A Literature Survey on Road Accident Automobile Detection Using Image Processing and IoT

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Abstract— A lot of life loss due to road accidents every day because of careless drives of drivers, Human life most important to save and to know cause .A system with newer technology needs to be work effectively to save the life of the injured people. In this paper we have done survey over different method for road accident detection and proposed algorithm using IoT and Image technique .An intelligent accident detection system, when the accident is met the number plate of vehicle number is captured and converted to texted form and location is send it to the cloud and nearby police station.

Keywords— IOT, Raspberry pi,

I. INTRODUCTION

Statistics show that the leading cause of death by injury is road traffic accidents and high ways, where the negligence of the driver lead to accidents.

In this review paper, we briefly review selected road accident detection techniques and propose a solution. In these techniques, a system is used that can automatically detect an accident in appreciably less amount of time and sends the basic information about the accident to the emergency center. These techniques use a smartphone, GSM and GPS, VANET and mobile applications.

In smartphone-based accident detection, the Internet services provided by a cellular network operator are used to send the information in case of a road accident. The geographical location of the accident spot is identified by the GPS system. In GSM and GPS based accident detection system; GSM cellular technology is used to send the data in case of a road accident. The location of the accident spot is identified by the GPS system.

In VANET-based accident detection system, in case of an accident, information to the emergency department is sent using the VANET - an ad-hoc network between moving vehicles. The location of the accident spot is identified by the GPS system. In a mobile application based accident detection system, when an accident occurs, a mobile application, eCALL for example, detect the accident automatically and makes a call to the emergency services using a mobile network operator.

We propose a solution to road accident detection problem with two image processing and IoT technologies attached to Raspberry pi embedded hardware system.

One of the cameras is fixed near to the number plate, which will be activated when an accident is met .it capture the number by using a technique called OCR , then this data is sent it to the cloud.

II. RELATED WORK ON AUTOMATIC ROAD ACCIDENT DETECTION AND METHOD

The researchers have proposed different methods to detect an accident automatically. These techniques include road accident detection using smartphones, GSM and GPS technologies, VANET, and mobile applications. Which all had different method to accomplish road accident detection.

A. Using Smartphones
In [14], automatic detection of accidents using smartphones is described. Car manufacturers like BMW or GM have incorporated a built-in automatic collision notification system, See Fig. 1.

They use sensors like accelerometer and airbag deployment monitors in their vehicles to determine an accident event and send this information using built-in cellular radios to the response centre.

Fig 1.Traditional accident detection system using a smartphone

Unfortunately, most cars do not have an automatic collision notification system. So in place of this system, the smartphone is used which not only detects the accidents but after detecting, send this information to the concerned department on its own as well. Using smartphones in place of automatic collision the notification system has many advantages like we can carry it easily and it can provide accident detection notification system in every type of vehicles like a bicycle or a motorbike.

Furthermore, as every smartphone is associated with its owner so it is easy to identify the victim.
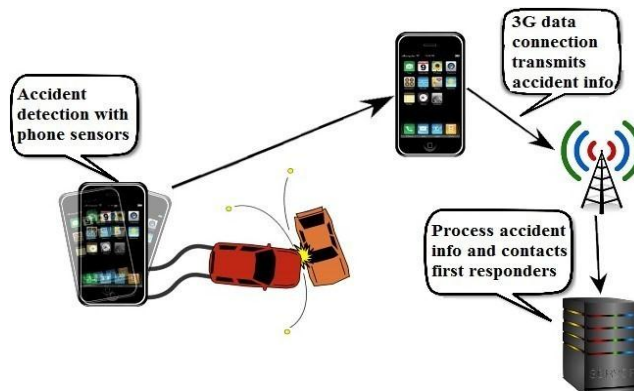

Fig 2. Smartphone Based Accident Detection System The sensors in a smartphone identify GPS location, speed

and acoustic signature of the vehicle during an accident and send this information with the help of a built-in cellular connection to the central server which further sends this information to the emergency department, See Fig. 2.

B .Using GSM and GPS
In [15], the automatic detection of an accident and messaging system is demonstrated by using GSM and GPS

technologies. The GPS satellites are used to identify the exact location of incident, speed, time and direction.

In a typical micro controller based road accident detection and communication system, an infrared sensor is used to detect objects. In case of an accident, the system determines longitude and latitude of a position where an accident occurs through the GPS module. Then it sends a message which contains the position of vehicle to the emergency department. Fig.3 shows the procedure of accident detection through GSM and GPS technologies.

Fig 3. Accident Detection scheme through GSM and GPS

C. Using Vehicular Ad-hoc Network(VANET)
In[16], VANET is used as an accident detection technique with the help of two sensors, a crash sensor, and an airbag system. When these sensors sense an accident, the information is sent to a microcontroller-based system. The location of the accident is determined using GPS and system sends the location of the accident to a predefined number using GSM.

The transmission of a message to the rescue team is sent through VANET, ad-hoc network between moving vehicles. The VANET is used to transmit the message to the rescue team. The transmission of an alert message starts with broadcasting the message from a source node to all the vehicles on the road. The VANET structure consists of a set of On-Board Units (OBU), that is fixed inside the vehicle and a Road Side Unit (RSU), which is fixed along the road. The OBU and RSU interact with each other using dedicated short-range communication (DSRC) [17].

The communication can be vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), or infrastructure -to-infrastructure (I2I) See Fig. 4.

D. Mobile application
In [18], accident detection through a mobile application is presented. The initiative is taken by the European Commission (EC), who declared that eCALL is mandatory in every car. The eCALL is a mobile application that detects the accident automatically. When an accident occurs it sends a

request for help to the emergency medical services by dialling an emergency number. The call is initiated by the cellular network to the nearest emergency center.

The graphical user interface (GUI) of the application consists of a large square in which one color red, green, or yellow is present. The color indicates the condition of the road at a particular moment.
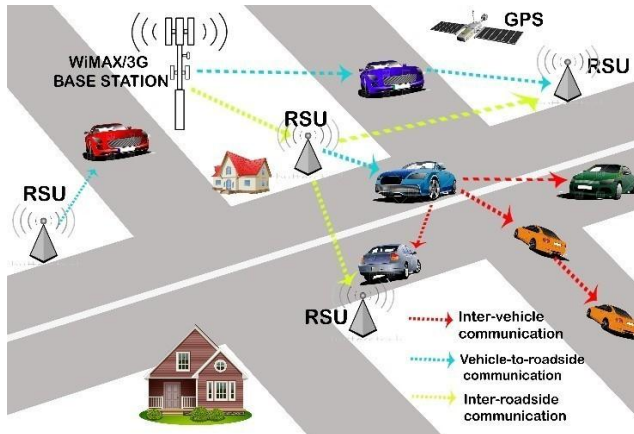

Fig 4. The Architecture of VANET

1) Avertino: This application warns the user with the help of a visual and audible alert. These alerts can be on permanent the basis or it can be temporary.

2) On Road Augmented Driving: This application warns the user when he does not keep the minimum safety distance between the cars. The GUI interface of the application is shown in Fig.5.

The graphical user interface (GUI) of the application consists of a large square in which one color red, green, or yellow is present. The color indicates the condition of the road at a particular moment. There is a grey circle present on the GUI which contains information in textual form. There is a report option on the GUI to check traffic condition, hazardous location ahead or location of an accident.

III. METHOD AND PROPOSED ALGORITHM

In this paper, the processes we have going through as such

- The first step is capturing the image approximately 1 meter from the number plate with the camera. The purpose is to get a clear image without distortion.
- The second step is cropping the number plate from the captured image. The cropped image is the input for character recognition.
- Te third step is character recognition. The OCR technique is used to recognize the character.

- Convert the recognize character to text form.
- The converted text is sent to the cloud using IoT.
- IoT cloud holds all the data of accident place, driver name, and location. • Rescue team can easily reach to the accident place by using the information of cloud.
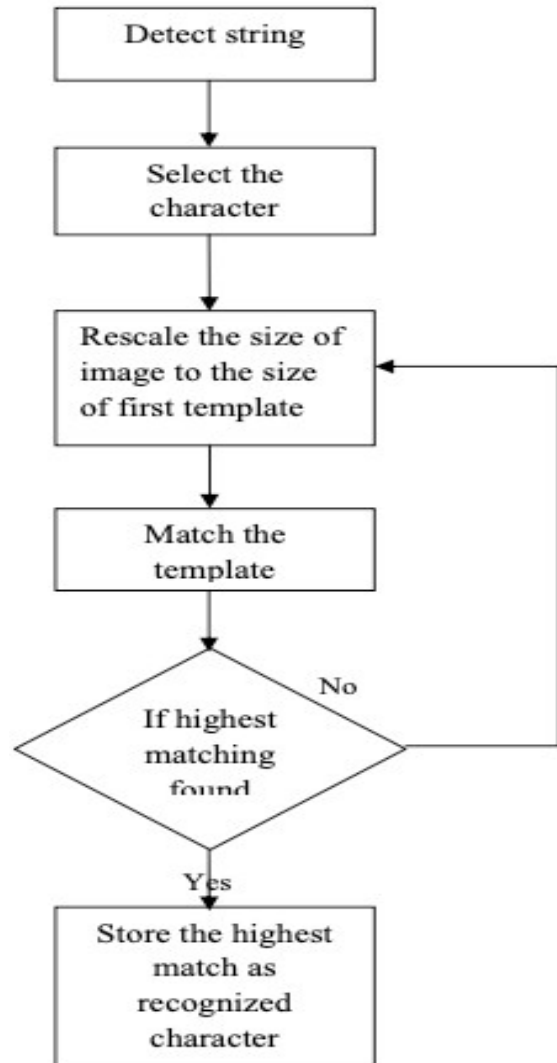

Fig.5. The GUI Interface of the Application

IV. CONCLUSION

In this paper, we have checked and evaluated the accuracy of the OCR technique. The Template matching affects the accuracy of number plate recognition. We have found that there are some factors which affect the effectiveness of template matching based on OCR technique i.e. font type, noise in image, tilting, etc. In future the work can be done on these factors and efficiency may be increased further for better results.

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