Wireless black box for accidental monitoring of vehicles using mems accelerometer and GPS tracking

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ABSTRACT

This paper is to develop a MEMS accelerometer and GPS tracking system for accidental monitoring. The system consists of an accelerometer, microcontroller unit, GPS device and GSM module, Temperature sensor. Micro Electro Mechanical System (MEMS) is a highly sensitive sensor and it indicates the position of an accident that is in which direction vehicle is tilted. When there is an accident, the Global System for Mobile (GSM) module will send SMS to the main server that is operating station and family member. The main server locates the accident spot, search the nearest hospital of that accidental area and give the information to the Ambulance driver about an Accident by using hospital unit so that the Ambulance will reach at the accident spot in time. Global Positioning System (GPS) is used to detect an accidental spot by using NMEA format and Micro-Electro-Mechanical System (MEMS) Accelerometer is used to locate the tilted position of vehicle and give this information to the microcontroller, Microcontroller sends this information to the main server by using Global System for Mobile Communication (GSM) Technology. Accidents have become a big problem in various countries and it happens because of drunk driving, riding with no helmet, riding without sufficient sleep, break problem of the vehicle, the clutch problem of the vehicle, etc. This project is about a system which is developed to automatically detect an accidental spot and give SMS to the main server and family member, the main server gives this information to the nearest ambulance driver by using hospital unit.

Keywords— GPS-Global Positioning System, GSM-Global System for Mobile Communication, MEMS-Micro-Electro Mechanical System

1. INTRODUCTION

There is loss of life due to Ambulance cannot reach to the accidental spot at the proper time. This is because the information of accidental spot cannot be reached to the hospital in proper time also waiting for the ambulance in the traffic signals. The vehicle unit installed in the vehicle senses the accident, Trace the Location of Accident by using GPS Technology and sends the location of the accident to the main server by using GSM Technology. The main server finds the nearest Hospital to the accident spot and also the SMS to the ambulance driver of that hospital, which is nearest to the accident spot and Family Member. Here in this technology, we use Global Positioning System (GPS), Global System for Mobile Communication (GSM), Micro-Electro-Mechanical System (MEMS), and Temperature Sensor etc. Initially, there was information given about an accident but there is not any information about particular accident location. But in this system, we use Global Positioning System (GPS) Technology which is used to locate an accidental spot by using NMEA format.
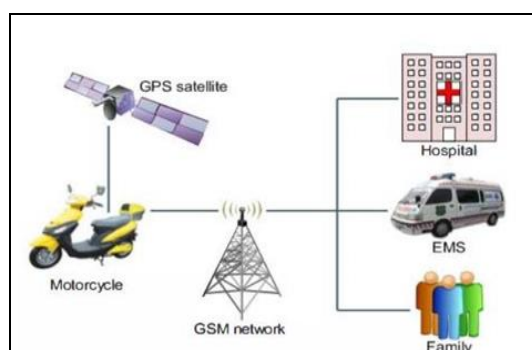

Fig. 1: System of architecture

2. EXISTING SYSTEM
In the previous day, when there is an accident the information of accident can be reached to the Hospital by using GSM Technology, but the particular accident spot cannot be informed in this system, that's why Ambulance can be reached to the accidental spot very late.

3. PROPOSED SYSTEM
Now a day the information of accident can be reached to the Hospital immediately, in this system the location of the accidental spot can be traced by using GPS Technology, that's why Ambulance can be reached directly to the accidental spot.

4. GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)
GSM Technology is used to send the information about an accident to the main server that is operating station and Family Member. GSM phones make use of a SIM card to identify the user's account. The use of the SIM card allows GSM network users to quickly move their phone number from one GSM phone to another by simply moving the SIM card.

5. GLOBAL POSITIONING SYSTEM (GPS)
GPS Technology is used to trace the location of accidental spot, give information to the microcontroller about an accidental spot, Microcontroller send the information to the main server by using GPS Technology. GPS trace the location anywhere, anyplace and anytime accurately. The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions,

6. ACCELEROMETER
An Accelerometer is a kind of sensor which gives an analog data while moving in X, Y, Z direction or may be X, Y direction only depends on the type of the sensor. Micro Electro Mechanical System (MEMS) is a high sensitive sensor and it indicates the position of an accident that is in which direction vehicle is tilted.

7. RESULTS AND CONCLUSION
With this system, the ambulance can be reached from the accident spot to the hospital in proper time. There is a loss of life due to the delay in the arrival of an ambulance to the hospital in the golden hour. This delay is mainly caused by the information of Accident can be reached to the hospital very late also the waiting of the ambulance in the traffic signals. The vehicle unit installed in the vehicle senses the accident, Trace the Location of Accident by using GPS Technology and sends the location of the accident to the main server by using GSM Technology. The main server finds the nearest Hospital to the accident spot and also the SMS to the ambulance driver of that hospital, which is nearest to the accident spot and Family Member.

It would be of great use to the ambulance if the traffic signals in the path of the hospital are ON. Thus we propose a new design for automatically controlling the traffic signals and achieving the above-mentioned task so that the ambulance would be able to cross all the traffic junctions without waiting. Every traffic junction will have a controller controlling the traffic flow. The traffic junctions are referred to as nodes and each node will have a GSM modem connected to the controller. The vehicle unit installed in the vehicle senses the accident and sends the location of the accident to the main server. The main server finds the nearest Hospital to the accident spot and also the SMS to the ambulance driver of that hospital, which is nearest to the accident spot.

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