Drowsy Detection On Eye Blink Duration Using Algorithm

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Abstract— this paper presents an automatic drowsy driver monitoring and accident prevention system that is based on monitoring the changes in the eye blink duration. Our proposed method detects the drowsiness in eyes using the proposed mean sift algorithm. Our new method detects eye blinks via a standard webcam in real-time YUY2_640x480 resolution. Experimental results in the eye-blink database showed that the proposed system detects eye blinks with 99.4% accuracy with a 1% false positive rate.

Keywords - Eye blinks detection, eye symmetry, and drowsiness detection.

I. INTRODUCTION

In physiology fatigue is to perform reasonable and necessary physical or mental activity. When the metabolic reserves of the body are exhausted and the waste products increased, as for example after prolonged exertion, the body finds it difficult to continue its function and activity.

The ever increasing numbers of traffic accidents all over the world are due to the drowsiness of driver. Drowsy driving is a factor in one in every six road accidents and one in three heavy vehicle accidents.

The annual financial toll is estimated to be at least $2 billion in health and insurance costs in Australia and $56 billion in the U.S. A 2009 survey by the National Transport Commission found that at least 45 per cent of heavy vehicle drivers were impaired by fatigue during their last shift. It found 52 per cent of major crash insurance claims were fatigue related. The survey also revealed 50 per cent of all long distance truck drivers had nodded off while driving more than once.

According to the National Sleep Foundation’s 2010 Sleep in America poll, 60% of adult drivers have driven a vehicle while feeling drowsy in the past year, and more than one-third have actually fallen asleep at the wheel.

II. FLOW CHART

Interfacing a camera through MATLAB

Start the camera in back round by trigger method

Cut the eye area from real Image

Make the origin to eyebrows and take a box which covers the eyes

Calculate the percentage of eyes opening

If eye opening percentage decreases from desired value

ALARM STARTS
The focus of this paper is on last category of alertness monitoring technologies. Those technologies monitor in real time. In this paper take only the eye parameters in real time image taken by trigger method because it takes less time than the preview method to check the drowsiness level of the driver. To become it practical and useful we use the warning system, this is a real world driving environment. The objective of this paper is to measure the current activity of the eyes of the driver which is visualized by the camera and we can check the drowsiness of the driver. In this we give the value of the eye closure percentage value and the time for which alarm blown, this is changed according to every person, it set in the program. When the alarm blown it continuously checks the eye pattern of eye closure if percentage increases then the alarm goes off. This is done in the while loop because it goes continuous, it do not break until we do not want.

III. IMAGE PROCESSING

This approach analyzes the images captured by camera to detect physical changes of drivers, such as eyelid movement, using MATLAB Software. Using image processing technique to measure the percentage of eyelid closure over the pupil over time... In addition this approach requires the camera to focus on a relative small area (around the driver’s eyes). It thus requires relative precise camera focus adjustment for every driver.

IV. OUTPUT/WARNING UNIT

For indication of warning we will use two approaches one by blowing alarm and second is the graphical method to take a record.

V. DROWSINESS DETECTION

We define three states for the driver drowsiness as seen in TABLE I. The typical eye blink duration is less than 400ms on average and 75ms for minimum. For this reason, we use the time of eye closure as explained in TABLE I.

<table>
<thead>
<tr>
<th>Drowsiness</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awake</td>
<td>Eye closure time &lt; measured value</td>
</tr>
<tr>
<td>drowsy</td>
<td>Eye closure time &gt; measured value and Eye closure time &lt; measured value</td>
</tr>
<tr>
<td>sleeping</td>
<td>Eye closure time &gt; measured value</td>
</tr>
</tbody>
</table>

TABLE 1-Drowsiness VS description

VI. CONCLUSION

We proposed a new method to detect eye blinks using the algorithm. The proposed system is independent from the eye blinks duration as it works within the same frame. Therefore, it has an advantage over the other systems that retains information of the past frames. In addition, it runs at a 640×480 resolution which is acceptable for real-time scenarios.

The proposed system detects eye blinks with 99% accuracy and a 1% false positive rate. Our experiments showed that the proposed system produces fast and accurate results for the detection of drowsiness. According to the real world experiments eye detection and symmetry is taken in the experiment in real time.

REFERENCES


