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Driver Drowsiness Alert Detection for Vehicle Acceleration Using Machine Learning

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ABSTRACT: We recommended that this approach minimise the amount of accidents caused by driver weariness, hence improving road safety. This device uses optical information and artificial intelligence to identify driver sleepiness automatically. To assess PERCLOS, we find, monitor, and evaluate both the driver's face and eyes (percentage of eye closure) Due to extended driving durations and boredom in crowded settings, driver weariness is one of the leading causes of traffic accidents, particularly for drivers of big vehicles (such as buses and heavy trucks).

I. INTRODUCTION

Driver fatigue is when a driver's ability to drive safely is reduced as a result of being physically or mentally tired or sleepy. Driver fatigue or is a significant safety hazard for the road transport industry. The main causes of 'drowsy driving' are too little sleep, driving at times when you would normally be asleep and working or being awake for very long hours. To detect driver drowsiness can be classified into three categories:

To detect driver drowsiness in real-time, the system has been tested and implemented in a real environment. The experimental results showed that the proposed system can detect driver drowsiness with 99%. The examples of facial features include eye blinks, head movements and yawning. Face detection is a broader term than face recognition. Face detection just means that a system is able to identify that there is a human face present in an image or video. Face detection has several applications, only one of which is facial recognition. Face detection can also be used to auto focus cameras.

1) Problem Identified

This is an important issue driver drowsiness since real-world food data-sets are open- ended and dynamic.

2) Problem Statements

When it comes to knowledge of the risk of falling asleep, the drivers were confronted with several statements concerning characteristics of drivers who fall asleep (age, sex, physical condition, sleeping problems) in addition statement that falling asleep can happen to anyone. Based on the driver's evaluation of these statements, it seems to be a general agreement among them, both private and professionals, that falling asleep can happen to anyone. In addition, they seem to have good knowledge of the actual risk of falling asleep while driving. The private drivers and the professional drivers respectively assume that an average of 40 and 36 drivers out of a hundred drivers have experienced falling asleep while driving. Calculated in percent these numbers make up shares that are close to the actual proportions found in this study.

Hence, the knowledge of the actual risk of falling asleep among drivers seems to be quite good.

II. LITERATURE SURVEY

Paper Name: Towards Detection of Bus Driver Fatigue Based on Robust Visual Analysis of Eye State
Author: Bappaditya Mandal, Liyuan Li, Gang Sam Wang, and Jie Lin
Description: Driver's fatigue is one of the major causes of traffic accidents, particu- larly for drivers of large vehicles (such as buses and heavy trucks) due to prolonged driving periods and boredom in working conditions. In this paper, we propose a vision-based fatigue detection system for bus driver monitoring, which is easy and flexible for deployment in buses and large vehicles. The system consists of modules of head-shoulder detection, face detection, eye detection, eye openness estimation,

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fusion, drowsiness measure percentage of eyelid closure (PERCLOS) estimation, and fatigue level classification. The core innovative techniques are as follows: 1) an approach to estimate the continuous level of eye openness based on spectral regres- sion; and 2) a fusion algorithm to estimate the eye state based on adaptive integration on the multimodel detections of both eyes. A robust measure of PERCLOS on the continuous level of eye openness is defined, and the driver states are classified on it. In experiments, systematic evaluations and analysis of proposed algorithms, as well as comparisonwith ground truth on PERCLOS measurements, are performed. The experimental results show the advantages of the system on accuracy and robust- ness for the challenging situations when a camera of an oblique viewing angle to the driver's face is used for driving state monitoring.

Paper Name: Automatic Detection of Driver Fatigue Using Driving Operation Information for Transportation Safety
Author: Zuojin Li *, Liukui Chen, Jun Peng and Ying Wu *
Description: : Fatigued driving is a major cause of road accidents. For this rea- son, the method in this paper is based on the steering wheel angles (SWA) and yaw angles (YA) information under real driving conditions to detect drivers' fatigue lev- els. It analyzes the operation features of SWA and YA under different fatigue sta- tuses, then calculates the approximate entropy (ApEn) features of a short sliding window on time series. Using the nonlinear feature construction theory of dynamic time series, with the fatigue features as input, designs a "2-6-6-3" multi-level back propagation (BP) Neural Networks classifier to realize the fatigue detection. An approximately 15-h experiment is carried out on a real road, and the data retrieved are segmented and labeled with three fatigue levels after expert evaluation, namely "awake", "drowsy" and "very drowsy". The average accuracy of 88.02in fatigue identification was achieved in the experiment, endorsing the value of the proposed method for engineering applications

Paper Name: Bus Driver Fatigue and Stress Issues Study

Author: Mr. Phil Hanley

Description: —This study was conducted with a "regulation neutral" approach. While the information derived from the study may be useful for decision making by FHWA/OMC, the study does not provide recommendations concerning changes to existing regulations or the creation of new regulations for the motorcoach industry. Human error is a causative factor in 85 percent or more of all crashes. The National Transportation Safety Board (NTSB) has documented numerous motorcoach accidents that have re- sulted in fatalities where driver fatigue has been determined to be a principal cause.

III. HARDWARE & SOFTWARE REQUIREMENTS

Purpose and Scope of Document:

A software requirements specification (SRS) is a document that is created when a detailed description of all aspects of the software to be built must be specified before the project is to commence. It is important to note that a formal SRS is not always written. In fact, there are many instances in which efforts.

3) NON-FUNCTIONAL REQUIREMENT:

Performance Requirements:

- The Performance of the functions and every module must be well. The overall performance of the software will enable the users to work efficiently.
- The overall performance of the software will enable the users to work effi- ciently.
- Performance of response should be fast.

4) Software Quality Attributes:

1. Maintainability: After the deployment of the project if any error occurs then it can be easily maintained by the software developer.
2. Reliability: The performance of the software is better which will increase the reliability of the Software.

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3. User Friendliness: Since, the software is a GUI application; the output generated is much user friendly in its behavior.
4. Integrity: Integrity refers to the extent to which access to software or data by unauthorized persons can be controlled.
5. Security: Users are authenticated using many security phases so reliable security is provided.
6. Testability: The software will be tested considering all the aspects.

5) SDLC Model:

The software development cycle is a combination of different phases such as designing, implementing and deploying the project. These different phases of the software development model are described in this section. The SDLC model for the project development can be understood using the following figure the chosen SDLC model is the waterfall model which is easy to follow and fits bests for the implementation of this project.

Requirements Analysis: At this stage, the business requirements, definitions of use cases are studied and respective documentations are generated. Design: In this stage, the designs of the data models will be defined and different data preparation and analysis will be carried out.

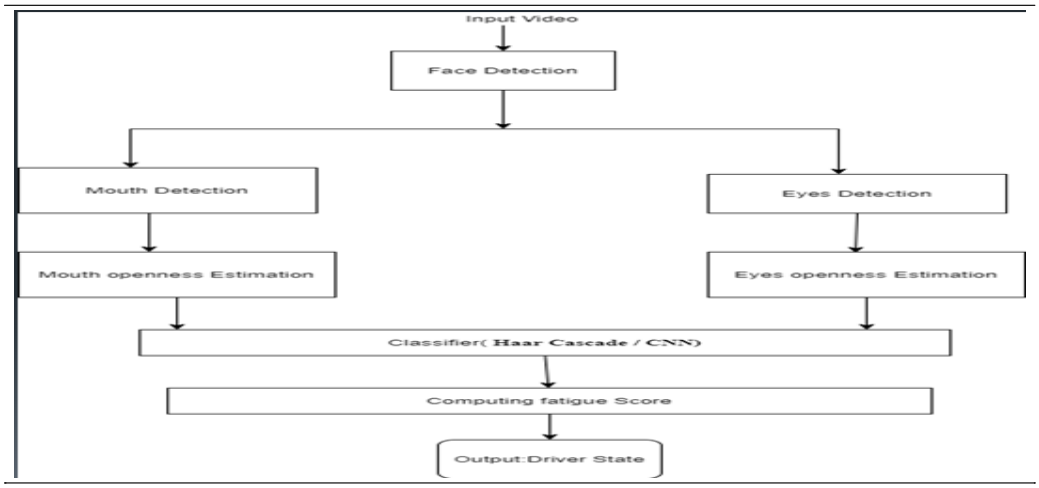
6) Mathematical Model:

Let S be the Whole system S= I,P,O I-
input
P-
procedure
O-output
Input(I)
I=Face Detected
Where,
Dataset- Videos Procedure (P),

P=I, Using I System perform operations and calculate the prediction Output(O)-
O= Detect Driver State

IV. SYSTEM DESIGN

7) SYSTEM ARCHITECTURE



8) DATA FLOW DIAGRAM:

In Data Flow Diagram, we Show that flow of data in our system in DFD0 we show that base DFD in which rectangle present input as well as output and circle show our system, In DFD1 we show actual input and actual output of system

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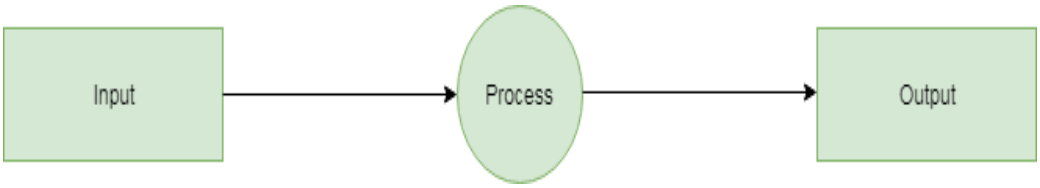
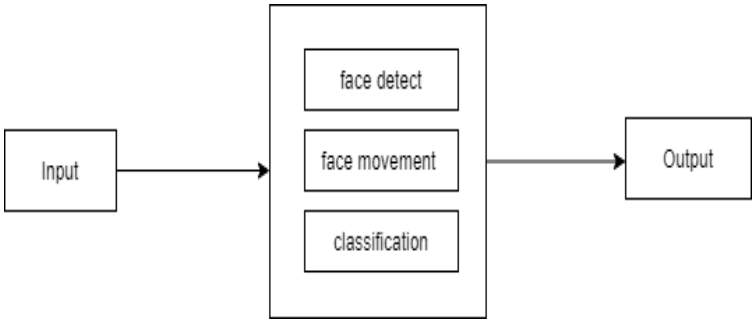
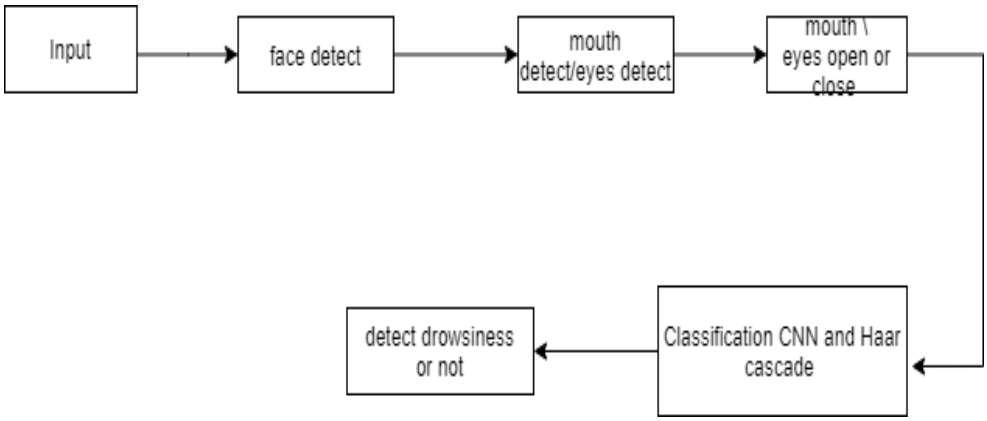
input of our system is text or image and output is rumor detected likewise in DFD 2 we present operation of user as well as admin.







V. PROJECT PLAN

Project Task Set: Major Tasks in the Project stages are:

- Task 1: correctness
- Task 2: availability
- Task 3: integrity

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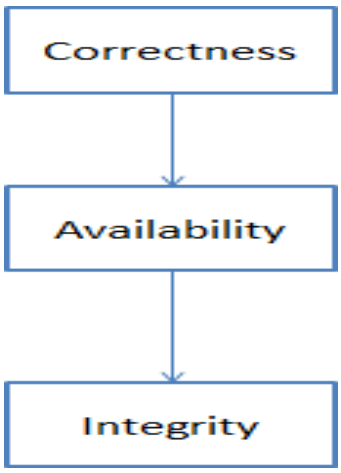
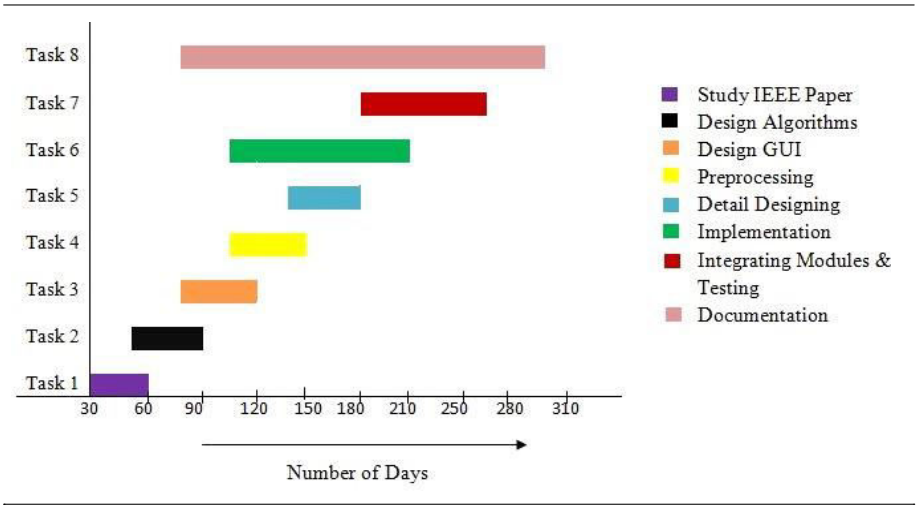


9) GANTT LIST:



10) ADVANTAGES OF SYSTEM:

Our proposed method is able to distinguish the simulated drowsy and sleepy states from the normal state of driving on the low-resolution images of faces and eyes observed from an oblique viewing angle. Hence, our system might be able to effectively monitor bus driver's attention level without extra requirement for cameras. Our approach could extend the capability and applicability of existing vision-based techniques for driver fatigue detection.

11) APPLICATIONS

- To avoid road accidents
- To avoid driver fatigue
- To drive safety

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VI. CONCLUSION

The increasing number of traffic accidents due to a diminished driver's vigilance level has become a serious problem for society. Statistics show that 20 percent of all the traffic accidents are due to drivers with a diminished vigilance level. Further- more, accidents related to driver hypo-vigilance are more serious than other types of accidents, since sleepy drivers often do not take correct action prior to a collision. For this reason, developing systems for monitoring driver's level of vigilance and alerting the driver, when he is drowsy and not paying adequate attention to the road, is essential to prevent accidents. it will be also uses alcohol pulse detection to check out the person is normal or abnormal. The prevention of such accidents is a major focus of effort in the field of active safety research. People in fatigue show some visual behaviors easily observable from changes in their facial features like eyes, head, mouth and face. Computer vision can be a natural and nonintrusive.

VII. FUTURE SCOPE

- For school bus driver the system was very useful.
- it will be also using alcohol pulse detection to check out the person is normal or abnormal.
- The driver fatigue is the major problem in today's world, because due to the downiness problem day by day accidents are increased. In the future work it further implemented with the help of Neural Network and other real time sensor devices. So that more accuracy is achieved.

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