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Real Time Driver Drowsiness System Using Eye Blinking Rate Calculations for Secure Means of Transportation

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Abstract: *With driver fatigue continues to cause serious and deadly car and motorcycles accidents, the need for automatically recognizing driver fatigue and alerting the drivers is apparent. Although various approaches that explore physiological and physical factors to classify driver fatigue have been developed, the overall accuracy, recognition speed, distraction in the driving process and the cost of these systems still need to be improved. In this paper, we present a low-cost driver fatigue level prediction framework (DFLP) for detecting driver fatigue in its earliest stages. DFLP predicts drive fatigue based on eyes, mouth, and head behavior cues using a non-physical contact sensor input (infrared radiation) (IR) camera. DFLP classifies the level of drowsiness and attributes the level of altering accordingly. To validate the proposed fatigue prediction framework, we conducted the experiment using real datasets under night and day illumination conditions. The results of the experiment show that the proposed approach can predict the level of driver's fatigue with 93.3health experts and readers as well as automakers to develop an in- vehicle fatigue prediction system.*

Keywords: Chatbot, Artificial Intelligence, Human Conversational Partner, Automated.

I. INTRODUCTION

Figure 1: Driver Drowsiness

Driver drowsiness is a significant factor in the increasing number of accidents on today's roads and has been extensively accepted . This proof has been verified by many researchers that have demonstrated ties between driver drowsiness and road accidents. The aim of this thesis is to contribute to the study of driver behaviour while driving, through the development and evaluation of a drowsiness driver model system. Non-intrusive is chosen as a method due to comfort to the drivers. The result from the research will be integrated to produce the systems that can be efficient in detecting the drowsiness level at an early stage by giving a warning to them about their lack of attention due to drowsiness or other factors. The objective of this research is to identify the current drowsiness detection by investigating flexible methods for studying the relationships between driver's manoeuvre performances whiles the vehicle on the move and the physiological driver drowsiness states.

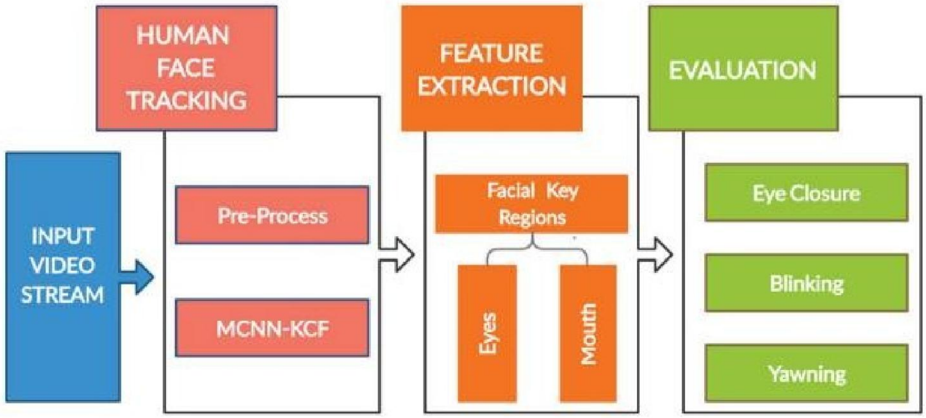

Figure 2: Block Diagram of System

II. METHODOLOGY

In this proposed system we are using the input for the proposed DFLP framework is video stream or webcam video. The face is detected from every frame of video by using OpenCV which has 2 models (OpenCV Haarcascade and DNN) for face detection. OpenCV Haarcascade performs the extraction of the frontal face that is bigger than 80 by 80 pixels, and it can even detect partial face images with a confidence value. In a situation whereby, the drivers turned their heads or talk, the OpenCV Haarcascade failed to detect the drivers' faces.

This means that the classification performance is affected by this factor. If there were many similar cases during the analysis of the frontal image in training videos, then it would be very difficult to determine whether the drivers are asleep or not. To overcome this problem, the framework uses OpenCV DNN, which is a very useful tool for detecting frontal and side view of a face in variable face sizes. However, the speed of detection is slow. Driver's drowsiness prediction in realtime is not much important, because fatigue is the feeling of exhaustion and can be determined by observing the behavior of drivers within a time frame of (23s)

III. MODELING AND ANALYSIS

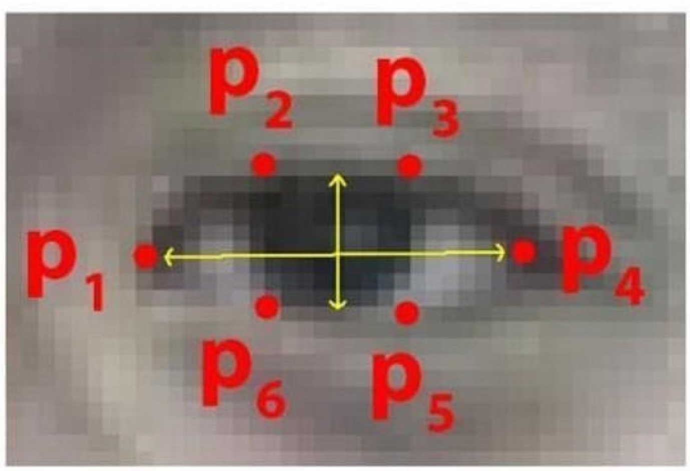

Figure 3: Eye Co-ordinates

Each eye is represented by 6 (x, y)-coordinates, starting at the left-corner of the eye. The eye aspect ratio is approximately constant while the eye is open, but will rapidly fall to zero when a blink is taking place. Using this simple equation, we can avoid image processing techniques and simply rely on the ratio of eye landmark distances to determine if a person is blinking. Provide input video frames.

- Extracts the eyes and mouth features and evaluates its state.
- Compute 'e' and 't', where 'e' is the eye-closure frame ratio in the 60s and 't' is the time duration of eye-closure.
- Compute 'r', where 'r' is the blinking-frequency.

IV. RESULTS AND DISCUSSION

Features of Proposed Results are:

1. Using the Eye-Blinking rate we can detect that driver is in state of fatigue and not fit for driving.
2. This can alert the driver and prevent the accidents long before it could happen.

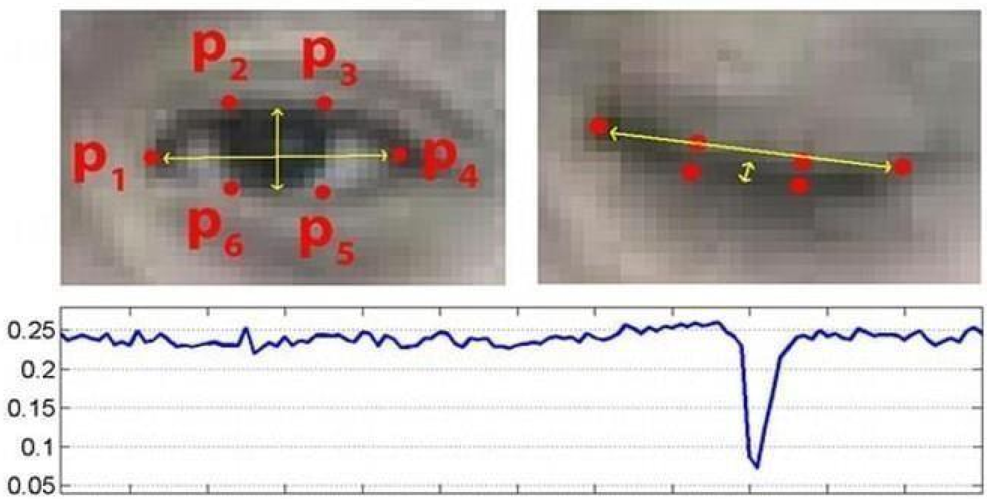

Figure 4: Detection of Blinking of an Eye

If the Eye blinking rate goes beyond the set threshold value we can detect the drowsiness and fatigue of the driver which can lead to accident, thus alerting the driver and saving lives even before it could ever happen.

V. CONCLUSION

In the behavioral approaches various techniques like machine learning, image processing were all used to solve drowsy problem, however despite their success, suffers false alarm, poor dataset design, unreliability, among others. There are many types of DL algorithms but CNN was choose due to its operating success in processing large image or video based data, when compared to other DL algorithms. We define the facial regions of detection based on facial key points. Moreover, we introduce a new evaluation method for drowsiness based on the states of the eyes and mouth. Therefore, the above mentioned system is almost a real-time system as it has a high operation speed.

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