Drowsiness Detection System

C J Muthu Kumaran[1] (RA2111026020130)
Aswin C[2] (RA2111026020163)
Nithin Kishore M[3] (RA2111026020149)
Engineering
III Year AI & ML Students
SRM Institute of Science and Technology
Ramapuram Campus, Chennai – 600 089

Vadivelu A[4]
(Assistant Professor)
Department of Computer Science and Engineering
SRM Institute of Science and Technology
Ramapuram Campus, Chennai – 600 089

Abstract:- One of the biggest challenges facing modern cities is making urban infrastructure more dependable and efficient. Making the most of the few parking spots that are available in order to minimize traffic is one method to do this. We discuss a special smart parking reservation system that operates in a commercial parking lot in an urban area. This strategy's main objective is to cut down on the time lost searching for a spot in a parking lot. In the same scenario, we may find an empty parking space in a vehicle park while saving more than 80% of the fuel wasted. Constrained parking spaces and the growing size of luxury vehicles are important contributors to ongoing problems with car parking.

I. INTRODUCTION

India's dynamic road system, which is brimming with a wide variety of cars and passengers, is essential to the country's economy. However, there is always a chance of a traffic accident when driving, even with its ease. One hundred three million people, or around 37 per cent, have dozed off while driving, according to the National Sleep Foundation database. Extended driving hours, travelling at night, inadequate rest areas and sleep difficulties are all causes of drowsiness. We developed a drowsiness-detecting technology to stop this, which would reduce these kinds of accidents. According to WHO data, accidents claim the lives of 1.25 million people annually, either by injury or death. Some of them disregard traffic laws, speeding, running red lights, cutting into lanes, and experiencing mechanical problems with their tires and brakes. This research focuses on the provision of an intelligent sleepiness detection system as a means of mitigating these problems by lowering the number of fatal occurrences.

➢ *Scope and Motivation:-*

The operation of this sleepiness-detecting system is described in the protocol that follows. It takes a picture using a camera, recognizes faces, draws an area of interest, and sends all of this data to a classifier, which generates a score based on the subject's sleepiness and determines whether or not the subject's eyes are open. An alert will sound to alert the driver if the classifier finds that the subject's score is higher than the allowable limit. The accuracy of this model is 90%. This model uses machine learning and computer vision, two subsets of artificial intelligence that let users train the system and forecast results within a range. Technology like this contributes to closing the gap between humans and machines. The library used in computer vision is what takes and interprets pictures in order to process them. In addition to using other libraries that are crucial to the system, it aids in the extraction and processing of data to provide information.

II. LITERATURE REVIEW

➢ *Author: X. Chen, J. Mukherjee, L. Li, and S. Lyu*

• Year: 2018
• Description: In the publication "Drowsiness Detection in Drivers using EEG Signals and Machine Learning," the authors suggested an electroencephalogram (EEG)-based drowsiness detection system. The technology analyzes EEG data and employs machine learning algorithms to precisely detect driver tiredness.

➢ *Author: H. M. Kumar, P. P. Naidu, and K. S. Babu*

• Year: 2018
• Description: The paper titled "Drowsiness Detection System for Motorists Using Smartphones" presents a novel approach to drowsiness detection. The authors utilize smartphone sensors to monitor driver behaviour and detect signs of drowsiness, making it a cost-effective and accessible solution.

➢ *Author: M. Ghimire, S. K. Mahato*

• Year: 2021
• Description: Ghimire and Mahato developed a drowsiness detection system for long-haul truck drivers. Their system combined vehicle data, including steering wheel movements and lane departure, with driver physiological data to detect fatigue-related drowsiness.

➢ *Objective:-*

The project's goal is to put in place a precise real-time driver drowsiness detection system. For Drowsiness Detection, we use modules like Dlib, Scipy, computer vision (CV), and pygame, which can improve system performance. A pre-trained facial landmark detector that can identify 68 points on a face is offered by Dlib. Developed on top of NumPy, SciPy is an open-source Python library that offers a large selection of tools for scientific and technical

computing. The goal of the artificial intelligence (AI) and computer science subject of computer vision is to educate machines on how to interpret photos and videos and extract relevant information so they can understand the visual world.This technology for roadside human safety is reasonably priced. To stop crashes brought on by drivers who slept off while operating a vehicle. It does this by warning the driver when sleepiness is detected.It offers a non-contact method for determining various driving alertness levels and makes it easier to identify a fall in alertness early on. When weariness is identified, it alerts the driver with a warning signal.

➢ *Problem Statement:*

Drowsiness is a safety trouble that has no longer been deeply tackled by the world. Drowsiness, in general, may be very hard to measure or examine, unlike alcohol or pills in particular, due to its nature. Alcohol or drugs have clear key notices and tests which are to be had without problems and hence be identified easily and can be prevented, but fatigue or drowsiness cannot be measured or identified, and also, it's a very common problem. Likely, the solutions to this trouble are to focus on fatigue-related incidents and encourage drivers to confess fatigue whilst wished. The former is hard and much more costly to obtain, and the latter is not possible without the previous, as riding for long hours may be very beneficial. For this reason, drowsiness detection structures are required for the safety of automobiles and their drivers. Another main problem Automobile owners face is vehicle theft. Yearly, around 1.65 lakh vehicles are stolen in India alone, and the major cause for this is the lack of anti-theft systems, and the existing systems are either not efficient or very expensive. A few existing systems include GPS tracker door alarms, which can be easily disabled or manipulated, hence sacrificing safety; the other existing systems, like high-end connected car features, are available in a few high-end cars, which are not only expensive but also inefficient.

➢ *Software Requirements*

• *Operating System:* Windows-based operating System for executing the project.

• *Programming Languages and Frameworks:*

✓ *Backend: Python programming language is used*
✓ *Backend interface: IDLE Python 3.12.0.*
✓ *Development and Testing Tools: Development IDEs (IDLE Python 3.12.0, Visual Studio code).*
✓ *Version control system (e.g., Git) for collaborative development.*

• *Documentation and Reporting Tools:-* Tools for generating project documentation and reports (e.g., Microsoft Office Suite).

III. FUNCTIONAL REQUIREMENTS

➢ *D-Lib:*

D-lib is a toolkit for growing actual-world devices, gaining knowledge of and records analysis packages. It is used to become aware of the face and to mark the facial landmarks, which may be used for a wide array of functions. The frontal face detector on the d-lib works properly.

➢ *Open CV:*

Opencv is a library the usage of which we will broaden actual-time computer vision programs. It, in particular, is used for photo processing, video seizure and assessment in conjunction with capabilities like face detection and object detection. Opencv is the big open-supply library Used for laptop imagination and prescient and also system gaining knowledge of and image processing.

➢ *Pygame:*

Pygame is an open-source, cross-platform library for the improvement of multimedia packages like video games made using python. It uses the clean direct media layer library and several different famous libraries to abstract the most common features. It includes cg and sound libraries, and it's intended for use with Python.

➢ *Scipy*

Scipy is an open-source Python tool used for solving scientific and mathematical riddles. The numpy extension was used in its construction, and it provides the user with access to several high-level functions for managing and displaying statistics.

IV. CONCLUSION

In the drowsiness detection model, we made an alert system which can alert the driver whenever he feels drowsy for more than 3-4 seconds. He'll be alarmed and can stay awake or take a break. Thedrowsiness detection system can be implemented in every vehicle so that we can prevent road accidents and decrease the death ratio which is caused by drowsiness. As AI techniques are growing vastly, we can make systems more intelligent to understand the requirements of the hour. We can introduce various models and use different types of algorithms to get the best results. Road accidents are common in countries like India. Due to small negligence, there's a huge loss to the lives of the human. By developing this system, basic road security against drowsy drivers can be established at a low cost and effectively; the real implementation of this project can indirectly reduce the number of accidents due to drowsiness or sleepiness of drivers.

REFERENCES

➢ *Academic Papers*

[1]. Zhao, X., & Wei, C. (2017, August). A real-time face recognition system based on the improved LBPH algorithm. In 2017 IEEE 2nd International Conference on Signal and Image Processing (ICSIP) (pp. 72-76). IEEE.

[2]. Qu, X., Wei, T., Peng, C., & Du, P. (2018, December). A fast face recognition system based on deep learning. In 2018 11th International Symposium on Computational Intelligence and Design (ISCID) (Vol. 1, pp. 289-292). IEEE.

[3]. Kumar, P. M., Gandhi, U., Varatharajan, R., Manogaran, G., Jidhesh, R., & Vadivel, T. (2019). Intelligent face recognition and navigation system using neural learning for smart security in Internet of Things. Cluster Computing, 22(4), 7733-7744.

[4]. Bohara, S. (2020). Artificial Intelligence and Machine Learning: Face Detection and Recognition with Python.

➢ *Books Referred:*

[5]. Driver Drowsiness Detection: Systems and Solutions (Springer Briefs in Computer Science) by **Aleksandar Čolić** (Author), **OgeMarques** (Author), **Borko Furht** (Author).

[6]. Automated Alert System for Drowsiness Detection Using Image Mining Techniques by **Stephen Raj S.**