



ROAD ACCIDENT DETECTION USING INTERNET OF THINGS

B K Rakshitha¹, Sowmya B P²

Research Scholar, Dept. of MCA, P.E.S College of Engineering, Mandya, India ¹

Professor Scholar, Dept. of MCA, P.E.S College of Engineering, Mandya, India ²

Abstract: An accident is an unpredicted and unintentional event. This system aims at providing early detection of accidents and communicating the information immediately to the emergency responses on time to provide quick assistance for the injured person. When the rider met with an accident. IOT is a system assures to provide immediate assistance to the victim of the accident. The results give exact locations of the accident. This project implements Internet of Things using Raspberry Pi 3b embedded with Global Positioning System and Sensors. This project helps to prevent road accidents caused due to the over speed and if at all accident is inescapable because of various other reasons then providing the victims with immediate rescue and medical assistant.

Keywords: Raspberry Pi 3b, Global Positioning System and Sensors, IOT, over speed.

I. INTRODUCTION

The Vision of the Internet of Things (IoT) has come out to reach unexpected bounds of today's computing world. It is a concept that not only can impact human's life but also how they function. The heart of IOT is smart sensors without which it would not have existed. These sensors form a vast network for their communication. They capture minute details of their surroundings and pass this important information to each other. Based on the received information, relevant actions are performed accordingly. It is the latest communication model that imagines the proximate future, in which objects of day to day life will be incorporated with microcontrollers for digital communication with the help of appropriate protocol stacks that will make them capable of communication with one another. It is a technology that aims to impart intelligence to devices so that they can smartly connect and perform the necessary actions to eliminate human labour. It gives an image of the future where non-living objects will be communicating with each other and doing the needful work. In this way, human labour will be eliminated to an extent and the devices will be performing necessary actions.

II. RELATED WORK

IoT based car accident detection and notification algorithm for general road accidents With an increase in population, there is an increase in the number of accidents that happen every minute. These road accidents are unpredictable. There are situations where most of the accidents could not be reported properly to nearby ambulances on time. In most of the cases, there is the unavailability of emergency services which lack in providing the first aid and timely service which can lead to loss of life by some minutes. Hence, there is a need to develop a system that caters to all these problems and can effectively function to overcome the delay time caused by the medical vehicles. The purpose of this paper is to introduce a framework using IoT, which helps in detecting car accidents and notifying them immediately. This can be achieved by integrating smart sensors with a microcontroller within the car that can trigger at the time of an accident. The other modules like GPS and GSM are integrated with the system to obtain the location coordinates of the accidents and sending it to registered numbers and nearby ambulance to notify them about the accident to obtain immediate help at the location.

Collision detection methods

In this study the author proposes a preliminary real-time autonomous accident-detection system based on computational intelligence techniques. Istanbul City traffic-flow data for the year 2015 from various sensor locations are populated using big data processing methodologies. The extracted features are then fed into a nearest neighbor model, a regression tree, and a feed-forward neural network model. For the output, the possibility of an occurrence of an accident is predicted. The results indicate that even though the number of false alarms dominates the real accident cases, the system can still provide useful information that can be used for status verification and early reaction to possible accidents. The raw data acquired from the Traffic Department is not usable in its existing format due to the amount of the data and some inconsistencies in the syntax and content. In order to process this type



of problematic data and extract the features accordingly, big data processing techniques are adapted.

The problem of finding the shortest route as one of the fundamental case studies in the field of computer science is quite challenging, especially if it involves large variables. Manual calculations will be difficult to obtain optimal solutions in a short time, even just for one destination. In this journal the discusses a combination of node combination algorithms and Dijkstra algorithm to find the shortest path from one point to another on Geographic Information Systems (GIS) based systems. This combination allows the use of memory during the route search process can be reduced, in addition to the solution obtained can be ascertained is the optimal solution with the shortest route. The data used in this research is obtained from the map location in Taman Subdistrict, Sidoarjo, East Java, Indonesia, with the number of nodes as many as 17 pieces and 72 vertices. Distance spacing is calculated based on the value of latitude and longitude obtained from the Google Maps API.

A Mobile-based Navigation Web Application: Finding the Shortest-time Path based on Factor Analysis

The shortest distance doesn't always mean that we can cover that distance in shortest time. Here the authors discusses about finding the path that can be covered in shorter times when compared to the other available paths to reach the destination. Here time taken to cover the distance in the presence of traffic congestion is the primary consideration. Accident Detection for Automobiles Switch and Buzzer

The distinguishing feature of this paper is here the authors Sharath Kumar K and Kavitha Juliet have provided a buzzer manual switch to turn off the system in case of a false alarm or if the accident is minor. Buzzer is used to emit the sound in the automobile, because the accident may be major or minor so in order to detect the accident condition of automobile. Buzzer is connected with Arduino kit which is also inter connected with Panic Switch. Panic switch plays more important role it determines whether accident is major or minor. It operates when accident is occurred, if accident is major than people in that automobile will be unable to touch so within few seconds the conformation of major accident will be sent to emergency stations else if panic switch is pressed within a stipulated time than there will be no confirmation message sent to the servers so that it determines that accident is minor so that no assistance will be provided at that time.

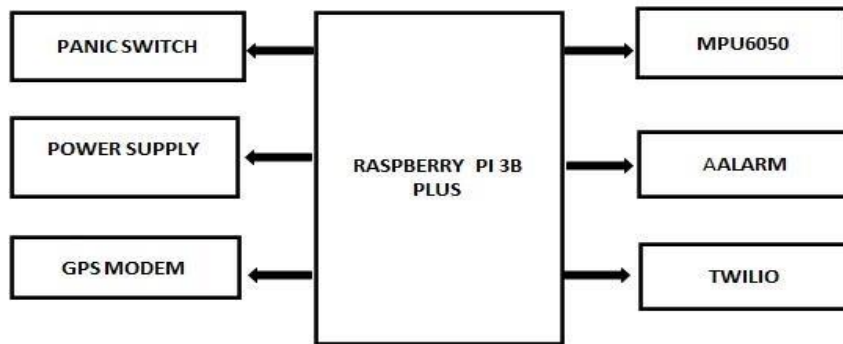
Raspberry Pi as Sensor Node and Hardware of the Internet of Things (Iot) for Smart Home

In the present days, home automation using wireless communication and network capabilities made the monitoring of remote parameters of sensor nodes very easy. In smart home concept, monitoring the sensor data plays an important role in detecting any abnormality in the house and taking proper response in time. However, all the existing sensor nodes required high cost and have lower processing capability and may use proprietary operating systems. That is why, these nodes do not provide optimum solution of the modern Smart Home systems. The paper proposes an implementation of cheap, fully customizable, and programmable Raspberry Pi board as gateway for the sensors and it also uses Linux as operating system which is free and open source. The proposed architecture has three main parts: a sensor data aggregator, i.e., Raspberry Pi, a notification system (SMS and Email), and a real time sensor data observation system using PubNub web service. The proposed architecture provides lower cost and user friendly environment than the existing architectures of sensor nodes. The Twilio is a web service that enables sending free SMS from the internet.

III. METHODOLOGY

This idea is achieved through the Global Positioning System, transmitting information to hospitals in case of accidents which would be detected by the Sensors. The Accident occurrence is intimated to the nearby hospital police stations and a family member (Found by the Region based search done by Global Positioning System) by the mailing unit. Once the mail is received, the authorized personnel intimate the ambulance and provide them with the accident location. One of the major causes behind the casualties of people in road accidents high speed of the vehicle. Research studies have stated that majority of accidents occur due to overspeed of the vehicle. Different countries have different statistics for accidents that occurred due to overspeed. Developing technology for high speed alert system is the main challenge. According to the report by "Ministry of Road Transport & Highways" there were 4,552 accidents reported every year in India, that took lives of thousands of people because of overspeed (Road Accidents in India 2016).

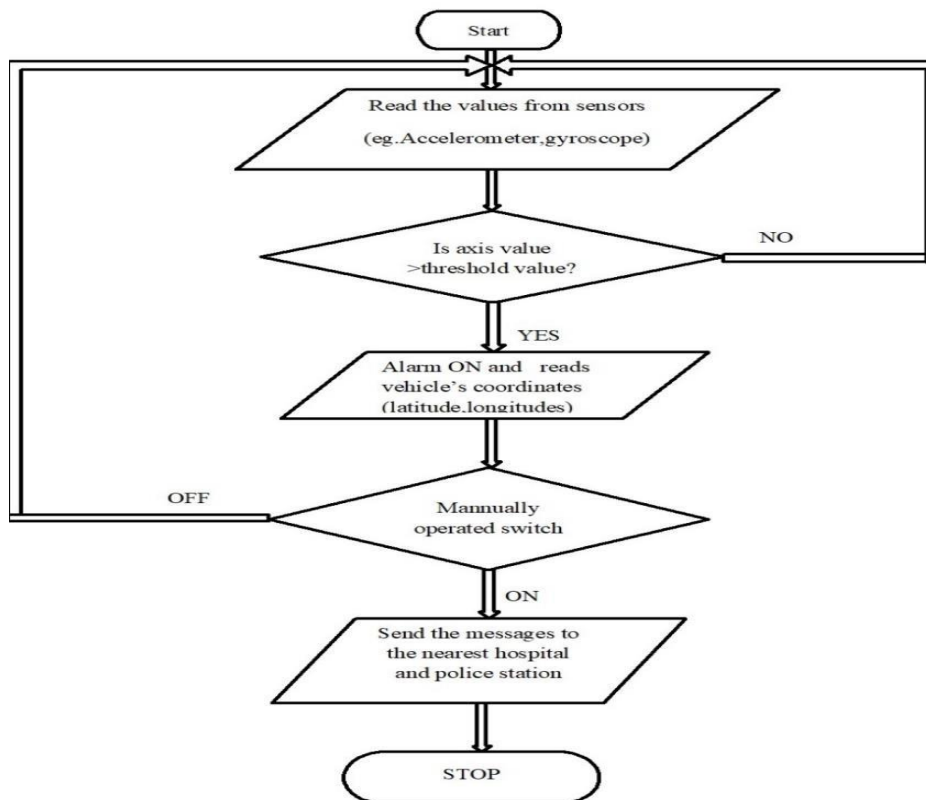
This project implements Internet of Things using Raspberry Pi 3b embedded with Global Positioning System, camera and Sensors. This project helps to prevent road accidents caused due to the driver's drowsiness and if at all accident is inescapable because of various other reasons then providing the victims with immediate medical assistance. Here we discuss Raspberry Pi as a currently exploring way to provide the accident information and GPS location of the vehicle to nearby hospitals through internet, providing a remedy to the increased time consumption to identify accidents and to begin treatment to the accidental victims.



Block diagram

IV. IMPLEMENTATION

Implementation is the stage of the project when the theoretical design is turned into working system. At this stage the workload of upheaval and impact on existing practices shift to the user department. If the implementation stage is not carefully planned and controlled, it can cause chaos, thus it can be considered to be the most critical stage in achieving new system and in giving the users confidence that the new system will work and be affective. The process of putting the developed system to actual use is called as System Implementation. It includes all the activities that take place to use the new system. Once the planning has been completed, the major effort in the department is to ensure that the programs in the system are working properly.



Flow of Implementation

V. CONCLUSION

This project presents vehicle accident detection and alert system with SMS to the user defined mobile numbers and control rooms. The proposed vehicle accident detection system can track geographical information automatically and



sends an alert SMS regarding accident. This vehicle accident detection and alert systems provide emergency responders with crucial information at the earliest possible time. Reducing the time between when an accident takes place and when it is detected can reduce mortality rates. Conventional in vehicle accident detection and notification systems are effective in reducing the time gap before first responders are sent to the scene.

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