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Driver's Drowsiness Detection System Using HAAR Cascade Algorithm

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ABSTRACT: Looking at the scenario of increasing population day by day the road accidents have increased simultaneously. This Driver's drowsiness detection is a car safety technology that helps prevent accidents caused by the driver getting drowsy. Research on road accidents has suggested that 20% of road accidents are fatigue-related. This paper first presents a new modern lookout strategy to generate a whole system that can be used to prevent many fatal accidents. Drowsiness is one of the most common reasons behind mishaps on the roads. To avoid/reduce such misfortunes we have provided you with this strategy. It alerts the person (Driver) driving by ringing an alarm to avoid any misfortune. It uses a Deep Learning Method. Here is used, a HAAR Face Detection Algorithm which extracts the required information and presents the output.

KEYWORDS: Artificial Intelligence, Autonomous Vehicle Technology, Drowsiness Detection, Open CV, HAAR Cascade Algorithm

I. INTRODUCTION

A glance at the synopsis of increasing road accidents day by day we have created this project to detect whether a person(Driver) is drowsy or not and if so, it will alert the person by sounding an alarm. It means whenever the driver is drowsy, the system will detect and the alarm will go off alerting the driver. It is an automatic detection system based on virtual information and deep learning. Deep Learning is a subset of Machine Learning it comes under machine learning. It is a Neural Network that has three layers of processing. This project has used Open CV which works as a binding generator, it provides a real-time optimized computer vision library.

II. LITERATURE REVIEW

This Drowsiness Detection System that we have created is based on the real-time system technique. In this project, we can simply detect the movements of the eye and facial recognition of the driver using Image detection with Open CV and an algorithm to identify the drowsy state of the driver, called HAAR Cascade classifier for face detection. This algorithm is used to track the objects placed in front of the Open CV continuously. The paper overall focuses on the issue of developing an unobtrusive system that detects the drowsiness and warns on time. This detection system will keep a track of the driver's eyes using the camera. By developing this HAAR Cascade algorithm the symptoms of the driver can be detected at an early stage to avoid further accidents. When the symptoms are detected/identified, an output is generated in the form of a sound to alert the driver. The warning in the situation will get deactivated automatically. After the image acquisition, the first stage of processing is face detection and checking whether the eyes are blinking or not. The second stage includes the alarm getting activated as soon as weird symptoms are found.

III. METHODOLOGY

ALGORITHM: -We have used HAAR Cascade Algorithm or Object Detection using HAAR cascade classifiers which are based on features is an efficient object detection method used to identify faces in an image or a real-time video. This algorithm uses edge or line detection features. In this approach, to train the cascade function, it is provided with a lot of positive (images of faces) and negative (images without faces) images and then used to detect objects in other images.

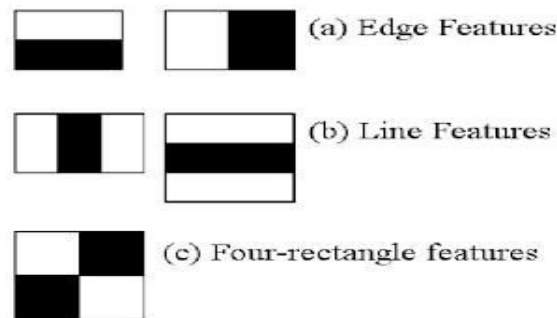


Image: Features of HAAR Cascade

It is a method for combining complex classifiers in a cascade which allows negative input (non-face images) to be quickly discarded while spending more computation on positive face-like regions. It significantly reduces the computation time and makes the process more efficient.

THE OPEN CV OVERVIEW: - **OpenCV** (*Open Source Computer Vision Library*) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage and then Itzel (which was later acquired by Intel). The library is cross-platform and free for use under the open-source Apache 2 License. Starting in 2011, OpenCV features GPU acceleration for real-time operations.

DETAILED EXPLANATION: -Open source computer vision library is used to perform computer vision-related tasks. It can be used to perform object detection, face detection, object tracking, etc. This library has more than 2500 optimized algorithms. So basically these algorithms provide the tasks of tracking or detecting faces or objects, human movements, extracting 3D models of objects, and many more. It uses the image processing method it is used to perform operations on an image. Companies, government bodies, and researchers have a high usage of these libraries. It supports multiple languages including C++, Java, and Python.

APPLICATIONS:-

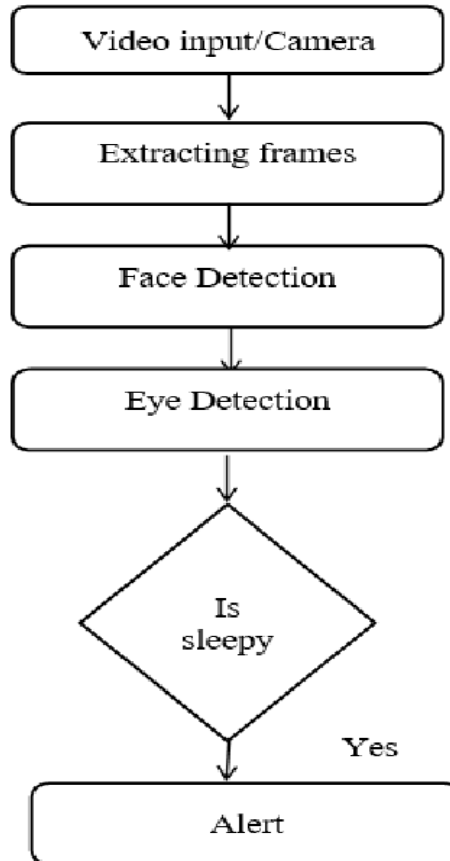
- 2D and 3D feature toolkits
- Facial recognition system
- Gesture recognition
- Human-computer (HCI)
- Mobile robotics
- Motion understanding
- Object detection
- Segmentation and recognition
- Structure from motion (SFM)
- Motion tracking
- Augmented reality

IV. PROBLEM STATEMENT

The proposed work is to alert the driver when he is drowsy or distracted away from the focus of the road, to alert him/her using a buzzer or an alarm mechanism.

In this following project, real-time data is collected by the video camera called Open CV and an algorithm called HAAR Cascade. This collected data gives information about the driving conditions of the driver which acts as an input for the project. The appropriate measures are taken to alert the driver. If the fatigue is identified during this process the alarm system is turned on to aware the driver at an early stage before any accident takes place.

ARCHITECTURAL DESIGN:-



V. FUTURE SCOPE

Using a drowsiness detection system, driver safety can be implemented in normal cars also. *Future works may focus on the utilization of outer factors such as vehicle states, sleeping hours, weather conditions, mechanical data, etc. for fatigue measurements.*

Driver drowsiness detection is a car safety technology that helps prevent accidents caused by the driver getting drowsy. Research has suggested that around 20% of all road accidents are fatigue-related, up to 50% on certain roads. In this project, one can have many other creative ideas to improve this project to another level by adding various types of sensors. In the future, by getting access to more resources we can expand our dataset to get more reliable and efficient results.

VI. CONCLUSION

This paper provides an aerial perspective study on similar papers related to Driver's Drowsiness Detection and alert system. In today's world, modern problems need modern solutions, and therefore to provide a good solution to the problem of detecting the state of drowsiness, an algorithm-based method is used. This system uses eye movements to detect the tiredness or the exhaustion of the driver. This eye movement is detected by a camera called Open CV, to recognize the symptoms to avoid accidents. This concept is based on eye-tracking, to obtain the finer and clearer results we have used several images of different people with different aspects. If the fatigue is identified during this process the alarm system is turned on to aware the driver at an early stage before any accident takes place. The problem statement and proposed system detect drowsiness if the eyes have been closed for a period of four or more frames. The main aim of this paper is to develop a software tool detection to avoid accidents. In the future re, the frequency of yawning can also be used as a parameter to detect drowsiness.



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