**Mini Project Report on**

# DRIVER INSOMNIA DETECTION USING MACHINE LEARNING

**Submitted in partial fulfillment of the requirement for the award of the degree of**

**BACHELOR OF TECHNOLOGY**

**IN**

**COMPUTER SCIENCE & ENGINEERING**


**Submitted by:**

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## CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the project report entitled **"Driver Insomnia Detection using machine learning"** in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science and Engineering of the Graphic Era (Deemed to be University), Dehradun shall be carried out by the under the mentorship of **Mr. Ankit Tomar, Asst. Professor**, Department of Computer Science and Engineering, Graphic Era (Deemed to be University), Dehradun.

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## Chapter 1

### Introduction

One of the most prevalent sleep disorders is insomnia, which affects from 5% to 30% of the general population. The wide range of prevalence values is mainly linked to the definition used to assess insomnia, which differs across studies. The current work focuses on primary insomnia. According to the Diagnostic Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) definition, primary insomnia is a complaint of nonrestorative and/or insufficient sleep with various symptoms, such as difficulties in initiating and maintaining sleep and early morning awakenings associated with complaints of daytime consequences without comorbidity. Using this definition, the prevalence of primary insomnia was found to occur in 3–5% of the general population.

Driver fatigue is one of the leading causes of traffic accidents today. For drivers on long journeys, it is natural to fall asleep behind the wheel. In this article, we will build a drowsiness detection system that will notify you when the driver has fallen asleep.

Many people face long nights at work. Truck drivers, security guards, medical personnel. Work is fundamental to society and to the health, well-being, and well-being of the general public. So, it's not uncommon to get behind the wheel when you're tired. This is something most drivers have probably done. It is very dangerous unless we find a way to warn the driver when he's getting too tired and it's affecting his driving.

Driving a car requires the possession of sufficient cognitive, visual, and motor skills, and involves managing attention in order to perform various driving- and nondriving-related tasks. Epidemiological and experimental studies have focused on some factors leading to road accidents or driving impairments. Sleepiness and fatigue are often cited. For example, it has been demonstrated that sleepiness is responsible for almost 15–20% of road accidents. Because patients with primary insomnia have not been found to be sleepy in most studies, Smolensk yet al. hypothesized that the increase in car crashes may be caused by other factors, such as daytime fatigue and cognitive impairment, which are consistently reported. The secondary objective of this study was to assess the effects of untreated insomnia on a cognitive function, i.e., vigilance. For this, we used the classic test used in sleep deprivation and driving studies, the Psychomotor Vigilance Test (PVT), which is based on a simple visual reaction time. Assessment of subjective feelings, i.e., change of mood, alert feelings, and subjective driving performance evaluation, were assessed using the Karolinska Sleepiness Scale (KSS), a Visual Analog Mood Scale (VAMS), and a driving scale.

**What is Machine Learning?**

Machine learning is a research field that gives computer systems the ability to do research without being explicitly programmed.

More formally, it can be written as: Laptop software is said to learn from enjoy E with some degree of elegance T and overall proficiency P if its performance on a task on T is measured by P and improved by enjoy E.

example: playing checkers.

E = the revel in of gambling many games of checkers.

T = the project of playing checkers

P = the probability that the program will win the following game.

The field of device mastering is vast and plays an important role in various important programs.

Inventory market forecasting involves projecting the ultimate cost of a company's inventory a specified number of days in advance.

The idea of Guide Vector Machines (SVM) has good generalization ability and good features that can be considered in fast computation.

## Chapter 3

# Methodology

To overcome the problem of Driver Drowsiness, the solution implementation is in the form of image processing. To perform image preprocessing, OpenCV and DLib open-source libraries are used. Python is used as a language to implement this idea.

A camera is used to continuously track the facial landmark and movement of eyes and lips of the driver. The main target is to track the landmarks of eyes continuously. Images are captured using camera at fix frame rate. These images are then passed to image processing module which performs face landmark detection to detect distraction and drowsiness of driver.

If the driver is found to be distracted, then a voice alert is provided.

If the eyes of the drivers are closed for a threshold period of time, then it is considered that driver is feeling sleepy and corresponding audio alarm is used to make the driver aware.

If the mouth of the driver remains open for the certain period, then it is considered that driver is yawning and corresponding suggestions are provided to the driver to overcome drowsiness.

If the driver does not keep eyes on the road, then it is observed using facial landmarks and the corresponding alarm is used to make the driver aware.

# ARCHITECTURE

## BLOCK DIAGRAM

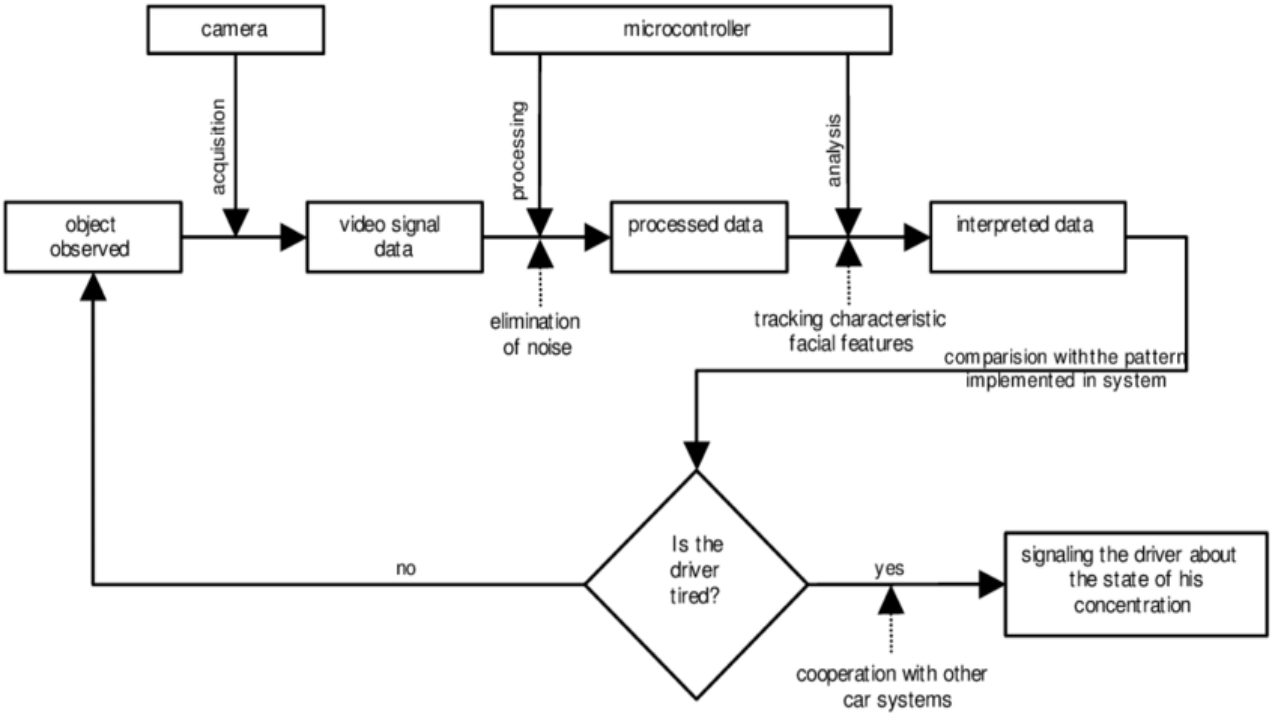


**Fig 3.1 – Block Diagram**

# ARCHITECTURE

## FLOW CHART

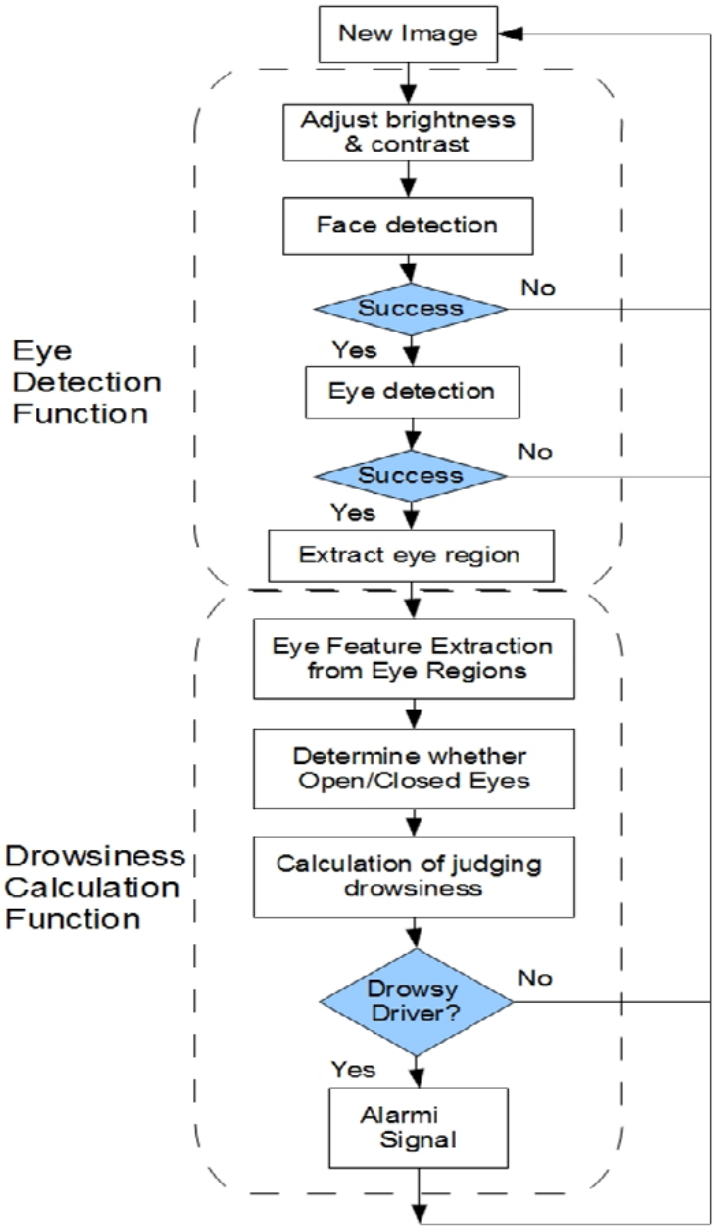


**Fig 3.2 – Flow Chart**

## Chapter 4

### Result and Discussion

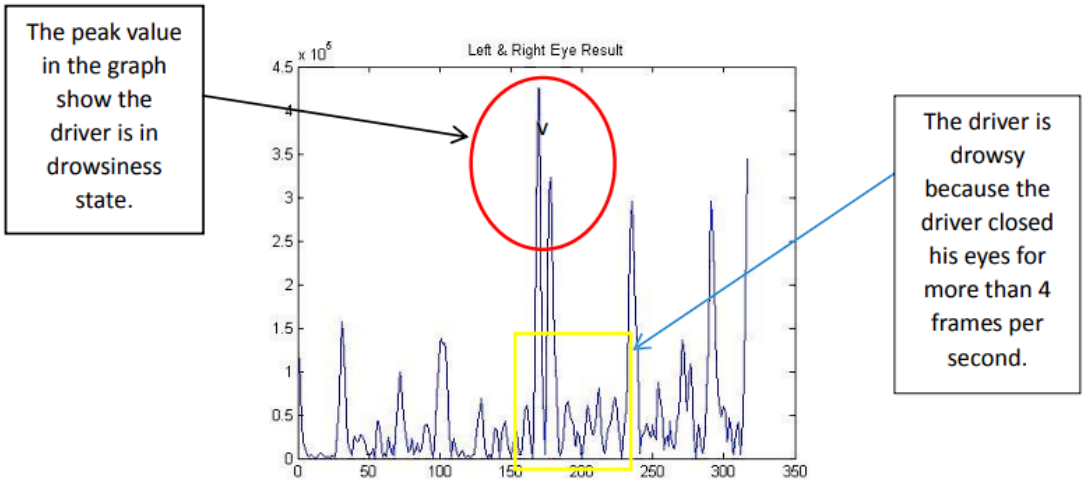


**Fig 4.1 - Drowsiness Detected**

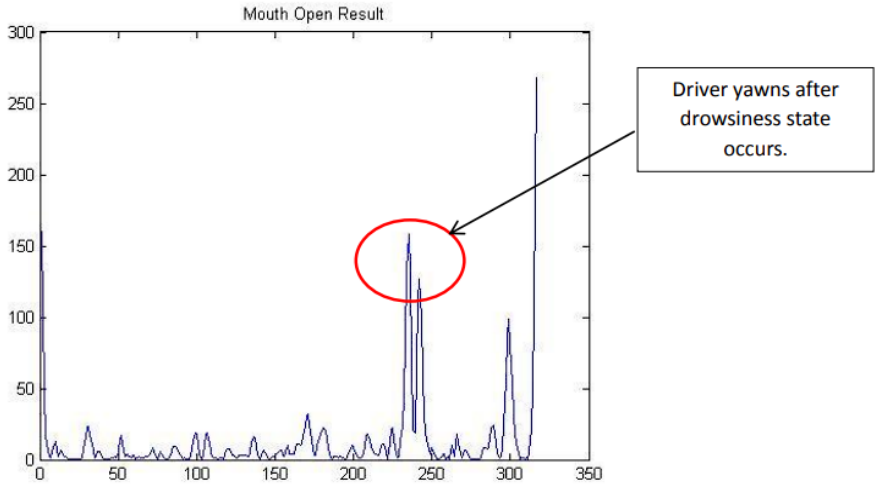


**Fig 4.2 – Mouth Open detected**

## Chapter 5

### Conclusion and Future Work

These findings revealed that primary insomnia is associated with a performance decrement during a simulated monotonous driving task. We also showed that patients can drive safely only for a short time. It appears advisable for clinicians to warn patients about their impaired driving performance that could lead to an increased risk of driving accidents.

The main purpose of this project is to develop a simulation system that can detect drowsiness. cam. Systems must meet specific requirements to consistently detect drowsiness. video frame. Therefore, the driver can avoid accidents. Second, you only need to detect drowsiness A character to prevent the system from misinterpreting random characters received from the driver.

Eye and mouth detection algorithms need to be improved for the future Implementation. To reliably detect gradients, you need to detect changes in luminance enough to improve detection results. Video or image quality used Drowsiness detection affects detection results. Therefore, good quality and high frame rate (number of pixels) is one factor that improves recognition. better technique Can be used to compare which technique is more reliable in detecting drowsiness

Another improvement to the system is the implementation of another method to detect drowsiness.

Allows the system to reliably detect drowsiness.
Besides that, a better internal you can run the system with your laptop or device specifications for smooth operation

Algorithmic execution and trustworthy systems.
The success of this project will reduce the number of traffic accidents
The project will be implemented in vehicles to detect driver fatigue

**References**

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[2] Eye tracking system to detect driver drowsiness by S.N. Demidenko.

[3] Drowsiness Detection System by Amrutha K.