Smart Medical Assistance For Accident Detection And Alert System

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Abstract- Road accidents rates are very high nowadays. Timely medical aid can help in saving lives. This system aims to alert the nearby center about the accident to supply immediate medical care. The attached vehicle within the vehicle senses the damage to the vehicle and therefore, the heartbeat sensor on the user's body senses the abnormality of the heartbeat to know the seriousness of the accident. The main cause for accidents is high-speed, drunk and drive, over stress, and other distractions. This paper deals with accident detection system that happens carelessness of driving the vehicle. This introduces accident alerting system which alerts the driving the vehicle. If the person isn't during a position to regulate the vehicle, then the accident occurs. Once the accident occurs to the vehicle this technique will send information to register mobile number. If accident occurs in anywhere, then the GPS system transmits the present location through a mobile. The accident is found through vibration sensor.

Keywords – IOT, GPS, GSM, CADANS.

I INTRODUCTION

In present days the rate of accidents can be increased rapidly. Due to employment the usage of vehicles like cars, bikes are often increased, the accidents are often happened due to over speed. People are taking high risk of their over speed, due to unavailability of advanced techniques, the speed of accidents can't be decreased [1-3]. To reduce the accident rate within the country this paper introduces the optimum solution. Automatic alert system for vehicle accidents is introduced; the most objective is to regulate the accidents by sending a message to the registered mobile using wireless communications techniques. When an accident occurs at a city, the message is sent to the registered mobile through GSM module. Arduino is the heart of the system which helps in transferring the message to different devices in the system. Vibration sensor will be activated when the accident occurs and the information is transferred to the registered number through GSM module. The GPS will help in finding the location of the accident spot.

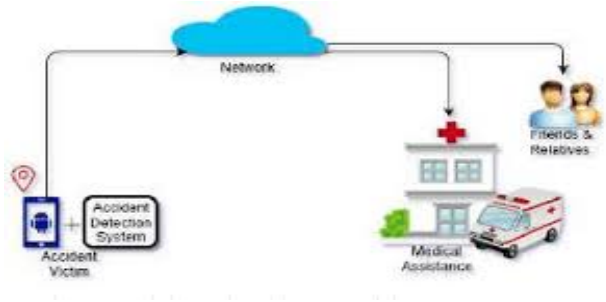

Figure 1: High level architecture of the proposed System

II ARCHITECTURE OF PROPOSED SCHEME

The proposed system includes an accident detection system and an Android smartphone. The accident detection system will constantly monitor the vehicle and detect whether the vehicle is in normal driving posture or has fallen down. When the vehicle fall is detected, the heartbeat rate of the driver is checked. If any abnormality is found, the

GSM will send alert to the nearby medical center about the accident. The system will inform the essential details of the person and therefore, the place of the accident using GPS coordinates from the mobile. The system also will inform friends and relatives of the driver, whose contact numbers are already stored within the SD card. The high level architecture of the proposed system

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2.1. ACCIDENT DETECTION SYSTEM

The Accident Detection System contains three modules. The first module detects accident. It is mounted on the vehicle itself. Second module consists of a vibration, alcohol, seat belt sensor, memory card, GPS, GSM, LCD, Arduino micro-controller. Once the vehicle fall is detected the message is send to the GSM. The second module consists of a Heartbeat sensor, temperature sensor, RF transmitter and Arduino microcontroller. Once the accident is detected the heartbeat of the driver is checked and if any abnormality is detected the choice that a significant accident has occurred is taken. Then the Accident Detection System is turned ON and it'll communicate with the Smart phone to alert the center. An Arduino Microcontroller is the heart of the device which handles all the sub devices connected across it. It has flash type reprogrammable memory.

2.2. ARDUINO

Microcontroller board based on the ATmega328P the Arduino UNO is a widely used open-source microcontroller and developed by Arduino.cc. The unit to detect or alert when an accident arduino is the major control occurs. It collects the information from vibration sensor, GPRS and GSM modules and reflects the output either in display system or through a message. Here vibration sensor plays a major role. This vibration sensor will receive the vibrations of the vehicle which successively acts as a accident detection module. Arduino gathers the data from all other modules and sends the message to the receiver though GSM module.

2.3. GSM MODULE

For providing communication between the GPS, GSM and therefore the allocated mobile number GSM SIM900 module is preferred. The name SIM900 says that, it is a tri band work ranging a frequency of 900MHz to 1900 MHz like EGSM900 MHz, PCS 1900 MHz and DSC 100 MHz Receiving pin of GSM module and transmitting pin of GPS module are used for communication between the modules and also the mobile.

2.4. GPS MODULE

To find the location on the world the whole is split into some coordinates where the location are often easily captured by a module called GPS module. Here the GPS used is SIM28ML. This GPS module will find the location of the vehicle and the information fetched by the GPS receiver is received through the coordinates and the received data is first send to arduino and therefore the information is transmitted to the saved contact through GSM module. The frequency is operated within the range of 1575.42 MHz and therefore the output of GPS module is in NMEA format which incorporates data like location in real time.

III LITERATURE SURVEY

To protect the vehicle and tracking numerous advanced technologies are available in now a days. In olden days the knowledge of accident are often transferred, but the place of accident spot can't be identified. In any vehicle airbags are designed, air bags are used for security and also for the safety travels. The air bag system was introduced within the year of 1968. Disasters are often either natural or manmade, and in both cases, one among the foremost important factors in reducing loss of life is that the time taken for response. There is a plethora of research dedicated to addressing this problem, given the severity of the difficulty, including developments in emergency predictive systems and road safety systems. Recent research within the area includes smartphone-based disaster management system cloud-based accident detection and disaster management system and also fog based disaster management systems. Cloud-based accident detection and disaster management system can face challenges concerning latency and bandwidth given the centralized nature of the service [4-7]. An emerging concept that can help address these issues is fog computing, which offers the promise of lower latency, mobility support, increased resilience and

scalability. Furthermore, by utilizing smartphone sensors, emergency detection and management systems are often cheaper and straightforward to deploy in legacy vehicles. A comparison of the research advances in smartphone-based accident detection and response systems is provided in Table 1 that presents brief details of the proposed solutions, along with limitations of the system. The papers are sorted by year of publication, in descending order. TPMS is system designed to control the pressure inside the pneumatic tires on vehicles that provides different operating conditions such as a lower tire pressure is desired in order to maximize traction, maneuvering through challenging terrain, pulling a large load out of an incline at slow speeds, crawling out of soft dirt. The pressure ranges from 15 to 45 PSI. Many other systems are proposed to deduce the accident. The existing system deals with two sensors where MEMS sensor is employed to detect the angle and vibration sensor is employed for detection the change within the vehicle. The other existing system uses IOT and cloud computer system. Where the vehicle detection id done through SVM (support vehicle machine) that is developed by Ant Colony Algorithm (ACA). Here IOT will monitor the vehicles using magne to resistive sensors. The main aim of this project is to differentiate the accidents which took place in traffic and at no traffic place. Existing system also provides the location of the accident using Atmega328p Microcontroller and RF transmitter and receiver. The information is send to the saved mobile numbers.

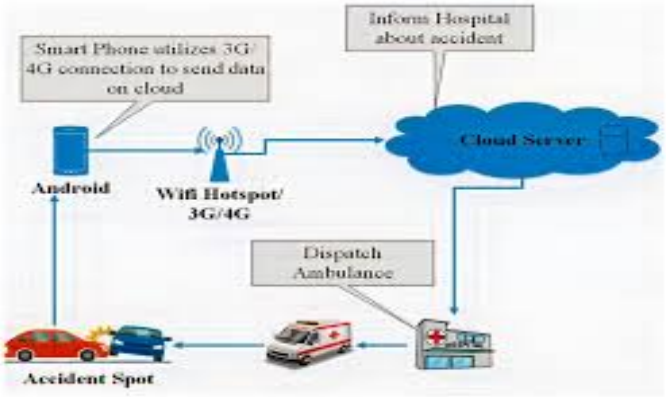


Figure 2: Enabled Accident Detection

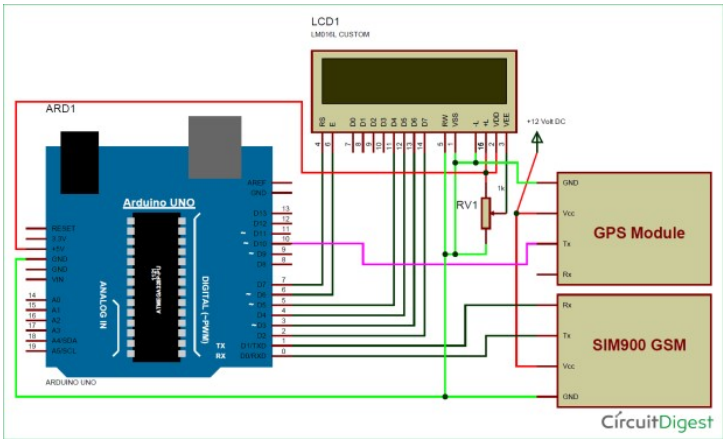


Figure 3: Working module of accident detection and alert system

3.1. WORKING METHOD

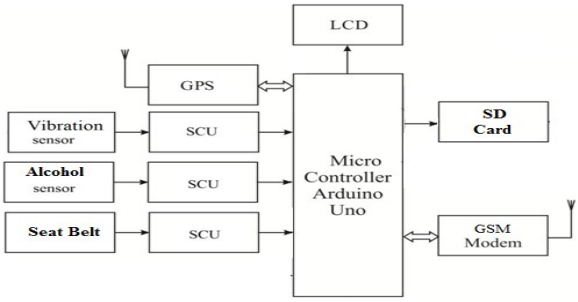
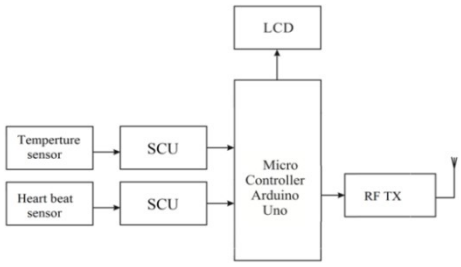


Figure 3: Work flow

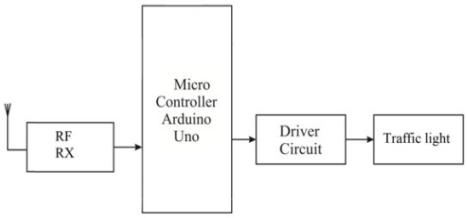
3.2. HEART BEAT SENSOR



A device for holding a heartbeat sensor in a very relatively fixed relationship with reference to the top of a user's fingertip. a tool is disclosed wherein one sheet of resilient material is formed into a base portion for holding the heartbeat sensor and three resilient bands that reach upwardly there from. The bands are adapted to grip the user's fingertip. the wedge-shaped holding structure being adapted to be held by the bottom portion in order that the cross-sectional area defined by each band and therefore the wedge-shaped holding structure decreases along the longitudinal length of the bottom portion. In another embodiment of the invention, each band defines a smaller cross-sectional area with reference to the bottom portion. Thus both embodiments end in more pressure being applied to the sensor at the portion of the user's fingertip closest to the top. [8]

The invention provides a tool for holding a heartbeat sensor during a relatively fixed relationship with reference to a user's fingertip. The device includes a base portion for holding the heartbeat sensor, and a pressure producing means connected to the bottom portion for holding the user's fingertip against the heartbeat sensor, the pressure producing means including means for causing pressure between the heartbeat sensor and therefore the user's fingertip to be greater at the portion of the user's fingertip closest to the end than at the portion of the user's fingertip furthest from the end. In a specific embodiment of the invention, one sheet of resilient material is made into a base portion and three flexible bands extending upwardly and over the bottom portion. Each of the bands partially forms an arch with respect to the base portion and is adapted to grip a portion of the user's fingertip. A holding structure for the heartbeat sensor is additionally provided, the holding structure being within the sort of a wedge having its thickest portion closest to the top of the user's fingertip. The holding structure is tailored to be held by the bottom portion. In a further embodiment of the invention, one strip of fabric is again formed into a base portion and three upwardly extending bands, each band defining a smaller cross-sectional area along a longitudinal length of the bottom portion. A holding structure for the heartbeat sensor is tailored to be held by the bottom portion [9].The user's fingertip is found between the bands and therefore the base portion in order that the fingertip end is gripped by the band defining the littlest cross-sectional area. The two embodiments above described thus effect a maximum pressure on the portion of the fingertip closest to its end instead of on the portion of the fingertip furthest from its end. The holding structure is tailored to position the heartbeat sensor at the utmost pressure portion, thereby minimizing movement between the sensor and therefore the fingertip.

IV PERFORMANCE RESULTS



Due to safety matter and the significant damage crash testing of the CADANS in real environments (real car accident) is not realistic and practical. Also the lack of the availability of laboratories that can be used to simulate the crash environment is making the crash testing difficult to achieve. Constructing some cases that simulate the scenarios of the proposed detection phase mechanism and testing the CADANS against these cases would produce a high confidence that supports more reliability and certainty of CADANS. These tests are performed on the CADANS in real environment; by having the vehicle in different speeds, so the speed of the vehicle is not steady all the time. Also the opposite factors, like G-Force and sound decibel are imitated inside the car while the car is moving at different speeds. The idea is to create an environment that mimics the real environment as these mimic environments are required to test the CADANS under different speed conditions (low speed and high speed). Before getting to demonstrate the tests on CADANS, the subsequent important issues that has got to be taken under consideration.

V CONCLUSION

This proposed system deals with the accident alerting and detection. Arduino is that the heart of the system which helps in transferring the message to different devices within the system. Vibration sensor are going to be activated when the accident occurs and therefore the information is transferred to the registered number through GSM module. Using GPS the location are often sent through tracking system to cover the geographical coordinates over the world. The accident are often detected by a vibration sensor which is employed as major module within the system.

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