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Smart Detection of Accident Using Raspberry Pi Based on IOT

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ABSTRACT: The important reason for loss of life in accidents is due to the delayed transmission of location and victim information to the concerned authorities. The proposed system concerns on overcoming these issues by implementing IoT in the existing accident alert system. An effective solution is formulated by embedding a series of sensors, GPS transceiver and a camera in Raspberry Pi. Initially, a centralized server has been set up with adequate medical information of people for easier retrieval in case of accidents. This system is configured with an auto-alert module to send the necessary information in case of an accident. In this we are using image processing to detect the accident using raspberry pi and send location through message.

KEYWORDS: Raspberry Pi, IoT, GPS

I. INTRODUCTION

Intersections also tend to experience severe crashes due to the fact that several types of injurious crashes, such as angle and left turn collisions, commonly occur there. Therefore, accurate and prompt detection of accidents at intersections offers tremendous benefits of saving properties and lives and minimizing congestion and delay. Traffic accident detection employing computer vision and image processing on freeways has attracted much attention recently focus on abnormal vehicle behaviours causing incidents (e.g., a traffic accident), traffic jams, fallen-down obstacles, etc. Data processing and electronic data interchange rely heavily on accurate, reliable, controllable and verifiable data recorded in databases. A prerequisite for correct and proper use and interpretation of data is that both users and owners of data have a common understanding of the meaning and representation of the data. To facilitate this common understanding, a number of characteristics, or attributes, of the data have to be defined. These characteristics of data are known as “metadata”, that is, “data that describes data”. The Internet of Things is defined as a fast growing network of Physical devices (which has a unique identifier) interconnected with some devices via Internet. These Physical devices communicate with the rooted devices by collecting and exchanging data without human interaction. Internet of Things has grown rapidly in the past few years due to increased efficiency, user friendly nature, and simple control which save time and money. An accident in mass transportation vehicle leads to high rate of life loss, mainly due to lack of information transmission about accident occurrence and knowledge about its location and the victim’s information.

Paper is framed as follows. Section II describes the existing & proposed work. The flow chart represents the algorithm for the proposed system in Section III. Section IV describes the experimental results showing results of images tested. Finally, Section V presents conclusion.

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II. RELATED WORK

The system implements Internet of Things using Raspberry Pi embedded with Global Positioning System, Electronic Health Record Reader, and Sensors. Initially, the medical records of the People are stored, maintained in the cloud and retrieved in case of accidents. This paper discusses Raspberry Pi as a currently exploring way to provide Electronic Health Record of accident victims and GPS location of the vehicle to the nearby hospitals through internet, providing a remedy to the increased time consumption to identify accidents and to begin treatment to the accidental victims. This idea is achieved by tracking the vehicle continuously through Global Positioning System, transmitting accident information to hospitals in case of accidents which would be detected by the Sensors. The Unique ID of the Electronic Health Record of the people present in the mass transportation vehicle is stored in the Raspberry Pi in a text file format. The Accident occurrence is intimated to the nearby hospital (Found by the Region based search done by Global Positioning System) by the mailing unit where the accident location and the text file (which has the unique id of passengers) are attached. Once the mail is received, the authorized personnel intimate the ambulance and provide them with the accident location. Then, the Authorized Personnel retrieves the required record information from the cloud and processes it for the victim details.

In our proposed system, the retrieval of location of accident through GPS involves the understanding of image processing, GPS system and Raspberry Pi and cloud. Raspberry pi is a small single board computer, which is in a size of a credit card that can be connected to any external electronic device for multiple purposes. In this the raspberry pi process the image of the scene if there is any accident occurs in the road then the raspberry pi process and detect the accident. Then it send the alert to ambulance service with the location. The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil, and commercial users around the world.

III. FLOWCHART OF PROPOSED SYSTEM

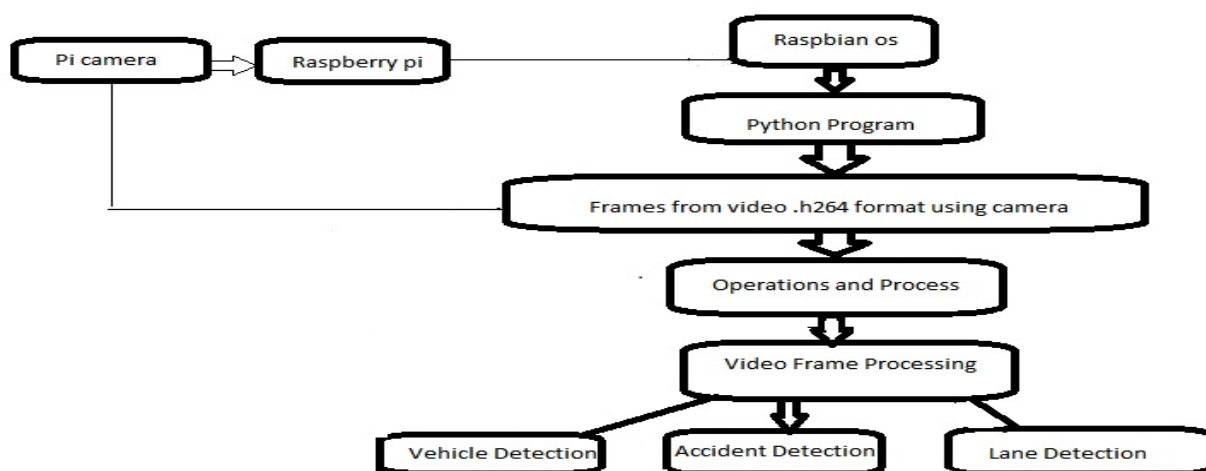


Figure 1.1

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The architecture of the proposed system. The input is obtained from Pi camera which is attached to Raspberry Pi, the input is then forwarded to the python code which is executed on Raspbian OS. The python program will execute concerned operations on each frames extracted from the live video of Pi camera the Figure 1.1 elaborates the processing and operations on single frame.

IV. EXPERIMENTAL RESULTS

The alert provided using the message signals is obtained as follows: In Figure 1.2, it depicts the system is tested for remote access over the internet using the wireless connection and a battery as power source providing it an independency. This helps to access and control the system from any geographical location which is shown in Figure 1.3

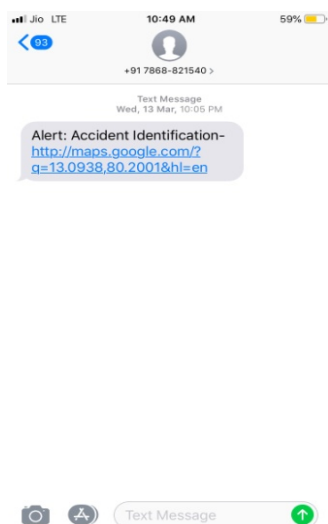


Figure 1.2

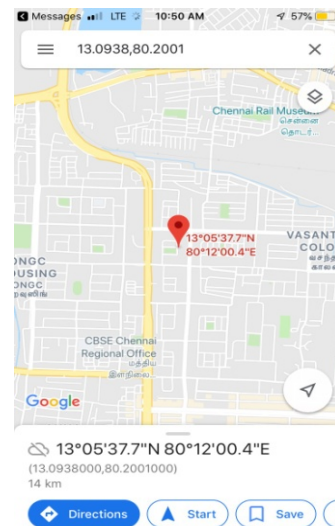


Figure 1.3

V. CONCLUSION

Thus by using this prototype we can solve multiple problems taking place in the very existing methodology followed. From the observations it is quite evident that this system can be used to facilitate better environment for the safety of the people who are driving. The alert system used can be quite beneficial to provide necessary guidance and first aid at the time of accident

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