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Acci-Alert

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ABSTRACT

The numbers of deaths due to accidents occurring in our country are increasing day by day. Most of them could have been avoided if it was informed to the concerned at the right time. To eliminate such a tragic situation we propose a project named ACCI-ALERT that focuses on sending information to the concerned when an accident occurs. The idea is to install a pressure sensor on the body of the vehicle. The sensor will get activated when the pressure on the vehicle exceeds a certain level. The sensor output will be given as a trigger to a monostable multivibrator which powers the Bluetooth module . An incorporated application on the user mobile phone is paired with the Bluetooth dongle. It sends a distress message or call to the provided number when the information is passed. Acci-Alert requires minimum hardware and is more economical. It can be easily incorporated into the vehicle and since it uses a mobile app for communication and hence it is more user friendly.

Keywords: Bluetooth module, pressure sensor, MIT App inventor 2.

I. INTRODUCTION

Traffic accidents are one of the leading causes of fatalities. An important indicator of survival rate after an accident is the time between the accident and when emergency medical personnel are dispatched to the accident location. The road accident take place frequently which causes loss of life because of the poor emergency facilities. It also becomes difficult to get necessary help in isolated areas and also during the mid night. By eliminating the time between when an accident occurs and when the first responders are dispatched to the scene decreases mortality rates, we can save lives. Our project will provide an optimum solution to this draw back. “Acci-Alert” attempts to inform the authorities and relatives when an accident occurs. It has a pressure sensor attached to the vehicle whose output is provided to a relay through a triggering circuit. The output from the relay activates the Bluetooth module which is already paired with the user mobile. The android application on the user mobile sends message to the given numbers of authorities and relatives in case of an accident. Acci-alert thus helps the victims at the critical time. It is also user friendly and cost effective. Acci-alert uses simple modules like the pressure sensors and Bluetooth module whereas the existing projects use complex and costlier elements like the GPS and GSM modules. Its

accuracy may depend on the number of pressure sensors on the body of the vehicle and the poor network connectivity may lead to its inefficiency. The use of android application on the now common mobile phones makes it more comfortable for the users and its low cost make them affordable. During the literature survey of this project, similar technologies were found to be existing but are more complex and not cost effective. Technological approaches for detecting and monitoring fatigue levels of driver fatigue continue to emerge and many are now in the development, validation testing, or early implementation stages. Previous studies have reviewed available fatigue detection and prediction technologies and methodologies. Accident avoidance and detection on highways is about advanced technologies in cars for making it more intelligent and interactive for avoiding accidents on roads. By using ARM7 this system becomes more efficient, reliable & effective. There are very less number of systems implemented on human behaviour detection in or with cars. In this paper, we describe a real-time online safety prototype that controls the vehicle speed under driver fatigue. The purpose of such a model is to advance a system to detect fatigue symptoms in drivers and control the speed of vehicle to avoid accidents. The main components of the system consist of number of real time sensors like gas, eye blink, alcohol, fuel, impact sensors and a software interface with GPS and Google Maps APIs for location[4].

Speed is one of the basic reasons for vehicle accident. Many lives could have been saved if emergency service could get accident information and reach in time. Nowadays, GPS has become an integral part of a vehicle system. Accident Detection and Reporting System using GPS,GPRS and GSM Technology proposes to utilize the capability of a GPS receiver to monitor speed of a vehicle and detect accident basing on monitored speed and send accident location to an Alert Service Center. The GPS will monitor speed of a vehicle and compare with the previous speed in every second through a Microcontroller Unit. Whenever the speed will be below the specified speed, it will assume that an accident has occurred. The system will then send the accident location acquired from the GPS along with the time and the speed by utilizing the GSM network. Accident detection systems help to reduce fatalities stemming from car accidents by decreasing the response time of emergency responders. Smart phones and their onboard sensors (such as GPS receivers and accelerometers) are promising platforms for constructing such systems. Using Smart phones to Detect Car Accidents and Provide Situational Awareness to Emergency Responders paper provides three contributions to the study of using smart phone-based accident detection systems. First, we describe solutions to key issues associated with detecting traffic accidents, such as preventing false positives by utilizing mobile context information and polling onboard sensors to detect large accelerations. Second, we present the architecture of our prototype smart phone-based accident detection system and empirically analyze its ability to resist false positives as well as its capabilities for accident reconstruction. Third, we discuss how smart phone-based accident detection can reduce overall traffic congestion and increase the preparedness of emergency responders. Smartphone-based accident detection applications provide several advantages relative to conventional in-vehicle accident detection systems, e.g., they are vehicle independent, increasingly pervasive, and provide rich data for accident analysis, including pictures and videos. Building a smart phone-based wireless mobile sensor network for accident detection system is hard, however, because phones can be dropped (and generate false positives) and the phone is not directly connected to the vehicle. In contrast, conventional in-vehicle accident detection systems rarely incur false positives because they rely on sensors, such as accelerometers and airbag sensors, that directly detect damage to the vehicle. Solution approach → Use on board sensors and physical context information to detect car accidents. This paper shows how smart phones in a wireless mobile sensor network can

capture the streams of data provided by their accelerometers, compasses, and GPS sensors to provide a portable "black box" that detects traffic accidents and records data related to accident events, such as the G-forces (accelerations) experienced by the driver. We also present an architecture for detecting car accidents based on Wreck Watch, which is a mobile client/server application we developed to automatically detect car accidents. The figure shows how sensors built into a smart phone detect a major acceleration event indicative of an accident and utilize the built-in 3G data connection to transmit that information to a central server. That server then processes the information and notifies the authorities as well as any emergency contacts.

In the event of an accident, the smart phone will experience the same forces and accelerations experienced by the occupants of the vehicle. Moreover, if the smart phone remains stationary relative to the vehicle during the collision, it is possible to use the data gathered from the smart phone to recreate and model the forces it experienced. In this case, the smart phone can provide data much like that gathered by vehicular ECUs[5]. Smart phones are often carried in some form of pocket attached to a person. In these cases, the smart phone would experience the same forces as vehicle occupants, and could thus provide more information than in-vehicle systems by recording the forces experienced by occupants rather than just the vehicle itself. When this directionality and movement is combined with speed and location information from the GPS receiver, it is possible to fully reconstruct the accident, including any secondary impacts.

II. RELATED WORK

Acci-Alert is basically a safety device whose role comes to play in dire situations such road accidents that occur in rural areas especially during the night hours when chances of arrival of help are slim. The small size and simplicity of the device enables it to be compatible with any on road car model. The device can be easily installed on vehicles. Low cost of the device makes it affordable for people of all classes. The Acci-Alert system is user friendly as it just requires to install an app on the user mobile and give the important numbers for contact after installation. Prior to installing the device on the car, the user must download and install the Acci-Alert app on his/her mobile phoneand pair the Bluetooth module inside the device with his/her mobile phone by selecting the device in the Bluetooth settings. The MAC id of the Bluetooth module used in the corresponding Acci-Alert device is entered in the program of the app at the time of manufacturing. The MAC id of each Bluetooth module is different. The app will run only if the programmed MAC id is detected. After this process, the device can be installed on the vehicle.

On detection of collision by the pressure sensor, the Bluetooth module will be driven by the monostable multi vibrator for five seconds, during which the app in the user's phone will detect the Bluetooth module. The much essential time is saved no transfer of data between the Bluetooth module and the phone is necessary. Upon detection of the Bluetooth module, the app will take location of the user and send it to a preset number (be it to the police, ambulance service or close relatives) as a distress message from the mobile phone in the form of text message. The working is shown in Fig:1 . The crash sensors used in the device is similar to the crash sensors used in air bags. These are known to work without fail. Also the Bluetooth module and the necessary circuitry is encased within a protective casing which prevents it from damage to an extend. Therefore, the working of the device is guaranteed in the case of an accident.

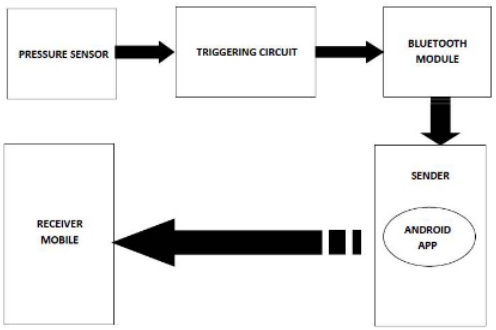

Fig.1:Block Diagram

III.PROPOSED SYSTEM

A. Seat Belt Check

Initially checks whether the driver has put on his/her seatbelt. The driver can start the car only if the seat belt is buckled and an alarm sound is generated until done.

B. Accident Detection

When an accident occurs in a city, vibration sensors will be activated as they are placed at certain positions similar to the air bag sensor location. A reset button is provided which can be pressed within30 seconds of the collision/accident to stop the alert system if it is not severe. If the reset button is not pressed, then a message is sent automatically to the registered mobile numbers through the GSM module and also sends the same to a server using MQTT protocol,immediatelyafter30 seconds.

C. Accident Alert

The physiological parameters are measured with biomedical sensors which also include a coma stage status module to detect the driver's movement .The collected information is sent to the emergency care centers via SMS and web application. ESP32 camera is also incorporated at the front and rear ends of the car to analyze the accident. When the accident occurs the information is transferred to the registered number through the GSM module. The GPS system will help in finding the location of the accident spot. In SMS, message that an accident is detected along with location is sent to emergency care centers, friends, relatives; while in web application detailed information about the accident is sent (along with live stream)to hospitals and police.

IV.IMPLEMENTATION

The safety of four –wheelers and immediate assistance to accident victims to reduce the number of road fatalities is the main idea of the proposed system. Therefore ,the proposed prototype utilizes the three-modules, namely (1)Seat Belt Check (2) Accident Detection (3) Accident Alert system. The system is implemented using a combination of hardware and software. The vibration sensor is placed at certain positions of the vehicle in proximity to airbag sensors to detect an accident when above a certain threshold value. The data collected by biomedical sensors (temperature, BPM, coma status)from the victim's body and location (latitude, longitude)from GPS is displayed in serial monitor of Arduino Mega. Fig 3showstheflowchart.This processed data is sent to theESP8266 module which is then sent to the website using MQTT protocol. The web applications a login-based system; accessing it requires an username and password. The details are displayed in tabular format in the commit accidents tab and on clicking 'check' for a particular accident it leads to accident check page with the victim's parameters to all hospitals with commit button. The hospital nearest to the patient accepts the patient and then the data of the victims available only to that hospital.

V. CONCLUSION

The prototype of Acci-Alert device was able to be made using HC-05 bluetooth module, Keyestudio crash collision sensor and a multivibrator circuit(using NE555).Also, the mobile application was developed using MIT App Inventer2. The Acci-Alert is a project proposal that is used to avoid the accidental fatalities that goes unknown. The project concentrates to ensure the faster arrival of necessary help to the victim after an accident occurs. As the deaths due to the delay in informing the concerned at the right time after an accident occurs is increasing, Acci-Alert is expected to decline this number of fatalities into a considerable amount. The product is designed in such a way that it can be easily installed and is more user friendly. The Android application that replaces the complex hardware and the low cost makes it different from the similar currently existing products.

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