ISSN: 2454-9940

INTERNATIONAL JOURNAL OF APPLIED SCIENCE ENGINEERING AND MANAGEMENT

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www.ijasem.org

INTERNATIONAL JOURNAL OF APPLIED SCIENCE ENGINEERING AND MANAGEMENT

ISSN2454-9940

www.ijasem.org

Vol 18, Issue 2, 2024

DRIVER DROWSINESS MONITORING USING CONVOLUTIONAL NEURAL NETWORKS

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ABSTRACT

Automated self-driving automobiles, etc., are a result of computer vision advancements that aid drivers. About 20% of accidents are caused by sleepiness or exhaustion on the part of the driver. It presents a significant challenge that has prompted several solutions to be suggested. Having said that, they can't handle processing in real time. These approaches suffer from a lack of robustness when it comes to dealing with lighting circumstances and variations in human faces. We want to install a smart processing system that may significantly lessen the occurrence of traffic accidents. Using this method, we may detect the driver's facial features, such as the frequency of blinking, the eye-mouth aspect ratio, the proportion of closed eyes, the frequency of yawning, the movement of the head, and so on. A camera is used in this system to continually observe the driver. Haar cascade classifiers are used to identify the driver's eye and face. In order to determine whether both eyes are closed, we extract pictures of the eyes and feed them into a custom-designed convolutional neural network. The eye closure score is computed using the categorization. There will be an alert that goes off if the driver is determined to be too sleepy.

1.INTRODUCTION

Investigations revealed fatigue to be a key cause of four-wheeler accidents, and several safety-connected driving assistance programmes reduced the risk of these mishaps. The assumption that sleepy drivers were responsible for one-fifth of all fatal accidents was proposed by an automotive group. According to many revisions shown by Volkswagen AG, driver sleepiness is the cause of 5-25% of all accidents. A reliable intelligent driver tiredness monitoring system is necessary because inattention impairs steering movements and slows reaction time, and updates have shown that drowsiness increases the risk of accidents. Making a smart processing strategy to prevent car accidents is the goal. A length of time spent monitoring the driver's level of sleepiness may help achieve this goal and alert them when they are becoming too distracted to drive safely. Three criteria, including physiological, behavioural, and vehicle-based measures, may be used to identify driver tiredness, according to the literature review. However, in certain real-world situations, these methods might be problematic.

2.LITERATURE SURVEY

1AI-Powered Facial Recognition System

Written by Priya Gupta and Nidhi Saxena

Numerous practical applications of face recognition (FR) may be found in areas such as biometrics, information security, access control, smart cards, surveillance systems, law enforcement, and the like. FR is the process of identifying individuals using facial photographs. One kind of deep network that has shown promise for FR is the Convolutional Neural Network, or CovNets. It is necessary to do certain preprocessing operations, such as sampling, prior to using CovNets in real-time systems. To be more specific, CovNets receives whole photos (including all pixel values) as input and handles feature selection, feature extraction, and training on its own. This is the main reason why establishing a CovNet might be a tedious and intricate process at times. CovNets still have a ways to go, but their results are impressive for such a young network. In order to improve facial recognition, the study suggests a different approach that makes use of deep neural networks. This method relies on the retrieved face characteristics rather than raw pixel values as input. With this, the complexity is reduced and the accuracy on the Yale faces dataset is 97.05%.

2) Data Dispatcher Based on Behavior Co-authored by Mohan Sai Singamsetti and Mona Teja Kurakula There is a complicated social framework to human existence. People can't find their way around until they read each other. They do this by recognising

the faces. Depending on the other person's mood, you may choose the appropriate reaction condition. On the other hand, facial gestures are a good indicator of a person's emotional state. Using deep convolutional neural networks (DCNNs), the project's goal is to build a "Facial emotion Recognition" model that can recognise facial expressions in real time. Since DCNN has been shown to outperform CNN in terms of accuracy, it is used to create the model (convolutional neural network). Human facial expressions are very dynamic; they may go from happy to sad to angry to fearful to surprised to disgusted to neutral in a matter of seconds. Predicting a person's emotional state in real time is the goal of this study. The neural networks in our brains are in charge of every kind of thought we may have (decision making, comprehending). By teaching the computer, this approach aims to build these decision-making and categorization abilities. All of a person's expressions and features may be identified and predicted by it simultaneously. We use the models that have been trained on hundreds of datasets to get better accuracy.

3) Eye-tracking-based driver fatigue detection

Sarada Devi Mandalapu and others

A significant proportion of traffic accidents are attributed to driver weariness, according to international data. As a result, many accidents might be prevented, resulting in financial savings and less human suffering, with the aid of a system that can identify approaching driver weariness and provide early warning. In an effort to identify driver weariness, the authors have attempted to develop a system that employs a video camera aimed directly at the driver's face. A warning signal is sent to the driver in the event that weariness is detected. The camera-captured video files have been edited by the writers. The video file is decoded into individual frames. Finding out whether the eyes are open or closed requires finding them in each frame and then calculating the intervals between the intensity variations in the eye region. The system will emit a warning signal if it detects that the driver's eyes are closed for five consecutive frames, indicating that the driver is falling asleep. We have

ISSN2454-9940
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successfully developed, deployed, and evaluated the algorithm, and it has shown to be effective.

4) A System for Detecting Driver Drowsiness Utilising Feature Representation Learning with Multiple Deep Networks

EXTRACOPYISTS: Sanghyuk Park, Chang D. Yoo, Fei Pan, Sunghun Kang

Twenty percent of all traffic accidents are caused by drivers who are too sleepy to pay attention, and drowsiness detection is an algorithm for vehicular safety that may wake up a dozing motorist in the case that an accident is imminent. In this research, we provide a deep architecture called a deep drowsiness detection (DDD) network that can learn useful characteristics and identify whether a driver is drowsy using an RGB input video. Learned local facial motions and head gestures crucial for accurate recognition are part of the DDD network's three deep learning layers, which also provide global resilience against background and environmental fluctuations. In order to identify lethargy, the three networks' outputs are combined and inputted into a softmax classifier. On the NTHU-drowsy driver detection benchmark dataset, experimental findings demonstrate that DDD attains a detection accuracy of 73.06%

3. EXISTING SYSTEM

Research showed that fatigue was a key cause of four-wheeler accidents, and driving assistance systems reduced the risk of such accidents. The assumption that sleepy drivers were responsible for one-fifth of all fatal accidents was proposed by an automotive group. According to many revisions shown by Volkswagen AG, driver sleepiness is the cause of 5-25% of all accidents. A reliable intelligent driver tiredness monitoring system is necessary because inattention impairs steering movements and slows reaction time, and updates have shown that drowsiness increases the risk of accidents. Making a smart processing strategy to prevent car accidents is the goal. A length of time spent monitoring the driver's level of sleepiness may help avoid accidents caused by driving inattention.

DISADVANTAGES OF EXISTING SYSTEM:

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- The current approach relies on three factors
- physiological, behavioural, and vehicle-based measurements
- to identify drowsiness, but it isn't fit for real-time processing.
- However, in certain real-life situations, these methods might be problematic.

Technique: Support Vector Machines (SVM), Learning Vector Quantization (LVQ)

3.1 PROPOSED SYSTEM:

An answer to the problem of keeping tabs on drivers' sleepiness is our suggested approach. Using a custom-designed CNN with an input driver picture allows us to overcome the current system's drawbacks, which include extracting just chosen hand-crafted features. A camera will now keep an eye on the driver at all times. A series of frames is generated from the recorded footage. Predefined classifiers called haar cascade classifiers are used in opencv to recognise the face and eye for each frame. In order to determine whether the eyes are closed or not, the pictures of the eyes are first extracted and then sent through a sequence of 2D convolutional neural network (CNN) layers, including max-pooling layers (2x2), 2x5 kernel valid padding, and lastly, a fully connected dense layer. Eye closure is used to calculate a score. The device will interpret the driver as being tired and raise an alarm if they shut their eyes for 15 consecutive frames. Using custom-designed CNN, we accurately classify driver tiredness and remove the normalisation difficulties in the previous model.

ADVANTAGES OF PROPOSED SYSTEM:

- When both eyes are closed, the score goes up, and when they're open, the score goes down. We are now working on the result to show the driver's current time status.

The method allows us to detect facial features such as the driver's blink rate, yawning, head movement, eye-mouth aspect ratios, and the proportion of closed eyes.

INTERNATIONAL JOURNAL OF APPLIED SCIENCE ENGINEERING AND MANAGEMENT

ISSN2454-9940

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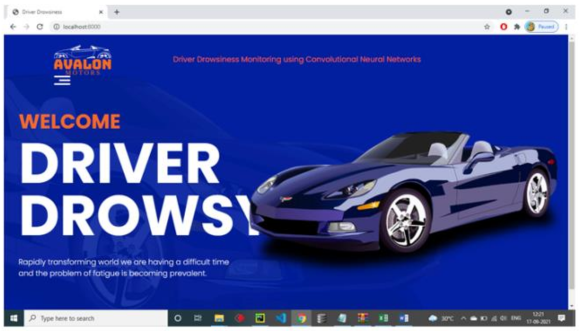
4. OUTPUT SCREENS

Home Page



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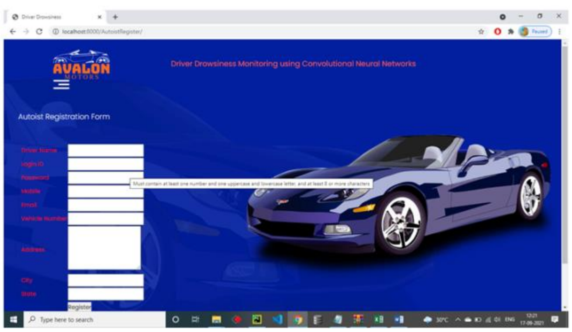
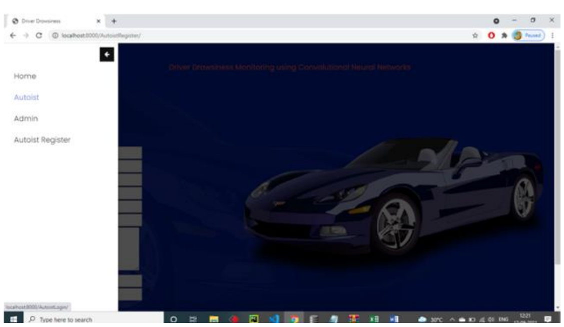
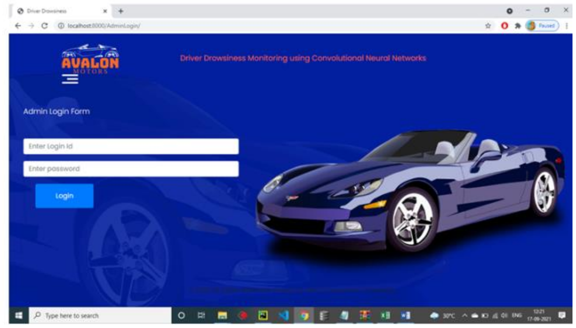


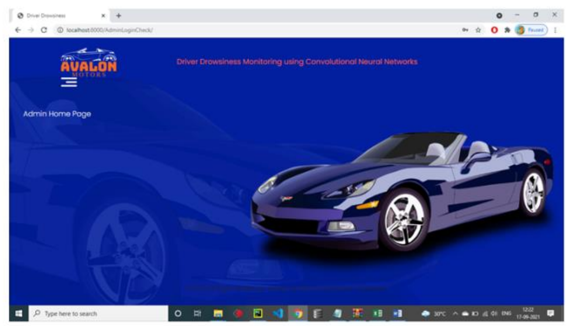
System menu



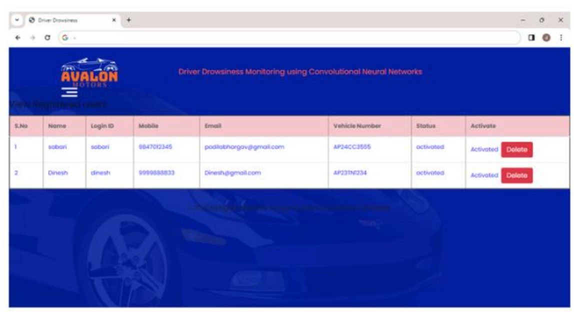
Admin Login



Admin Home Page:



View Registered Autoist



Drowsiness Detections

INTERNATIONAL JOURNAL OF APPLIED SCIENCE ENGINEERING AND MANAGEMENT

ISSN2454-9940

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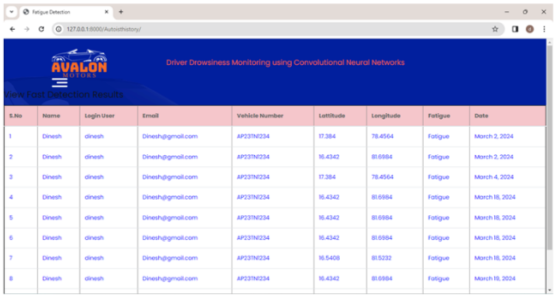
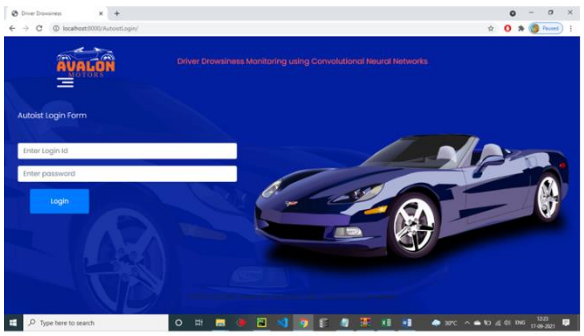
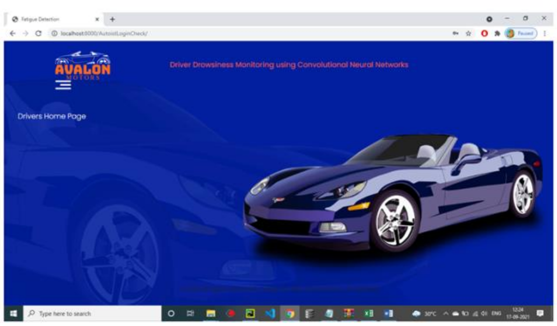


S.No	Name	Login User	Email	Vehicle Number	Lattitude	Longitude	Fatigue	Date
1	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	17.384	78.4564	Fatigue	March 2, 2024
2	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	16.4342	81.6984	Fatigue	March 2, 2024
3	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	17.384	78.4564	Fatigue	March 4, 2024
4	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	16.4342	81.6984	Fatigue	March 18, 2024
5	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	16.4342	81.6984	Fatigue	March 18, 2024
6	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	16.4342	81.6984	Fatigue	March 18, 2024
7	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	16.5408	81.5232	Fatigue	March 18, 2024
8	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	16.4342	81.6984	Fatigue	March 19, 2024

Autoist Login Form



Autoist Home Page



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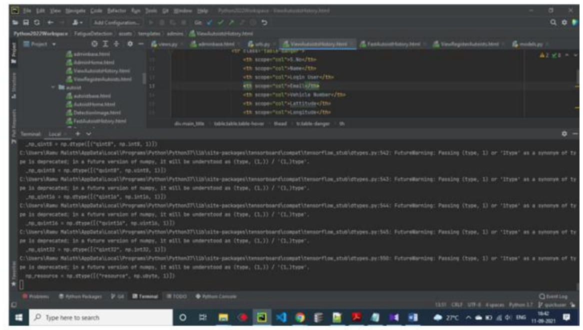
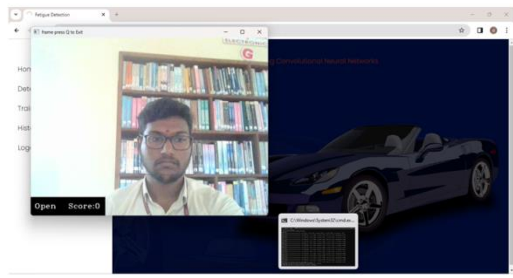


Detection Process Started



Eye Blink Staretd

Fast History Results

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ISSN2454-9940

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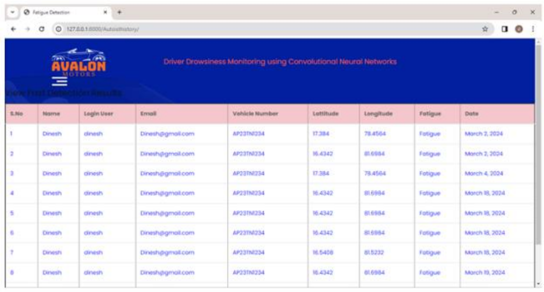

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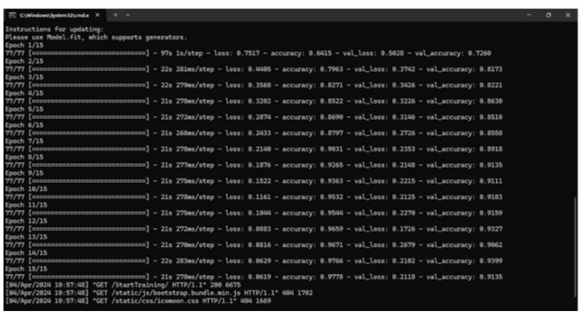
7	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	16.5408	81.5232	Fatigue	March 18, 2024
8	Dinesh	dinesh	Dinesh@gmail.com	AP23TN1234	16.4342	81.6984	Fatigue	March 19, 2024

Training Process Started



5. CONCLUSION

An efficient convolutional neural network (CNN) architecture is crucial to a sleepiness sensing model that aims to detect tiredness via eye closure. The process of creating picture datasets for open and closed eye scenarios began with the installation. When training a custom-designed CNN, 75% of the dataset is used, while the remaining 25% is For testing reasons, we use 25% of the dataset. To begin, the video data is split into individual frames, and then, in each frame, the eyes and face are identified. We may now classify eye openings and closings with the help of the automatic and effective learnt features provided by the upgraded CNN. An alarm will sound to notify the motorist if their eyes close for fifteen consecutive frames. An impressive 97% training accuracy and 67% testing accuracy were produced by the suggested CNN. Additional facial attributes may be added to future works to improve detection accuracy. Additionally, we may merge the face feature extractions with data on the vehicle's driving patterns gleaned from the On-Board Diagnostics sensors.

6.REFERENCES

Add