

Accident Prevention from Real-Time Driver Drowsiness using Python

C.R.Claina, James Ruban.A

Abstract — Transportation is playing important role in our life. But recently, driver drowsiness, distractions, and speed limit crossing cause road accidents which lead to fatalities drowsiness dozed, which need to alert the driver before a accident occur. In this paper, the design of a system that can alert the drivers using alert system and stopping them from driving while is being in a drowsy state, improper driving to avoid road accidents. In this paper, using sensor detect the eye blink of the driver. The variation of value taken from human eye will vary as per eye blink. When eye is closed then its indicate output is high otherwise output is low. It showing current state of human eye, its become closing or opening position of an eye. In our project system is also focused on ensuring safety issues like fastening seatbelt automatic alert, preventing from accident, speed limit control access and driving while being in a drunken state etc. In this paper, used IOT module ,advanced microcontroller ,python software using Raspberry Pi, Camera and sensors for monitoring driver's eye movements, detecting speed limit to prevent human accidents. Internet of Things is excutig in vehicles for transmitting the information of the driver and his driving stage under the weather condition and quick response under critical or emergency situations.

Keywords— Drowsiness, sensor, speed limit

I. INTRODUCTION

In recent facts and reports 20 million to 50 million people are killed or injured in accident all around world. Indian, human beings die every one year because of road accidents, in large part prompted because of the Drowsiness, improper driving. Assessments conducted by using US NHTSA(National Highway Traffic Safety Administration) confirmed that 1,100 vehicles accidents arise each year. These injuries price over 12.5 billion\$ and 1550 deaths and 71000 injuries. National Sleep Foundation of USA declared that 54% of adult drivers had pushed in the course of sleepiness and 28% of these drivers had fallen asleep absolutely. Current market examples include home automation (also known as smart home devices) such as the control and lighting, heating ,air conditioners , and other applications such as washer/dryers, vacuums, air purifiers and refrigerators/freezers .Moreover it use Wi-Fi for remote monitoring.

IOT is also expected to generate large amounts of data from exact locations, with the consequent indispensable for quick aggregation of the data, and an increase in the need to index, store, and process such data more effectively.

IOT is one of the new platforms of today's developed and developing countries, Smart City, and Smart Energy Management Systems.

This Paper explain about how to prevent accidents using IOT techniques. This is achieved by using IOT sensors in accident prone areas that sense and collect information from the

surroundings, uploads it to the cloud and data is processed later. The sensor also placed on the road identifies a car, bus etc. That is used to measure over speed, identify exact location of the vehicle and communicates to the transport system. In case of an accident, the device notified and transfers the information to the concerned authorities for immediate help.

II. EXISTING SYSTEM

Now a day's technology accident control and driver safety method. Sensing and indicating abnormal signals technology using in automobiles luxurious vehicles only. Various electronic devices emerged to functions of speed measurement, temperature and vibration measurement. However functionality or flexibility of the devices is still very limited.

In existing system approaches of drowsiness detection and improper driving . In behavioral measuring or visual based approach different gestures of driver like eye blink, head movement and yawning are monitored to observe the driver state. If there any positive detection as a closed eyes, open mouth simultaneously and alert the driver with a

buzzer. This is done with the help of fixing camera in front of the driver and continuously capturing its real time video/image using MATLAB. In vision based concepts, drowsiness of the driver detected system is developed. In existing systems require a camera is fixed in front of driver. It points driver face and monitors the driver's eyes for identify the drowsiness. For large vehicle such as heavy trucks and buses this arrangement is not predict accurate result. Bus has a large front glass window to have a wide view for safe driving in bus. If we placed a camera on the window of front glass, the frontal view of driver sometime blocked by camera so it is not practical. If the camera is placed on window, then the camera is unable to cover anterior and interior view of the face of the driver correctly.

In the oblique view, the Open CV eye detector fails to trace pair of eyes frequently. If the eyes are closed frequently system indicates that the driver is slumbering and issues in warning signal. Hence existing system is not applicable for large vehicles and heavy trucks. In order to the problem of existing system, new detection method developed in this project proposed system work.

Driver entered into vehicle, sat down in the driver's seat, and performed alcohol detection task using for approximately 10 min. During in this period, sensor signals forwarding and video recordings were continuously logged.

Sober perform task 5 times. Intoxicated perform one measurement before drinking and continued measure new measurement every 30 min until their breath alcohol level was high. If sensor sensed alcohol level content high then automatically, buzzer activated and its give alert sound continuously.

Existing system eye blink sensor is used. A spectacle with fix sensor used to detect the driver drowsiness same as alerts the driver with buzzer. The various hardware components are given below

1. LPC2148 microcontroller
2. Fix sensor
3. Alcohol sensor

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4. Tilt sensor
5. LDR
6. LCD and buzzer
7. GSM and GPSI

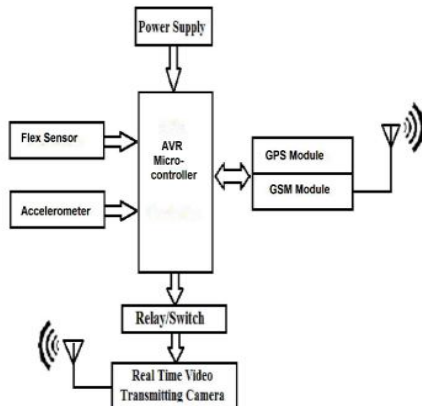


Figure 1: Intelligent System for Vehicular Accident Detection and Notification.

III. PROPOSED SYSTEM:

In proposed system approaches of drowsiness detection and alcohol content of driver body. In this system real time video transmitting camera capture images and video of driver state simultaneously and transfer to transport service using GPRS modem. Optical mouse sensor used for sensing or capture positive detection driver eyes drowsiness, improper driving and open mouth simultaneously capture driver state and transfer to microcontroller ADC(Analog To Digital Converter) converter as a digital value then forward to authorized transport service using GPRS modem and make buzzer continuous sound alert for driver and passenger.

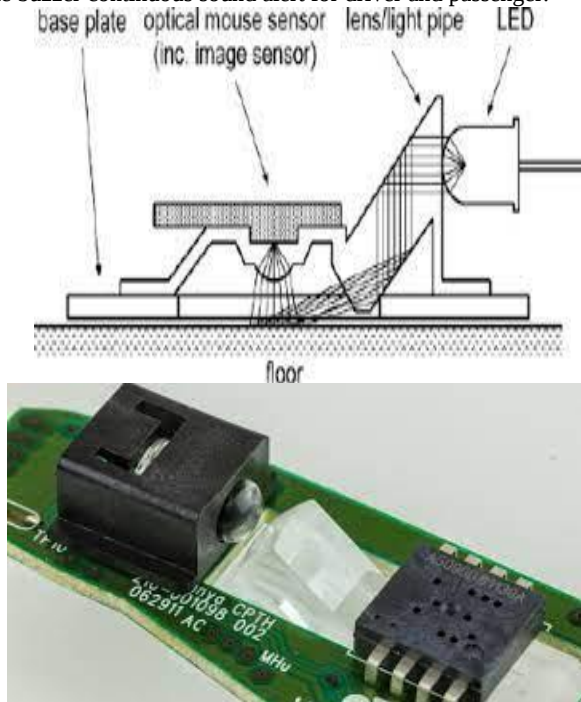


Figure 2: Optical mouse sensor

MSP430 is used to control the functions of embedded systems in machines, robot and other applications etc. A microcontroller is a single metal-oxide-semiconductor IC chip. A microcontroller contains CPU's along with ADC, memory and programmable input/output peripherals devices.

Microcontroller, also called an MCU, and it's exactly like the computer. The computer is a general computer, it can do an different and unlimited number of tasks. However, a microcontroller is a specialized computer. It's used to do one task as well.

A general packet radio service (GPRS) modem is global system technology mainly used for mobile communications and wireless communication. In wireless data transmission modem using GPRS/GSM modem technology. A GSM modem generally uses a circuit-switched type of technology and packet-switched technology used for transmitting data and receiving data. This frequently results in faster transmission of data when using GPRS modem.

All you need to do is power the heater coil with 5V, add a load resistance, and connect the output to an ADC converter using in microcontroller and send information to transport service and alert driver and passenger using buzzer(sound alert) sound.

ADNS5050 is a cheap Optical Mouse sensor. In that 8 pin pack from Avago. It detects movement along with monochrome 19x19 pixel image sensor and image processing techniques

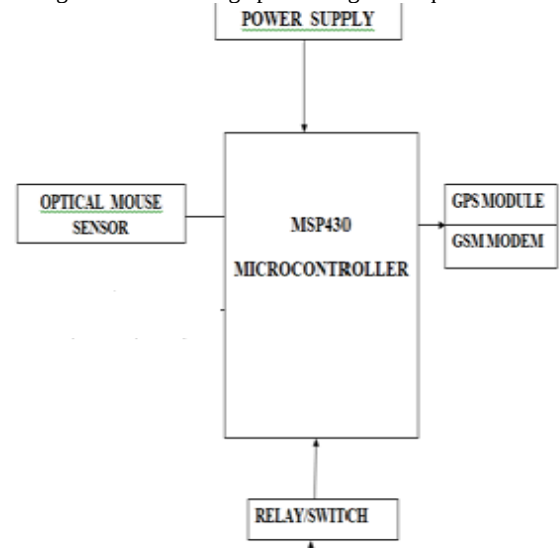


Figure 3. Accident prevention control

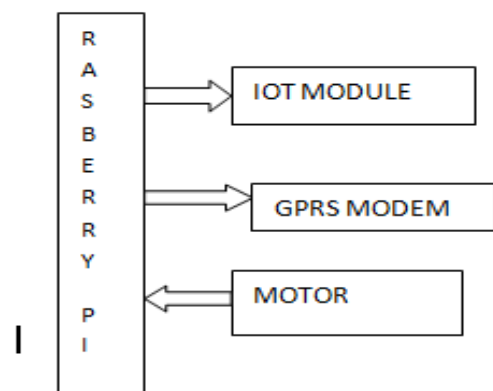


Figure 4: Detection measurement using raspberry and python software

A. ADNS5050 MOUSE OPTICAL SENSOR

A ADNS5050 mouse optical sensor has similar in the form of a light source. Built-in camera captures images rapidly. These images

are then sent to your microcontroller processor and translated into mouse movement or GPRS modem.

The ADNS5050 is a cheap Optical Mouse sensor .In that 8 pin pack from Avago. It detects movement along with monochrome 19x19 pixel image sensor and image processing techniques. This sensor allows read the pixels using image sensor and into a very cheap 19x19 pixel camera.

The ADNS-5050 is based on Optical Navigation Technology, its measures changes in position by back to back sequential surface images (frames), mathematically determine the image direction and magnitude of image movement.

The ADNS-5050 contains an Image Acquisition System(IAS) and Digital Signal Processor (DSP).The IAS acquires microscopic surface images nearby with the lens and illumination system.

ADNS5050 mouse optical sensor are

- Small form factor, pin-to-pin compatible
- Register-to-register compatible
- Built-in LED driver for simpler circuitry.
- High speed motion detection .
- Self-adjusting frame rate in optimum performance.
- Internal oscillator – no clock input needed, Operating voltage-5V nominal.

ADNS5050 mouse optical sensor are three-wire serial interface□ . Only 4 capacitors and no transistor required□ .

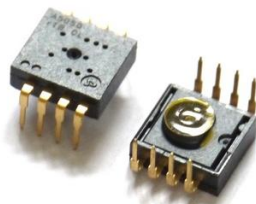


Figure 5:ADNS5050 Optical Sensor

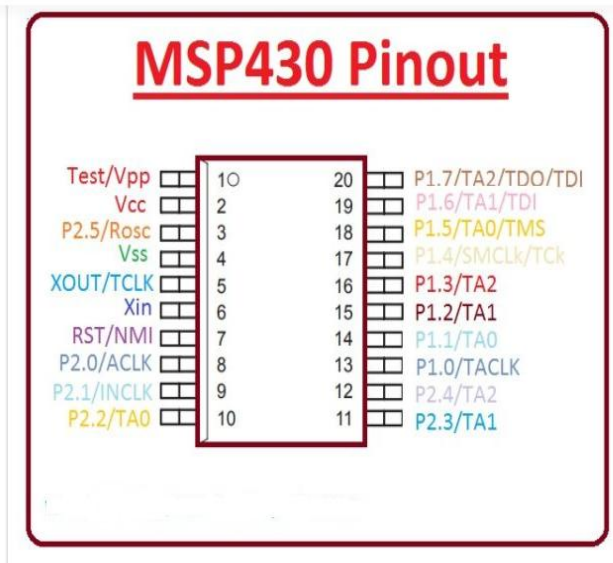


Figure 6: MSP430™ microcontroller

MSP430 MICROCONTROLLER

Our 16-bit MSP430™ microcontrollers (MCUs) give good solutions for all applications. In integrated circuit Chip analog enables designers to enhance system performance well and lower system costs.

Microcontrollers are embedded with inside devices to control the actions and features. It can also be referred to as embedded

controllers. Used to run one specific program and are dedicated to a single task. They are low power devices with dedicated input devices and small LED or LCD display outputs

B. GPRS MODEM

A GPRS modem is supports the GPRS technology for data transmission and receiver. GPRS stands for General Packet Radio Service. It is a packet-switched technology that is an used with help of GSM.GSM is used in circuit-switched technology.

C. PYTHON ON THE RASPBERRY PI 4

Now a day's Raspberry Pi using every day to interact world around them .Python comes built-in on the Raspberry, so you can use your own skill and build you Raspberry Pi projects today

- Raspberry Pi to a wired/wireless network and also Raspberry Pi used in Bluetooth built in for wireless connections.

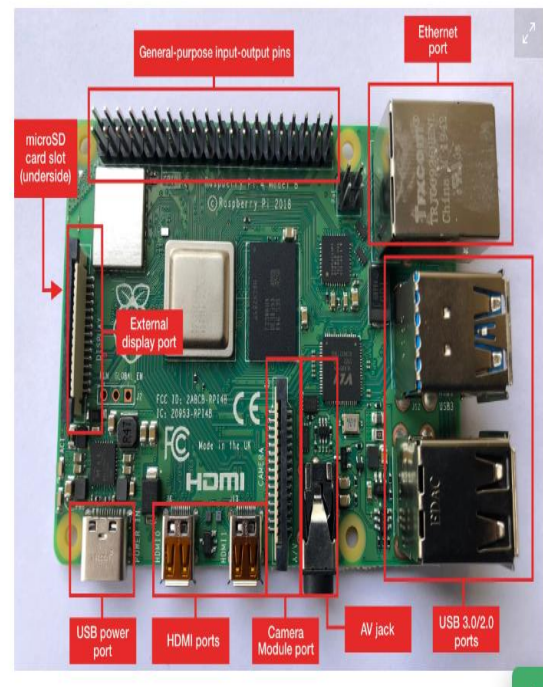


Figure 7: Raspberry Pi 4

The Raspberry Pi 4 contain following some important components:

- General-purpose input–output pins: Pins are used to connect Raspberry Pi to electronic components or software.
- Ethernet port: Ethernet port connects the Raspberry Pi to a wired/wireless network. The Raspberry Pi also used in Bluetooth built in for wireless connections.
- Two USB 3.0 and two USB 2.0 ports: USB ports mainly used in connect peripherals like a keyboard or mouse. Two black ports are USB 2.0 and Two blue ports are USB 3.0.
- AV jack: AV jack used to connect speakers/headphones to the Raspberry Pi 4.
- HDMI ports: HDMI ports connect the Raspberry Pi to monitors also. The Raspberry Pi 4 features two HDMI Ports: Drive two separate monitors at the same time.
- USB power port: This USB power port the Raspberry Pi. The Raspberry Pi 4 is a USB Type-C port.
- External port: External Port is used to connect Raspberry Pi 4.
- microSD card slot: microSD card that also contains in Raspberry Pi OS .

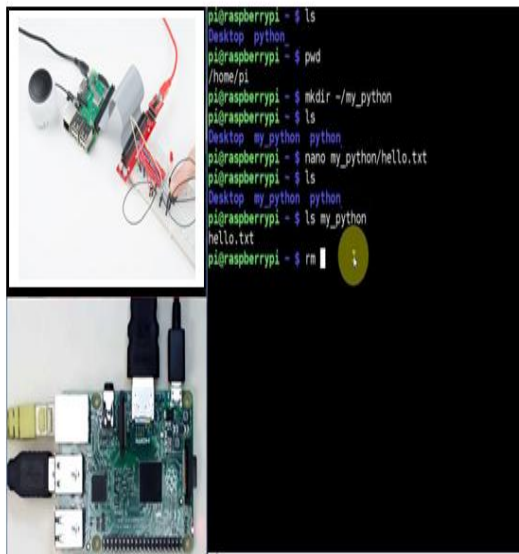
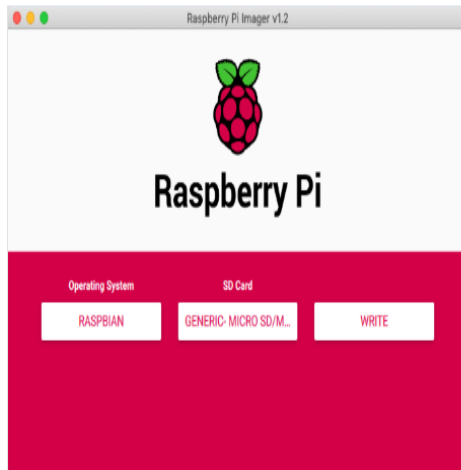


Figure 8: Running Python on the Raspberry Pi 4

Python on the Raspberry Pi is that Python is a best platform for Raspberry for accurate result.

The Raspberry Pi mostly used in Python language because of its accuracy, powerless and ease of use.

IV. PRESENT WORK

The proposed work is mainly focused on driver's drowsiness and alcohol detection based on behavioral measures in face yawning and eye blink detection and alcohol content in breath air.

This study gives detected value using python on Raspberry pi 4.

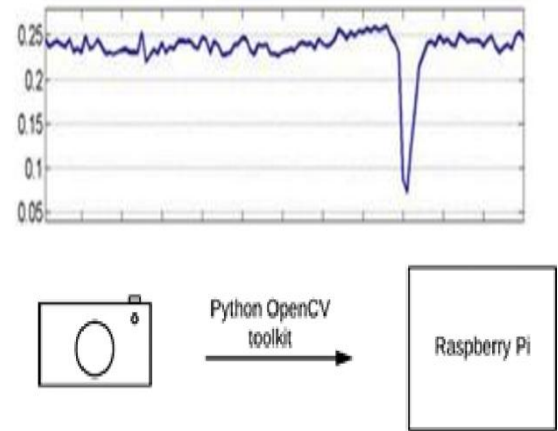


Figure 9: Closed Eye detection using Python on the Raspberry Pi 4

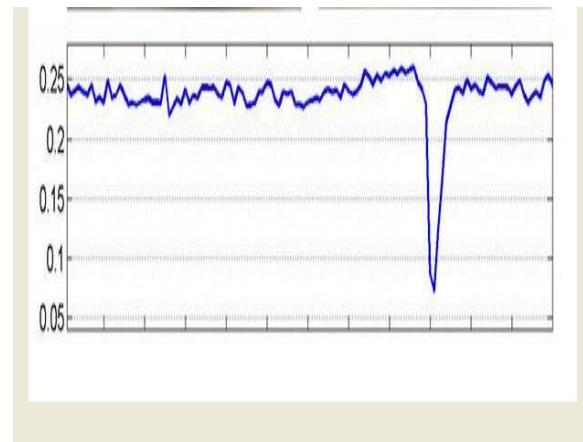


Figure 10: Face and facial features detection using python on the Raspberry Pi 4

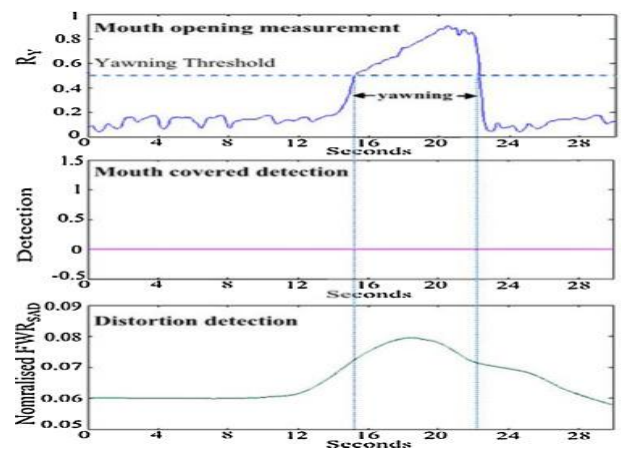


Figure 11: Yawning detection using Python on the Raspberry Pi 4

V. FUTURE SCOPE:

In this work video is transferred to control system wirelessly, processed it and give alert to a wireless buzzer system. This work includes face detection ,yawn detection and sleep detection, Head movement detection can also graphed using python on raspberry pi 4. In this project night vision camera used for increase accuracy in all light conditions whether dark or dim.

VI. REFERENCES

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