

ABSTRACT

Driving a vehicle with utmost safety measures is always required to prevent accidents at the wheel. Most of the accidents that occur in every part of the country are due to driver fainting at the wheel. Major causes for accidents interms of loss of attention and diseases that may inhibit with the benign operation of vehicles can be found in the following factors such as least correct vision, Earshot problems, Cardiac diseases, Cerebral Stroke, Effects of using sedatives and aging issues that provides the decrement in strength, slow reaction time, lack of responsiveness and misperception. Among these issues, fatigue and sudden heart attack are the major causes of accidents which cannot be controlled by driver even if he wants to do. It is important to point out the distinction between prediction and detection of drowsiness. Obviously prediction in advance is the main task, since at the detection point, drowsy driving may already have led to a potentially hazardous situation or even an accident.

Initial step starts with the acquisition of an image from the camera followed by face tracking, eye detection, mouth detection and drowsiness detection which is described in detail below. For performing the face detection, the first step is pre-processing. It is used to calculate the integral images and lighting corrections from the scaled original image. The second step is processing the frame sequences along with trained threshold values. The third step is post-processing. It clusters the adjacent detected faces to one or several rectangles to represent faces according to distance factor. From the resultant binary image collect the number of connected components and check if there are two connected components left to find the eye blink .If so then an eye blink has been occurred. If the correlation coefficient r is bigger than the value of Threshold, then we are assuming that the eyes are still open. The commands tic and toc are responsible for measuring the time, how long the user keeps his eye

closed. If the correlation coefficient is under the value of threshold, then an eye blink has been detected. Based upon the user closing eyes within the threshold, the timer triggers or provides end of blink. This Simulation was performed using MATLAB and OPENCV tools.

The basic methods of acquiring ECG signals from the subject then extracting heart rate using LabVIEW as a tool was analysed. An ECG simulator is used to produce the typical ECG waveforms of different leads. The ECG simulator empowers us to investigate and study normal and abnormal ECG waveforms without actually using the ECG sensors and DAQ board. We have used waveform peak detector and the output of peak detector was used to calculate the heart rate. The results depicts the time measured between two QRS complexes are 0.9 seconds, from which the number of beats per second is calculated as 1.11 beats / second. Applying a scalar and appending a constant will determine the conversion into seconds/minute which results in 66.7 beats per minute.

Next a simple method of detecting heart rate based driver drowsiness system is explained using Proteus a tool. The heart rate is extracted from the sensors wrapped around the steering wheel. If the heart rate is getting below 60 then it is stated as low heart rate but if he reaches the threshold then crash will occur. So a threshold level of 65 is set to ensure drowsiness. An immediate alarm will be activated and even if there is no decrease in speed of the vehicle, automatic fuel flow to the engine will be blocked. The alert SMS of the subject is sent to the medical practitioner to get quick attention along with the GPS location. If the heart rate is higher than the threshold then abnormal heart rate is detected and the same SMS can be sent to avoid panic situation. The device was tested in all environments and it was able to predict low and also abnormal heart rate.