IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 4, March 2024

Driver Drowsinesss Detection using AI

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Abstract: *Facial expression recognition has many potential applications which have attracted the attention of researchers in the last decade. Feature extraction is one important step in expression analysis which contributes toward fast and accurate expression recognition. Facial expressions are most used for interpretation of human emotion. There is a range of different emotions in two categories: positive emotion and non-positive emotion. There are four types of generally using system: Face detection, extraction, Classification and recognition. In this proposed taking the large-scale image, hybrid extraction feature and Haarcascade algorithm to classification of frame-based expression recognition try to detect facial expression detection and emotion detection for authentication of website application.*

Keywords: Face detection, Extraction, Classification, Recognition, Haarcascade algorithm

I. INTRODUCTION

Drowsy driving is one of the major causes of deaths occurring in road accidents. The truck drivers who drive for continuous long hours (especially at night), bus drivers of long-distance route or overnight buses are more susceptible to this problem. Driver drowsiness is an overcast nightmare to passengers in every country. Every year, a large number of injuries and deaths occur due to fatigue related road accidents. Hence, detection of driver's fatigue and its indication is an active area of research due to its immense practical applicability. Facial Expressions plays an important role in emotions. Facial expression is a non-verbal scientific gesture which gets expressed in our face as per our emotions. Automatic recognition of facial expression plays an important role in artificial intelligence and robotics and thus it is a need of the generation. Here, the video of the driver's frontal face is captured in acquisition system and transferred to the processing block where it is processed online to detect drowsiness. Driver will get alert sound when drowsiness is detected, and the person is angry or sad.

II. METHODOLOGY

A convolutional neural network, named CNN, is proposed to detect the states of the eyes and mouth from the ROI images. The percentage of eyelid closure over the pupil over time (PERCLOS) and mouth opening degree (POM) are two parameters used for fatigue detection. This application will use inbuilt webcam to read pictures of a driver and then using OPENCV CNN algorithm extract facial features from the picture and then check whether driver in picture is blinking his eyes for consecutive 20 frames then application will alert driver with Drowsiness message.

Data Collection and Pre-Processing

- Description of the dataset used for training and testing the AI model.
- Preprocessing steps such as image cropping, resizing, and normalization for input data consistency.

AI Model Architecture and Training:

- Overview of the deep learning architecture employed for drowsiness detection.
- Details of the training process, including hyperparameter tuning, loss function selection, and optimization techniques like gradient descent.

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III. MODELING AND ANALYSIS

In an intrusive approach, sensors are used to detect driver drowsiness by placing them on the driver's body, whereas in a non-intrusive approach, a camera is used for drowsiness detection by identifying yawning patterns, eyelid movement and head inclination.

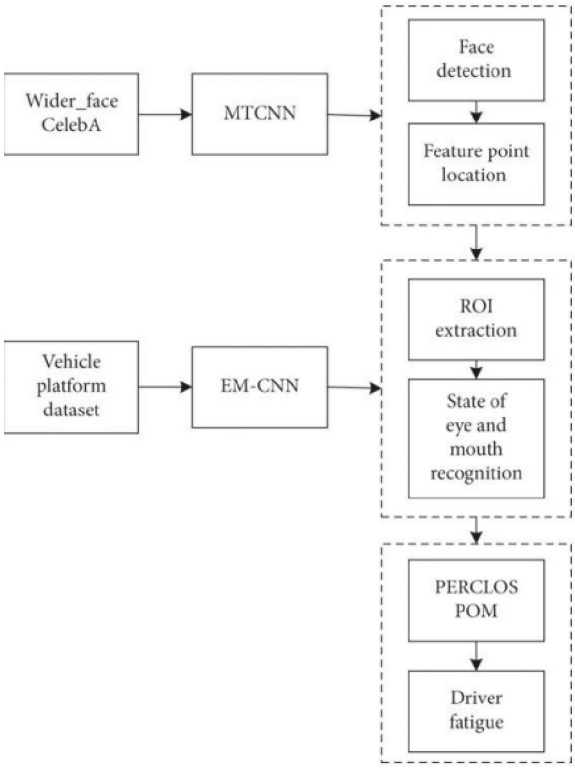

Figure1: Architecture diagram

IV. RESULTS AND DISCUSSION

The drowsiness detection system was evaluated using various performance metrics on a held-out test dataset.The robust performance of the drowsiness detection system holds significant practical implications for real-world applications. By accurately identifying drowsy drivers, the system can contribute to enhancing road safety, ultimately saving lives and minimizing traffic incidents. Despite the promising results, there are several avenues for future research and improvement. These include potential enhancements to the model architecture and data collection techniques as well as exploration of additional features or sensor modalities to further enhance the system's accuracy and robustness.

Table 1. AI Model Architecture

Layer	Type	Output shape	Parameters
Input	Input	(Input dimensions)	0
Convolution 1	Conv2D	(32,3,3)	(number of filters) *(filter size+1)
Max pooling 1	MaxPooling2D	(16,3,3)	0
Convolution 2	Conv2D	(64,3,3)	(number of filters) *(filter size+1)
Max pooling 2	MaxPooling2D	(8,3,3)	0
Flatten	Flatten	(Input size)	0
Dense 1	Dense	(128,)	(Input size) *(128+1)
Dense 2	Dense	(2,)	(128+1) *2

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V. CONCLUSION

Drowsiness Detection and facial emotion was built to help a driver stay awake to stay calm while driving in order to reduce car accidents caused by drowsiness and persons emotion. The system which can differentiate normal eye blink and drowsiness can prevent the driver from entering the state of sleepiness while driving. During the monitoring, the system is able to decide if the eyes are closed or opened. When the eyes have been closed for too long and if the person is angry or sad a warning signal is issued. The ultimate goal of the system is to check the drowsiness condition of the driver. Based on the eye movements of the driver, the drowsiness is detected and according to eye blink, the alarm will be generated to alert the driver and to reduce the speed of the vehicle. By doing this, many accidents will be reduced and provides safety to the driver and vehicle.

VI. REFERENCES

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