Iot Based Drowsiness Detection System Using Labview

Kalathiripi Rambabu, Jennifer Shalini, Shaik Ayesha Anjum, P.Ramya Ramani

Abstract:A new method for automobile safety and security with the autonomous region based automatic car system has been proposed in this model. We have designed drowsiness detection by using software called LabVIEW which also includes IoT. Accidents due to drowsiness has become a common problem hence to overcome this problem, we have incorporated driver situation based local environment recognition based AI system is proposed. As safety is very important during transportation one needs to be alert in all times. One of the main reason of accidents to occur is drowsiness or fatigue of the driver due to which both the driver and passengers are impacted and are prone to accidents, so here is a device which detects the drowsiness of the driver by detecting his eyes movement and a message will be sent via GSM and LabVIEW. Camera is fixed near to the steering wheel, so that the driver's face is captured clearly. The real time images of eye are taken and matched, if the driver is not in the state of driving due to drowsiness an alarm will ring which will be very irritating and helps the driver to wake up. The driver is not responsible for providing any feedback to the system (i.e., the alarm alert system should start on its own). The system is designed in such a way that it operates regardless of surroundings, color and the texture of the face. The device is capable handling diverse conditions such as change in light, shadows, reflections, etc. A drowsiness detection system using LabVIEW and IoT has been proposed.

Index Terms: LabVIEW, IoT, Raspberry Pi.

I. INTRODUCTION

Driver fatigue is considered to be one of the main reasons for causing accidents. According to the latest research, every year at least 1,200 deaths and around 76,000 injuries are caused due to drowsy driving. The major challenge in the field of accident avoidance is to detect and prevent drowsiness of the person driving the vehicle.

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Fatigue or drowsiness is a general human nature which can come at any time. But avoiding drowsiness is essential especially on road while driving because of the hazard that is caused due to drowsiness on road; certain measures have to be taken in order to avoid accidents. Eye is an important feature for detection of drowsiness. Detection of fatigue consists a sequence of images of the driver's facial profile, and by observing the movement of the eye and its blinking pattern. The main objective of this project is to implement a prototype by capturing the live images of the eye and fed them into the microcontroller by using a software called LABVIEW. On the whole…, by detecting the state of a particular person's eye, many major accidents are avoided which are mainly caused due to sleepiness of driver and driver's fatigue. Life is precious, which has to be safeguarded properly. The main reason for accidents to occur includes a small reason which is the driver's fatigue or sleepiness. This project is mainly to avoid accidents caused due to drowsiness which is small size prototype which can be installed easily in a car and easy to implement. The primary cause of drowsiness depends on the person's body status while driving. Driving while feeling drowsy is the most dangerous situation of driving. This generally happens when a driver doesn't have enough sleep, but there are also chances that it can happen due to untreated sleep disorders, drinking alcohol, shift work, or medications. Makes drivers less able to pay attention to the road. So, the driver might react slowly. When a person who is driving a vehicle when he is feeling drowsy, then an alert notification will be sent to that person that he is dozy[5].

A.Facts of drowsiness

Accidents mostly occur at late nights or in the early mornings. This is the natural sleep period.Sleepness also can peak in the middle of the afternoon. In the mid-afternoon, there is more likeliness in adults to have a drowsy–driving accident.

There are chances that driving accidents most often occur on highways and other major roads at high speeds. However, drowsy–driving accidents can occur slower speeds.

Driver's behaviour in many cases who are drowsy make no effort to brake or avoid

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an accident. A minimum of one vehicle may steer off the road.

B.Risk factors

Even a sleep of one night may keep the driver at risk of drowsy driving. But there are chances that certain people might have a greater risk than others.

II.LITERATURE SURVEY

The detection of drowsiness depends mainly on factors which are having sensing of driver operation and sensing of physiological characteristics along with response of sensing vehicle, response of driver monitoring. Measuring changes in physiological signals, like brain waves, heart beat rate, and blinking of eye; and measuring physical changes such as posture sagging, driver's head leaning and the open/closed states of the eyes. But the entire focus is mad on open and closed states of eye. According to the research the average person blinks every 4 seconds which isn't a lot of time. But if the person fails to keep his eye open for less than the struggling to keep his eye open for more time then the device understands and gives and alarm which should be manually turned off. This is having periodically requesting the driver to send a response to indicate alertness from system. The problem with this method is that it will eventually becomes tiresome and annoying to driver in current development of the drowsiness detection system, the possible techniques can be generally divided into the several categories. This category method includes measures of the driver's present state, especially relating to the eye and eyelid movements and physiological state changes. Driver performance, with a focus on the vehicle's behavior including headway and lateral position. A combination of the driver's present state and driver performance. But by using software like LABVIEW, results are more efficient and the hardware required for this project is very simple which can be easily affordable by any person and thereby giving effective results[1][6].

Driver Attention Monitoring is a vehicle safety system introduced by Toyota in 2006 Automobile companies like Volkswagen and Volvo have been the initial car developers to implement this system[9].

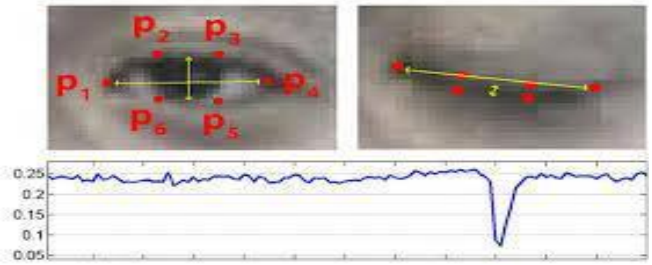


Fig .1. Sleep detection while driving

III.WORKING PRINCIPLE USING LABVIEW

Since, we have used a simulating model based on LabVIEW software, there are many aspects to be learnt and understood before the actual explanation of the code. **Laboratory Virtual Instrument Engineering Workbench (LabVIEW)** is a development environment and system-design platform for a virtual programming language from National Instruments.

The aim of this section is to develop software to detect drowsiness. This simulation software extracts eyes from images taken by camera placed in front of driver, and sends them to the system. This is completed by employing image processing methods and different functional codes including LABVIEW code. The program written is in LABVIEW code using its respective tools. Initially a template will be given of their respective car owners. Now the camera takes continuous image inputs of the person driving the car and is compared with the inherited template. If there is a sign of drowsiness, a signal is given to alarm detector thereby ringing the alarm. The entire analysis should be made more efficiently because there are a bunch of factors which affect the proper operation of the device. All these factors have to be taken into consideration of in order to have efficient working of the alarm alert and drowsiness detection which helps in avoiding major accidents due to driver's to feel exhausted. Hence the system must be operated regardless of color and texture of the face and also must be able to handle diverse conditions like shadows, changes in light and reflections,[2]. The design of this device is relatively small compared to any other automobile innovations. The components of this device include the camera is placed on the board behind the steering wheel or an eye blink sensor which is LABVIEW coded. The code is set up such that the camera detects only eyes from a face image and is matched with the template. The code is set up such that it takes images for every 1 sec and keeps on processing. If there is a case of drowsiness then the alarm rings which might be a buzzer or an irritating sound which forces the driver to switch off manually[4].

Objectives:

The objective of this paper is to develop a model (prototype) of detection of drowsiness system and alarm alert. The total concentration and focus will be placed on designing a drowsiness detection system that will correctly monitor real time state of open and closed eye of driver. By monitoring the eyes constantly, it can be observed that the driver symptoms fatigue can be detected early to avoid an accident. This could be done by taking relatively continuous eye input images which

includes eye movement or span of eye blinking. Devices to detect when drivers are tring to sleep and to provide alert warnings to them of the

risk. Drowsiness driving has become a serious concern where even researches are unable to decide which factor lead to the accident[7].

Hence the main objective of the proposed system is to detect drowsiness of the driver using image processing techniques to detect open and closed eye and monitoring by using Internet of Things(IoT) and LabVIEW

IV.PROPOSED MODEL

The main aim of our project is to design a model which captures real time images of a particular person's eye and simulate in order to know if the person is sleepy or tired. If the person is sleepy then the code runs and operates in such a way that an alarm rings which has to be turned off manually which eventually would wake up the person. The code is written in such a way that it takes images of an eye in two cases open and close. If the match is found then the buzzer rings and it continues ringing until it is switched off manually.

In order to make one's life safe this prototype is mainly used. This model is comparatively small which is efficiently made and installed in a car. It is a cost-effective model can be used effectively by common people. The following block diagram shows proposed Drowsiness Detection System[8]

A. Block Diagram of System:

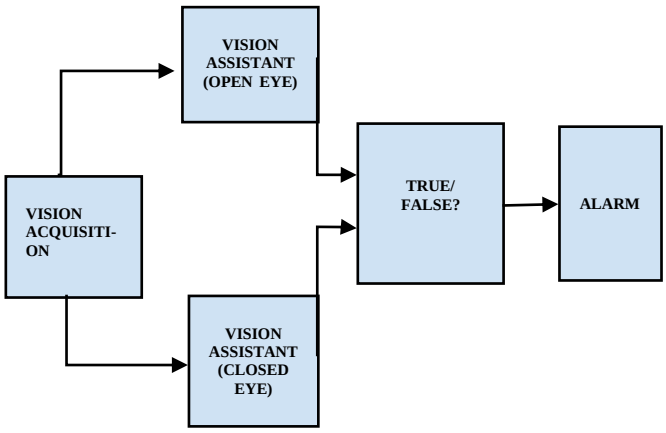


Fig.2. Block diagram of the system

B. Vision acquisition:

The vision acquisition name suggests takes the input image for every 500 milliseconds and then sends the image in grayscale format to both the vision assistants one is a block of the open eye and the other, is a block for the closed eye these two based on the internal code written check the conditions that are present and ascertain whether eye is opened or closed for longer duration than necessary and hence giving the expected output and telling whether it is true or false after the state of the eye is determined then it passes to the alarm section and a alarm rings in such a way that the person wakes up and turns it off making it possible for him to be out of danger for coming out of sleep and not causing any accidents. It tends to take images continuously through a webcam or camera and send those data through the entire code.

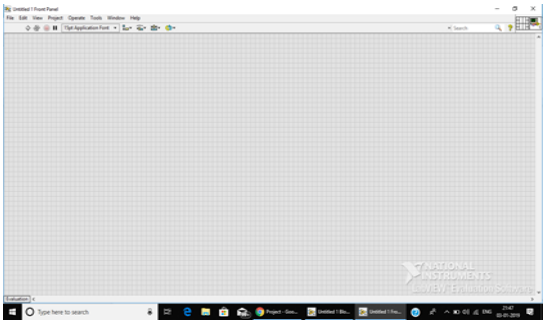
C. Vision Assistant:

It creates editing and running vision applications by using NI vision assistant. Vision Assistant is a tool to prototype and tests an image processing applications. To prototype design an image processing application, develop custom algorithms with feature of Vision Assistant scripting.

V.EXISTING MODEL

The main idea of this model has already come into existence by many known companies like Volvo, Mercedes-Benz but there were many drawbacks which can be overcome by our model. This model is cost effective and is made more efficiently which gives effective results. We have implemented software simulating model in our proposed system.

The existing models increased the price of the vehicle and by implementing our model, common people can buy and use the car efficiently. The existing model was not able to please the audience because the implementation and usage of the device were not efficient and had many drawbacks. Our model consists of simple devices with an inherent code which is very easy to be made and used[10.



A Fig.3.front panel of LabVIEW

When open a new VI, front panel window of the VI shown. For VI, front panel window is the user interface. Figure. 3 is a example of a VI front panel window.

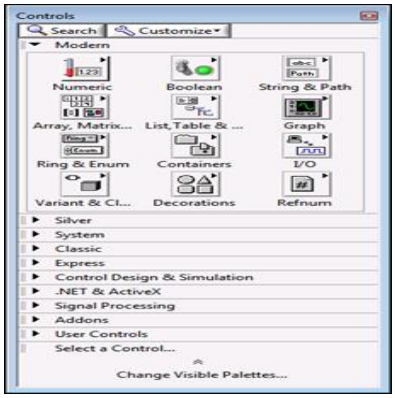


Fig.4. Control palette in the front panel

The Control palette is having of indicators and controls which is used to create in front panel.

The following shows the flow chart of python code

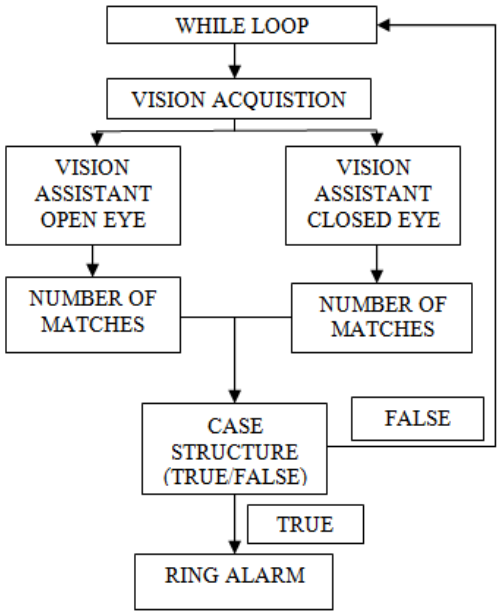


Fig.5. Code Flow Chart

We have situated the entire program in a while loop because the while loop checks at least one condition before terminating the program and hence keeps on running until the condition is satisfied. Now, the vision acquisition takes the images one after the other continuously and keeps saving them in the temporary memory now these.

The vision assistant checks all the input images and based on whether it is a closed eye or an open eye then it executes the program. The number of matches is shown in one section of the code. Here we can also see that a case structure is present where we can check the true and false conditions of the program if the statement is true then a buzzer will ring if the statement is not true then it will not ring this is the purpose of the program. Here we can use GSM module or mail to send the message to the frequently contacted people which would increase the alert thereby avoiding accidents.

VI.RESULTS

Fig.6.Hardware Of The System

The Hardware of drowsiness detection system comprises of Arduino board, Buzzer, Webcam and, an external power supply which is connected to a laptop where the code is written.

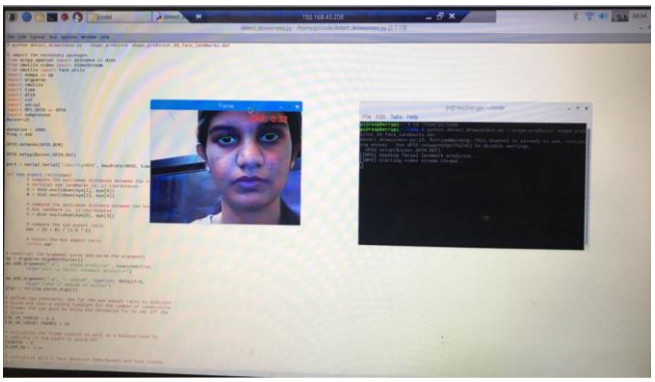


Fig.6.Detection of Open Eye

In the above image, the camera detects the open eye of the driver where only the frame of an eye is taken.

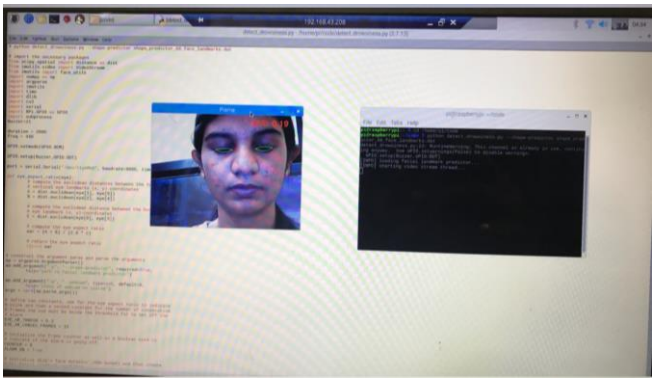


Fig.7.Detection OF Closed Eye

In the above diagram, the detection of closed eye is done where only the frame of an eye is taken and compared. If the driver is found drowsy an error will occur, the buzzer will ring and a message is sent.

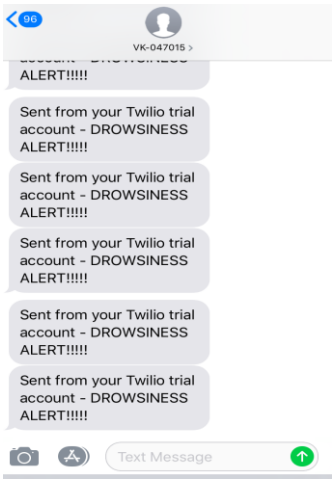


Fig.8.Alert Message Sent To Phone

When an alarm is ringing because of Drowsiness Detection, then a message alert will be sent to the particular persons frequently contacted list.

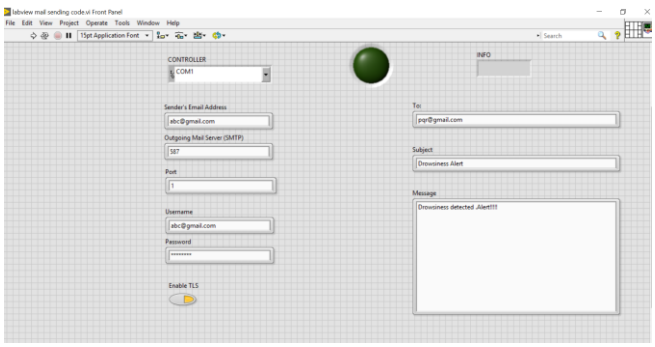


Fig.9.Front panel

The above diagram is the Front Panel of code. Here the sender's mail id and to the person whom the message has to be sent should be given here.

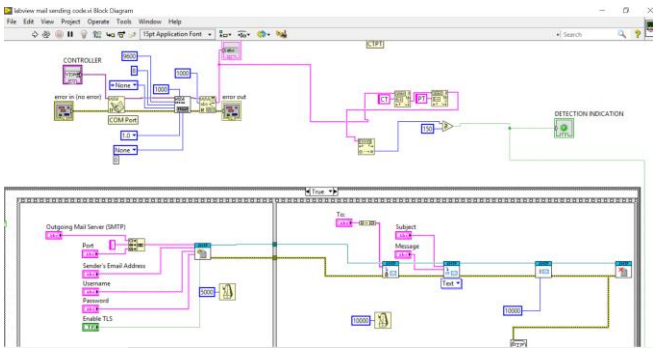


Fig.10.Block Diagram of System

This picture consists of code in LABVIEW. when drowsiness is detected the code runs and the buzzer rings which is supposed to be switched off by the driver manually. When the buzzer rings, sending of message to top contacted people is done who would help in increase of alertness. Even by using GSM, sending a message is possible.

VII.CONCLUSION

Now a days the accident ratio has been increased in large amount. Especially in a country like India, the rate has become more, and the main reason for these accidents to cause is drivers fatigue or drowsiness. We should always remember life gives us only one chance. Therefore this is a device which would help a huge amount of percent from accidents. This system is used to detect drowsiness while driving by giving a buzzer and also alerting people by alert messages.

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