Vehicle Detection and Driver Drowsiness Detection System using Raspberry PI

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Abstract **- Every day many people die due to road accidents. Big accidents on road can impact the economy. One of the major causes of the accident is driver drowsiness. By reducing time to reach the accident location as soon as possible with help of an accident detection system using raspberry pi. In India, road accidents are a very big issue that causes the death of very valuable human life. To reduce these accidents this paper introduces one more system that is image processing. Road Accidents happen anywhere where do not have a chance to rescue them. Where these locations are far from local areas. So, for this causes the medical facility or ambulance could not reach this location. but in that system here use GPS and GSM module. The main reason behind accidents is alcohol and driver drowsiness. For this problem, the system contains an alcohol sensor. And for Driver Drowsiness CNN algorithm was used. Which is give maximum Accuracy. So, with the help of this system may such accidents have reduced.**

Index Terms **- Raspberry pi, GSM, GPS, Image processing.**

I.INTRODUCTION

All over the world, many accidents happen gradually. In today's life, vehicles are a need of day-to-day life. And due to lots of vehicle accidents gets happens. Many lives die. In car occur worldwide.[1] For that two hundred thousand death in India. The death happens in accident site increase the percentage of deaths in the years 2000-2015. The main purpose of this system of an accident detection system. So, to reduce the road accidents. For ambulance there is every second is important. If there is some delay, then there will be human life loss. This system provides the solution to poor rescue teams in the most possible ways. The real-time position for a vehicle can give the information using pre-install components. Tracking of this system is done by using GSM and GPS module which store the information that is data. Who reports in 2015, the number of deaths in India was 238,562 but reported road traffic deaths was 137,572.[2] In traffic accidents most of the young people included. According to 2015, the 2030 agenda was which reduce the number of deaths with the help of an accident detection system. [3] Here in this paper, with the use of a vibration sensor and IR sensor, the system will work INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN TECHNOLOGY reserves the right to do the final formatting of your paper.

II. LITERATURE SURVEY

A. Wireless Vehicular Accident Detection and Reporting System

Author Megaligam, R.K, R.N, Nair introduce this system to reduce accidents. This system is placed anywhere in the car. This system contains a PIC16F877A microcontroller. When the sensor gives the input then the microcontroller decides on road accidents. Here RF transmitter is interfacing with the microcontroller and transmits the information to emergency services. This transmitted information receives the information to emergency services and receives it with the help of an RF receiver. Here they used low-cost RF modules, microcontrollers, LCD, and accelerometer.

B. Design and Implementation of Vehicle Tracking System using GPS Technology and Smart Phone Application

Author Seok Lee, G Tewolde, Jeorock Kwon. This system is efficient to the vehicle tracking system. In this paper, they used GPS, GSM technology, and smartphone applications with microcontrollers. The microcontroller is used to control the GPS. GPS module sends the geographic coordinates. Smartphone Application is also used to continue monitoring the

vehicle. Smartphone application gives the continuous location. So, it helps to keep track of that vehicles.

C. Accident Detection and Reporting System using GPS, GPRS, And GSM technology
Author Md Syedul Amin, Jubayer Jalil. In this paper, they used GPS, GPRS, and GSM modules. GPS tracks the location and monitors the speed of the vehicle. GSM module is used to send SMS to a nearby rescue team.

D. Collision Avoidance System using Computer Vision Technique
Author Sachin Umesh Sharma and Dharmesh J. Shah. In this paper, they introduce a collision-avoidance system. Here on highways, here cameras are mounted on a vehicle to track distance from any animal to avoid a collision. The camera takes 2200 images and video clips and alerts the vehicle driver.

E. Driver Drowsiness Detection System
Author Mohammad Amin Ansari, Mohammad Rehman. In this paper, the system is implemented on hardware using infrared light. In that project, face recognition.

III BLOCK DIAGRAM AND SYSTEM ANALYSIS

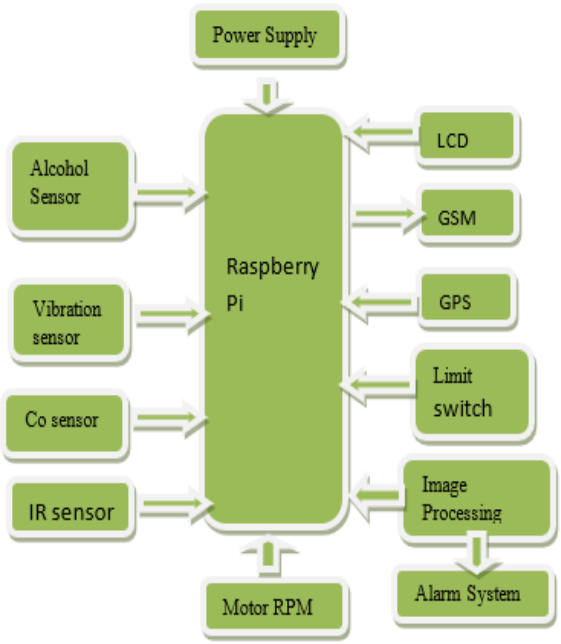

Fig 1. Block Diagram

In fig 1. Shows that block diagram of the vehicle detection systemin above block diagram there are four sensors to take input from the environment and send the information or data to the processor i.e. Raspberry Pi. So first when a system gets initialized then all sensor gets active. Both modules get active i.e. GSM and GPS. When the accident occurred then this vibration sensor senses the input and gives output to the processor. Similarly at the time of the accident if there is any fire or gas trace then the CO sensor sends that data to the processor. The alcohol sensor gives the percentage of alcohol present. IR pair connect with motor and that limit switch. Which slows down the speed of the vehicle. So, all this information store in Raspberry pi and it gives to the GPS and GSM module. GPS module sends data in longitude and latitude values. The location of the accident sends through GPS. GSM sends the information about alcohol percentage, Seat belt put or not, any fire or gas has detected or not. All this information can send to the emergency server number. And valuable human life saves. With that system, we used one more system i.e. Image processing for driver drowsiness. Here We used a Raspberry pi camera module to capture input in the form of video and images. To recognize the position of the eye and mouth we used the CNN Algorithm. For that, we used python, in that OpenCV Library which will help to capture images in a deep learning model which it detects if the eye is open or not. Here first it takes a picture from a camera which we used. Detect the image and check whether the eye opens or not. Here Convolution Neural Networks (CNN) algorithm is used to give maximum accuracy when an image is captured. CNN algorithm is a fully connected network. The algorithm has multiple layers. CNN layer consists of a hidden layer, input layer, and output layer. Convolutional Neural Networks (CNN) have other layers i.e. pooling layer, Fully Connected Layers, Receptive field, weights. When all the process is done then it detects the drowsiness, if it is detected then the alarm system gets on.

A. HARDWARE
Here we used the following components:

- Raspberry pi
- Alcohol Sensor
- CO sensor
- Vibration Sensor
- IR pair

- LCD display (16*2)
- GPS
- GSM
- DC motor

B. SOFWARE

Here we used the following software:

- Python
- OpenCV library
- dilb

IV ALGORITHM FOR DRIVER DROWSINESS

1. First Install OpenCV, dilb pygame, Keras
2. Take image from the camera.
3. Detect the face.
4. Detect the eye open or close using CNN.
5. If face detected drowsy then alarm on and alert the driver.
6. If not detected, then the system gets normal.

V RESULT

All the setup is done by the python program. If the accident occurs then is the sense through a vibration sensor and gives an alert message to nearby ambulance, police station number which is given in the program. A threshold value has been set so if the value goes beyond the threshold value alert msg has been sent. Therefore, all the information of vehicle like location, time updated from GPS and send message to GSM. Driver Drowsiness system used to minimize the risk while traveling. The system recorded images of a driver in that system to detect the eyes. Result of eye detection, each frame value analyzed if eyes open or close.

VI CONCLUSIONS

Vehicle detection and driver drowsiness detection system is important and with help of both systems the security of human life increases. The system provides emergency services like ambulance, medical treatment as soon as possible. With help of GPS tracking, reaching accident spots becomes easy and faster. GSM modules also trace the accident and inform all the aspects done there. Drowsiness detection system alerts the driver to avoid the accident with help of Image processing.

VII FUTURE SCOPE

This system will build an airbag system so it will help when drivers striking on steering wheel or windows. we can add some more modules to know about traffic. We can build a camera in a processor which will take a photograph of an accident spot.

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