

Driver Alert Control & Accident Prevention System

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Abstract - It is big problem for drivers to make aware of real-time needs in the automated system. At present, there are still unresolved issues such as the driver's head tilts and the image size of the eyes large enough. This fact-finding paper outlines an effective way to solve these driver's sleep detection problems in a system on the basis of the image processing techniques. This technique violates common sleep deprivation methods making it like real, using face and optics recognition to establish the driver's eye position; then using a tracking system by keeping track of optics. Finally, after that we can see the driver's drowsiness. Test results show that it complies with analysis.

1. INTRODUCTION

Various many researches have been done to measure driver drowsiness. Research on the image analysis and pattern - visual technology has become widely accepted.

While identifying a sleepy condition in a driver we should do the following: a. Face identification & face tracking. b. optic area & optics tracking. c. Identifying the optics condition . d. Driver sleep detection (see Fig.1) It is efficient way to get the driver sleepy but when it comes to using the automated system the concept has changed. In getting sleepy, the important problem is accuracy and immediate detection. The purpose of research paper is to increase the prototype of the sleep alert warning system. Our complete recognition and awareness can be based on device design to accurately reflect the open and closed world of the driver in real time. through continuous eye tracking, it may be seen that symptoms of inflammatory fatigue may appear early to distance themselves from spontaneous. This discovery can be made using a series of eye pictures and movements of the face and head. Observing eye movements and edges for detection may be used. Hitting tools when drivers fall asleep and giving them warning warnings about threats, or even controlling vehicle movements, have been a challenge to good education and development.

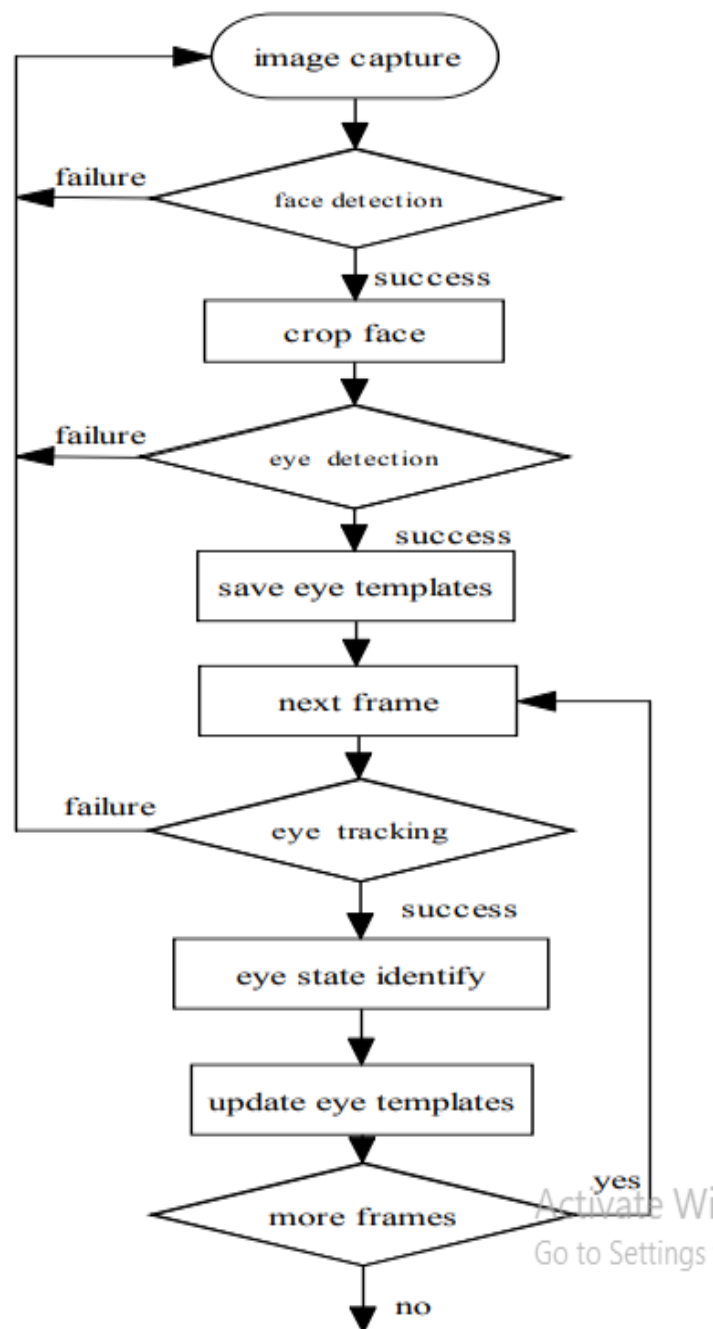


Figure 2. new drowsiness detection flowchart

Especially during driving, after the eye area is initiated with a straight face the tracking method of the object [9] is used to track the identification of the eye. Accurate methods can therefore be used to identify the condition of the eyes in an embedded system. Meanwhile such pregnancies have been adopted in [10,11], but with further testing on various human outcomes it appears to be less complete as the size of each eye is different, so a sensible diagnosis is needed. Our research paper used robust identifying methods, uses an eye image big enough, finds an optic to solve a problem and identifies a sleep condition that is a more reliable condition. Another research paper contains the following: Section 2 introduces the types of methods for initiating the eye area, Section 3 discusses eye tracking and eye conditioning, Section 4 presents the test results, and at last the conclusion is in Section 4

2.OPTIC POSITION DEALLOCATES

So, there are generally 4 important sorts of eye moves: saccades, clean pursuit moves, vengeance movements, and vestibulo-ocular moves. Each kind of optics motion is provided proper right here; in the following sections, neural circuitry that's accountable for three of these kinds of actions is supplied with an additional detail. rapid, shifting ballistic Saccades exchange the point of correction. they range in length from small movements even to evaluation, as an example, to many large actions made even as searching at a room. Saccades may be aroused spontaneously, but arises spontaneously on every occasion the eyes are open, even supposing they're focused on something. fast eye actions from every essential a part of sleep also within the saccades. Timeline of saccadic eye motion. After the begin of the saccade intention, it takes about 2ms for the eye motion to start. during this suspension, the area of the aim with appreciate in fovea is calculated (this, how some distance the eye must move), and the difference among the primary and meant role, or "car mistakes", is turned right into a automobile command that opens extraocular muscles to move the eyes. best distance at the proper course. Saccadic eye motion is stated to be ballistic because the saccade production system is unable to respond to next modifications within the goal function at some stage in eye direction. If the purpose motion is repeated all through this time (order 15–100ms), the saccade may be unnoticed of the target, and saccade 2 have to be made to correct the error.

A. Face perception

In the need to achieve highest facial recognition correctness, there is a need to have gain a characteristic based approach other than alternatives. As per all the conditions the haar is taken to be the best and optimal in facial detection. Here are a few simple features such as haar(shown in Fig.3) that we can use. When looking at features like facial haar, we have used the face detection approach on the basis of cascade of adaboosttrained dividers. There are various many other strategies for obtaining better face recognition, as an important figure and a waterfall.

The integral image at location x,y contains the sum of the pixels above and to the left of x,y , inclusive:

$$ii(x,y) = \sum_{x' \leq x, y' \leq y} i(x',y') \quad (2.1)$$

Where $ii(x,y)$ is the integral image and $i(x',y')$ is the original image, Using the following pair of recurrences:

$$s(x,y) = s(x,y-1) + i(x,y) \quad (2.2)$$

$$ii(x,y) = ii(x-1,y) + s(x,y) \quad (2.3)$$

(where $s(x,y)$ is the cumulative row sum , $s(x, -1) = 0$ and $ii(-1,y) = 0$) the integral image can be computed in one pass over the original image.

Cascade method is based on trained data. Qualified data is made up of 22 categories, each category being a robust system consisting of numbers of weak dividers.(Fig.5).

B. Optics Position

As per the tests the eye area detects a visible feature in horizontal cut in the profile or the face. So that we move on to a new way of finding the eye region on the basis of horizontal guessing. And we have to get the confirmation of the eye feature in the horizontal guessing curve.

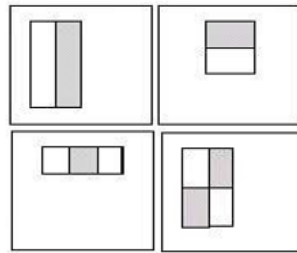


Figure 3. haar-like feature

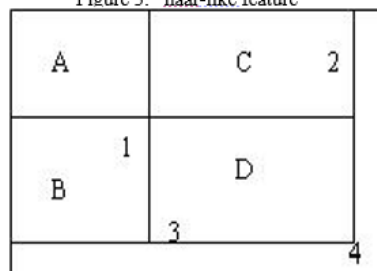


Figure 4. The number of pixels within rectangle D can be calculated by quoting four identical members. The total value of the image in area 1 is the total number of pixels in rectangle A. The area of the 2nd area is A + B, the 3rd area is A + C, and the 4th area is A + B + C + D. Inside of D can be counted as 4 + 1 - (2 + 3).

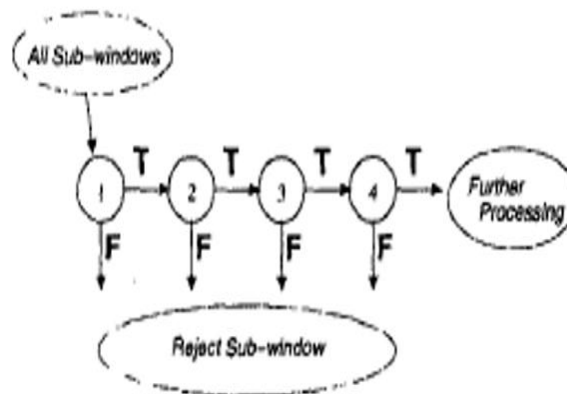


Figure 5. cascade flowchart

The horizontal projection function (as in Fig. 2) is based on the gray image.

$$PV(y) = \sum_{x=1}^m I(x,y) \tag{2.4}$$

Where we suppose size of the image is $m \times n$, $PV(y)$ is the horizontal projection value, $I(x,y)$ is the gray value.

We get the horizontal projection curves as shown below



Figure 6. horizontal projection curve of open eyes and close eyes

As our analysis in the picture the high point of guessing is slightly above the eyebrow. In terms of facial expression, the eye about 1/9 of head down the largest point, and the eye was about 1/7 the length of the face. We can therefore obtain an image of the eye region using such a relationship. We then extract an image of the eye region and extract it as an eye tracking template.

3.EYE TRACKING & STATES IDENTIFICATION

So, optics image are being captured, there is need for this to set it as a future tracking template, Based on the average shift arithmetic [9], we can track the eyes, after which we can identify the shape of the eye method is applied.

A. Optics Tracing

At this rate the blink of an eye and the duration of blindness are measured to cause drowsiness. because when the driving force feels sleepy then his blinking eye and the look between the eyelids are different from normal conditions so without any problems they get drowsy. The figure below shows the blink based on getting completely drowsy in this gadget the location of the irises and eye conditions are monitored over time to measure the frequency of the blink of an eye and its immediate length. This type of machine is also used as a remote camera to collect video and portable visual acuity techniques and then use it to line face, eyes and eyelids according to the degree of closure. Using these eyes near the blink of an eye is easy to detect. Such a system, installed in a smart car environment, can show any signs of tilt of the head, loose eyes, or simultaneous yawning. the following separations show the blinking sight. This scheme introduce a system's output for future operations., in the acquisition result used as an input into the next acquisition process.

$$M_{00} = \sum_{x' \leq m, y' \leq n} i(x', y') \quad (3.1)$$

$$M_{10} = \sum_{x' \leq m, y' \leq n} x' \times i(x', y') \quad (3.2)$$

$$M_{01} = \sum_{x' \leq m, y' \leq n} y' \times i(x', y') \quad (3.3)$$

$$X_c = \frac{M_{10}}{M_{00}}, \quad Y_c = \frac{M_{01}}{M_{00}} \quad (3.4)$$

B. Recognition of optics state

In paper prioritize eye conditioning statistics we need to analyze the image of the eyes closest to the opened eye (Fig.8). We saw that there is a difference in the two. Weight of the opened eyes is higher than the closed eye. Based on the regional image of the eyes, we use a new complex task to identify the shape of the eyes. First, we take a binary image with a dynamic threshold (fake code below):

$$grayvalue = \begin{cases} value & \text{if } value > threshold \\ 0 & \text{if } value < threshold \end{cases} \quad (3.5)$$

(where value is the pixel value of the eye region image)

PSEUDO CODE:

Initialize threshold1

While(1)

{

Get binary image by threshold;

Calculate black-num (black point of the binary image);

Get sum of the four corner;

If(black-num > threshold2)

threshold1-- ;

Else

Break;

}

After that, we detect the edge of the binary image by using laplacianoperator, the operator is as below (TABLE I):

TABLE I. LAPLACIAN OPERATOR

-1	-1	-1
-1	8	-1
-1	-1	-1

Finally, we apply the improved complexity functions [12] (the functions identify one of the eyes) to identify the eye state, as below:

$$com_x[k] = \sum_{j=1}^{m-1} \sum_{i=1}^{n-1} b(i, j) * k(j) \quad (3.6)$$

$$com_y[k] = \sum_{j=1}^{m-1} \sum_{i=1}^{n-1} b(i, j) * k(i) \quad (3.7)$$

$$com_sum = com_x[k] + com_y[k] \quad (3.8)$$

(where image size is $m \times n$, $b(i, j)$ is the value of eye image after canny)

$$k(j) = \begin{cases} j, & j < m/2; \\ m - j, & m/2 < j < m; \end{cases}$$

$$k(i) = \begin{cases} i, & i < n/2; \\ n - i, & n/2 < i < n \end{cases}$$

4. EXPERIMENT

We have successfully implemented our proposed method on a Corei5 8th generation portable computer with a clock speed of 2.6Ghz and 8GB of RAM under the TENSORFLOW environment using a built-in web camera of 0.9MP (1280 * 720). In this test, we tested our system for different people in all different situations to confirm the output. The system works with high accuracy even with major obstacles such as mirrors, dim light, sound etc.

TABLE II. ARITHMETIC SIMULATION RESULTS

Total frames		False	Miss	Correct
kinds	num.	percentage(%) Stat. of face detection		
	Stat of e	e.state	entification	
Open eye (non-glasses)	207	22		89.3
Close eye (non-glasses)	99	14		85.9
Open eye (with-glasses)	68	20		70.6
Close eye (with-glasses)	21	7		66.7

they are driving, the arithmetic of the system can be supposed to be feasible.

The system processed at the average of 12 frames per second. It surely met the needs of realtime.

5. CONCLUSION

Driver sleep systems are being analyzed and a driver alert system is being developed. In this paper the main focus is on avoiding accidents due to drowsiness and alert drivers when the situation arises. This project uses image processing techniques to analyze a driver's drowsiness by continuing to detect blinking eyes. This project has been successfully tested in all strict testing conditions. It has been proven by testing that the system works at almost 100% accuracy when the lights are on and off. In this paper, we have studied the special techniques that can be used to examine the eye of the nation to detect insomnia. This paper briefly describes the step-by-step methods of every novel-crafted eye-catching technique. and, it describes the pros and cons of specialized strategies based on the accuracy of results and real suffering around the world considering that there is no data set right now with unconventional strategies that are almost impossible to fully evaluate the effects of real world-class strategies. This paper has explained the importance of the results reported by various authors and how they may relate to the goal of this paper on finding the best way to get drowsiness. Since that is a real problem and is now unthinkable, from now on it needs a viable solution. As explained in the rest of the paper, there are a few technologies available to stumble upon driving fatigue, but they have their weaknesses. Therefore, in order to have a solution to this, with the best implementation of the driving force detector with the most accurate lessons needed to be achieved. When these types of parameters are used it can improve accuracy in many ways. We plan to further the work-related drawings with the help of a sensor to sing the heartbeat along the way to prevent accidents caused by sudden heart attack in drivers. the same version and techniques that can be used for a variety of applications such as Netflix and other live streaming services can log in while the user is asleep and block the video as a result. can also be used for sleep deprivation for the future, we are planning a similar study on this topic with a view to having a positive response to help limit and further eliminate this problem. As a result, designing a low- cost device that can detect drowsiness to protect the highway.

6. REFERENCES

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