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Driver Safety using Raspberry Pi

Archana S. Gaikwad
Lecturer, Department of E&TC
Pimpri Chinchwad Polytechnic, Pune, Maharashtra, India

Abstract: *This provides an approach to identifying driver drowsiness due to sleep or addiction or use of mobile phone during driving a vehicle in real time. 22 percent of injuries are attributed to cell phones, and 33 percent of incidents are due to drug or alcohol consumption, according to government report. Developing such a technology in vehicle that can track alcohol intake and use of driver's cell phones is currently a major challenge. This image processing method may be more effective to complete this task. We develop a device which uses Raspbian OS supports the camera. This device we can monitor the driver's real-time condition and turn on the warning when the mobile phone and drug or alcohol use is detected by the raspberry pi-based signal that shuts off the vehicle's ignition power source.*

Keywords: Alcohol Sensor, L293d, Raspberry pi, Camera, GSM, Buzzer, Power Supply, Speaker, LED (Hazard Light)

I. INTRODUCTION

The level of attention of driver while driving the vehicle degrade because of less sleep, use of mobile phones, drunk driving, long continuous driving. Several surveys on road accidents say that around 30 present of accidents are caused by fatigue of the driver. When driver drives for more than normal period for human then excessive fatigue is caused and also results in tiredness which drives the driver to sleepy condition or loss of consciousness. Most of the road accidents are caused because of drowsiness, use of mobile phones and drunk driving and also working environments, reduced sleep and time factor. Driver drowsiness and fatigue drunk driving reduces the driver decision making capability and perception level.

These two situations affect the ability to control the vehicle. There are some techniques which are used to detect cell phone use and drowsiness in drivers like by sensing of driver operation or physiological characteristics of driver or vehicle movement etc. Traffic survey shows that driver fatigue and use of mobile may be a contributory factor in up to 20% and due to alcohol drinking it is about 31% of all road accidents. The main aim of this cell phone and alcohol monitoring system is to build a device that can minimize the number of injuries induced by drowsiness and drunk driving in the vehicle.

The first part of this project measures drowsiness by tracking the motions of the eyelids during a given amount of time by recording the facial images. Using Open CV, The Input 8-megapixel camera which is capable of capturing images and video in real time, eye tracking is the essential part of this project. The caught frame is for Raspberry pi to handle. Using Python, CNN Algorithm is implemented.

II. METHODOLOGY OF SYSTEM

2.1 Description of Block Diagram

Figure 1 shows system architecture of design system. To train the classifier, the classifier must be equipped using the algorithm with a lot of positive images (face images) and negative images (faceless images). It then extracts features from it. - function was a single value obtained by subtracting number of pixels from the number of pixels under the black rectangle under the white rectangle. The number of pixels under white and black rectangles was determined by image integral for each measurement of the function. It simplifies computation of sum of pixels, however large may be the number of pixels, to an operation involving only four pixels. Each and every feature on all the training images has been applied. The best criterion was added for each attribute which could rate the faces positively and negatively. Yet clearly mistakes or misclassifications were possible.

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Therefore, the features with least error rate were chosen, meaning they were the features that best distinguish the representations of the face and non-face. A weighted sum of those weak classifiers is the final classifier. It's considered weak because the image cannot be labelled by itself, but together with others, it forms a strong classifier. If eye blinking frequency of driver increase system generate an alert and ignition system become locked and owner get information about that. Also system can detect alcohol level of driver for such a system we use python language to build system. Basic building block architecture shown in figure.1

III. SYSTEM BLOCK DIAGRAM

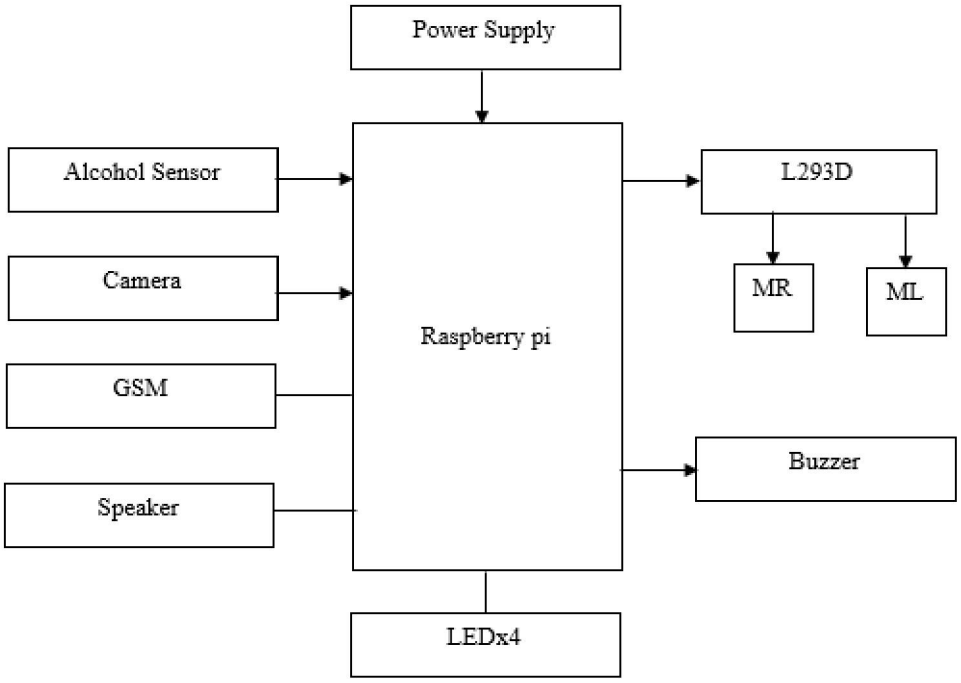

Figure. 1 (System Block Diagram / Architecture)

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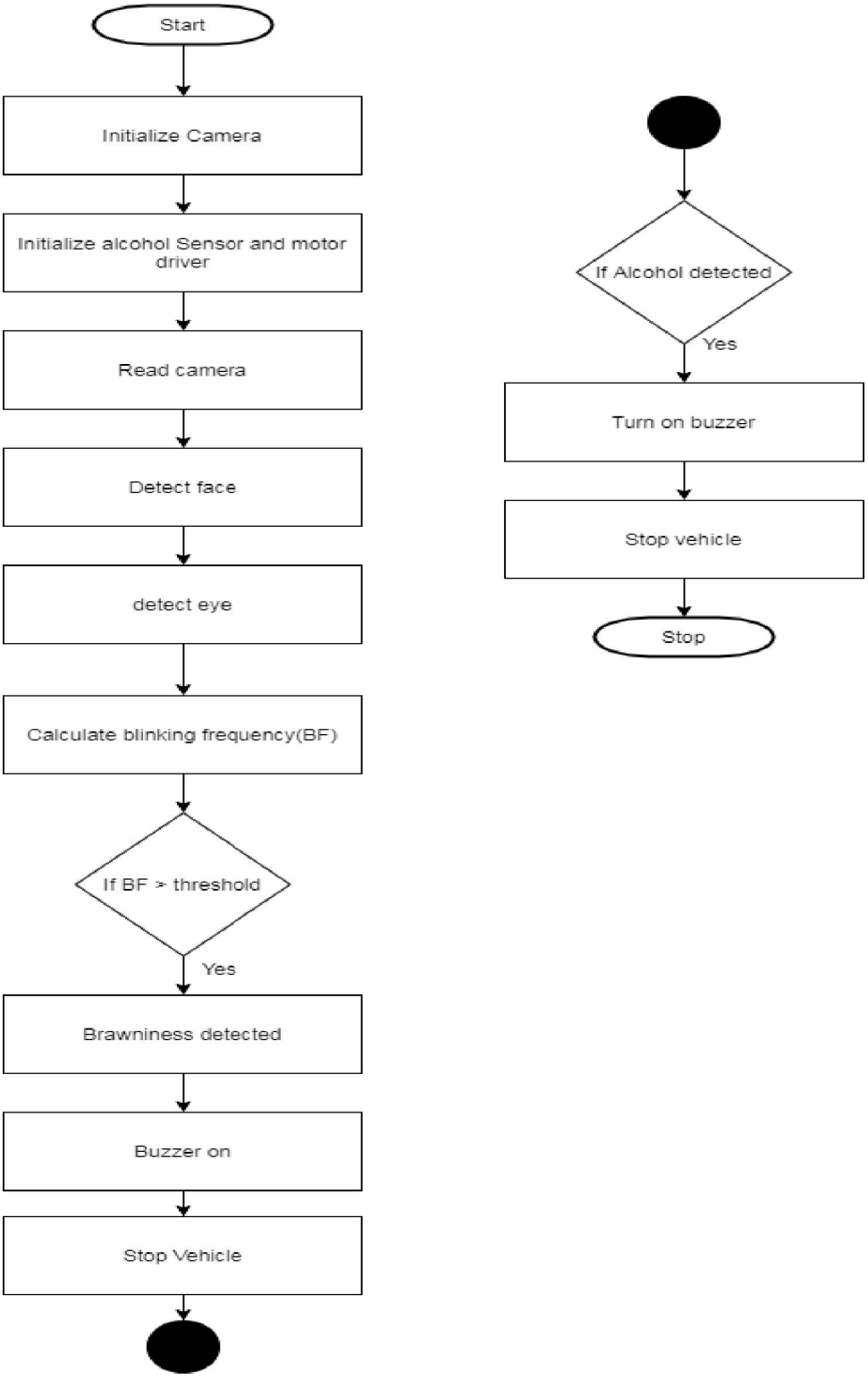
IV. FLOW CHART



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V. ADVANTAGES

- Alcohol Detection in Real-Time to Prevent Drunken Driving
- System for Road Transportation Safety in Smart City
- Accident Avoiding
- Increase in awareness of safety
- System will keep close eye on Driver
- Vehicle safety
- Low cost solution
- Multiple alert system (Voice message, Buzzer and SMS to vehicle owner)
- Less time required for Programming
- Component cost is less
- Component mounting and component fitment is easy
- Awareness in the surrounding regarding the use of the feature may help the people educate and know importance of automation.
- Driver Drowsiness (Image process, all Driver Actions will be captured)
- Cost saving (All possible Driver negligence is covered in single project)

VI. CONCLUSION

In this research, we introduced computer vision technology with image processing and use of the new embedded systems aimed at reducing road accidents related to driver drowsiness, mobile phone use and intoxicated addiction that locates and monitors the eyes. Due to road accidents, tracking and detecting the conductor's behaviour to ensure road safety as well as protecting human life is extremely important. It is therefore important to capture driver behaviour that will control the accidents due to alcohol-influenced rash driving. The proposed device deals with alcohol identification, cell phone use while driving and Drowsiness using sensors and steps are taken to deliver the warning alert to the user accordingly. Experimental findings should suggest that the Improved Drowsiness Warning System has been successfully tested and that alcohol dependence is also operating successfully. This is cost saving solution because we have combined all the safety aspects in one project. In some cases avaible are having individual development which adds cost and with less safety

VI. FUTURE SCOPE

The future works may focus on the utilization of outer factors such as vehicle states, sleeping hours, weather conditions, mechanical data, etc, for fatigue measurement. Driver drowsiness pose a major threat to highway safety, and the problem is particularly severe for commercial motor vehicle operators. Twenty-four hour operations, high annual mileage, exposure to challenging environmental conditions, and demanding work schedules all contribute to this serious safety issue. Monitoring the driver’s state of drowsiness and vigilance and providing feedback on their condition so that they can take appropriate action is one crucial step in a series of preventive measures necessary to address this problem. Currently there is not adjustment in zoom or direction of the camera during operation. Future work may be to automatically zoom in on the eyes once they are localized

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