Review on Driver Drowsiness Alert Detection for Vehicle Acceleration Using Deep Learning

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Abstract— Many people find it difficult to relax and get a decent night's sleep at night. Drivers who are sleep-deprived are more probable to fall asleep behind the wheel, growing the likelihood of an accident. The driver assistance system is presented in this system with the goal of reducing the frequency of accidents caused by driver fatigue and thereby improving road safety. Based on optical information and artificial intelligence, the proposed system treats the automatic identification of facial and driver fatigue. The proposed system estimates the distance between the eye iris and neck angle by locating, tracking, and analyzing both the driver's face and eyes. The location of the eye and neck, as well as the activities of those being seen, are all taken into account. It is used to determine how far the eye iris angle is from the neck angle in the eye and neck angle-based approach.

Indexed Terms-- driver safety; drowsiness detection; Image processing; alert system, etc.

I. INTRODUCTION

It is believed that fatigue can have a detrimental effect on people in the workplace and classroom. The paper propose a solution to this problem.The solution is to design a detection system that recognises key sleepiness characteristics and alerts users when they become drowsy. There are two approaches for determining whether a driver is drowsy:

1) Once the driver's face is recognised, it is determined whether or not the driver is the vehicle's owner.
2) Behavior-based approaches, and
3) Approaches based on the eye and neck angle The distance between the neck and eye iris angles is determined using the Euclidean distance formula in the eye and neck angle-based technique.

According to current studies, methods that assess the distance between the driver's open and closed eyelids are more reliable and accurate than previous approaches for detecting driver tiredness. This research's major objective is to develop a system capable of detecting and alerting a weary motorist. Driver fatigue has a significant role in a significant proportion of traffic accidents. Detection can be achieved by a variety of approaches and criteria. The proposed system makes use of the behaviour of parameters. Eye blinking, yawning, eye opening, and jaw position are only a few of the behavioural requirements.

A camera mounted on the bus captures the live footage. The video is broken up into frames from which photographs are chosen. Individual shots are taken to decrease image noise.

II. LITERATURE SURVEY

Petchara Inthanon, Surasak Mungsing [1] Drowsiness has an impact on people's daily lives, resulting in unproductive work or car accidents caused by insomnia, resulting in harm to life and property. It is especially dangerous when it involves public transit. Drowsiness is a condition that causes car accidents, according to the author, who works for the Department of Land Transport (DLT). As a result of this worry, an effective detection of sleepiness system is carried out. The goal of this research is to create an algorithm for analysing facial structure in video data and identifying tiredness. The system is also used to test the efficiency of the Algorithm. The results suggest that employing face landmarks can help to efficiently produce eyes and mouth components, which can help to correctly create equations to analyse drowsiness using Nvidia Nano Jetson.

Hitendra Garg, [2] Technology advancements over the years have provided assistance to drivers through the use of smart vehicle technologies. In recent years, there has been a significant increase in traffic accidents in India and around the world. The most common causes of this are drowsiness and weariness. As a result, detecting driver drowsiness and exhaustion is a big potential area for preventing a high number of sleep-related traffic accidents. In light of this issue, this study offers a Real-Time Drowsiness Detection System (RT-DDS) for use in motor vehicles using traditional Computer Vision technologies. The system used different Computer Vision applications such as blink rate, eye closure, and yawning to successfully and swiftly recognise a driver's tiredness while driving the car and adjust the driver accordingly. The proposed study attempted to contribute to a reduction in the number of road accidents while keeping the techniques simple and intact.

Engr. Ghulam Hyder,Prof. Dr. Bhawani Shankar Chowdhry,Engr. Khuhed Memon,Engr. Aisha Ahmed, [3] : In today's quickly growing world, where every industry's advancement contributes to enhancing comfort and safety to human life, the automotive business is focusing on delivering safe, dependable, and autonomous automobiles to rescue humans from unfathomable losses. Our research aims to help prevent road accidents caused by driver inattention, drunk driving, or unexpected health concerns. The proposed system is a SoC (System on Chip) that can be simply placed in a car; it can correctly monitor the driver's state while driving and, if incapability is detected, the system switches to auto drive mode, followed by safe parking in the left lane. The created system is divided into four sections. The sleepiness detection sub-system monitors the driver's drowsiness by using image processing techniques to detect his face and eyes and determining his drowsiness based on the Eye Aspect Ratio (EAR). Alcohol is detected by continuously analysing the driver's Blood Alcohol Concentration (BAC) levels, vital signs such as heart rate and electrocardiogram (ECG) are measured within the car, and if they are found to be abnormal, the information is coordinated with the driver and forwarded to a concerned family member and an emergency helpline using the GSM/GPRS module. When any of the subsystems detects an irregularity, the automobile enters auto driving mode.

Venkata Phanikrishna B, Suchismitha chinara, [4] The advancement of the automotive industry has made our lives easier, yet traffic accidents have gradually increased. Driver sleepiness when driving is responsible for a substantial proportion of vehicle accidents. EEG-based methodology, like many other drowsiness detection technologies, is regarded as an immediate, efficient, and promising modality. In EEG-based sleepiness detection, several feature types have been used. In this paper, The proposed systemoffer a new feature extraction approach based on a single Hjorth parameter and compare its classification performance to that of the existing Power spectral density (PSD) feature. The results reveal that the proposed H-parameter features outperform the current work's PSD features in terms of performance. Traditional feature extraction algorithms outperform in this field.

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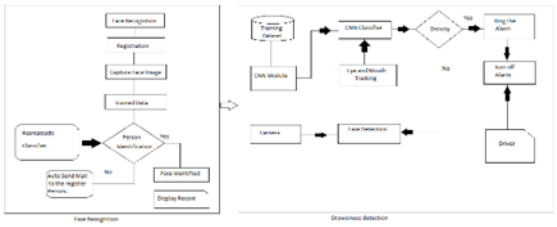
III. PROPOSED SYSTEM

The proposed system will detected driver drowsiness or NOT in the proposed system. The proposed system employed the Harr cascade technique as well as the

CNN algorithm. The Harr cascade technique is used to detect faces, and the CNN algorithm is used to train the Model dataset. To begin, construct a Drowsiness dataset, then train it and categorise it using the CNN algorithm. Create a CNN model as well. Second, use the Harr cascade algorithm to detect the faces of the driver and determine whether or not the individual is authorised. The trained CNN model was then utilised to detect driver eyes and mouth and classify driving drowsiness or not.



A. CNN:

For image and video recognition, Convolutional Neural Networks are perfect. Picture analysis applications such as image identification, object recognition, and segmentation are the most prominent use cases for CNN. Four distinct layers make up Convolutional Neural Networks (CNNs). In a conventional neural network, each input neuron is linked to the next hidden layer. There are only a few connections between neurons in the CNN's input layer and neurons in the hidden layer. To reduce the feature map's dimensionality, a pooling layer is applied. Numerous activation and pooling levels of the CNN's hidden layer are expected. Data is flattened when it is reduced to a one-dimensional array for use in the next layer's input A single long feature vector is generated by flattening the output of the convolutional layers. Fully connected layers are the final stages of network connectivity. The output of the final Pooling or Convolutional Layer is flattened and transmitted to the fully linked layer as input.

Step 1: Convolution Operation (Filter image)
Step 1(b): ReLU Layer
Step 2: Pooling (used max pooling function)
Step 3: Flattening (Covert Matrix into 1D Array)
Step 4: Full Connection.
Step 4(b): Dense ()
Step 4(c): Optimizer ()
Step 4(d): compile ()

B. Harr cascade:

Haar Cascade Detection is one of the most ancient and powerful face detection algorithms ever devised. It has existed for a long time, long before Deep Learning became renowned. Face detection with Haar cascades is a machine learning approach in which a cascade function is learned using a collection of input data. Many pre-trained classifiers for face, eyes, grins, and other features are already included in OpenCV

Step1: Input as Image
Step2: Create Cascade Classifier it will contain the features of the face.
Step3: use opencv library for display image.
Step 4: color image.
Step 5: Gray image using opencv library.
Step 6: Load Harr Classifier.
Step 7: Run detector on gray scale image.
Step 8: Get Faces Co-Ordinates.
Step 9: Draw rectangle on original image using co-ordinates.

CONCLUSION

The face will be detected using computer vision and contours will be formed around it. The individual is examined using sleepiness detection and face detection via webcam. The camera system examines the person's drowsiness parameters. It sends a message to the person in charge to pick up the individual who is drowsy and the car owner. Face detection and driver drowsiness are detected using the camera and the harcasscad and CNN algorithms.

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