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Implementation of the Drowsiness Sensing System

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ABSTRACT-
In this paper we present different perspectives of modelling the fatigue in any working individual. Mood detection and fatigue detection is based on lot of parameter like facial expression , voice tone known as speech synthesis, eye movements and gestures etc. This paper highlights the most expressive way of humans to display emotions and fatigue that is through facial expressions. This paper proposes fatigue detection and show the implementation face component segregation.
Keywords - localization of eyes, fatigue detection.

I. INTRODUCTION

Humans can express emotions through their facial expressions. Emotional intelligence is extremely helpful in managing and controlling our emotions. When it comes to working successfully, emotional intelligence is important just like logical ability. It is difficult to manage work properly, than ever to cope with stress in the workplace. Other than occupation, or salary level, we're spending more and more of our work days being frantic and out of hand.

Emotional quotient or intelligence is communicating with others in a way that people are attracted to you, overcoming difficult situations , heal hurt feelings, and release tension . It includes lot of parameter such as nonverbal cues or signals, moment-to-moment emotions influence, while some stress is a normal part of the workplace, excessive stress can interfere with the productivity and reduce your physical and emotional health. Finding solution to cope with office stress is not about making huge difference or thinking again about career ambitions. Rather, stress management requires to give importance to your self control. Facial expressions are also used as paralinguistic cues to regulate our conversation. So to express feelings and tension of a person various modules are available. As there is lot of key factor such as tone of voice, posture, gesture etc. This paper describes most extravagant ways of expressing human emotions.

For the computer to interact with humans, it needs to have the ability to understand the emotional state of the person.

The drowsiness affects directly human performance in term of perfection and time of reaction . Generally the interaction between a machine and a human being affects many things it may be fresher, student, or a software techie or any other organization where work based on human expressions, either it may be student or employee of software industry or industrialist.

Detection of fatigue involves a sequence of images of a face, and the pattern of eye movement and blinking of the eyes..

The analysis of human face is marching ahead in the research area with various applications such as human face recognizer, virtual tools, and human detection and identifying security systems. This paper mainly focuses on the locating the eyes from the human face , and also involves looking at a human face, and finding the exact location of the eyes with the help of locating algorithm. Once the position of the eyes is located, the system is designed to determine whether the eyes are opened or closed, and detect fatigue.

People who are tired or exhausted show certain signs in eyes ,head, and facial expressions, eyelid movement, blinking rate of eyes, head movement.

II. VISUAL DROWSINESS MANAGING DESIGN SYSTEM

This method used a new objective visual fatigue measurement system by using a high resolution camera and an infrared illuminator. As drowsiness evaluation method there are various approaches one is subjective approach and objective approach. As subjective approach use observer views so there may be less accuracy so used objective approach based on movement of eyes such as the portion around eyes, pupil accommodation speed, rate of blinking, and eye closed timings means pupil detection methodology which model under different stages such as

1. Picture searching
2. Movement of eyes
3. Cropping Eye Region
4. Eye Separation

III. FLOW OF IMPLEMENTED PHASES

a. Take an image as input from a standard set of data.
b. Convert the picture into appropriate size for processing.
c. Perform steps to segregate the components of face

Causes of drowsiness :
Deprived Sleep
Under Medicine Influence
Working Long Hours In Work Or Journeys Especially Night Shifts

The work proposed in this paper is related to detecting drowsiness. This paper work involves our real-time event detection (i.e. sleep onset) technique.

An Exhausted person usually reflects sleepiness, tiredness person's facial expression and affect eye-lid movement and rate of blinking, gaze , and head movement. Such visual cues can be exploited by computer vision techniques for the detection of the fatigue and vigilance levels in drivers.

The remainder of this paper is organized as follows. This paper describes the proposed approach. Last part shows experimental results, while our last part draws conclusions and describes future work.

PROPOSED SYSTEM

This paper includes real time image drowsiness detecting system. The system detects the driver fatigue based on eye tracking which comes under an active safety system. At first, an ordinary color webcam is used to capture the images of the driver for fatigue detection. The first frame is used for detecting face and eye location. If any one of these detection procedures fails, then go to the next frame and restart the above identifying processes.

Otherwise, the current eye images are used as the dynamic templates for eye tracking, and then the fatigue detection process is performed. If eye tracking fails, the face detection and eye location restart on the current frame. These procedures continue until there are no more frames.

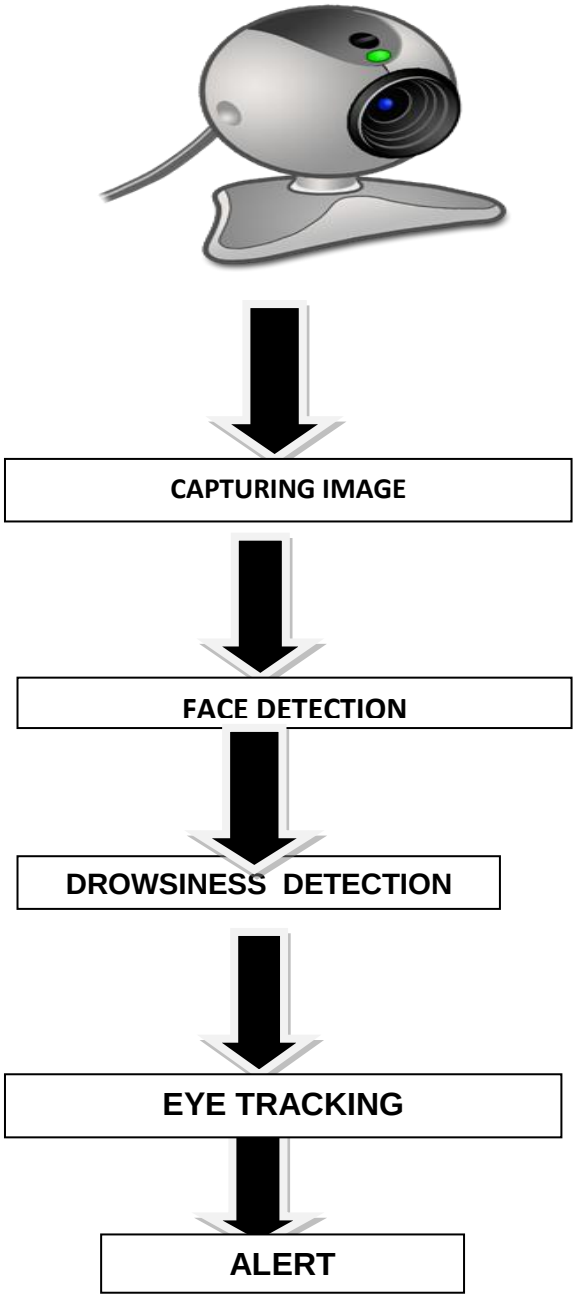

FIG 1.BLOCK DIAGRAM OF THE SYSTEM

This report presents an approach for real-time detection of person's fatigue. The systemconsists of a video camera directly pointed towards the driver's face. The input to the system is a continuous stream of images from the video camera. The system monitors the driver's eyes to detect micro-sleeps (short periods of sleep lasting 3 to 4 seconds). The system can analyze the eyes in each image as well as compare two frames. The input to the system are images from a video camera mounted in front of the car, which then analyzes each frame to detect the face region. The face is detected by

searching for skin color-like pixels in the image. Then a "blob" separation performed on the grayscale image helps obtain just the face region. In the eye-tracking phase, the face region obtained from the previous stage is searched for localizing the eyes using a pattern-matching method. Templates, obtained by subtracting two frames and performing a blob analysis on the difference grayscale image, are used for localizing the driver's eyes.

The eyes are then analyzed to detect if they are open or closed. If the eyes remain closed continuously for more than a certain number of frames, the system decides that the eyes are closed and gives a fatigue alert. It also checks continuously for tracking errors. After detecting errors in tracking, the system starts all over again from face detection. The main focus is on the detection of micro-sleep symptoms. This is achieved by monitoring the eyes of the driver throughout the entire video sequence. The three phases involved in order to achieve this are the following:

1) localization of the face,
2) tracking of eyes in each frame, and
3) detection of failure of tracking.

To make sure that it is the face region that is detected, and not the background that might have skin-like color, the system checks if the area detected as skin has a minimum area (number of pixels). During tracking, the eye templates are matched with the face region to locate eyes. The match scores for the eyes detected are checked continuously. If the match scores for both the open and closed eyes fall below a certain threshold, the system decides that there is an error in tracking and goes back to face detection again. The search space need not be adjusted unless there is a tracking error. The eyes can be detected with fair accuracy unless there is large head-bouncing movement. Further, to ensure correctness in the detection of the eyes, the information about the horizontal alignment and the minimum distance between the two eyes is used.
The eye-detection and -tracking algorithm is tested with
different subjects under different facial orientations and illuminations

Now there are various important modules :
1. FACE DETECTION
2. EYE –TRACKING
3 .DROWSINESS DETECTION

FACE DETECTION

Face detection is the main step in the driver fatigue detection systems. Face detection is a process that aims to locate a human face in an image. The process is applied on stored image or images from a camera. Human face varies from one person to another. This variation in faces could be due to race, gender, age, and other physical characteristics of an individual. Here face detection is done by skin color model. The use of skin color analysis for initial classification of an image into probable face and non face regions stems from a number of simple but powerful characteristics of skin color. Firstly, processing skin color is simpler than processing any other facial feature. Secondly, under certain lighting conditions, color is orientation invariant. The major difference between skin tones is intensity e.g. due to varying lighting conditions and different human race. In order to distinguish the skin color of the user's face from the other image regions in the image, the distribution of the skin color in the chromatic color space must be known prior to employing the system for detecting the human face. Skin color models vary with the skin color of the people, video cameras used and also with the lighting conditions.

IV. EYE-TRACKING USING DYNAMIC TEMPLATE MACHING

Eye-Tracking has got two phases namely eye tracking and dynamic template matching is done. Because the value of pixels in eye region is relatively lower than other region of face. We calculate the average gray value along X axis and roughly find the eye region. Thus by symmetrical characteristics of eyes we obtain the eye templates. After we get the eye templates, we use gray scale correlation over eye region to find the position of the eye.

DROWSINESS DETECTION

Once the face of the driver is detected and the eye of the driver is successfully tracked, we continuously monitor the variations of the eye. A pattern matching technique is then used for detecting whether the eyes of the driver are open or closed. Based on the blink threshold and the detection threshold the open and closed variations of the eye are judged. If the eyes remain closed for a certain period of time (3 to 4 seconds), the system determines that the person has fatigue and gives a warning signal. The system also checks for tracking errors; once an error is detected, the system returns to the face detection stage. The main focus is on the detection of micro-sleep symptoms. This is achieved by monitoring the eyes of the driver throughout the entire video sequence.

At this stage, the colours of the eyeballs in the eye templates are used directly for fatigue detection. Since the property that the eyeball colours are much darker is a quite stable feature, the eye templates are converted to the greyscale model. The original darker eyeballs become brighter ones in the converted image. According to the observation, the saturation values of eyeball pixels normally fall between 0.00 and 0.14. This observation is used to

distinguish whether a pixel in an eye template is viewed as an eyeball pixel. When the eyes are open, there are some eyeball pixels. When the eyes are closed, there are no eyeball pixels. By checking the eyeball pixels, it is easy to detect whether the eyes are open or closed. an eyeball pixel. When the eyes are open, there are some eyeball pixels. When the eyes are closed, there are no eyeball pixels. By checking the eyeball pixels, it is easy to detect whether the eyes are open or closed.

Update the eye coordinate position each time the frame is successfully tracked, and take this coordinate as the reference of next search range, if it is an eye-open area, take it as next template, then repeat. This is a method which updates template and search range instantaneously to match eye-area dynamically. During the track process, if matched areas in several continuous frames are no longer eye-area, it seems tracking is fail and the algorithm needs restart. So far the eye localization and its state detection of driver video sequences has already been finished, which supply basis for fatigue detection. The blink detection algorithm first checks to make sure that a decent correlation exists, then looks for 8 frames in a row where the average darkness of the template image is at least 12 pixels greater than the average darkness of the source image, whereupon it outputs the message "Fatigue Detected ".

V. CONCLUSION

In this system the eyes are continuously tracked from the captured image during the video taken from webcam. Then there is comparison between the normal eye –template and the drowsy eye-templates. Finally after comparison the system will alert that the person has fallen asleep.

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