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IMPLEMENTATION OF DRIVER DROWSINESS DETECTOR WITH VOICE ALERT AND HEALTH MONITORING SYSTEM

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Abstract - *This project presents a real-time driver drowsiness detection and health monitoring system for driving safety Predicated on computer vision techniques; the driver's face is located from a colour video captured in a conveyance. Then, face detection is hired to discover the areas of the motive force's ocular perceivers, which are applied because the templates for ocular perceiver tracking in next frames. Ultimately, the tracked eye's pix are used for drowsiness detection so that you can generate caution buzzer indicators and stop the automobile. And also the heart beat sensor monitoring the heart beat condition, if the up normal condition of the driver and hence a voice alert and stop the vehicle. The proposed approach has three stages Ocular perceiver detection and lethargy detection and monitoring the heart beat. The function of picture processing is to agnize the face of the driver after which extracts the image of the ocular perceivers of the driver for detection of slumberousness. The face detection algorithm takes captured frames of picture as enter and then the detected face as output. Next, CHT (circle Hough Transform) is used to tracking eyes from the detected face. If the eyes are closed for a predefined period of time the ocular perceivers of the driver will be considered closed and hence a sound alert will be started to warn the driver and stop the vehicle using relay and then the pulse rate of the driver is sensed using pulse sensor. If drowsiness not detected means vehicle continuous running. The proposed system is implemented on a Raspberry pi with camera. The experimental results appear quite encouraging and promising. The system could reach more frames per second for face and eye tracking comparatively, and the average exact rate for eye location and tracking could achieve 99.0% on some test videos. Thus, it can be concluded that the proposed approach is a low cost and efficacious solution method for a genuine-time detection of driver somnolence and health monitoring system.*

Key Words: Voice alert, computer vision technique, heart beat sensor, buzzer, image processing, CHT (circle Hough Transform), raspberry pi, camera.

1.INTRODUCTION

The innovations in the automobile industry over the last hundred years have made our conveyances more puissant, more facile to drive and control safer more energy efficient, and more environmentally convivial. Majority of the accidents caused today by cars are mainly due to the driver fatigue. Driving for a long period of time causes extravagant fatigue and lassitude which in turn makes the driver slumberous or loose cognizance. With the expeditious increase in the number of accidents seems to be incrementing day to day. Ergo a desideratum arises to design a system that keeps the driver fixated on the road. Data on road accidents in India are accumulated by Convey Research Wing of Ministry of Road Convey & Highways.

The aim of this project is to develop an archetype of somnolent driver warning system. Our whole focus and concentration will be placed on designing the system that will accurately monitor the open and closed state of the driver's ocular perceiver in genuine time. By perpetually monitoring the ocular perceivers, it can be visually perceived that the symptoms of driver fatigue can be detected early enough to evade a contingency. This detection can be done utilizing a sequence of images of ocular perceivers as well as face and ocular perceiver.

The optical discernment of ocular perceiver forms of kineticism and its edges for the detection will be utilized. Contrivances to detect when drivers are falling asleep and to provide admonishments to alert them of the jeopardy, or even control the vehicle's kineticism, have been the subject to much research and development. Driver fatigue is a solemn quandary resulting in many thousands of road accidents each year. It is not currently possible to calculate the exact number of slumber cognate accidents because of the difficulties in detecting whether fatigue was a factor and in assessing the calibre of fatigue. However research suggests that up to 25% of accidents on monotonous roads in India is fatigue cognate. Research in other countries withal denotes that driver fatigue is an earnest quandary.

Puerile male drivers, truck drivers, company car drivers and shift workers are the most in jeopardy of falling asleep while driving. However any driver travelling long distances or when they are tired, it is at the peril of slumber cognate accidents. The early hours of the morning and the middle of the afternoon are the peak times for fatigue accidents and long journeys on monotonous roads, concretely motor-ways, are the most liable to result in a driver falling asleep. In this project the algorithms for face detection and ocular perceiver tracking have been developed on frontal faces with no restrictions on the background.

2. RELATED WORK

In Existing System was made to the following

- The existing method uses support vector machine to detect the drowsiness of driver.
- Due to the scan of the input image without any disparity in this method for human detection, processing speed cannot meet the injuctive authorization of an authentic-time system opportunely.
- Under such a circumstance, an edge symmetry based human detection algorithm is used Buzzer.

3. METHODOLOGY

In this system, the processor used to serve the system is raspberry pi.The raspberry pi camera will capture the real-time video and send the video as input to the system. Then the system will extract the image frames from the video to perform image processing technique. Firstly the system will detect the face region in the images using Haar Cascade Algorithm. Secondly, the region of eyes will be fetched and differentiated by using Circular Hough Transform (CHT).
Thirdly; the detected eye region will be checked for the condition of close or open. If the eyes are closed for a certain period of time, the system will detect the driver as drowsy or fatigue driver. after detection, the system will warn the driver by generating voice alert and stop the vehicle and also the heart beat sensor monitoring the heart beat condition, if the up normal condition of the driver and hence a voice alert and stop. The system block diagram is shown in figure 1

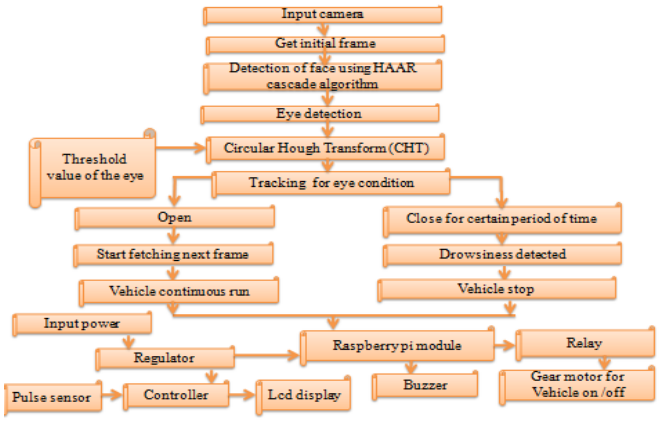

Fig -1: Block Diagram of Implementation of Driver Drowsiness Detector with Voice Alert and Health Monitoring System

4. HARDWARE USED

4.1 Raspberry Pi Module:

Fig -2: Raspberry Pi Board

Fig 2 shows the Raspberry Pi Board. The Raspberry Pi hardware has developed through several versions that feature variations in recollection capacity and peripheral-contrivance support.
Broadcom VCOS – Proprietary operating system which includes an abstraction layer designed to integrate with subsisting kernels, such as ThreadX (which is utilized on the VideoCore4 processor), providing drivers and middleware for application development.
In case of Raspberry Pi this includes an application to commence the ARM processor(s) and provide the publicly documented API over a mailbox interface, accommodating as its firmware The name MATLAB stands for matrix laboratory.

4.2 Relay:

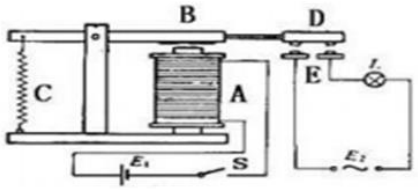

Fig -3: Relay sensor

The Fig 3 shows relay Add a certain voltage to the coil and some currents will pass through the coil thus generating the electromagnetic effect. So the armature overcomes the tension of the spring and is attracted to the centre, consequently ultimate the transferring contact of the armature and the usually open contact (or you may say releasing the previous and the usually closed touch).

4.3 Arduino Nano:

Nano is a microcontroller board designed through Arduino.cc. The microcontroller used within the Arduino Nano is Atmega328, the identical one as used in Arduino UNO. It has a wide range of programs and is a major microcontroller board because of its small length and flexibility.

Fig -4: arduino Nano

4.4 Pulse Sensor:

Fig -5: Pulse sensor

Heart beat sensor is designed to give digital output of heat beat when a finger is placed on it. When the heart beat detector is running, the beat LED flashes in unison with every heart beat. This virtual output can be linked to microcontroller without delay to degree the Beats in keeping with Minute (BPM) charge.

5. SOFTWARE USED

5.1 Arduino IDE 1.8.13 version:

Fig -6: Arduino open-source software

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board, the Arduino project provides an integrated development environment (IDE) based on a programming language named Processing, which also supports the languages, C and C++.The open source Arduino IDE makes it easy to write code and upload it to the board.

5.2 Thonny IDE:

An Integrated Development Environment (IDE) facilitates computer programmers by integrating fundamental tools (e.g., code editor, compiler, and debugger) into a single software package. Users do not need to install the language's compiler/interpreter on their machines; an IDE provides the environment itself. Thonny is a free, dedicated IDE for Python designed for beginners.

5.3 Algorithm:

5.3.1 CIRCULAR HOUGH TRANSFORM:

The circle Hough remodel (CHT) is a basic function extraction method used in virtual picture processing for detecting circles in imperfect snap shots. The Hough transform is a function extraction approach used in image evaluation, pc imaginative and prescient, and virtual picture processing. The cause of the technique is to discover imperfect instances of items within a sure magnificence of shapes

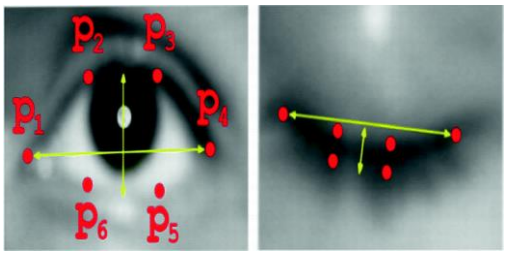

Fig -7: Drowsiness Detection

6. EXPERIMENTAL RESULT

We have implemented Innovative implementation Of Driver Drowsiness Detector With Voice Alert And Health Monitoring System which is shown in fig6. And also application is designed to control the vehicle remotely with the help of Arduino Bluetooth Control App and snapshot of it is shown in fig.8

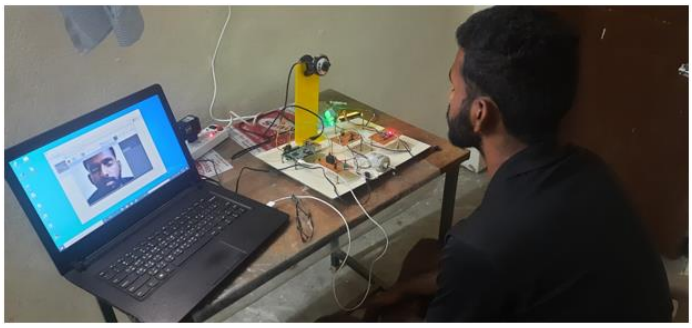

Fig -8: Experimental Setup

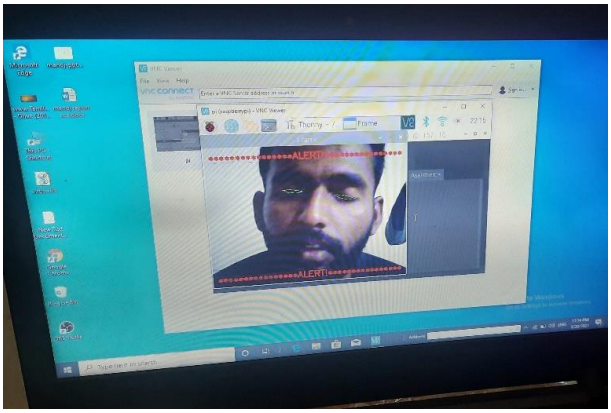

Fig -9: Drowsiness Alert

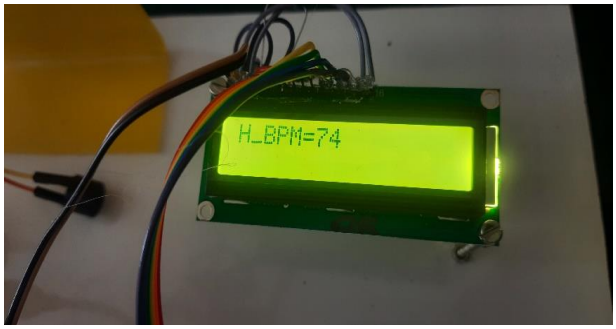

Fig -10: Heart pulse Rate Monitoring

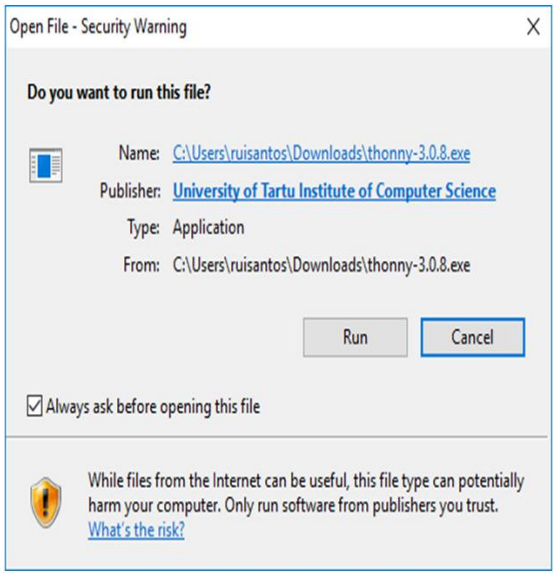

Fig -11: Screenshot of the Installation of Thonny Software

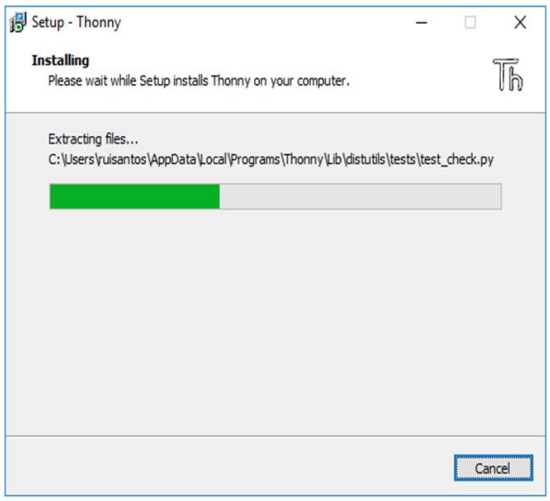

Fig -12: After completing the installation opens Thonny IDE. A window as shown in the following figure should open

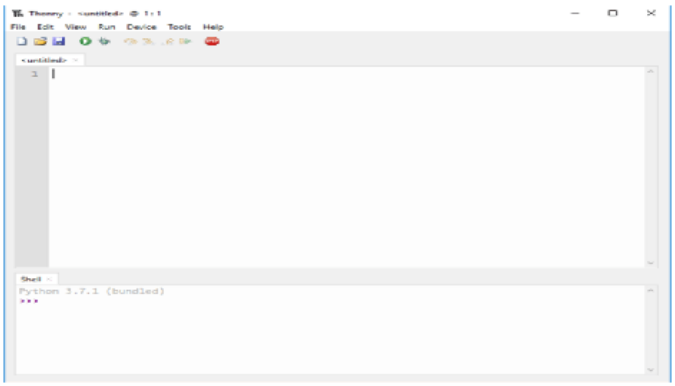

Fig -13: Thonny setup

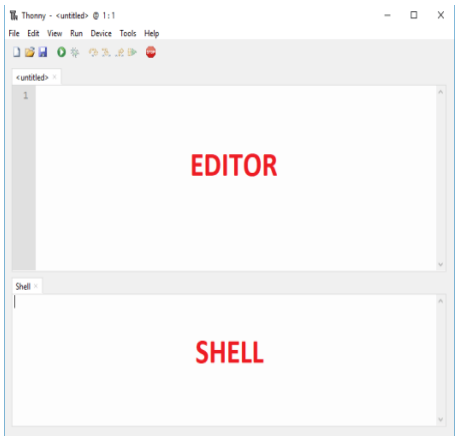

Fig -14: Thonny Editor

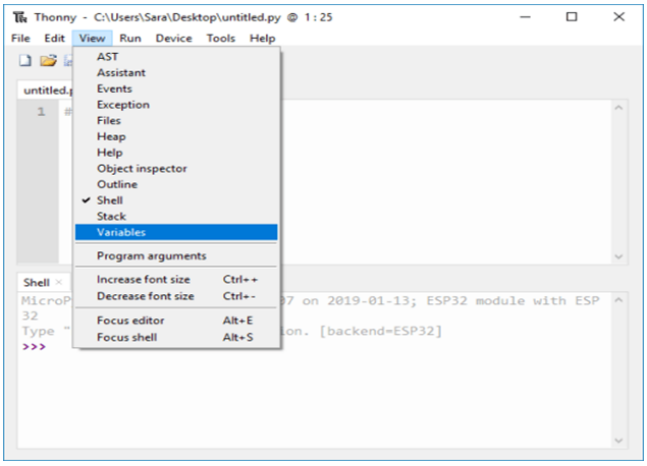

Fig -15: Thonny Window Page.

7. CONCLUSIONS

We developed a device that localizes and music the eyes and face moves of the motive force so that it will come across drowsiness and coronary heart beat sensing machine. The system uses a combination of face detection and function primarily based matching a good way to localize the eyes and tracking the heart beat. Throughout tracking, system will be able to determine if the eyes are open or closed and whether or not the motive force is looking in the front and monitoring the coronary heart beat. whilst the up regular situation of coronary heart beat and eyes will be closed for too long, a warning sign could be given in the shape of sound and forestall the vehicle robotically and avoid the coincidence.

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