PREDICTING DRIVER DROWSINESS USING KNN ALGORITHM

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Submitted: 02-09-2025 *Accepted: 03-10-2025* *Published: 10-10-2025*

ABSTRACT

For driver state classification, the suggested system employed the k-NN approach. It has not before been explored in the context of a camera-based driver sleepiness detection employing blink features, to the best of our knowledge. Steering behavior, EEG measurements, and facial traits are examples of existing k-NN-based techniques. The research looks into the viability of a drowsiness classification system based on blink features collected using an EOG. The author attained a promising classification accuracy, demonstrating the utility of a k-NN classifier combined with blink-based features. When a high-dimensional feature space is available, the k-NN model requires a set of acceptable features as a basis for classification. The accessible data becomes scarce as the number of alternative configurations increases, according to the "curse of dimensionality" phenomenon. grows. As a result, one goal of this research is to discover an appropriate set of significant traits. Wrapper approaches are the most commonly utilized feature selection strategies in this work. Wrapper approaches choose feature subsets based on their predictive value during the classification phase. As a result, because it directly evaluates classification performance, this method can take into account dependencies between the feature subset and the classifier.

1. INTRODUCTION

1.1 Introduction

When it comes to road safety, drowsy driving is a contentious issue. Almost everyone who drives a car on a daily basis has had tiredness or even micro-sleeps while driving. Nonetheless, it is a relatively unknown topic in society. Nonetheless, the number of drowsiness-related incidents in Germany grew from 2008 to 2018. This points to a greater requirement for dependable sleepiness monitoring devices in vehicles. The main functions of such a system are to help the driver better evaluate tiredness and to prevent serious impairments in driving skills. A driver sleepiness monitoring system can be built around several measurements surrounding the vehicle and/or the driver. Some approaches to driver sleepiness monitoring seek to create a system around a single metric. but the majority of recent approaches (so-called hybrid methods) rely on a combination of measures. This is especially useful in complex real-world settings when a single metric may not adequately capture the driver's state. As a result, the detections can be confirmed with additional information from other domains, boosting the confidence in the drowsiness classification.

Nonetheless, a detailed understanding of the distinct signs indicating the driver's level of tiredness is required. The goal of this effort is to estimate the driver's state based on behavioral data, specifically the drowsy driver's head movement and blink patterns, and to offer a break if certain indicators of sleepiness are found. Another goal of this endeavor is to obtain knowledge about specific behavioral characteristics in order to enable future development of strong and reliable driver state classification systems. The k-Nearest Neighbor (k-NN) method is employed for this purpose to classify the driver's level of tiredness based on eye closure and head movement features.

2. Literature Survey

[1] J. Shad and S. Sharma, “A Novel Machine Learning Approach to Detect Phishing Websites Jaypee Institute of Information Technology’’Many phony websites have emerged on the World Wide Web in recent years with the intention of hurting people by obtaining their private data, including account IDs, user names, passwords, etc. Phishing is a type of social engineering attack that primarily targets mobile devices today. That can lead to losses on the financial front. In this article, we discussed a variety of detection methods that make use of URL and hyperlink properties to distinguish between websites that are broken and those that are not. There are six basic methods: the heuristic, the blacklist, the fuzzy rule, machine learning, image processing, and the CANTINA-based method. It provides a thorough analysis of the phishing problem, a current machine learning solution, and future research on the hazards posed by phishing utilizing a machine learning **approach.**

A strong tool for thwarting phishing assaults is machine learning. The characteristics and machine learning-based detection methods are surveyed in this work.

3. OVERVIEW OF THESYSTEM

3.1 Existing System

In recent years, drowsy driver identification has become the most important process for preventing road accidents, most likely globally. The goal of this research was to develop a smart alert system for creating autonomous automobiles that can detect and avoid drowsy driving. However, sleepiness is a natural human body phenomenon caused by a variety of circumstances. As a result, in order to avoid the source of the incident, a powerful alarm system must be designed. The existing system addresses a drowsy driver alert system that has been designed utilizing such a technology in which the Video Stream Processing (VSP) is examined by an Eye Aspect Ratio (EAR) and Euclidean distance of the eye.

3.1.1 Disadvantages of Existing System

- The polarity of each sentence in the previous work is not calculated in an existing system. The same approaches used for document level classification cannot be used for sentence level classification.
- This system has a lower performance because of There is no more specialized

[2] Y. Sönmez, T. Tuncer, H. Gökal, and E. Avci,

“Phishing web sites features classification based on extreme learning machine,” 6th Int. Symp. Digit. Forensic Secur. ISDFS - Proceeding: Phishing is a widespread tactic used to trick gullible people into disclosing their personal information by using phony websites. Phishing website URLs are designed to steal personal data, including user names, passwords, and online financial activities. Phishers employ websites that resemble those genuine websites both aesthetically and linguistically. Utilizing anti-phishing methods to identify phishing is necessary to stop the rapid advancement of phishing techniques as a result of advancing technology. approach for opinion mining than phrase level sentiment classification.

3.2 Proposed System

For driver state classification, the suggested system employed the k-NN approach. It has not before been explored in the context of a camera-based driver sleepiness detection employing blink features, to the best of our knowledge. Steering behavior, EEG measurements, and facial traits are examples of existing k-NN-based techniques. The research looks into the viability of a drowsiness classification system based on blink features collected using an EOG. The author attained a promising classification accuracy, demonstrating the utility of a k-classifier combined with blink-based features. When a high-dimensional feature space is available, the k-NN model requires a set of acceptable features as a basis for classification.

3.3 Methodology

In this project work, I used five modules and each module has own functions, such as:

1. System Module
2. User Module

Modules:

The first stage in creating a camera-based classification system is to define drowsiness in terms of observable measurements. Over the years, researchers have focused on eyelid movements as sleepiness indicators. The authors of proposed the PERCLOS measure, which denotes the proportion of time in a specific interval when the eyes are closed for more than 80% of the time. 28] suggests that blink behaviour in general is an observable sign of tiredness.

Other blink-related parameters, in addition to the PERCLOS, can be derived from an eyelid movement signal. The majority of these characteristics show altered behavior with growing tiredness.

Data Collection;

We collected around 134 hours of data throughout three driving simulator tests in order to get data that reflected the interactions between eyelid closure and tiredness. As a result, a camera facing the driver is installed to detect and track eyelid movements. It is mounted on the steering wheel column and has infrared illumination for accurate eye and head tracking. The camera sends many indications to the driver, including head position, gaze direction, and eyelid closure. Among them, four signals are of particular importance for this work: eye closure and eyelid confidence for blink feature extraction, as well as the roll and pitch angle of head rotations. The maximum distance Ld between the specified lenses for eye closure.

Feature Extraction and Analysis:

Based on the eye closure signal, a robust technique for detecting blinks and deriving blink features is proposed. Using this strategy, a list of 35 blink features forms the foundation of this work. Depending on the domain, they are classified into eleven categories: frequency, time, amplitude, velocity, amplitude-velocity ratio, percentage, blink (shape), eyelid, head movement, symmetry, and the PERCLOS1. When it comes to signal processing and feature extraction, it is important to remember that drowsiness does not happen suddenly, but rather gradually. A sophisticated driver drowsiness classifier is expected to effectively handle interindividual variances and achieve high classification accuracy on all subjects equally. However, the variability in blinking behavior between individuals can be enormous. To deal with this, The features are baselined by designating the first 10 minutes of each experiment as a representation of each subject's awake condition. This underpins the premise that the individual is still awake when the experiment begins. Drivers who began the experiment in a drowsy state run a high chance of adding invalid data into the underlying dataset, distorting the model. As a result, these patients are pre-excluded from the dataset.

4 Architecture

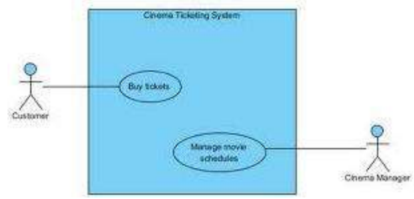
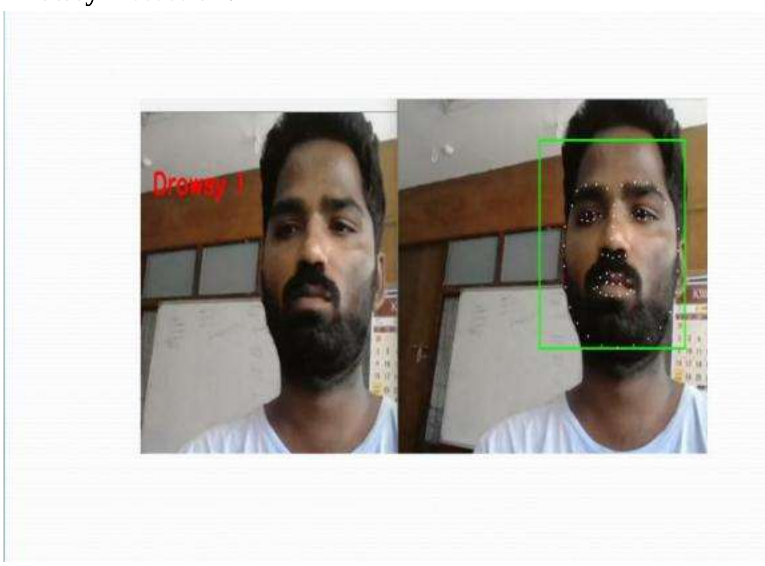


Fig 1: Frame work of proposed method

5 RESULTS SCREEN SHOTS Home Page:

Open camera:

Drowsy Detection:



Predict Result:

6. CONCLUSION

The goal of this work was to assess the driver's state by expanding the detection of driver drowsiness in automobiles utilizing signals from a driver monitoring camera. We created and tested a k-Nearest Neighbor algorithm for driver state classification, with an emphasis on feature selection. A sufficiently substantial dataset was recorded and evaluated for this purpose. The recorded eye closure signal was used to derive many head movement and blink features, which served as the foundation for the following model design. The identification of relevant features was a critical component of the k-NN-based categorization. In the binary and multiclass classification settings, our technique achieved balanced validation accuracy of 84.2% and 70.0%, respectively.

Future Scope:

Despite certain difficulties, the proposed categorization system provides useful insights into the impact of tiredness on blinking behavior and head movements. As a result, it sets the groundwork for the development of a driver sleepiness monitoring system, which would improve road safety even more. The next stage in developing such a system is to test its obustness using real-world data.

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