

Driver Drowsiness Detection Using Machine Learning

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Abstract: This document is a review report on the research conducted and the project made in the field of computer engineering to develop a system for driver drowsiness detection to prevent accidents from happening because of driver fatigue and sleeping.

The report proposed the results and solutions on the limited implementation of the various techniques that are introduced in the project. Whereas the implementation of the project gives the real world idea of how the system works and what changes can be done in order to improve the utility of the overall system.

Keywords: Driver drowsiness, eye detection, yawn detection, blink pattern

I. INTRODUCTION

Humans have always invented machines and devised techniques to ease and protect their lives, for mundane activities like traveling to work, or for more interesting purposes like aircraft travel. With the advancement in technology, modes of transportation kept on advancing and our dependency on it started increasing exponentially. It has greatly affected our lives as we know it. Now, we can travel to places at a pace that even our grandparents wouldn't have thought possible. In modern times, almost everyone in this world uses some sort of transportation every day. Some people are rich enough to have their own vehicles while others use public transportation. However, there are some rules and codes of conduct for those who drive irrespective of their social status.

One of them is staying alert and active while driving. Neglecting

our duties towards safer travel has enabled hundreds of thousands of tragedies to get associated with this wonderful invention every year. It may seem like a trivial thing to most folks but following rules and regulations on the road is of utmost importance. While on road, an automobile wields the most power and in irresponsible hands, it can be destructive and sometimes, that carelessness can harm lives even of the people on the road. One kind of carelessness is not admitting when we are too tired to drive. In order to monitor and prevent a destructive outcome from such negligence, many researchers have written research papers on driver drowsiness detection systems. But at times, some of the points and observations made by the system are not accurate enough. Hence, to provide data and another perspective on the problem at hand, in order to improve their implementations and to further optimize the solution, this project has been done.

A.Motivation

Now-a-days, there is huge increase in private transportation day by day in this modernize world. It will be tedious and bored for driving when it is for long time

distance. One of the main causes behind the driver's lack of alertness is due to long time travelling without sleep and rest. Tired driver can get drowsy while driving.

Every fraction of seconds drowsiness can turn into dangerous and life- threatening accidents may lead to death also. To prevent this type of incidents, it is required to monitor driver's alertness continuously and when it detects drowsiness, the driver should be alerted. Through this we can reduce significant number of accidents and can save lives of people.

II. LITERATURE SURVEY

A. System Review

This survey is done to comprehend the need and prerequisite of the

general population, and to do as such, we went through different sites and applications and looked for the fundamental data. Based on these data, we made an audit that helped us get new thoughts and make different arrangements for our task. We reached the decision that there is a need of such application and felt that there is a decent extent of progress in this field too.

B. Technology Used

1) **Python**: Python is an interpreted, high-level, general- purpose programming language. Python's design philosophy emphasizes code readability with its notable use of significant whitespace.

2) **Image Processing**: In computer science, digital image processing in the use of computer algorithms to perform image processing on digital images.

3) **Machine Learning**: Machine learning is the scientific study of

algorithms and statistical models that computer systems use in order to perform a specific task effectively without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly told. image processing is the use of computer algorithms to perform image processing on digital images.

III. Existing System

Now a days maximum members are using vehicle (car, lorry, bus). according to survey 10 to 15% are accidents are accruing because of the driver was in sleepy mode. No software is having to give alert to the driver

Dis-advantages: -

More Accidents are accruing
Unable to give alert while driver was sleepy.

IV. Proposed System

Face and Eye Detection open cv algorithm

In this paper a novel approach to critical parts of face detection problems is given, based on analogic cellular neural network (OpenCV) algorithms. The proposed Open CV algorithms find and help to normalize human faces is, effectively while cause for most accident related to the vehicles crashes. Driver fatigue their time requirement is a fraction of the previously used methods. The algorithm starts with the detection of heads on colour pictures using deviations in colour and structure of the human face and that of the background. By normalizing the distance and position of the reference points, all faces should be transformed into the same size and position. For normalization, eyes serve as point reference. Other OpenCV algorithm finds the eyes on any grayscale image by searching characteristic is features

of the eyes and eye sockets. Tests made on a standard database show that the algorithm works very fast and it is reliable. In proposed method, first the image is acquired by the webcam for processing. The images of the driver are captured from the camera which is installed in front of the driver on the car dashboard. It will be passed to preprocessing which prepares the image for further processing by the system. Its main operations are to eliminate noises caused by the image acquisition subsystem and image enhancement using Histogram Equalization. Then we search and detect the faces in each individual frame. If no face is detected then another frame is acquired. If a face is detected, then a region of interest is marked within the face. This region of interest contains the eyes. Defining a region of interest significantly reduces the computational requirements of the system. After that the eyes are detected from the region of interest.

If an eye is detected then there is no blink and the blink counter is set to „20“. If the eyes are closed in a particular frame, then the blink counter is decremented and a blink is detected. When the eyes are closed for more than 4 frames then it is deducible that the driver is feeling drowsy. Hence drowsiness is

V. System Architecture

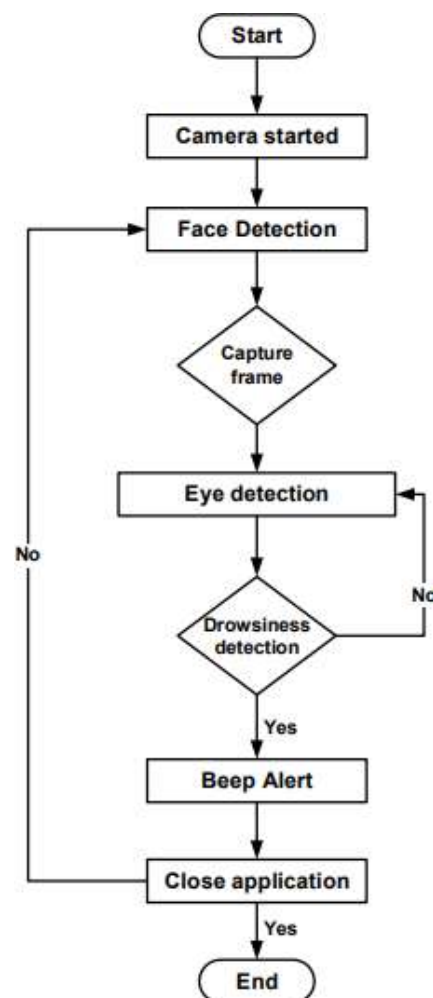


Fig: System Architecture

detected and an alarm sounded. After that the whole process is repeated as long as the driver is driving the car. The overall flowchart for drowsiness detection system is shown in Figure 2.1

VI. SYSTEM REQUIREMENTS

Hardware Requirements

Processor: 64 bit, quad-core, 2.5 GHz minimum per core

- 1) RAM: 4 GB or more.
- 2) HDD: 20 GB of available space or more.
- 3) Display: Dual XGA (1024 x 768) or higher resolution monitors.
- 4) Camera: A detachable webcam.
- 5) Keyboard: A standard keyboard

Software Requirements

Python: Python 3.6 and higher version

Libraries

Numpy, Scipy, Playsound, Dlib, Imutils, opencv, etc.

Operating System

Windows or Ubuntu

VII. CONCLUSION

It completely meets the objectives and requirements of the system. The framework has achieved an unfaltering state where all the bugs have been disposed of. The framework cognizant clients who are familiar with the framework and comprehend it's focal points and the fact that it takes care of the issue of stressing out for individuals having fatigue-related issues to inform them about the drowsiness level while driving.

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