Intelligent Vehicle Accident Detection System

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Abstract: The more we try to make our lives easy and luxurious the more hazardous it gets. The advancement of technology also plays a significant role. With the improvement of the growth of traffic and thus road accidents count has reached to an enormous scale. This rate of fatalities and serious injuries leads to loss of human lives. The survey of 2015 reveals that about 1,374 accidents and 400 deaths happen every day in India. This scenario can be explained as 57 accidents and loss of 17 lives on an average every hour in India. The main cause of these deaths lack of immediate medical aid provided to the victim. In this project we locate the accident spot with the help of GPS. Once the location is known a message will be sent to some concerned person of the victim. This will help the ambulance to approach the accident spot on time.

Keywords: GPS (Global Positioning System),EMS (Emergency Medical Service),GSM (Global System for Mobile communication)

I. INTRODUCTION

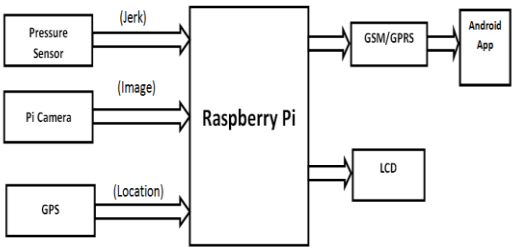
There has been a rapid growth in technology and the expansion in urbanization at a massive scale over the past few years. Such heavy automobile usage has increased traffic and thus resulted in rise of road accidents. Road mishaps have increased by 1.4 percent in 2015. This takes a toll on the property as well as causes human life loss because of unavailability of immediate medical facilities. Most of the time, the location of the accident spot cannot be traced in time and as a result ambulance cannot be dispatched, which results in delay. Moreover accurate data cannot be obtained in case of some remote areas. Whenever an accident is being met, the nearby people call the ambulance. The problem associated with this is that the victims depend on the mercy of nearby people. This project aims to locate the accident spot with the help of GPS and sends the message to the respective persons. The message consists of registered vehicle number, image captured by the camera placed near the dashboard of the vehicle, location in terms of latitudes and longitudes. The data is processed in the raspberry pi. Once the data is processed it is sent to the persons through an app. The persons logged in to the app can view the message. In this way the immediate medical facilities and services can be provided to the victim.

II. LITERATURE SURVEY

No new project can be designed without the complete understanding of the existing system. A new project is designed to overcome the flaws in the current system. Thus a new project requires complete understanding of the system in practice. Any new system can be designed after all the requirements are listed out and after a thorough study of the current systems. Some of the concepts required for this project are mentioned below:

N. Watthanawisuth[1]hasdesigned a system using MEMS accelerometer and GPS tracking system to monitor the accidents. Thecomponents include an accelerometer, microcontroller unit, GPS device and GSM module. As accident occurs, the wireless device will send mobile phone short message indicating the position of vehicle by GPS system to family member, emergency medical service (EMS) and nearest hospital.Hoang Dat Pham [2]presented GPS and GSM systems to track down the vehicle more effectively. The vehicle location can be obtained in form of coordinates which can be transmitted using GSM modem to the relevant persons's mobile phones.According to the research done by Rashida Nazir, Ayesha Tariq, Sadia Murawwat, Sajjad Rabbani [3] explained the use of SONAR to prevent accident. GPS module helps us to locate the 99accident locations in terms of latitude and longitude and GSM module is used to send the message on mobile. S.Sonika, Dr.K.Sathiyasekar, S.Jaishree[4] suggested the possible shortest path thereby reducing the chances of getting the ambulance stuck in the traffic. This reduces the time lag by making use of RF technologies that controls the traffic signals. Sri Krishna Chaitanya Varma, Poornesh, Tarun Varma, Harsha [5] explained thatif an accident happens, the impacted side of the vehicle is found by the impact sensors. After collecting all information which is stored in internal memory,controller sends this data to base or surveillance unit via SMS using GSM modem.

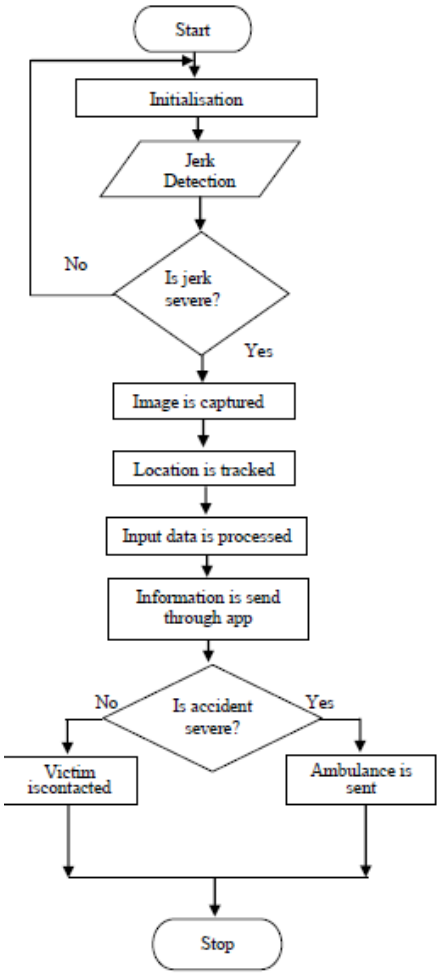
III. BLOCK DIAGRAM



IV. WORKING

Usually during any major accidents, time plays a very important role in saving the victim's life. The accuracy of the system should be as high as possible in order to ensure best results. This system sheds more light on these aspects by using different modules which makes the system to work efficiently. When the accident occurs, the pressure sensors detect the jerk (vibrations) and send the data to the Raspberry Pi. It is a series of small single board computers. It is basically ARM based PC that primarily uses Raspbian, a Debian-based Linux operating systems.The camera is situated near the dashboard of the car. As soon as the specific level of jerk is measured, the camera takes the image of the driver assuming that a severe accident has occurred. This image is provided to the Raspberry Pi module.With the help of satellites, GPS system can locate accident spot in terms of latitude and longitude. The respective data is processed in the raspberry pi. In this project we make use of an android app. A message will be forwarded to family members and family doctors of the victim. Once they log in to the app the image, location and the registered number of the vehicle which can be viewed by the victim's relatives and family doctors. On receiving this information, the concerned people can accordingly seek for help depending on the situation.

V. FLOWCHART



VI. RESULTS

A global positioning system is a coordinate system that helps us to track any location on the earth with the help of the satellites orbiting the earth. The more the number of satellites, the higher is the accuracy of GPS system. The precision of the system is around 5 meters. The GPS operations and management are carried out by the U.S. Department of Defense.

The latitudes are horizontal lines which run from east-west while longitudes are vertical lines which run from north-south. The point at which latitude and longitude intersects is the location to be tracked.Degrees, minutes and seconds (DDD, MM, and SS) is one of the ways to represent GPS coordinates. The directions north, south, east and west are based on equator and the prime meridian. For latitude north or south, is denoted by N or S. East and west are located on the opposite side of prime meridian with east being positive and west being negative. In this system, the decimal degree is approximated to the nearest normal, including minutes and seconds.At the most, 4 decimal places are tolerable. Both minutes and seconds are in the same range i.e. from 0 to 60 whereas degrees range from 0 to 180 and vice versa. However for manual calculations, set of formulae prescribed are as below.

Degrees Minutes Seconds to Degrees Minutes.m (GPS)

Degrees = Degrees, Minutes.m = Minutes + (Seconds / 60)

Degrees Minutes.m to Decimal Degrees.d = M.m / 60, Decimal Degrees = Degrees +.d.

Once a person is logged into the system then the accident spot location in terms of latitude and longitude along with the owners name and registered vehicle number will be sent to the concerned persons.

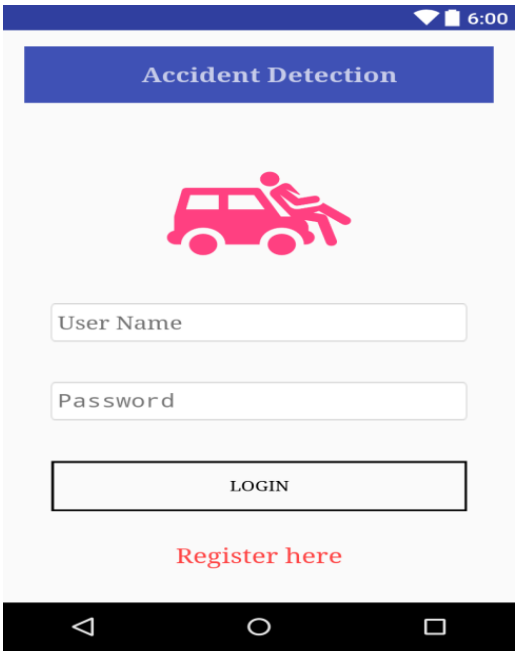


Fig.1 Login screen

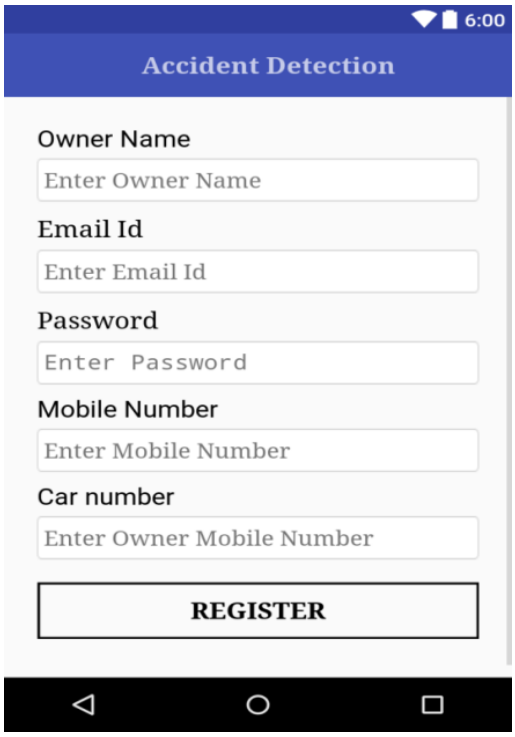


Fig.2 Registration screen

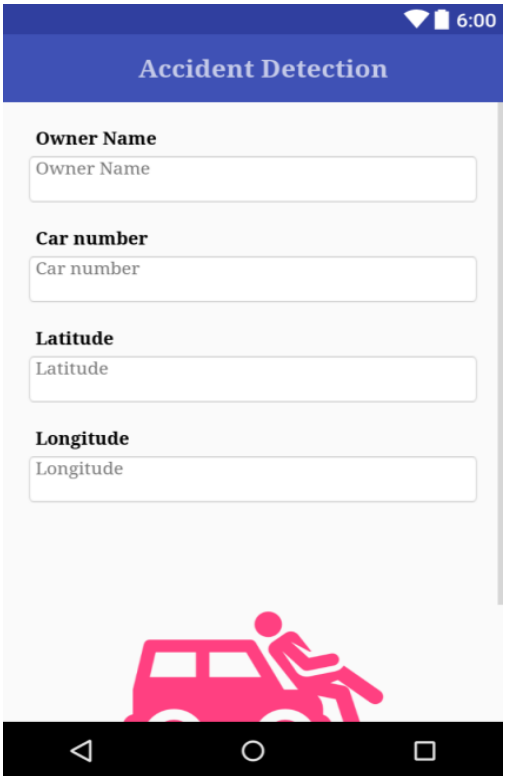


Fig.3 Output screen

VII. CONCLUSION

Once the accident spot is known it is easy to provide the necessary medical help. This saves time and lives of the victim. The project also provides immediate response with vital information without any unnecessary delay. Cutting down the time between the occurrence ofan accidentand its detection can reduce fatality rate.

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