SURVEY ON ACCIDENT PREVENTION USING EYE BLINK AND ALCOHOL SENSOR

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ABSTRACT

The accident prevention for vehicle is the system in which eye blink sensor is used to detect the driver's drowsiness and alcohol sensor is used to detect the alcoholic sensation. Initially, the proposed system is fitted with the motor of the vehicle so that the vehicle is controlled by the kit. The eye blink sensor is used to detect the blinking of the eye and the speed of the vehicle is reduced when there is no blinking of an eye for 2-5 seconds. The alcohol sensor is used to detect the alcoholic sensation and the alcohol consumed level is displayed in the LED of the vehicle, so that the ignition gets reduced while the count reaches the maximum count. Thus the accident is prevented by means of buzzer alarm produced in the vehicle as a result of alcohol and eye blink sensor.

Keywords: Eye blink sensor, alcohol sensor, blink count, alcohol consumed level, motor.

1. INTRODUCTION

The analysis of driver's drowsiness is done with the observation of eye blink and the odor of the alcohol. In this system the detection can be done in two aspects. The first method is that detecting the alcohol consumption by observing the smell of the alcohol using MQ2 sensor and the count is analyzed in the LED display and it also doesn't allows the driver to start up the vehicle.

It eventually prevents the driver from starting the vehicle which avoids the unconscious driving of the vehicle that also causes problems to the passer by persons on the road detecting of driver consuming odorless alcohol then alcohol detection is impossible but the another method used here is by detecting the eye blinking of the person. The drowsiness initially causes the reduction in the eye blink which can be analyzed by the IR LED sensor that monitors the blinking of the eye. In the case if the driver is drowsy then the system works out by checking the eye blink by the sensor and it gives the buzzer alarm so that the passengers those who travel along the road can be aware of the accident that might be happened.

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If the driver cannot be controlled by the buzzer alarm then the speed of the vehicle is automatically reduced by 10 units then proceeds the moving of the vehicle, and it exceeds until the speed reduced to 20 Kmph and then it doesn't reduce to avoid the sliding of the vehicle by sudden stop in the traffic. Our system mainly focuses on the prevention of accidents caused in the two wheeler (bike) by the techniques followed for the car in this stream.

METHODS OF DETECTING DROWSINESS

I. ECG and EEG

In this system physiological signals were used to detect drowsiness using Electrocardiogram (ECG). The Heart Rate (HR) also varies significantly between the different stages of drowsiness, such as alertness and fatigue. Therefore, heart rate, which can be easily determined by the ECG signal, can also be used to detect drowsiness. Others have measured drowsiness using Heart Rate Variability (HRV), in which the low (LF) and high (HF) frequencies fall in the range of (0.04–0.15 Hz) and (0.14–0.4Hz) fig.1 using physiological signal sensing system that can be integrated into vehicles to detect driver drowsiness.[1]

The Electroencephalogram (EEG) is the physiological signal most commonly used to measure drowsiness. The EEG signal has various frequency bands, including the delta band (0.5–4 Hz), which corresponds to sleep activity, the theta band (4–8 Hz), which is related to drowsiness, the alpha band (8–13 Hz), which represents relaxation and creativity, and the beta band (13–25 Hz), which corresponds to alertness . A decrease in the power changes in the alpha frequency band and an increase in the theta frequency band indicates drowsiness [2].

In another aspect it can be used as follows. The EEG signal was measured with a composition of four spoon electrodes located on the vertex zone of the cranium and attached to the head surface with colloid. Once the subjects are seated and connected to the acquisition systems, they were asked to drive for around 8 hours on a real highway or a mountain route stopping during at least 10 minutes every two hours of continuous driving or every time they felt drowsy. Regardless of the type of measurement, one of the chief problems of drowsiness detection studies is the difficulty of carrying out experimental tests to validate the techniques [1].

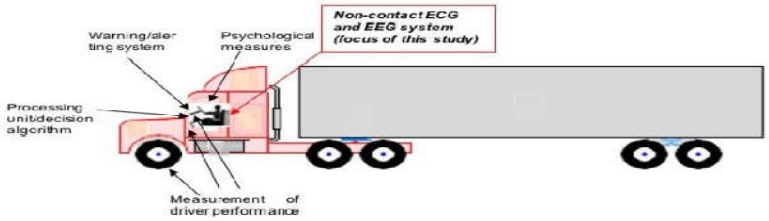

Fig 1: Method of EEG and ECG

Drawback: EEG and ECG is the method of analyzing drowsiness through heart beat of the sudden break and crossing of vehicles will lead to the increase in the driver's heart beat so this method's result will not be exact in finding out the drowsiness.

II. FACE DETECTION

Human face localization and detection is often the first step in applications such as video surveillance, human computer interface, face recognition and /or facial expressions analysis, and image database management. A lot of research has been done in the area of human face detection . In prior studies, different human skin colors from different races have been found to fall in a compact region in color spaces. Therefore skin can be detected by making use of this compactness. The face detection is performed in three steps .The first step is to classify each pixel in the given image as a skin pixel or a non-skin pixel. The second step is to identify different skin regions in the skin-detected image by using connectivity analysis. The last step is to decide whether each of the skin regions identified is a face or not. After the probable location of the face is found the left and the right edges of the face is determined with these detection can be done [3].

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Drawback: The working system can build using virtual instrumentation software's like LABVIEW & Add on Cards and Custom chip can be build using VHDL for embedded system. This is not autonomous decision making module so it cannot control the steering of the vehicle. It can only detect drowsiness but cannot prevent any father problems.

III. LBP

Local binary patterns (LBPs) have aroused increasing interest in image processing and computer vision. As a nonparametric method, LBP summarizes local structures of images efficiently by comparing each pixel with its neighboring pixels. The most important properties of LBP are its tolerance regarding monotonic illumination changes and its computational simplicity. This technique is mostly used for detecting emotions on the face like, happiness, sadness, excitement etc. LBP (local binary pattern) is used in drowsiness detection for detecting face of the driver, it divides the image into four quadrants then the top and bottom part are detected."Fig.2", shows LBP extract the image from the video then the image is divided into blocks, after that LBP histogram are generated from the each block and feature histograms are formed Figure Shows the LBP technique[1].

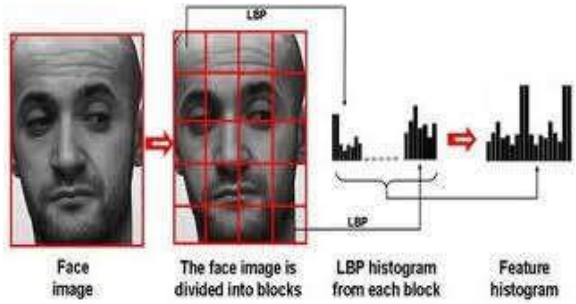

Fig. 2. Local Binary pattern

Drawback: This method is mostly used in the detection of face reactions and now for finding drowsiness but it is prolonged process that observation doesn't help in avoiding of accident because thinking of person also causes changes in face reactions.

IV. OPTICAL DETECTION

The most common implementation of an optical sensor system uses infrared or near-infrared LEDs to light the driver's pupils, which are then monitored by a camera system. Computer algorithms analyze blink rate and duration to determine drowsiness. The camera system may also monitor facial features and head position for signs of drowsiness, such as yawning and sudden head nods. Depicts the use of an optical detection system [1].

Drawback: This method is mainly done with infrared LED to detect drowsiness with driver's pupil but the major problem is using infrared needs some accuracies. Change in the position of infrared with pupil will results in failure in the working of the system because infrared is so sensible. So this method is ineffective in heavy traffic and in rash driving.

V. HEAD MOVEMENT

This system uses head movements as the sole input methods; more precisely head's tilt angles are used. Head tilt angles define how much the head is rotated along an axis by using reed switch. There are three possible head tilt movements, which are shown in Fig.3 and they are defined as:

- Pitch, the vertical head rotation movement (as in looking up or down)
- Roll, the head rotation that occurs when tilting head towards the shoulders

Yaw, the horizontal head rotation movement (as in looking to left or right).[4]

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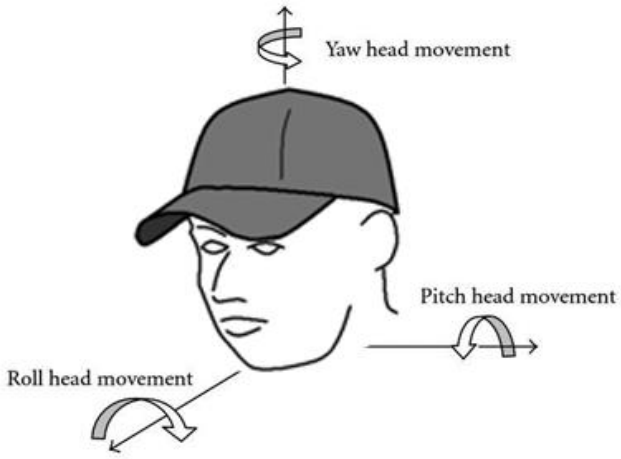

Fig 3.Three possible head movements

Drawback: This method is ineffective because the product called reed switch to detect head angle tilt which is not very effective is used. So this method is not up to the level of preventing accident in real time.

CONCLUSION

As described throughout the paper, many technologies are used in the detection of driver's drowsiness. These are all implicated only in car and our system works out with two wheeler .so we used eye blink sensor and alcohol sensor which can directly detect the drowsiness and it also prevents out the accidents by not allowing the drunken driver to start up the driving. Further the system can be proceeded out in implementation of these sensors for the prevention of accidents.

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