International Journal of Research in Engineering, Science and Management
Volume-3, Issue-6, June-2020
www.ijresm.com | ISSN (Online): 2581-5792

Smart Accident Detection and Emergency Notifications System Using IoT and Mobile Computing

P. Nirmal Tejashri[1*], S. Nikam Archana[2], B. Muradnar Mohinee[3], S. Kashid Kanachan[4], S. Chandgude Amar[5]

[1,2,3,4]*Student, Department of Computer Engineering, S. N. D. College of Engineering, Yeola, India*

[5]*Assistant Professor, Department of Computer Engineering, S. N. D. College of Engineering, Yeola, India*

*Corresponding author: nirmaltejashri98@gmail.com

***Abstract*: Technology rapidly growth, but also people do not survive his/her life after road accident. Because there are no emergency facilities available in our country. So we design a technology which facilitates the emergency facility. This project informs about an accident that is occurred to vehicle to rescue team and family members of the travelling persons. It uses MEMS sensor which can detect the abrupt vibration when an accident is occurred and also used ultrasonic sensors for distance calculation. The development in the field of automobiles is highly increasing and which leads to the accidents and so many hazards due to traffic. People's life is under high risk. This situation prevails, just because there is a lack of emergency facilities in our country. In our country, many people lose their life with accidents. Because of causalities or improper communication to rescue team. We are in the process of solving this issue by proposing an efficient solution and to reduce the loss of lives as much as possible.**

***Keywords*: Accident detect, Hidden Markov model, Occlusion, Spatio-temporal, Marko random field, Tracking.**

1. Introduction

The development in the field of automobiles is highly increasing and which leads to the accidents and so many hazards due to traffic. People's life is under high risk. This situation prevails, just because there is a lack of emergency facilities in our country. In our country, many people lose their life with accidents. Because of causalities or improper communication to rescue team. We are in the process of solving this issue by proposing an efficient solution and to reduce the loss of lives as much as possible. In our theory, the design of the system helps us to detect accidents in significantly less time and transfer the fundamental information's to the first aid centre within a few seconds covering the geographical coordinates, the time and the angle where the vehicle had met with an accident.

2. Literature Survey

[1] Using GPS, GSM and GIS:

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. The research work is going on for tracking of the vehicle even in dark clumsy areas where there is no network for receiving the signals. In literature, a number of approaches to provide security and safety through monitoring the vehicle's real time precise positioning and information using different technologies have been proposed. A good survey of using GPS, GSM and GIS has been provided in [Ioan Lita, Ion Bogdan Cioc, Daniel Alexandru Visanetal, 2006] and Ramya Kulandaivel, P. Ponmalar, B. Geetha, G. Saranya, 2012].

The general mechanism is to provide the real time geographical position of a vehicle using GPS receiver and send this information to GSM center through configurable software, this is all done by the monitoring center which is working as a control unit that is connected not only by an optical cable but also connected wirelessly through TCP/IP protocols. The monitoring center distributes the data to the client in an understandable format and it also stores the travelling recordsanddisplaystherealtimeinformationaboutvehicleonelect ronicmapthroughGIS system [IoanLita, Ion Bogdan Cioc, Daniel Alexandru Visan et al, 2006

[2] An Approach to Make Way for Intelligent Ambulance Using IoT:

Firstly, it is fully control of Traffic management control. GPS, GPRS and network, upon those technologies Internet of Things is found, to construct an intelligent traffic monitoring system, which can serve a good facility to make apath to ambulance in traffic load to reach the hospital which makes the latter as a part of the former. Secondly, intelligent traffic monitoring system based on Internet of Things has a number of advantages such less cost, high reliability, never affected by adverse weather, all weather operations etc. Thirdly, the technologies of Internet of Things makes it possible that a complete automation in monitoring system from data detect to data transmission, and to intelligent decision-making, from vehicle management to highway congestion control. Because fully automatic monitoring and management for vehicles and high ways in an intelligent traffic monitoring system based on Internet of Things can completely realized, it will have a broad

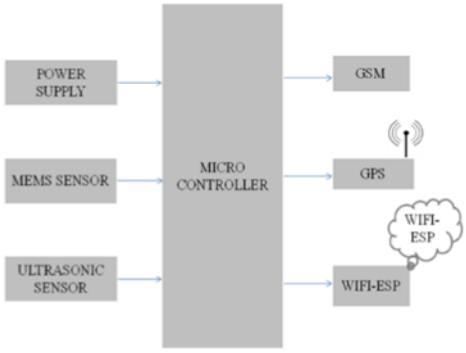
applying perspective.

[3] Automatic ambulance rescue system using shortest path finding Algorithm:

In a critical situation many vehicles faces accident, due to this lot of person lost their lives. Some people can be saved at that time, but because of lack of information, time and place, it may not be possible. Using the vehicle black box concept, the accident happened can be detected with the help of GPS and GSM systems. The victim can be admitted in the hospital by the ambulance section as soon as possible by controlling the traffic signals. Therefore, the black box concept can provide for road safety hence it creates a safe driving for the driver and give security for the life and property of the public. The successful implementation of the PTM Scan continuously provides field data and valuable experiences to test and evaluate the effectiveness of the ACP.

3. Proposed System

In daily basis we found no public life is unsafe due to daily traffic. We are in the process of solving this issue by proposing an efficient solution and to reduce the loss of lives as much as possible. We solving problem of accident using IOT and sensors.



1. User Registration: Here user can register himself and add relative no with other required fields.

2. User Login: After Registration user can login into the system.

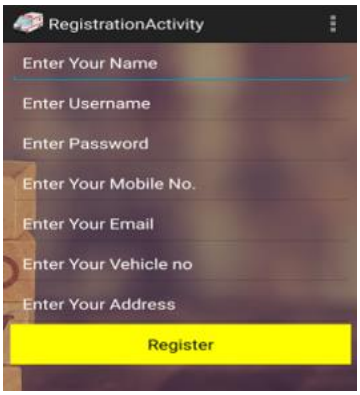
3. Vehicle Tracking: module is working in background in system.

4. Sensor Module: With help of sensor module if accident done sensor thought we can send sms to relative with exact location.

A. Algorithm/Technique

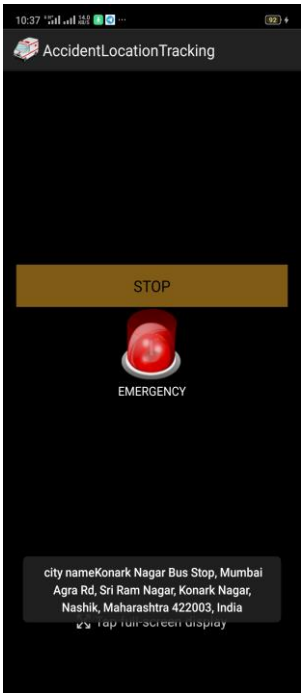
1. Start
2. Register with essential information
3. If user already exist, then enter mobile no. and password.
4. Tracking Location.
5. Accident Spot Detection.
6. Send SMS.

4. Result



Here User can registration in this module user have register first and all field should be must.

This is login module here after registration successfully user can login to the system



Here User can send his/her current location to relative and police to save his life**.**

5. Sensors Details

A. Microcontroller

It gets information from sensor and process on it. It compares the received data with the threshold level set and accordingly output is generated. The LPC131/32/34//38 microcontrollers are based on a 16/32-bit ARM7TDMI-S CPU with concurrent emulation and entrenched outline holdup, that unite the microcontroller with 32KB, 64KB, 128KB, 256KB and 512KB of entrenched.

B. Wi-Fi mode

This unit is authoritative enough on board processing and storage capability that allows it to be integrated with the sensors and other application explicit devices through its GPIOs with minimal development up front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front end module, is designed to occupy minimal PCB area. The ESP8266 provisions APSD for VoIP claims and Bluetooth co-existence confines, it comprises a self-calibrated RF leasing it to vocation be neat hall operational conditions, and involves no peripheral RF parts. There is an approximately immeasurable spray of in sequence accessible for the ESP8266, all of which has been provided by amazing community support.

C. Power Supply

Computer power supply: A modern computer power supply is a switch-mode power supply that converts AC power from the mains supply, to several DC voltages. Switch-mode supplies replaced linear supplies due to cost, weight, and size improvement. The diverse collection of output voltages also has widely varying current draw requirements Electric Vehicle power supply Vehicle is those which rely on energy created through electricity generation. A power supply unit is part of the necessary design to convert high voltage vehicle battery power.

D. MEMS Sensor

MEMS are constructed on one chip with electrical circuitry for inputs and outputs of the electro-mechanical components. Poly silicon springs suspend the MEMS structure the substrate such that the body of the sensor (also known as the proof mass) can move in the X and Y axes. Acceleration causes deflection of the proof mass from its centre position. Around the four sides of the square proof mass are 32 sets of radial fingers. These fingers are positioned between plates that are fixed to the substrate. Each finger and pair of fixed plates make up a differential capacitor, and the deflection of the proof mass is determined by measuring the differential capacitance. This sensing method has the ability of sensing both dynamic acceleration (i.e. shock or vibration) and static acceleration (i.e. inclination or gravity). The differential capacitance is measured using synchronous modulation/demodulation technique. After amplification, the X and Y axis acceleration signals each go through a 32KOhm resistor to an output pin (Cx and Cy) and a duty cycle modulation or the user may limit the bandwidth, and there by lower the noise floor, by adding a capacitor at the Cx and Cy pin. The output signals are voltage proportional to acceleration and pulse-width-modulation(PWM) proportional to acceleration. Using the PWM outputs, the user can interface theADXL2O2 directly to the digital inputs of a microcontroller using a counter to decode the PWM.

E. Ultrasonic Sensor

An ultrasonic sensor transmits ultra-sonic waves into the air and detects reflected waves from an object. It provides an easy method of distance measurement. This sensor is perfect for any number of application that requires you to perform measurements between moving on stationary object. A single I/O pin is used to trigger and ultrasonic burst and then “Listen” for the echo returns pulse. In this project, the ultrasonic sensor observes the vibrations that are produced by the nearby objects. Here when accident occurs, the nearby object or another nearby vehicles is been detected and is displayed in the LED display.

F. GSM

GSM network operates in a number of different carrier frequency ranges. The GSM ranges from900MHZ to 2-8GHZ and we use 4G sim for the transformation of message hence it uses 2-8GHZ frequency range. The frame duration is 4.615ms and 270.833 Kbits/s (half -rate channels). The subscriber (sim) carries the mobile station and subsystem controls the radio link with mobile station.

6. Conclusion

We proposed for controlling the traffic signals in favor of vehicle tracking during the accidents. With this system the driver and vehicle can be reached to the in time lag. The proposed system uses the IOT for vehicle accident spotting and alarming the authorities regarding accidents, vehicle tracking using GPS modem. In this theory we have designed IoT based vehicle accident detection and tracking system using GPS modem. Hence IOT can revolutionize the way the system interacts and respond for the variety of applications especially in case of traffic control.

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