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DROWSINESS DRIVER DETECTION USING DEEP LEARNING APPROACH

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ABSTRACT

Drowsiness is a very common problem with people. Whenever the people do monotonous jobs they usually feel drowsy. The drowsiness is the effect of heavily oily food, improper sleeping habits or continuous work load. If the driver is drowsy, he not only puts his own life but also the lives of other road users in danger. Here in this project, a method is proposed to identify the driver's drowsiness and wake him up if he is drowsy. In this project, the drowsiness is identified in multiple methods and is authenticated by their collective results. Once the drowsiness is confirmed, the driver will be alerted by a sound or by vibration. Then he will be prompted to take a little rest before he move further.

INTRODUCTION

In current years, drowsy driver detection is the most necessary procedure to prevent any road accidents, probably worldwide. The aim of this study was to construct a smart alert technique for building intelligent vehicles that can automatically avoid drowsy driver impairment. But drowsiness is a natural phenomenon in the human body that happens due to different factors. Hence, it is required to design a robust alert system to avoid the cause of the mishap. In this proposed paper, we address a drowsy driver alert system that has been developed using such a technique in which the Video Stream Processing (VSP) is analyzed by eye blink concept through an Eye Aspect Ratio (EAR) and Euclidean distance of the eye. With this Python project, we will be making a drowsiness detection system.

PROJECT DESCRIPTION

Detecting abnormal behaviour at the wheel is always a challenging task. The different methods pertaining a solution to detect fatigue behaviour at the wheel were

discussed in Most of the techniques portrayed were based on complex algorithms and also the factors like late night driving, Illumination effects and posture of the subject were found to be the limitations.

In this chapter a three step algorithm to detect eye opening and closing using OpenCV and Matlab as a simulation tool is discussed. This chapter discuss about the materials and methods involved in Drowsiness Image processing using Matlab. The other part describes about Eye blink recognition using Haarscade classifiers in Open CV Method.

SYSTEM TESTING

Testing is a process of executing a program with the intent of finding an error. Testing is the crucial element of software quality assurance and presents ultimate review of specification, design and coding. System testing is an important phase.

TYPES OF TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

UNIT TESTING

Unit testing is the testing of each module and the integration of the overall system is done. Unit testing becomes verification efforts on the smallest unit of software design in the module. This is also known as ‘module testing’. The modules of the system are tested separately. This testing is carried out during the programming itself. In this testing step, each model is found to be working satisfactorily as regard to the expected output from the module. There are some validation checks for the fields.

INTEGRATION TESTING

Data can be lost across an interface, one module can have an adverse effect on the other sub function, when combined, may not produce the desiredmajor function. Integrated testing is systematic testing that can be done with sample data. IntegrationTest Casediffers from other test cases in the sensei focuses mainly on the interfaces & flow of data/information between the modules. Here priority is to be given for the integratinglinks rather than the unit functions which are already tested. The

need for the integrated test is to find theoverall system performance. There are two types of integration testing. They are

i.Top-down integration testing.

ii.Bottom-up integration testing.

FUNCTIONALTESTING

Functional testing is a quality assurance process and a type of black-box testing that bases its test cases on the specifications of the software component under test. Functions are tested by feeding them input and examining the output, and internal program structure is rarely considered (unlike white-box testing). Functional testing is conducted to evaluate the compliance of a system or component with specified functional requirements.[3]Functional testing usually describes what the system does.Since functional testing is a type of black-boxtesting, the software's functionality can be tested without knowing the internal workings of the software.

Functional testing differs from system testing in that functional testing verifies a program by checking it against design document or specification while system testing validate program by checking it against the published user or system requirements.

OUTPUTTESTING

After performing the validation testing, the next step is output asking the user about the format required testing of the proposed system, since no system could be useful if it does not produce the required output in the specific format. The output displayed or generated by the system under consideration. Here the output format is considered in two ways. One is screen and the other is printed format. The output format on the screen is found to be correct as the format was designed in the system phase according to the user needs. For the hard copy also output comes out as the specified requirements by the user. Hence the output testing does not result in any connection in the system.

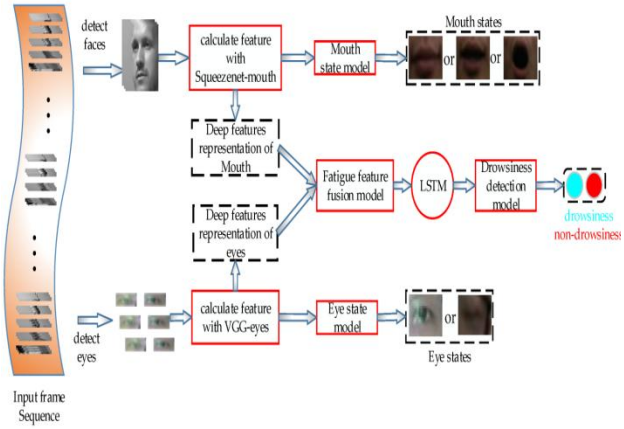
SYSTEM DESIGN

SYSTEM ARCHITECTURE

The methodology of this project is the first video is captured using a webcam and from the video first face is detected using the Harcascade algorithm and then the eyes are detected. Then we use our deep learning model which is built using transfer learning to know the status of the eye. If it is an open eye then it will say Active and if it is a closed eye then it will check for a few seconds and then it will

say the driver is drowsy and will beep an alarm.

I will use Python, OpenCV, TensorFlow, and Keras to build a system that can detect the closed eyes of drivers and alert them if ever they fall asleep while driving. If the driver's eyes are closed, this system will immediately inform the driver



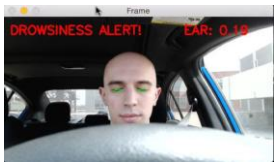
SYSTEM IMPLEMENTATION:

Detecting abnormal behaviour at the wheel is always a challenging task. The different methods pertaining a solution to detect fatigue behaviour at the wheel were discussed in chapter II. Most of the techniques portrayed were based on complex algorithms and also the factors like late night driving, Illumination effects and posture of the subject were found to be the limitations.

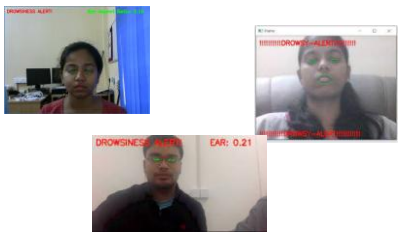
In this chapter a three step algorithm to detect eye opening and closing using OpenCV and Matlab as a simulation tool is discussed. This chapter discuss about the materials and methods involved in Drowsiness Image processingusingMatlab. The other part describe

about Eye blink recognition using Haarscade classifiers in Open CV Methode.

Output 1



Output 4



CONCLUSION

A Drowsy Driver Detection System has been developed, using a non-intrusive machine vision based concepts.The system uses a web camera that points directly towards the

driver's face and monitors the driver's head movements in order to detect fatigue. In such a case when fatigue is detected, a warning signal is issued to alert the driver. The algorithm developed is unique to any currently published papers, which was a primary objective of the project. The system deals with detecting eyes, nose and mouth within the specific segment of the image. If these are not found for 5 consecutive frames, the system draws the conclusion that the driver is falling asleep.

FUTUREENHANCEMENTS

In the real time driver fatigue detection system it is required to slow down a vehicle automatically when fatigue level crosses a certain limit. Instead of threshold drowsiness level it is suggested to design a continuous scale driver fatigue detection system. It monitors the level of drowsiness continuously and when this level exceeds a certain value a signal is generated which controls the hydraulic braking system of the vehicle.

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