Anti-Sleep and Alcohol Detection Using Eye Blink And Mq3 Alcohol Sensors

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Abstract— **Drinking and driving is the main cause of death which may also include drowsiness. More such accidents can be avoided if the driver is warned ahead of time. Such sensors come in use for reducing accidents. Two of such types are MQ3 sensors and Eye Blink sensor which monitors sleep and alcohol concentration while driving. This sensor keeps on monitor the facial expressions and detect if any issues are faced by the driver**

The working principle is simple when the driver blinks his/her eyes the sensor detects it and immediately slows down the vehicle and there will be a break in the engine and the vehicle stops, same goes with the alcohol sensor as well when the concentration of alcohol is detected in the breath of the driver the car doesn't move and the engine breaks and the vehicle stops. Many high variety cars have eye blink sensor implanted in the cars system; we believe even the cars in India will also this system will get added in the cars system.

I. INTRODUCTION

Drowsiness is the main cause of car crashes in day-to-day life. Driving while drowsy or drunk state are main two reason for the cause of car crashes mainly in high ways. The highway traffic safety has given a report that almost 15,000 cases are caused due to drowsiness. To control this our project is very helpful. The components we use is eye blink sensor, MQ3 alcohol sensor, Arduino nano. LITERATURE SURVEY

As per study there are almost 3 types of sleep.

1. A sleep between complete asleep and the other is drowsy.

2.A sleep that's a lightweight sleep or nap.

3.A state of deep sleep.

Drowsiness cannot be understood by a person on his own, he may realize it only after an accident or slight hit of vehicle somewhere.

It can be caused by a heavy day or a sleepless night drive.

Our project should be more advanced in a way that the vehicle should have a customized AI to sense the signals and drag the vehicle to the side to parking state, otherwise the vehicle from behind will crash into the car due to the engine break or car engine stops to function due to the sensors or any sort of vehicle causing again serious injury for both the drivers and the passengers in the car

II. COMPONENTS

1. Eye Blink Sensors: -

The eye blink sensor module generaly consists of a eye blink sensor and a frame along with IR sensors and a relay. The eye blink sensor when wore by the driver, Whenever the driver falls asleep orwhen an accident occurs the vibrator vibrates given a caution signal to alert the driver.

2. Alcohol Sensors: -

An alcohol sensor is used to detect the concentration of alcohol in a people breathe. The sensor can activate at temperature varying from -10 to 50°C with a power supply is less than 150Ma to 5V. The sensing range of alcohol level is from 0.5mg/L to around 4mg/L.

3. Arduino Nano: -

It is a microcontroller that is very suitable for wearable and portable projects like anti sleep and alcohol detection sensor systems. We use this nano because of it's compactable size and it's easy to program. It is very easy to access for beginners in the field of electronics or coding.

4. Buzzer:-

Buzzer is used as a vibrator that alerts sound when alcohol is detected in the driver or if drowsiness is detected.

5. LEDs:-

It indicates different states for example we take red and green, where green indicates safe and red indicates danger.

6. 1-ch 5V Relay module: -

It controls vehicle ignition or other hardware in this project we use 2 modules, One for eye blink sensor and one for alcohol sensor.

7.Power Supply: -

We used a power bank as power supply source for the arduino nano.

III. METHODOLOGY

In this field the research is based on four types of fatigue detection. The first one is made up of electroencephalogram (EEG), electrocardiograph (ECG) and electrooculogram (EOG).

This category delivers impressive outcome, most often getting these signals is troublesome and challenging. When the driver is tired, he reduces his force when holding the steering wheel, ultimately leading to our second method that is operating

behaviour. The third method is based on the vehicle's condition, whether it is in the correct lane or not. To complete the fourth method is based on physiological characteristics like an unusual blink and yawn pattern, especially in the eye. Several of these approaches require significant investment due to sensors, cameras inside and outside the vehicle, and an external computer for enhanced processing.

A. Drowsiness Detection System

Natural state of rest for the body and mind is known as sleep. We know that is it the basic necessity of a human. Sleep-wake cycle is the internal biological process that regulates our sleep and wake pattern over a 24-hour period. Every human has their own cycle based on various reason such as work, sleep disorder time zones etc.

The two phases are sleeping phase which basically lasts for 7 to 9 hours and is classified into non rapid eye movement (NREM) and rapid eye-movement (REM).

Regulators of the sleep-wake cycle are Suprachiasmatic Nucleus (SCN): it is an internal biological clock, which responds to the signals of light during the day and darkness in the night present in the environment.

Melatonin: in response to

darkness the sleep hormone is released by the pineal gland. Cortisol: in response to light the wake hormone is released by the adrenal gland.

B. Main Causes of Drowsiness

Drowsy driving is a significant threat to road safety, and several factors contribute to driver drowsiness. The main causes of drowsiness for drivers include lack of quality sleep, particularly for those who work non-traditional hours or have irregular sleep schedules. Additionally, driving during peak sleepiness hours, such as between 2-4 pm and 12-2 am, can increase the risk of drowsy driving. Furthermore, factors like fatigue from long hours of driving, medication side effects, and underlying medical conditions like sleep apnoea can also cause drowsiness. Moreover, driving in a warm and comfortable vehicle, or listening to soothing music, can also induce drowsiness. Lastly, drivers who are under the influence of sedatives, antidepressants, or other substances that can cause drowsiness are also at a higher risk of falling asleep at the wheel.

C. Sleep Fragmentation

Sleep is a basic requirement, and a reasonable sleep schedule does not mean that sleep promotion compares.

Continuous interruption of sleep causes inadequate sleep, resulting in a detrimental impact on work and daily life. Internal and external trigger is caused by sleep fracture. Sleep disturbance is an illness, which is the primary internal cause. Factors such as turbulence, actions, infants, or job related are the effects of improper sleep. For example: the NTSB is a sleep time frame, that has reasoned simple safeguards to sleep induced collisions, sleep estimation for the last 24 hours, and divided sleep designs

D. Circadian Factors

The circadian pacemaker routinely creates sentiments of sleepiness during the evening and night, the individuals who do not sleep denied. Too much work can aggravate sleep by interfering with circadian sleep designs additionally.

E. Drowsiness Detection and Measurement Methods

There are a few approaches to avoid driver drowsiness. They are gathered into five divisions: abstract, physiological, vehicle based, social, and half-and-half. There are parts in this too which give a short overview of the drowsiness detection techniques, and these are.

1) Subjective Methods

The need for a human body to overcome tiredness can be explained as sleepiness. The more tired our body is the more sleep we need. Scientific bodie such as the Sleep Laboratory [27], the Sleep Disorders Division [28], and the Sleep Specialist Association [29]. These have different standards of sleepiness. Present subjective methods are based on questionnaires and sleep electrophysiological tests used to test sleepiness. They want to offer insights based on the conditions leading to crashes and help identify and reduce those driver drowsiness conditions. This measurement of their perception of drowsiness is called subjective measurement since crowdsourcing has been done here as well to describe sleepiness. Some popular subjective sleepiness testsare:
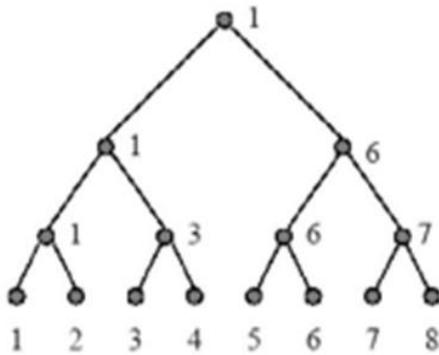
2) Epworth Sleepiness Scale (Ess) [60]

GURE 1. The bottom-up binary tree used for classification.

This is a simple test or method to know how a sleepy person feels during the day, especially in a calm and quiet environment. It tells us how likely someone is to doze off while doing things like reading on your phone or tablet, watching TV, or just sitting in a car as a passenger. We can rate ourselves on a scale from 0 to 3 for each situation where 0 means you're wide awake and wouldn't nod off at all while 3 means you're very likely to fall asleep

Face Detection And Recognition:

The approach of our project is to detect the facial expressions and sense it. But sometimes the support vector mechanism (SVM) fails to perform its function properly, because of the eye not visible or partially visible. Due to these issues the system came up with a new technology called the partially support vector

mechanism (PSVM) which can even detect the hidden details and function accordingly. It works better than SVM due to its improved efficiency

IV. FRAMEWORK:

FIGURE 2. Occlusion cases taken into account.
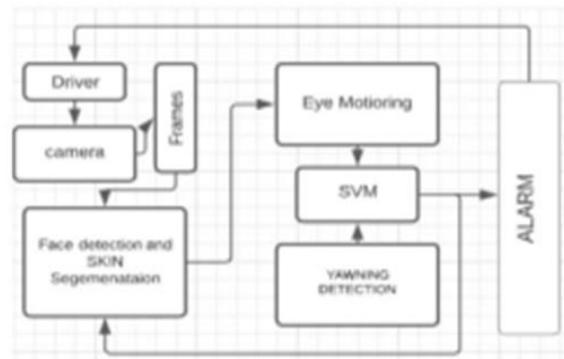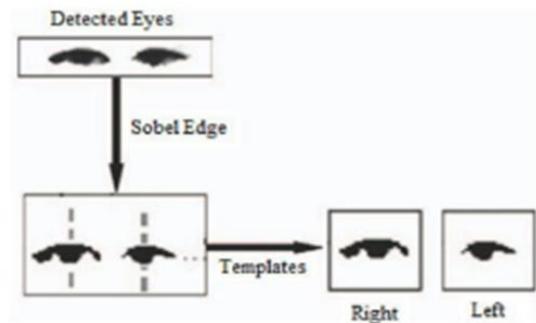
Conclusions and Future Work:

In this research, we have explained how our drowsiness detection system works effectively in real time, regardless of lighting conditions. The system utilizes Support Vector Machines (SVM) and image processing and clustering methods for better classification and video analysis, using input from hardware

devices. We have tested the algorithm under various conditions and found that it was performed well with

high accuracy in well-lit environments and at an optimal distance from the camera.

However, the accuracy decreased in low-light conditions and when the subject moved further away from the camera. Notably: The system achieved 100% accuracy in image segmentation. For emotion and gesture recognition, the overall accuracy was 83.25%, even across different scenarios.

Future Directions:

To improve the system, the following can be explored: Testing with high-quality cameras and under a wider range of lighting conditions. Adding recent deep learning techniques to boost accuracy and flexibility. Utilizing various datasets for better generalization and performance in real-world scenarios. These improvements could make the system more reliable for practical applications.

Conflict of Interest

The authors confirm that there are no conflicts of interest related to this study on anti-sleep and alcohol detection using eye-blink sensors and MQ3 alcohol detection sensors. This work was carried out with the sole purpose of enhancing road safety and reducing accidents caused by drowsiness or alcohol consumption. The research, implementation, and findings were conducted independently and without any influence or bias from external parties or organizations. No financial, professional, or personal relationships affected the integrity of this research. The authors stand by the impartiality and transparency of their work in developing this innovative system

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