**CHAPTER 2**

**LITERATURE REVIEW**

[1].Paul Viola and Michael Jones**, “Rapid Object Detection using a Boosted Cascade of Simple Features**”, describes a machine learning approach for visual object detection which is capable of processing images extremely rapidly and achieving high detection rates. The work is distinguished by three key contributions. The first is the introduction of a new image representation called the “Integral image” which allows the features used by our detector to be computed very quickly. The second is a learning algorithm, based on AdaBoost, which selects a small number of critical visual features from a larger set and yields extremely efficient classifiers. The third contribution is a method for combining increasingly more complex classifiers in a “cascade” which allows background regions of the image to be quickly discarded while spending more computation on promising object like regions.

[2]. Ovidiu stan et.al. Says in the paper **“eye-gaze tracking method driven by Raspberry pi applicable in automotive traffic safety”** that this paper comes as a response to the fact that, lately, more and more accidents are caused by people who fall asleep at the wheel. Eye tracking is one of the most important aspects in driver assistance systems since human eyes hold much information regarding the driver's state, like attention level, gaze and fatigue level. The number of times the subject blinks will be taken into account for identification of the subject's drowsiness. Also the direction of where the user is looking will be estimated according to the location of the user’s eye. The developed algorithm was implemented on a raspberry pi board in order to create a portable system.

[3]. Kulkarni S.Et.al. Says in the paper **“application of raspberry pi based embedded system for real time protection against road accidents due to driver’s drowsiness and/or drunk and drive cases”**. The application of raspberry pi cpu based sensing system to the detection of the driver’s lethargy and alcoholism in order to avoid the road accidents. The embedded system consists of 5 megapixel digital camera, alcohol detection sensor and the buzzer interfaced to the micro controller. The embedded system is controlled by raspbian operating system. The system detects real time situation of the driver’s vigilance and control over the vehicle. If alcoholic and / or drowsiness tests are positive, it switches on the alarm, (ii) turn off the vehicle’s engine via micro controller based program controlling ignition power source and (iii) sends a sms and location to the relative close of driver.

[4]. Oraan Khunpisuth, Taweechai Chotchinasri and Narit Hnoohom**, “Driver Drowsiness Detection using Eye-Closeness Detection”** purpose of paper was to devise a way to alert drowsy drivers in the act of driving. One of the causes of car accidents comes from drowsiness of the driver. Therefore, this study attempted to address the issue by creating an experiment in order to calculate the level of drowsiness. A requirement for this paper was the utilisation of a Raspberry Pi Camera and Raspberry Pi 3 module, which were able to calculate the level of drowsiness in drivers. The frequency of head tilting and blinking of the eyes was used to determine whether or not a driver felt drowsy. With an evaluation on ten volunteers, the accuracy of face and eye detection was up to 99.59 percent.

[5]. Belal ALSHAQAQI; Abdullah Salem BAQUHAIZEL; Mohamed El Amine OUIS; Meriem BOUMEHED; Abdelaziz OUAMRI; Mokhtar KECHE, **“Driver Drowsiness Detection System”** describesa module for Advanced Driver Assistance System (ADAS) is presented to reduce the number of accidents due to drivers fatigue and hence increase the transportation safety; this system deals with automatic driver drowsiness detection based on visual information and Artificial Intelligence. We propose an algorithm to locate, track, and analyse both the drivers face and eyes to measure PERCLOS, a scientifically supported measure of drowsiness associated with slow eye closure.

[6]. Tejasweni Musale and Pansambal, B.H, **“Driver Drowsiness Detection Technique using Raspberry PI”** paper presents a real-time driver drowsiness detection system for driving safety. Based on computer vision techniques, the driver’s face is located from a color video captured in a car. Then, face detection is employed to locate the regions of the driver’s eyes, which are used as the templates for eye tracking in subsequent frames. Finally, the tracked eye’s images are used for drowsiness detection in order to generate warning alarms. The proposed approach has three phases: Face, Eye detection and drowsiness detection. The role of image processing is to recognize the face of the driver and then extracts the image of the eyes of the driver for detection of drowsiness.