

Smart Accident Detection and Emergency Notification System using IoT and Mobile Computing

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Abstract - Now a day, technology rapidly growth, but also people do not survive his/her life after road accident. Because there is no emergency facilities available in our country. So we design a technology which facilitates the emergency facility. This project inform 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 are under high risk. This situation prevails, just because there is a lack of emergency facilities in our country. In our country, many people loose 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 help us to detect accidents in significantly less time and transfer the fundamental information 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.

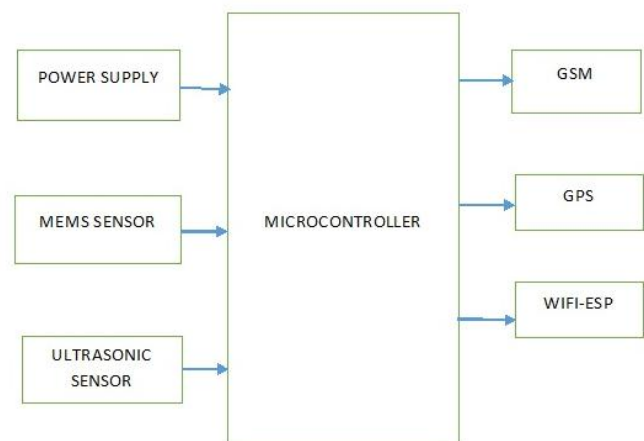
Key Words: Accident detect, Hidden Markov model, occlusion, spatio-temporal Markov random field, tracking

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 are under high risk. This situation prevails, just because there is a lack of emergency facilities in our country. In our country, many people loose 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 help us to detect accidents in significantly less time and transfer the fundamental informations 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. This alert message is sent to the rescue team(ambulance) and the family within the short period. This real time application saves many valuable lives. The message is sent through the GSM module and the location of the basic idea is to localize the vehicle system by receiving the real time position of the vehicle through GPS and send the information through GSM

module via SMS service with an added feature of GPRS transmission to the monitoring center through usage of internet

3. Architecture



4. Sensor Details

i. WI-FI MODE:

This unit is authoritative enough onboard processing and storage capability that allows it to be integrated with the sensors and other application explicit devices through its GPIOs with minimal development upfront and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the frontend module, is designed to occupy minimal PCB area. The ESP8266 provisions APSD for VoIP claims and Bluetooth co-existence confines, it comprises a selfcalibrated RF leasing it to vocation beneath all 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.

ii. 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.

iii. MEMS SENSOR:

MEMS are constructed on one chip with electrical circuitry for inputs and outputs of the electromechanical components. Poly silicon springs suspend the MEMS structure above 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.

iv. ULTRASONIC SENSOR:

An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object.

v. GSM:

The Global System for Mobile Communications (GSM) is a standard developed by the European Telecommunications standards Institutes (ETSI) to describe the protocols for second generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets.

vi. GPS:

The Global Positioning System (GPS), originally NAVSTAR GPS, is a satellite-based radio navigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system (GNSS) that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.^[3] Obstacles such as mountains and buildings block the relatively weak GPS signals.

vii. MICROCONTROLLER:

A microcontroller is a compact integrated circuit designed to govern a specific operation in an embedded system. A typical

microcontroller includes a processor, memory and input/output (I/O) peripherals on a single chip.

5. Modules

- User Register
- User Login
- Update Vehicle Location.
- Send Notification to the relative of accident location.

6. Literature Survey

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 [IoanLita, Ion BogdanCioc, Daniel AlexandruVisan et al, 2006] and [Mrs. RamyaKulandaivel, P.Ponmalar, B.Geetha, G.Saranya et al, 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 records and displays the real time information about vehicle on electronic map through GIS system [IoanLita, Ion BogdanCioc, Daniel AlexandruVisan et al, 2006]. Another approach is that vehicle terminal includes a GPS receiver which extracts information about position through GPS satellites and sends it through GSM network and to the control center which reads

3. CONCLUSIONS

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 interact and respond for the variety of applications especially incase of traffic control.

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