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Real time drowsiness detection and Alert system Using CNN

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***Abstract*— This paper detect drowsiness in driver eyes using various machine learning techniques and ends with a conclusion of which technique to use while detecting drowsiness in driver eyes.**

Keywords—drowsiness, CNN, neural networks

I. INTRODUCTION

One of the major causes behind the casualties of people in road accidents is driver's drowsiness. After continuous driving for long time, drivers easily get tired resulting into driver fatigue and drowsiness. Research studies have stated that majority of accidents occur due to driver fatigue. Different countries have different statistics for accidents that occurred due to driver fatigue. Developing technology for detecting driver fatigue to reduce accident is the main challenge. According to the report by "Ministry of Road Transport & Highways" there were 4,552 accidents reported every year in India, that took lives of thousands of people because of sleepy drivers(Road Accidents in India 2016). For instance, many vehicles are driven mostly at night such as loaded trucks. The drivers of such vehicles who drive for such continuous long period become more susceptible to these kinds of situations. Detecting drowsiness of drivers is still an ongoing research in order to reduce the number of such miss-happenings and accidents. Typical methods used to identify drowsy drivers are physiological based, vehicle based, and behavioural based. Physiological methods such as heartbeat, pulse rate, and Electrocardiogram etc. are used to detect fatigue level. Vehicle based methods include accelerator pattern, acceleration and steering movements. Behavioural methods include yawn, Eye Closure, Eye Blinking, etc. The methods used are non-intrusive in nature; hence, no additional costs would be incurred during the course of the drowsiness detection method. The rest of the paper is organized as follows.

Section 2 describes the work we have done. Section 3 contains the figures explaining our project. Result and the future scope of our project is also explained.

II. OUR WORK

1. This section details the proposed approach to detect driver's drowsiness that works like the drivers face is recognized. The image is then gray scaled and the eyes are detected to see if the eyes are open or not. The driver is not drowsy and the eyes of driver are open then there will be no beep sound i.e. alarm produced and score will be zero. If the driver is drowsy and his/her eyes are slightly closed or closed then the score will be printed and beep sound i.e. alarm will be produced. Hence it will be ease for the traffic police to detect the drowsiness in drivers eyes. The cost is very low to calculate the same and very easy and reliable application. Convolutional Neural Networks is used for better reliability and accuracy.

III. FIGURES AND TABLES

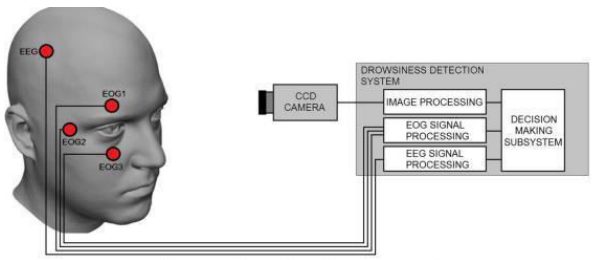

Fig 1. Drowsiness detection system overview.

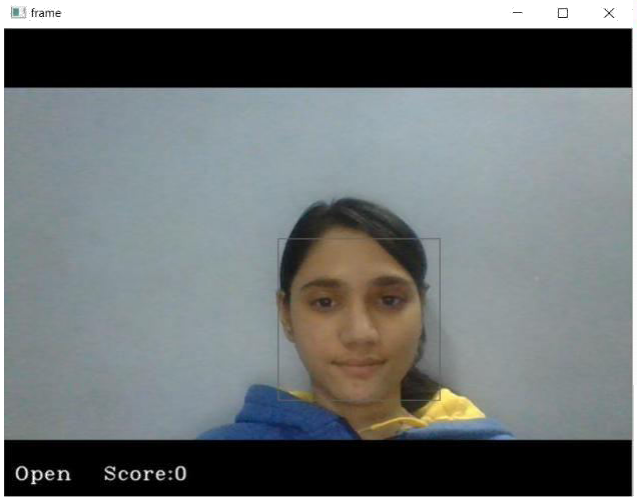

Fig 2.1. Image of a driver with opened eyes

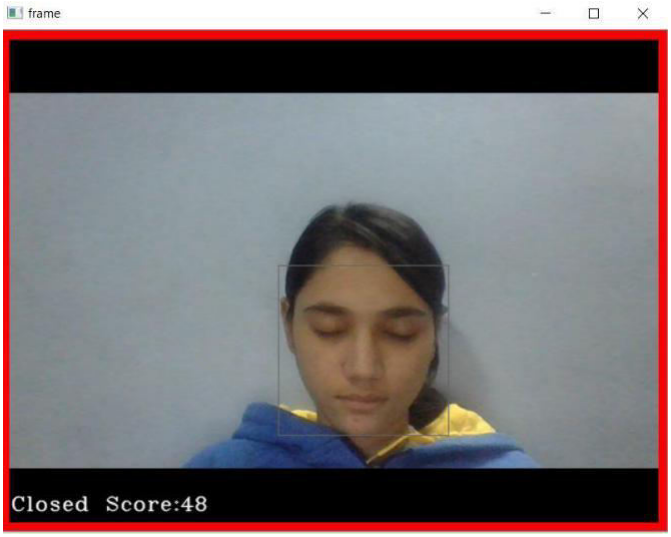

Fig 2.2. Image of a driver with closed eyes

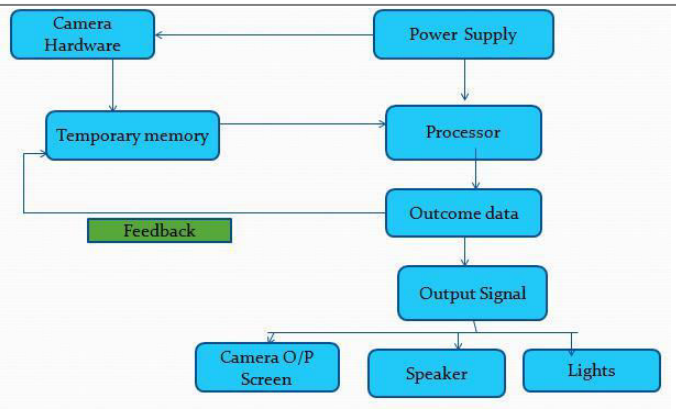

Fig 4. Data Flow diagram

RESULT

In this work, a real time system that monitors and detects the loss of attention of drivers of vehicles is proposed. The face of the driver has been detected by capturing facial landmarks and warning is given to the driver to avoid real time crashes. Non-intrusive methods have been preferred over intrusive methods to prevent the driver from being distracted due to the sensors attached on his body. This is useful in situations when the drivers are used to strenuous workload and drive continuously for long distances. The proposed system works with the collected data sets under different conditions. The facial landmarks captured by the system are stored and machine learning algorithms have been employed for classification. The system gives best case accuracy for random forest classifier. The future work can include integration of the proposed system with globally used applications like Uber and Ola. The system, if integrated, can reduce the number of casualties and injuries that happen regularly due to these drowsy states of the drivers. This experiment can run as a part of pilot plan i.e. for a few days/months in different regions of the world where such incidents occur regularly. Thus, our proposed approach also gives the same accuracy for the people wearing spectacles. Accuracy of our proposed system improves with the increase in brightness of the surrounding environment. The work can be extended for different types users such as bike riders or in different domains like railways, airlines etc

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