

# Design and Develop a Monitoring System on Embedded Platform for Finding the Driver Drowsiness Using ARM Microcontroller

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**Abstract:** -- The principle thought behind this work is to build up a nonintrusive system which can recognize weakness of the driver and issue an advantageous forewarning [3]. Since endless accidents happen in light of the driver tiredness [1]. Thus this system will be useful in averting numerous mischances, and subsequently spare cash and decrease individual enduring [2]. In this paper the location of eye state and head posture of driver is to screen and the driver mindfulness in autos. This venture is to screen the driver's eye and head developments by utilizing webcam. This implanted venture is to outline and build up a minimal effort highlight which depends on installed stage for finding the driver sleepiness [5]. In particular, our system incorporates a webcam set on the directing section which is proficient to catch the eye developments and head developments of the Driver [4]. In the event that the driver is not focusing out and about ahead and a perilous circumstance is identified, the system will caution the driver by giving the notice sounds as voice [6]. Our Embedded System utilizes ARM miniaturized scale controller has an element of picture preparing procedure and in addition Analog to Digital Conversion. Picture handling is any type of flag preparing for which the information is a picture, for example, a photo or video outline; the yield of picture preparing might be either a picture or an arrangement of qualities or parameters identified with the picture.

**Index Terms:** -- Fatigue Detection, Driver drowsiness, Eye, Webcam, Driver monitoring system, ARM micro controller.

## 1. INTRODUCTION

The Real Time hazardous practices which are identified with exhaustion whether in type of eye shutting, head gesturing or the mind movement [1]. Consequently we can either quantify change in physiological signs, for example, cerebrum waves, heart rate and eye Blinking or by estimating physical changes, for example, hanging stance, inclining of driver's head and open/shut condition of eyes. The past procedure, while more precise, isn't reasonable since exceedingly delicate terminals would need to be appended specifically on the driver's body and subsequently which can be irritating and diverting to the driver. Furthermore prolonged stretch of time driving would bring about sweat on the sensors, lessening their capacity to screen precisely. The second method is to quantify physical changes (i.e. open/shut eyes to identify exhaustion) is appropriate for true driving conditions since it is non-meddlesome by utilizing a camcorder to recognize changes. What's more smaller scale rests that are brief time of dozes enduring 2 to 3 seconds are great marker of weariness state. In this way by consistently checking the eyes of the driver one can recognize the sluggish condition of driver and convenient cautioning is issued.

Flow chart

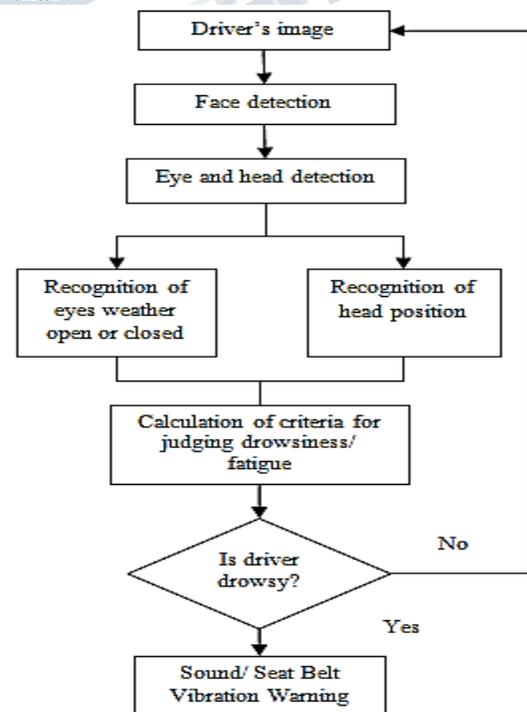
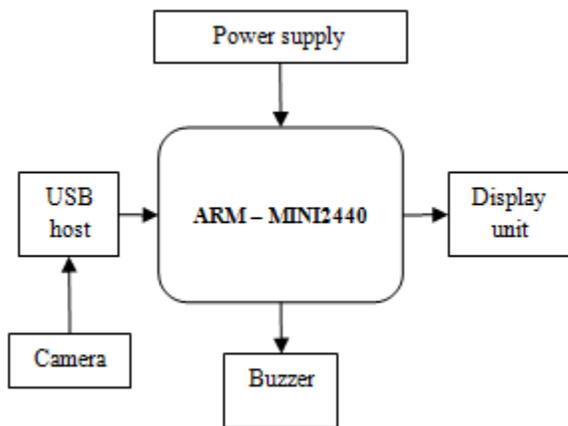


Fig1: Eye and head tracking system

This framework will recognize a driver weakness by handling of eye locale and head position. As appeared in stream outline in Fig.1. After picture obtaining, confront location is the main phase of preparing. At that point manifestations of hypo-carefulness are separated from the eyes. In the event that eyes are squinting regularly no notice is issued however when the eyes are shut for the greater part second and furthermore if the head isn't in straight position i.e., if the head in various edge then this framework issues cautioning to the driver in type of alert and vibration [5].

**II. BLOCK DIAGRAM**



*Fig. 2 Eye state and head pose based driver Fatigue Monitoring and Warning system*

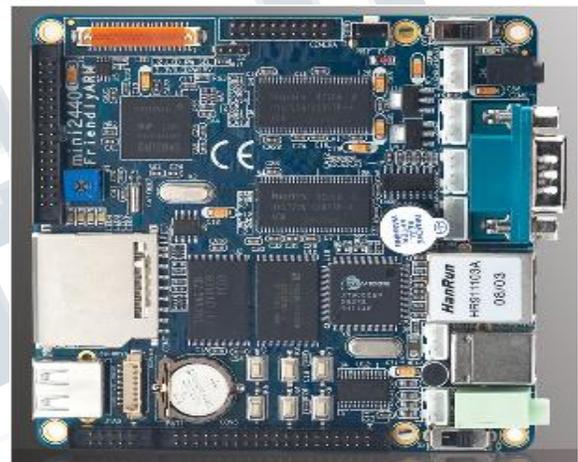
The Embedded work is to plan and build up an ease highlight which depends on inserted stage for finding the driver sluggishness. In particular, our framework incorporates a webcam set on the guiding segment which is able to catch the eye developments and head development. In the event that the driver isn't focusing out and about ahead and a hazardous circumstance is identified, the framework will caution the driver by giving the notice sounds through signal. At the point when our application begins running it first checks every one of the gadgets and assets which it needs are accessible or not. After that it checks the association with the gadgets and offers control to the client. The GUI for the client has the accompanying choices. A discretionary mark is utilized for showing the picture taken from the camera. A status box is for speaking to whether sleepiness is distinguished or not. We can't get S3C2440 microcontroller exclusively. We will get it as FRIENDLY ARM board else we can call it as MINI 2440 board. Our ARM board accompanies coordinated peripherals like USB, ADC and Serial and so forth. On this board we are introducing Linux working framework with essential drivers for every single

fringe gadget .In this Visual investigation of eye state and head posture framework we are utilizing USB camera to identify the EYE STATE and HEAD POSE esteems which is associated with the ARM controller. These qualities will be figured by actualizing some picture handling calculations.

**III. HARDWARE IMPLEMENTATION**

**A. Mini2440 Development Board**

Mini2440 is a practically minimal effort ARM9 advancement board, is as of now the most noteworthy in a financially savvy learning board. It is for the Samsung S3C2440 processor and the utilization of expert power stable center CPU chip to chip and reset security allow framework steadiness.



*Fig3. Mini2440 Development board*

The mini2440 Immersion Gold PCB utilizing the 4-layer board configuration process, proficient, for example, long-wiring to guarantee that the key flag lines of flag uprightness, the generation of SMT machine, large scale manufacturing; the industrial facility have been a strict quality control, with exceptionally point by point in this manual can help you rapidly ace the advancement of Embedded Linux.

**B. UVC Driver Camera:**



*Fig4. UVC Driver Camera*

An UVC (or Universal Video Class) driver is a USB-classification driver. A driver empowers a gadget, for example, your webcam, to speak with your PC's working framework. Furthermore, USB (or Universal Serial Bus) is a typical sort of association that takes into account fast information exchange. Most present working frameworks bolster UVC. Despite the fact that UVC is a moderately new organization, it is rapidly getting to be normal.

There are two sorts of webcam drivers:

1. The one included with the establishment circle that accompanied your item. For your webcam to work legitimately, this driver requires some an opportunity to introduce. It is particularly tuned for your webcam, planned by your webcam producer and improved for webcam execution.

2. A UVC driver: - You can just utilize one driver at any given moment, yet possibly one will enable you to utilize your webcam with different applications.

The following Logitech webcams support UVC: Logitech® Quick Cam® Pro 9000 for Business, Logitech® Quick Cam® Pro for Notebooks Business, Logitech® Quick Cam® Communicate MP for Business, Logitech® Quick Cam® Deluxe for Notebooks Business, Logitech® Quick Cam® 3000 for Business.

#### **C. TFT display unit**

TFT remains for Thin Film Transistor, and is a sort of innovation used to enhance the picture nature of a LCD. Every pixel on a TFT-LCD has its own transistor on the glass itself, which offers more control over the pictures and hues that it renders. While TFT-LCDs can convey sharp pictures, they likewise tend to offer generally poor review points, which mean they look best when seen head-on. On the off chance that you see a TFT-LCD from the side, it can be hard to see. TFT-LCDs additionally expend more power than different sorts of wireless showcases.

#### **IV. RESULT**

1. Effectively executed and tested basic driver alert monitoring on ARM9 Hardware.
2. The ARM 9 design support to Haar and Viola Jones calculation is investigated to identify protests in work.
3. Captured the pictures and displayed it on TFT screen on ongoing premise utilizing ARM9, Webcam.

4. Utilizing calculations driver development is checked persistently like gesturing head, tilting and so forth.

5. At the point when sensors enacted then ARM produces buzzer sound to caution the drivers while driving.



Output for driver alert monitoring system

#### **V. CONCLUSION**

This system will detect eye and head movement to detect the fatigue state of driver and gives warning in half second. It has been developed by integrating features of all the hardware components and software used. By monitoring the eyes and head positions using camera and using this new algorithm we can detect symptoms of driver fatigue early enough to avoid an accident. It uses highly advanced ARM9 board and with the help of growing technology the work has been successfully implemented.

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