTION

According to the survey in 2017, approximately the total of 2,076 people died in road accidents. The demand of the automobiles has increased the road accidents , Due to the lack of emergency facilities in our country, we are introducing the automatic alert device for vehicle accidents. The proposed system detects the accident and sends the information in less time to near-by first aid center. The road accident in many developing countries is characterized by human powered vehicle without adopting traffic segregation resources. This caused great concern to engineers and planners. The road accidents are predicted to cause the leading death unless action is taken. 'Accidents are caused not natural', so approximate measures are developed , The uncontrolled event of a person results in personal injury. The highest percentage of all deaths due to road traffic accidents. It not only affects the crash but also increases the risk involved in it , With this project, an app is created along with the hardware components so that the information is transferred to the near-by police station or ambulance. An IOT is the network of the physical device, vehicles and other items embedded with electronics, software, sensors, actuators and network connectivity which help in connectivity of data , IOT refers to rapidly growing network of connected objects that are able to collect and exchange data using embedded sensors. It is used for monitoring events and changed in structural conditions which compresses of risk and scheduling repair and maintenance activity in efficient manner. In today's era, vehicles are the important part of the human's daily life. The usage of vehicles has increased rapidly over the past decades. The major reason for the death rates over the world is due to the road accidents. The appearance of vehicles impacts on the human life. The increasing number of vehicles has also increased not only the road accidents but also traffic hazards. Preventing deaths and serious injuries in road accidents is becoming an important goal for the governments around the world. The main reasons for the accidents are high speed driving, lack of sufficient sleep, drunk and driving and also the use of electronic gadgets while driving. To recognize the location of the accident and to find the accident location automatic accident identification and alerting system is very useful. For an accident victim, every second is important to save the victim's life. Hence, it is important to provide medical services on a time to the victim of the accident. In the arrival of ambulance if there is delay, there will a probably loss of life. Near about 1.2 million people are died every year and 50 million people injured every year worldwide due to road accidents. The most likely reason of individual's death after accident is lack of first aid because emergency services cannot reach on time at accident location. Analysis shows that if we decrease only 1-2 minutes of accident response time that can increase the chances of saving person's life up to six percent. Hence, emergency services should reach on time at accident location. Therefore, the main goal of the accident identification system is to detect an accident and automatically send the message to the registered numbers such as emergency services along with the location. Real time geographic location of the vehicle is informed by the system by using preinstalled sensing accelerometer equipment. The output of an accelerometer is given input to the microcontroller, this input data is continuously monitored by the microcontroller unit. The vehicle can be tracked in all weather conditions. GPS and GSM technologies are used in the proposed system to provide all the data to the registered number or the remote server. The information received is used to provide services to the individual at the time of emergency. The output of the accelerometer is continuously monitored and processed by the microcontroller.

When an accident occurs, there is a sudden change in the acceleration or the roll-off in the car's axis. The accident is detected with the help of the microcontroller. The microcontroller sends an alert message automatically to the relatives as well as nearby police station and emergency medical services through the GSM module. The geographic location of the vehicle is acquired by the GPS module. The alert message includes the geographic coordinates, time in which accident has occurred. In case if there is false detection of accident or a minor accident happened and there is no medical facility required a switch is provided to the user to terminate the ongoing emergency message. The switch has to be pressed by the user within specified time which is 1 or 2 minutes. Hence with help of this project we can detect the location of the vehicle where the accident has occurred so that we can provide the first aid to the victim as early as possible.

Main Reasons of Accident Every day, thousands of road accidents happen across the world. Main reasons of accidents are because of human errors or human mistakes while driving vehicle. Road accidents occur due to variety of reasons. Often, drivers are distracted while driving, taking their focus away from the road. In some cases, drivers get tired after spending more hours in driving vehicle. In some cases, accidents occur in multiple reasons like bad visibility and unsafe road design. Some of the common reasons which causes accident are Over-speeding, Drunken driving, Distraction of driver, red light jumping, Bad Road conditions, Drowsy driving, Animal crossing, etc.,

II.INTRODUCTION TO IOT

The IOT concept was coined by a member of the Radio Frequency Identification (RFID) development community in 1999, and it has recently become more relevant to the practical world largely because of the growth of mobile devices, embedded and ubiquitous communication, cloud computing and data analytics. Imagine a world where billions of objects can sense, communicate and share information, all interconnected over public or private Internet Protocol (IP) networks. These interconnected objects have data regularly collected, analyzed and used to initiate action, providing a wealth of intelligence for planning, management and decision making. This is the world of the Internet of Things (IOT). Internet of things common definition is defining as: Internet of things (IOT) is a network of physical objects. The internet is not only a network of computers, but it has evolved into a network of device of all type and sizes , vehicles, smart phones, home appliances, toys, cameras, medical instruments and industrial systems, animals, people, buildings, all connected ,all communicating & sharing information based on stipulated protocols in order to achieve smart reorganizations, positioning, tracing, safe & control & even personal real time online monitoring , online upgrade, process control & administration], We define IOT into three categories as below: Internet of things is an internet of three things: (1). People to people, (2) People to machine /things, (3) Things /machine to things /machine, Interacting through internet. Internet of Things Vision: Internet of Things (IoT) is a concept and a paradigm that considers pervasive presence in the environment of a variety of things/objects that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things/objects to create new applications/services and reach common goals. In this context the research and development challenges to create a smart world are enormous. A world where the real, digital and the virtual are converging to create smart environments that make energy, transport, cities and many other areas more intelligent.

Internet of Things is referring to the general idea of things, especially everyday objects, that are readable, recognizable, locatable, addressable through information sensing device and/or controllable via the Internet, irrespective of the communication means (whether via RFID, wireless LAN, wide area networks, or other means). Everyday objects include not only the electronic devices we encounter or the products of higher technological development such as vehicles and equipment but things that we do not ordinarily think of as electronic at all - such as food , clothing ,chair, animal, tree, water etc.

Internet of Things is a new revolution of the Internet. Objects make themselves recognizable and they obtain intelligence by making or enabling context related decisions thanks to the fact that they can communicate information about themselves. They can access information that has been aggregated by other things, or they can be components of complex services. This transformation is concomitant with the emergence of cloud computing capabilities and the transition of the Internet towards IPv6 with an almost unlimited addressing capacity. The goal of the Internet of Things is to enable things to be connected anytime, anyplace, with anything and anyone ideally using any path/network and any service.

III. ENABLING TECHNOLOGIES FOR IOT

Internet of things (IoT) is a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies. With the Internet of Things, the communication is extended via Internet to all the things that surround us. The Internet of Things is much more than machine to machine communication, wireless sensor networks, sensor networks, 2G/3G/4G, GSM, GPRS, RFID, WI-FI,
GPS, microcontroller, microprocessor etc. These are considered as being the enabling technologies that make "Internet of Things" applications possible. Enabling technologies for the Internet of Things are considered in and can be grouped into three categories: (1) technologies that enable "things" to acquire contextual information, (2) technologies that enable "things" to process contextual information, and (3) technologies to improve security and privacy. The first two categories can be jointly understood as functional building blocks required building "intelligence" into "things", which are indeed the features that differentiate the IoT from the usual Internet. The third category is not a functional but rather a de facto requirement, without which the penetration of the IoT would be severely reduced. The Internet of Things is not a single technology, but it is a mixture of different hardware & software technology. The Internet of Things provides solutions based on the integration of information technology, which refers to hardware and software used to store, retrieve, and process data and communications technology which includes electronic systems used for communication between individuals or groups. There is a heterogeneous mix of communication technologies, which need to be adapted in order to address the needs of IoT applications such as energy efficiency, speed, security, and reliability. In this context, it is possible that the level of diversity will be scaled to a number a manageable connectivity technology that address the needs of the IoT applications, are adopted by the market, they have already proved to be serviceable, supported by a strong technology alliance. Examples of standards in these categories include wired and wireless technologies like Ethernet, WI-FI, Bluetooth, ZigBee, GSM, and GPRS.

IV. CHARACTERISTICS OF IOT:

The fundamental characteristics of the IoT are as follows [2, 6]: Interconnectivity: With regard to the IoT, anything can be interconnected with the global information and communication infrastructure. Things-related services: The IoT is capable of providing thing-related services within the constraints of things, such as privacy protection and semantic consistency between physical things and their associated virtual things. In order to provide thing-related services within the constraints of things, both the technologies in physical world and information world will change. Heterogeneity: The devices in the IoT are heterogeneous as based on different hardware platforms and networks. They can interact with other devices or service platforms through different networks. Dynamic changes: The state of devices change dynamically, e.g., sleeping and waking up, connected and/or disconnected as well as the context of devices including location and speed. Moreover, the number of devices can change dynamically. Enormous scale: The number of devices that need to be managed and that communicate with each other will be at least an order of magnitude larger than the devices connected to the current Internet. Even more critical will be the management of the data generated and their interpretation for application purposes. This relates to semantics of data, as well as efficient data handling. Safety: As we gain benefits from the IoT, we must not forget about safety. As both the creators and recipients of the IoT, we must design for safety. This includes the safety of our personal data and the safety of our physical well-being. Securing the endpoints, the networks, and the data moving across all of it means creating a security paradigm that will scale. Connectivity: Connectivity enables network accessibility and compatibility. Accessibility is getting on a network while compatibility provides the common ability to consume and produce data.

V. LITERATURE SURVEY

To protect the vehicle and tracking so many advanced technologies are available now a days. In olden days the information of accident can be transferred, but most of the time place of accident spot cannot be identified. In all vehicle airbags are designed, air bags are used for security and safety travels. The air bag

system was introduced in the year of 1968. Many other systems have been proposed to deduce the accident. The existing system deals with two sensors where MEMS sensor is used to detect the angle and vibration sensor is used for detection the change in the vehicle. The other existing system uses IOT and cloud computing system. Where the vehicle detection is done through SVM (support vehicle machine) that is developed by Ant Colony Algorithm (ACA). Here IOT will monitor the vehicles using magneto resistive sensors.

Existing system also provides the location of the accident using Atmega 328 Microcontroller and RF transmitter and receiver. The information is sent to the saved mobile numbers. Some existing system also provide location and alert on mobile numbers by usinggps and gsm device.

VI. PROPOSED SYSTEM

Proposed system will provide an automatic detection and alert of accident it also locates the location of the vehicle and send it to emergency numbers and registered mobile number and send alert on email. The system we made is the lower cost then others as we are not using any expensive device like gsm and other sensors. The system just uses the nodemcu as a main controller of the system and other than that we are using MPU-6050 3 Axis Accelerometer and Gyroscope sensor to detect the accident occurs and NE0-6M gps module to locate the exact position of the vehicle.

VII. BLOCK DIAGARAM

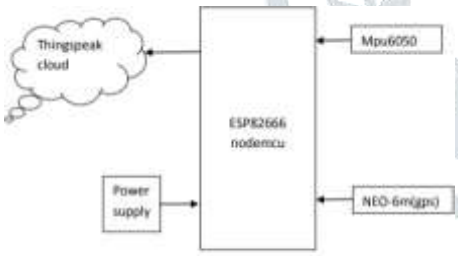

Fig.1: Block diagram of proposed system

Description:

ESP8266(nodemcu): we are using nodemcu for our design as it is low cost device which gives us feature like controlling the devices connected to it and according to the sensor data take action. It provide us an IoT platform to send our sensor data on cloud server and take action according to that.

Fig.2: Nodemcu

MPU-6050: MPU6050 is based on Micro-Mechanical Systems (MEMS) technology. This sensor has a 3-axis accelerometer, a 3-axis gyroscope, and an in-built temperature sensor. It can be used to measure parameters like Acceleration, Velocity, Orientation, Displacement, etc.

MPU-6050 3 Axis Accelerometer and Gyroscope sensor

NEO-6M(GPS): GPS module is based on the NEO 6M GPS. This unit uses the latest technology to give the best possible positioning information and includes a larger built-in 25 x 25mm active GPS antenna with a UART TTL socket. A battery is also included so that you can obtain a GPS lock faster. This GPS module gives the best possible position information, allowing for better performance. The module has serial TTL output, it has four pins: TX, RX, VCC, and GND.

Fig.4: NEO-6M(GPS)

Power supply: 5v constant dc power supply is used as all the device is work on the regulated dc power supply and it need constant power.

VIII. WORKING

The system takes the continuous reading from MPU-6050 3 Axis Accelerometer and Gyroscope sensor. The sensor gives us the X,Y,Z axis reading according to that we do action. as first the we will take some reference reading of the x,y,z axis and according to that it detects the accident and send alert. If the accident occurs the reading of the sensor changes drastically and will detect accident according to that and the gps take the latitude and longitude reading and give it to nodemcu. As nodemcu get the reading it will send it to thingspeak cloud. And as the data upload on the cloud it will send email alert and text messages to the emergency number and the registered number. The system will use the IFTT webhooks to create the event and as the alert send to cloud server the webhook event will be trigger and the alert is sent to emergency number and registered number and email. The alert message includes the exact location of the vehicle.

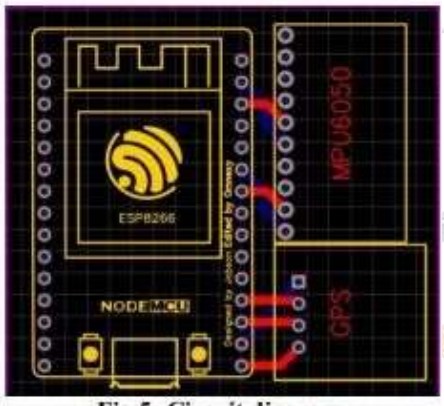

Fig.5: Circuit diagram

IX. CONCLUSION

The proposed system deals with the accident detection and alert. ESP8266 is the heart of the system which helps in sending data to thingspeak cloud and help to trigger the webhook event which will send location and alert to the specified number and email. Mpu6050 sensor will change its reading drastically when the accident occurs and the information is transferred to cloud. Using GPS the location can be sent through tracking system to cover the geographical coordinates over the area. The accident can be detected by a mpu6050 sensor which is used as major module in the system. By using this system we can reduce the death occurs due to late help after the accident

X. REFERENCES

[1]. Mr.S.Iyyappan and Mr.V.Nandagopal , "Accident Detection and Ambulance Rescue with Intelligent Traffic Light System", International Journal of Advanced Technology and Engineering Research,2013.

[2]. .AboliRavindraWakure,ApurvaRajendraPatkar, "Vehicle Accident Detection and Reporting SystemUsing Gps And Gsm." International Journal ofEngineering Research and General Science,2014

[3]. Miss.Monali D.More,Miss.Shivani L. Lamkane and Miss.Prajakta B. Jadhav, "Vehicle Tracking And Accident Alert System Using Microcontroller", International Journal of Research in Engineering and Science,2021.

[4]. T Kalyani, S Monika, B Naresh, Mahendra Vucha, "Accident Detection and Alert System", International Journal of Innovative Technology and Exploring Engineering,2019.

[5]. B. Huang and J. Preston, "A Literature Review on Motorcycle Collisions", Transport Studies Unit Oxford University April 2004.

[6]. Vikas Desai, "Design and Implementation of GSM and GPS Based Vehicle Accident Detection System", IJIT, vol. 01, Issue-3, 2013

[7]. Nicky K., Arun G., Mithun T.P., "Intelligent Accident Detection and Alert System for Emergency Medical Assistance", IEEE, Jan-5, 2017.

[8]. Nimisha C., "Automatic Vehicle Accident Detection and Messaging System using GPS and GSMModem",IRJET, vol. 5, Mar-2018,pp. 252-254.

[9]. T. Kalyani, S. Monika "Accident Detection & Alert System", IJITEE, vol. 8, Mar-2019, pp.227-229.

[10]. M. Reddy, J. Tulasi "Accident Detection Depending on the Vehicle Position and Vehicle Theft Tracking, Reporting Systems," IJSETR, vol. 3, Sep-2014, pp. 2359-2362.

[11]. Nayan Jeevagan, Pallavi Santosh, Rishabh Berlia, Shubham Kandoi, "RFID Based Vehicle Identification During Collisions", IEEE, Oct-2014, pp.716-720.

[12]. N. Suganya , E. Vinothini, "Accident Alert and Event Localization", IJEIT, Feb-2015,vol. 3, Issue 8, pp. 53-54.

[13]. Bruno F., Vitor G., "Mobile Application for Automatic Accident Detection and Multimodal Alert", Instituto de Telecomunicações Universidade de Aveiro, Portugal, May-2015.