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Driver Drowsiness Detection and Alcoholic Alerting System

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Abstract: In recent years, driver drowsiness has been one of the major causes of road accidents and can lead to severe physical injuries, deaths and significant economic losses. The system architecture for driver drowsiness detection and alcoholic alerting system using microcontroller. The driver drowsiness is detected by using drivers wearing eye blinking sensor .In one of the major disappointment of the system does not wearing all time eye blinking sensor by drivers because the sensor is irritating the drivers eye. It is overcome by using camera. Determine if the eyes are open or closed. The system deals with using information obtained for the binary version of the image to find the edges of the face, which narrows the area of where the eyes may exist. Once the face area is found, the eyes are found by computing the horizontal averages in the area. Once the eyes are located, measuring the distances between the intensity changes in the eye area determine whether the eyes are open or closed. A large distance corresponds to eye closure. Alcohol drinking it is about 31% of all road accidents. By using alcoholic gas sensor to detect the alcohol when the driver is drunken or not.

Keywords: driver drowsiness, alcoholic gas sensor transportation safety and alerting system.

I. INTRODUCTION

Driver Drowsiness and alcohol drinking is a significant factor in a large number of vehicle accidents. Recent statistics estimate that annually 1,200 deaths and 76,000 injuries can be attributed to driver drowsiness and alcohol drinking related crashes.[6] The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems. The aim of this project is to develop a prototype drowsiness detection system and alcohol detection system. The focus will be placed on designing a system that will accurately monitor the open or closed state of the driver's eyes in real-time. By monitoring the eyes, it is believed that the symptoms of driver drowsiness can be detected early enough to avoid a accident. Detection of drowsiness involves a sequence of images of a face, and the observation of eye movements and blink patterns. As the project progressed, the basis of the horizontal intensity changes idea. This facial characteristic is the centre of the finding the eyes on the face, which will allow the system to monitor the eyes and detect long periods of eye closure. An explanation is given here of the eye detection procedure. After inputting a facial image, pre-processing is first performed by binarizing the image.

The top and sides of the face are detected to narrow down the area of where the eyes exist. Using the sides of the face, the centre of the face is found, which will be used as a reference when comparing the left and right eyes.[9] Moving down from the top of the face, horizontal averages (average intensity value for each y coordinate) of the face area are calculated. Large changes in the averages are used to define the eye area. The following explains the eye detection procedure in the order of the processing operations. All images were generating in Matlab using the image processing toolbox. The analysis of face images is a popular research area with applications such as face recognition, virtual tools, and human identification security systems. This project is focused on the localization of the eyes, which involves looking at the entire image of the face, and determining the position of the eyes by a self developed image-processing algorithm. Once the position of the eyes is located, the system is designed to determine whether the eyes are opened or closed, and detect fatigue .By using gas sensor to detect alcohol, when the driver is drunk or not. On the other hand to detect the alcohol intake bye the person, an alcohol gas sensor is interfaced with the microcontroller board which will sense whether the person in driving seat drunk or not.[1] [3]

II. EYE TRACKING AND MONITORING

There are several different algorithms and methods for eye tracking, and monitoring. Most of them in some way relate to features of the eye (typically reflections from the eye) within a video image of the driver. The original aim of this project was to use the retinal reflection (only) as a means to finding the eyes on the face, and then using the absence of this reflection as a way of detecting when the eyes are closed.

It was then found that this method might not be the best method of monitoring the eyes fort two reasons. First, in lower lighting conditions, the amount of retinal reflection decreases; and second, if the person has small eyes the reflection may not show. The project progressed, the basis of the horizontal intensity changes idea. One similarity among all faces is that eyebrows are significantly different from the skin in intensity, and that the next significant change in intensity in the y-direction, is the eyes. This

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facial characteristic is the centre of finding the eyes on the face, which will allow the system to monitor the eyes and detect long periods of eye closure. Another main aim of the project to detect alcohol when the person in the driven seat drunk or not. By using alcohol gas sensor to detect when the person consuming alcohol or not in the driven seat. Alcohol gas sensor is interconnected with the microcontroller. When the person in the driver seat consuming alcohol immediately the alarm tone will be generated.[5] [1][9]

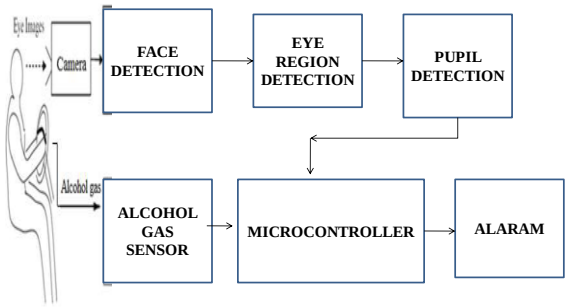
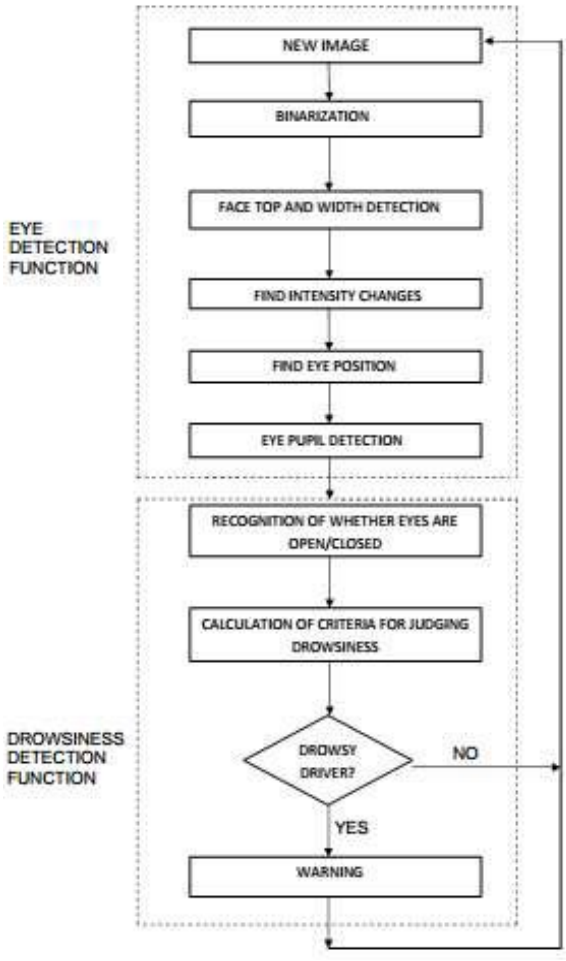


Fig. 1 Methodology



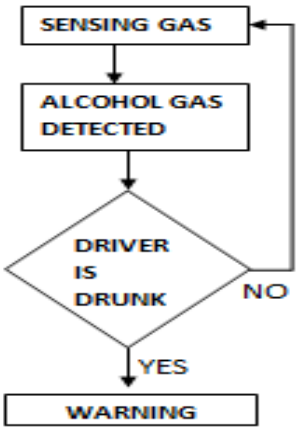


Fig.2 flowchart of driver drowsiness & driver alcoholic detection

III. BINARIZATION

The first step to localize the eyes is binarizing the picture. Binarization is converting the image to a binary image. A binary image is an image in which each pixel assumes the value of only two discrete values. In this case the values are 0 and 1, 0 representing black and 1 representing white. With the binary image it is easy to distinguish objects from the background. The grey scale image is converting to a binary image via thresholding. The output binary image has values of 0 (black) for all pixels in the original image with luminance less than level and 1 (white) for all other pixels. Thresholds are often determined based on surrounding lighting conditions, and the complexion of the driver. After observing many images of different faces under various lighting conditions a threshold value of 150 was found to be effective. The criteria used in choosing the correct threshold was based on the idea that the binary image of the driver's face should be majority white, allowing a few black blobs from the eyes, nose and/or lips.

A. Alcohol gas sensor

Sensitive material of Alcohol gas sensor is SnO2, which with lower conductivity in clean air. When the target alcohol gas exist, the sensor's conductivity gets higher along with the gas concentration rising. Users can convert the change of conductivity to correspond output signal of gas concentration through a simple circuit. Alcohol gas sensor has high sensitivity to alcohol gas and can resistant to the interference of gasoline, smoke and vapour. It is with low cost and suitable for various applications of detecting alcohol at different concentration.

IV. DETECTION PROCESS

A. Eye detection function

An explanation is given here of the eye detection procedure. After inputting a facial image, pre-processing is first performed by binarizing the image. The top and sides of the face are detected to narrow down the area of where the eyes exist. Using the sides of the face, the centre of the face is found, which will be used as a reference when comparing the left and right eyes.

Fig.3 open eye and closed eye

Moving down from the top of the horizontal averages (average intensity value for each y coordinate) of the face area are calculated. Large changes in the averages are used to define the eye area. The following explains the eye detection procedure in the order of the processing operations. All images were generating in Matlab using the image processing toolbox. In this project we can easily identified efficiently.

B. Alcoholic detection function

By using a alcoholic gas sensor is interconnected with the microcontroller. If we detecting driver is drunk, the alarm signal will be generated otherwise the process of detecting alcohol by using alcoholic gas sensor will be continuously processed. The main aim of this gas sensor application is to detect the alcohol drunken people. We are developing an gas sensor which is interconnected by the microcontroller kit which will be placed in a vehicle .Now, the vehicle will be under the control of the kit. If any drunken people enter in to the vehicle, it gives alarm sound immediately.

V. CONCLUSIONS

A non-invasive system to monitor the driver drowsiness and alcohol detection was developed. Information about the head and eyes position is obtained through various self-developed image processing algorithms. During the monitoring, the system is able to decide if the eyes are opened or closed. When the eyes have been closed for too long, a warning signal is issued. In addition, during monitoring, the system is able to automatically detect any eye localizing error that might have occurred. In case of this type of error, the system is able to recover and properly localize the eyes.

Image processing achieves highly accurate and reliable detection of drowsiness and without the annoyance and interference. An alcohol consumption of driver is detected by using alcoholic gas sensor which is interconnected by the microcontroller. We are developed an embedded kit which will be placed in a vehicle. Now, the vehicle will be under the control of the kit .If any drunken person enters in to the vehicle it gives a buzzer sound immediately.

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