Driver Drowsiness Detection System

Project report submitted in fulfillment of the requirement for the degree of Bachelor of Technology

In

Computer Science and Engineering

By

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Under the supervision of

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To

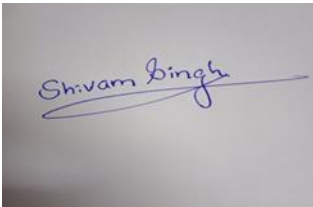# Department of Computer Science & Engineering and Information Technology

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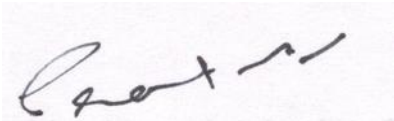
CANDIDATE DECLARATION

We hereby declare that the work presented in this report entitled **"DRIVER DROWSINESS DETECTION SYSTEM"** in fulfilment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science and Engineering/Information Technology** submitted in the department of Computer Science & Engineering and Information Technology, Jaypee University of Information Technology Waknaghat is an authentic record of our own work carried out over a period from January 2021 to May 2021 under the supervision of **Mr. Prateek Thakral** (Assistant Professor, Computer Science and Engineering And Information Technology).

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

Shivam Rakesh Kumar Singh, 171306

This is to certify that the above statement made by the candidate is true to the best of

my knowledge.

Mr Prateek Thakral

Assistant Professor

Computer Science and Engineering and Information Technology

Dated:

ACKNOWLEGEMENT

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LIST OF ABBREVIATIONS

IDE- Integrated Development Environment

SVM-Support Vector Machine

EAR- Eye Aspect Ratio

UI- User Interface

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ABSTRACT

A various number of people are driving on the expressway night and day. Cabbies, transport drivers, transporters and individuals who travel significant distance experience the ill effects of absence of rest. Because of which it turns out to be extremely hazardous to drive when feeling an individual is feeling excessively tired . The majority of the mishaps that happen is because of the sleepiness of drivers.

Essentially we will actualize the Driver Drowsiness Detection System utilizing python ,dlib and OpenCV. Fundamentally in this System First of all we will Apply facial milestone restriction to remove the eye districts from the face and afterward we will attempt to Compute the eye viewpoint proportion to decide if the concerned individual's eyes are shut or not And in the event that the eyes are shut for an adequately long sufficient opportunity, at that point we will sound caution.

CHAPTER- 1
INTRODUCTION

1.1 INTRODUCTION

Driver Drowsiness is a deep learning application which will be built using Python,dlib and OpenCv. Basically in this System First of all we are going to Apply facial landmark localization to extract the eye regions from the face.

Once we will have our eye regions, we will be able to compute the eye aspect ratio to determine if the eyes are closed or not . If the eyes have been closed for a sufficiently long enough period of time, we will be able to assume that the user is at risk of falling asleep and will sound an alarm to grab their attention .

1.2 PROBLEM STATEMENT

With this moderate level Python venture, we are attempting to make a sleepiness distinguishing gadget.

36 % of mishaps occur because of the sluggishness of the driver. Thus, to forestall these mishaps we are attempting to assemble this driver laziness identification framework.

1.3 OBJECTIVES

The goal of this task is to construct a face recognition framework that will identify that an individual's eyes are shut for a couple of moments or not . In the event that that individual's eyes are shut, at that point our framework will alarm the driver when sleepiness will be recognized.

1.4 METHODOLOGIES

Most importantly what we will do is we will figure out how to recognize eye squints in video transfers utilizing EAR and facial milestone.

What's more, we will expand this strategy by deciding how long a given individual's eyes have been shut for. In the event that their eyes are shut for a specific measure of your time , we'll expect that they're starting to nod off and play a caution to awaken them and catch their eye.

To achieve this assignment, we have separated it into three sections.

In the initial segment, we will set up a camera so it could undoubtedly recognize our face and apply facial milestone restriction to screen our eyes.

We will at that point show how we will execute our own languor recognition utilizing OpenCV, dlib, and Python.

When we will have our eye areas, we will have the option to apply the eye perspective proportion to decide whether the eyes are shut or not . On the off chance that the eyes have been shut for an adequately long enough timeframe, we will have the option to accept that the client is in danger of nodding off and will sound a caution to catch their eye.

1.5 ORGANIZATION

As an outline, the structure of this report is coordinated as follows:

Part 1: Describes an overall presentation of the undertaking, issue proclamation venture points and task scope.

Section 2: Provides subtleties writing audit that incorporates a prologue to some essential ideas and a review of existing works in the regions of building up the profound learning application. This section clarifies in detail all the explores, studies, speculations and social occasion that have been make all through the task.

Part 3: Discusses the framework and plan of the undertaking which gives an itemized portrayal of the plan to build up an application.

Section 4: Discusses about the outcome and Screenshots.

Section 5: Concludes the venture and gives proposals for future work.

CHAPTER- 2
LITERATURE SURVEY

2.1 Python

2.1.1 What is Python?

Python is used world wide.It is an advanced programming language.The language was planned by Guido van Rossum in 1991 and was created by Python Software establishment. It was fundamentally created for to focus on coding intelligibility , and kind of its language sentence formation is planned in such a way that it permits developers to communicate their thoughts and ideas in less lines of code.

Python is anything but difficult to learn and its sentence structure is planned so that it lessens the expense in keeping up the program.It underpins modules and bundles which supports the particularity of program and reusability of code.

Regularly, we see the vast majority of the software engineers' best option is Python. The purpose for its prominence is a direct result of its expanded efficiency that it gives. Since there is neither any assemblage step so it as of now makes it very. Troubleshooting the projects in python is very easy.Python programs are very basic: a bug or wrong information neither create division flaw. All things being equal, when translator finds any mistake, it just raises an kind of exemption which isn't terrible. At whatever point the program can't get the exemption, the work the translator simply do is that it prints a stack follow. The most energizing part is that debugger itself is written in Python , which as of now demonstrates how ground-breaking the language is in itself. Then again, the fastest route for investigating a program is we can add a not many print articulations to the source.

2.1.2 History Of Python

In the late 1980. It was that brilliant time when chipping away at Python began. Not so far after which, Guido Van Rossum started accomplishing the work of application in December of 1989 at the Centrum Wiskunde and Informatica (CWI) which is situated in Netherland. It kind of simply begun as such a side interest venture ever since he was finding for something new to keep him busy while christmas.The programming language that python succeeded was ABC programming language. He had just aided in making ABC before in his vocation yet he was having a few problems with ABC yet additionally he was partial to a portion of its highlights. After that what he did was an extremely sharp move. He utilized the sentence
arrangement of the ABC, and took a part of its greatest highlights and made a decent scripting language in which all the defects were taken out. The motivation which he got for the name of this language came from a well known TV show–'Monty Python's Flying Circus', as he kind of was a major fanatic of that TV show and furthermore he was searching for short,different and to some degree unique name for the innovation and thus he kind of named it the Python!

The language at long last appeared in 1991. At the point when it was released,it made a devastation as it was utilizing significantly less codes for communicating the concepts,in examination with Java, C++ and C. At the point when it was delivered it had enough capacity for giving classes legacy, different center information types exemption taking care of and capacities.
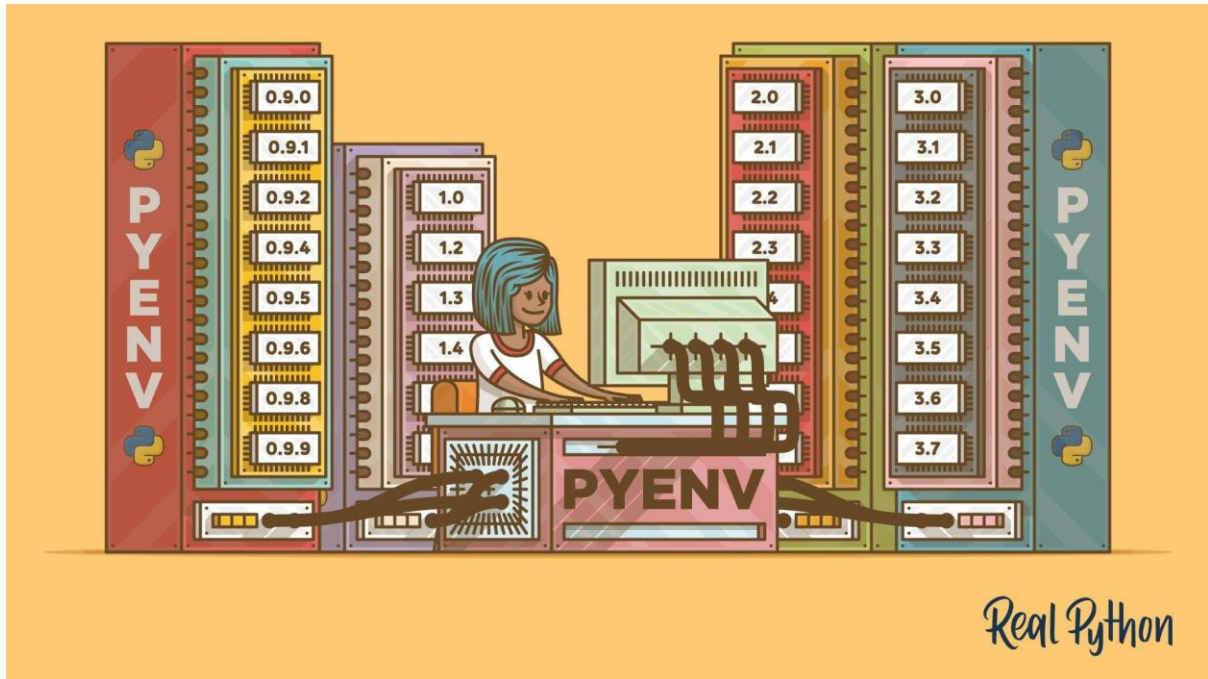
Fig- 1 Python

2.2 What is Deep Learning?

Profound learning is an AI method through which we instruct PCs to do that thing which people do normally . Profound learning is an extremely crucial innovation behind driverless vehicles, empowering them to separate between start or quit signs,recognizing the contrast between the foothpath or street and so on Nowadays individuals have begun perceiving the significance of profound learning and for valid justifications.

2.2.1How does the deep learning reach to such an impressive results?

1.   In todays world profound learning has accomplished acknowledgment exactness at levels which are far higher than it used to be. This is causing purchaser hardware to live up to its client expectations, and it conveys likewise essential in wellbeing simple applications for example vehicles which are driverless.. Ongoing advancements in profound learning have reached to a level where profound learning has begun beating people in a certain kind of undertakings.

2.   While profound learning was distinctly in the hypothesis parts in 1980s, there are fundamentally two indispensable reasons that why as of late it has gotten helpful:

3.   Profound learning utilizes a lot of marked information. For instance, driverless vehicle improvement utilizes a huge number of pictures and thousand hours of video.

4.   Profound adapting needs enough processing power. High-performing GPUs having an equal design is the base prerequisite for profound learning. At the point when groups or distributed computing are consolidated, this will help improvement groups to lessen their preparation time for a profound taking in organization from weeks to hours or less.

2.2.2 Examples of Deep Learning at Work?
Instances of Deep Learning implementation at the Work

Profound learning applications is implemented in businesses from mechanized heading to clinical gadgets.

Mechanized Driving: Automotive scientists are utilizing profound figuring out how to naturally identify objects like stop signs and traffic signals. also , profound learning is utilized to distinguish walkers, which try to helps to reduce mishaps.

Aviation and Defense: Deep learning is utilized to spot objects from the satellites that look for territories of very special, and differentiate between protected or hazardous areas for the troops.

Clinical Research: Cancer analysts mostly using profound figuring out how we can naturally differentiate between malignant growth cells. Groups in UCLA assembled a muddled magnifying lens that can yields a very high-dimension full of information index wont to helps us in preparing us in way of a very profound kind of learning application to perfectly recognize malignant growth cells.

Modern Automation: Deep learning assists with improvising labour security around large equipment in way of consequently identifying when individuals or articles are kind of inside a hazardous distance of some machines.

Electronics:As we as a whole realize that Deep learning is now getting utilized in discourse interpretation and hearing thing. for example , home help gadgets that answer our voice and act predictable with it .

2.2.3 How Deep Learning Works

A large portion of the techniques for profound learning utilizes neural organization designs, That is the reason profound learning models are otherwise called profound neural organizations.

The expression "profound" as a rule shows the quantity of concealed layers present in the neural network.Traditional networks used to contain 2-3 shrouded layers, However profound organizations have the ability of 150.

Models of profound learning are essentially prepared by utilizing different arrangements of enormous marked information and neural organization structures which gains includes straightforwardly from the information so that there is no requirement for manual element extraction too.
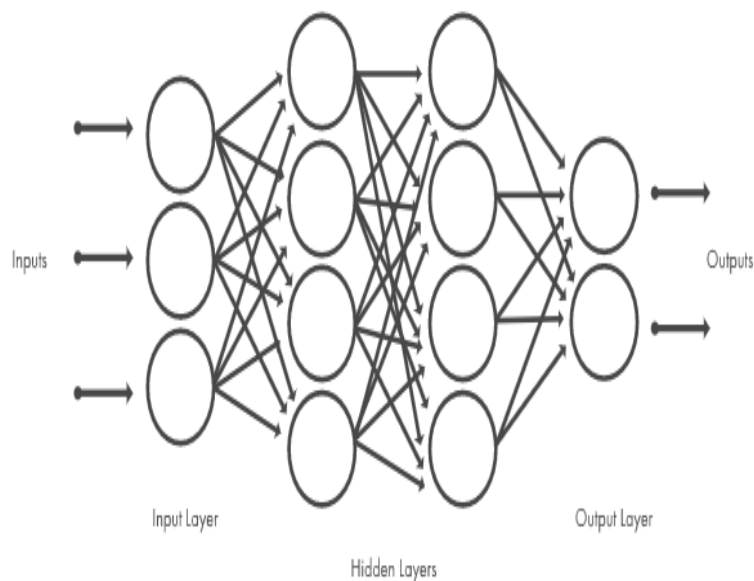

Figure 1: Neural networks, which are organized in layers consisting of a set of interconnected nodes. Networks can have tens or hundreds of hidden layers.

Fig- 2 Neural Networks

.

2.2.4 What's the Difference Between Machine Learning and Deep Learning?

The vast majority of the techniques for profound learning utilizes neural organization designs, That is the reason profound learning models Deep learning is a particular type of AI. An AI work process begins with important highlights being physically separated from pictures. The highlights are then used to make a model that classifies the items in the picture. With a profound learning work process, significant highlights are consequently extricated from pictures. Also, profound learning performs "start to finish learning" – where an organization is given crude information and an errand to perform, for example, arrangement, and it figures out how to do this naturally.

Another key contrast is profound learning calculations scale with information, though shallow learning unites. Shallow learning alludes to AI techniques that level at a specific degree of execution when you add more models and preparing information to the organization.

A critical favorable position of profound learning networks is that they frequently keep on improving as the size of your information increments. are otherwise called profound neural organizations.

The expression "profound" normally shows the quantity of concealed layers present in the neural network.Traditional networks used to contain 2-3 shrouded layers, However profound organizations have the capacity of 150.

Models of profound learning are fundamentally prepared by utilizing different arrangements of huge named information and neural organization structures which gains includes straightforwardly from the information so that there is no requirement for manual element extraction too.

2.2.5 Types of Machine Learning

<u>**Supervised learning**</u>

Supervised learning as the name suggests the presence of a supervisor as a teacher. Usually supervised learning is a type of learning in which we try to teach or train the machine using various types of data which is well labeled i.e some data is already there with the right answer. After that, the machine is provided with a set of new examples(data) so that the supervised learning algorithm starts analysing the training data(set of training examples) and start producing a correct outcome from labeled data.

Supervised learning is divided basically into two categories of algorithms:

Classification: A classification problem is a type of problem when the output variable is type of a category, such as right or wrong.

Regression: A regression problem is a type of problem when the output variable is type of real value, such as in numbers.

Supervised learning works only with labeled data.Which suggests that some data is already tagged with the right answer.

Types:-

Regression

Regression is generally used in stats to find particular trends in the data. For example we can say that there might be a connection between what we eat and how much we weigh. Regression analysis can help us in finding that.Regression can help us in finding the equation which can predict data.

Logistic Regression
Logistic regression is a type of model which is statistical in its basic form; it uses a type of logistic function to model a type of binary dependent variable, although many more complex things exist.

Naïve Bayes Classifiers

Naive Bayes is a classifier which you can say is like a total bunch of classified Algorithms totally based on theorem of Bayes. This is just not the type of alone Algorithm Since we can consider it a single group of algorithms where each one Of them have a common objective i.e. each and every single pair of property or Features are classified are not dependent on each other .

Decision Trees

Decision trees are one of the most popular and strongest tools used for prediction and classification.. A Decision tree is like a flowchart i.e like a structure of a tree where each and every internal kind of node represent itself like a test on an attribute, where each particular branch sort of represent itself like an output of that test, and where each node i.e leaf one is holding a label of class type.

Support Vector Machine

Support vectors is kind of points of the data that you can assume very near To its existing hyperplane and location as well as its overall structure is based On it.support vectors, the margin of the classifier is maximized by us.position the hyperplane will change as we delete support vectors. These are set of points that helps us in building our svm.

Advantages:-

- Supervised learning is a learning which permits us to keep all data and provides us data result from the past experiences.
- Guides us to improvise performance judgement with the help from previous experience
- Supervised machine learning is very helpful in solving different types of the real-entity computing problems.

Unsupervised learning

Unsupervised learning is the type of training in which machine uses information which you can say neither divided not labeled and allows algorithm to work on the information on its own without any supervisor. In this the work of machine is recognize information wrt to likeliness, some

patterns and on some visible differences   present in data without any previous data training.

Not like supervised learning, here teacher is not provided it means that no prior training is provided to that machine. Therefore machine is unable to look for the hidden or lost structure in unlabeled data by its self.

Unsupervised learning is basically divided into 2 types of the algorithms:

- **Clustering**: The clustering is a problem in which where we need to find the inherent groups in our data, such as to group the particular kind of customers by their behavior of purchasing.
- **Association**: An association is the rule learn problem is a type of a problem where we need to find rules which tells us about large area of our data, such as you can say people that have a tendency to buy x also and y also.

2.3 Existing System

There are no existing systems at this moment of time but there are many models under development to detect the drowsiness of the driver of taxi,cars,trucks in the night. Many solutions are being developed extensively at this point of time to help everyone driving in the night remove the feeling of drowsiness so that they can drive peacefully and be sure that someone is watching them and will wake them up if they fall asleep. Due to the feeling of drowsiness many innocent people have lost their lives because they have met with an accident.

2.4 Research work

Since the beginning of the PC age, new innovations are coming every single day . Individuals get ongoing to new gadgets and programming to make their regular day to day existence simpler. Individuals request new advancements to play out an expanding measure of assignments. For route frameworks, this infers that giving bearings alone no longer satisfies the clients' necessities. Organizations are continually searching for approaches to improve their route frameworks as to

close the hole between gadget abilities and clients desires. Be it in improving the methods of cooperation, or by extending the assignments that can be performed.

A constant calculation to distinguish eye flickers in a video grouping from a standard camera is proposed. Late milestone identifiers, prepared on in-the wild datasets display superb heartiness against a head direction as for a camera, fluctuating brightening and outward appearances. We show that the milestones are distinguished decisively enough to dependably appraise the degree of the enlightening. The proposed calculation in this manner gauges the milestone positions, separates a solitary scalar amount – eye angle proportion (EAR) – describing the educational in each casing. At last, a SVM classifier identifies eye flickers as an example of EAR esteems in a short worldly window. The basic calculation beats the cutting edge results on two standard datasets.
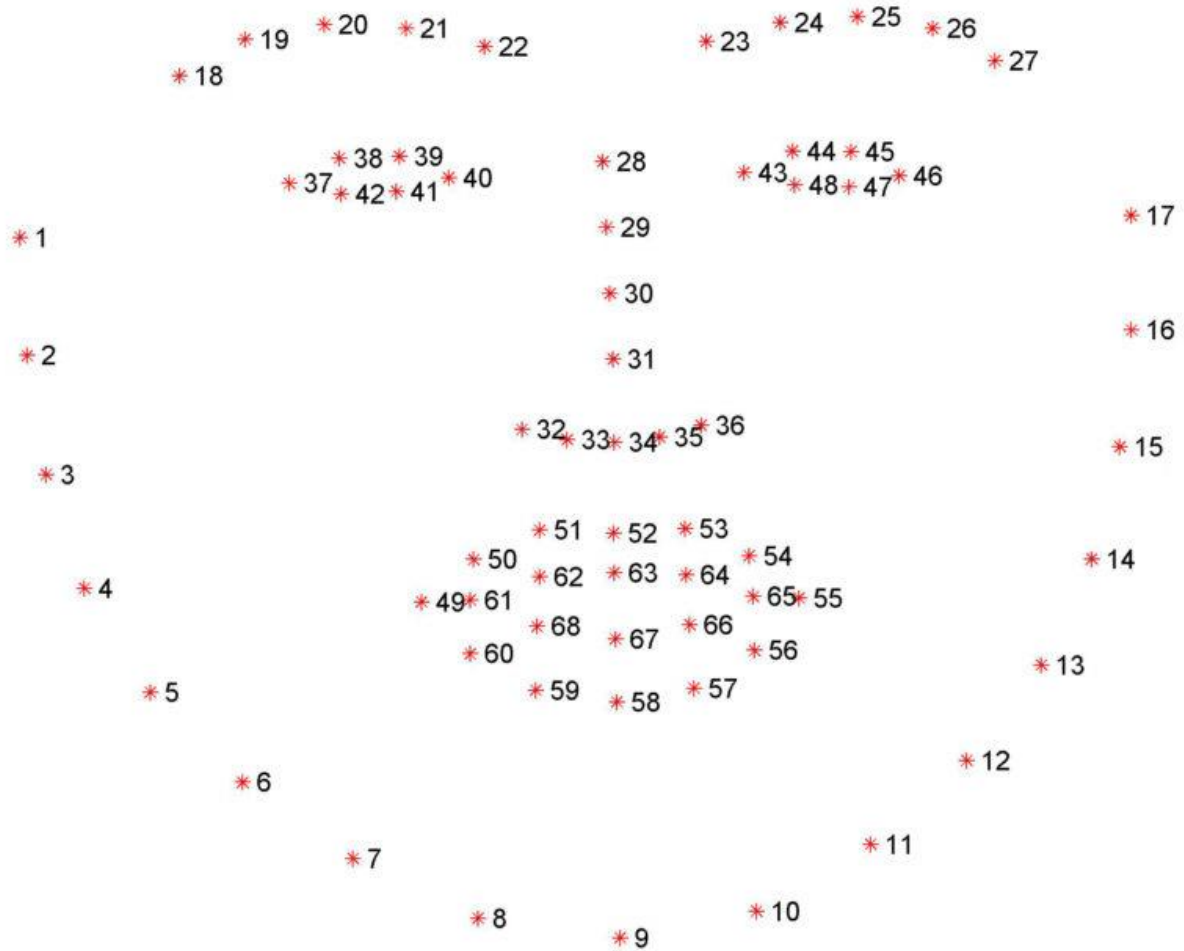
Fig 3. facial region of the face

As appeared in the above picture we have separated our eye area into focuses so we need to compute the Eye Aspect Ratio from point no 37 to point no 42 for the left eye and point no 43 point no 48 for the correct eye. We will check whether the focuses are framing a straight line that implies the eye is shut this is an indication of languor so we will send the solicitation to the alert to play the ringer.

Fig 4. Connection between eye viewpoint proportion and facial area

Identifying eye squints is imperative as an illustration in frameworks that screen an individual's administrator carefulness, for example driver

laziness [5, 13], in frameworks that caution an individual watching the screen without squinting for an all-encompassing opportunity to stop the dry eye and accordingly the PC vision conditions [17, 7, 8], in human PC interfaces that ease correspondence for impair individuals [15], or for hostile to mocking insurance in face acknowledgment frameworks [11].

Existing techniques are either dynamic or latent. Dynamic techniques are dependable yet utilize unique equipment, regularly costly and nosy, for example infrared cameras and illuminators [2], wearable gadgets, glasses with exceptional close-up cameras noticing the eyes [10]. While the detached frameworks accept a run of the mill distant camera as it were. Numerous strategies are proposed to consequently identify eye flickers during a video grouping. A few techniques are upheld for movement assessment inside the eye locale. Ordinarily, the face and eyes are recognized by a Viola-Jones type identifier. Next, movement inside the eye region is assessed from optical stream, by inadequate following [7, 8], or by outline to-outline force differencing and versatile thresholding. At long last, a decision is framed whether the eyes are or aren't covered by eyelids [9, 15]. an uncommon methodology is to deduce the condition of the consideration opening from one picture, as for example by relationship coordinating with open and shut eye formats [4], a heuristic flat or vertical picture force projection over the consideration area [5, 6], a parametric model fitting to search out the eyelids [18], or dynamic shape models [14]. a genuine downside of the past methodologies is that they regularly certainly force too solid prerequisites on the arrangement, inside the feeling of a relative face-camera present (head direction), picture goal, brightening, movement elements, and so forth Particularly the heuristic strategies that utilization crude picture power are probably going to be extremely touchy in spite of their ongoing presentation.

Anyway these days, powerful ongoing facial milestone locators that catch a large portion of the trademark focuses on an individual's face picture, including eye corners and eyelids, are accessible, see Fig. 1. The greater part of the cutting edge milestone identifiers define a relapse issue, where a planning from an image into milestone positions [16] or into other milestone parametrization [1] is educated. These advanced milestone indicators are prepared on "in-the-wild datasets' ' which they're in this manner powerful to shifting enlightenment, different outward appearances, and moderate non-frontal head pivots. a mean mistake of the milestone confinement of a cutting edge indicator is typically under

five percent of the interocular distance. Ongoing strategies run even fundamentally very constant [12].Therefore, we propose a simple yet productive calculation to identify eye flickers by utilizing an ongoing facial

milestone indicator. one scalar amount that mirrors A degree of the consideration opening springs from the milestones. At long last, having a for every casing arrangement of the enlightening evaluations, the consideration flickers are found by a SVM classifier that is prepared on examples of squinting and non-squinting examples. Facial division model introduced in [14] is comparable to the proposed technique. Be that as it may, their framework is predicated on dynamic shape models with revealed preparing season of around 5 seconds for each casing for the division, and thusly the enlightening sign is standardized by measurements assessed by noticing an all-encompassing arrangement. The framework is in this way usable for disconnected handling as it were. The proposed calculation runs continuous, since the extra expenses of the consideration opening from tourist spots and in this way the straight SVM are unimportant.

The eye flicker might be a quick shutting and resuming of an individual's eye. Every individual has a tad of an alternate example of flickers. The example contrasts inside the speed of shutting and opening, a level of compacting the consideration and during a flicker length. The eye squint endures approxi-mately 100-400 ms. We propose to exploit cutting edge facial milestone locators to limit the eyes and eyelid shapes. From the milestones distinguished inside the picture, we determine the consideration proportion (EAR) that is utilized as a gauge of the consideration opening state. Since the perframe EAR may not really perceive the consideration squints effectively, a classifier that takes a greater transient window of an edge viable is prepared.

CHAPTER- 3
SYSTEM DEVELOPMENT

3.1 HARDWARE AND SOFTWARE REQUIREMENTS

Hardware Requirements:

● x86-64 processor (64-bit Windows with an Intel Core 2 Duo, Intel Core i3, Intel Core i5, Intel Core i7, or Xeon processor)

● 8 GB of RAM

● 100 GB of internal storage

 ● Network interface card

 ● Windows 7 and above

Software Requirements:

1. IDE
    ·Visual Studio Code/Python Idle/Anaconda
2. DATABASE
    ·Firebase
3. TESTING TOOL
    ·Laptop
4. OPERATING SYSTEM
    · Windows 10

5. Concepts of

   a. Python
   b. OpenCV
   c. Dlib
   d. Machine Learning
   e. Deep Learning

3.2 MODEL DEVELOPMENT

3.2.1 figure 4: Activity DIAGRAM

FLOW CHART OF DRIVER DROWSINESS DETECTION
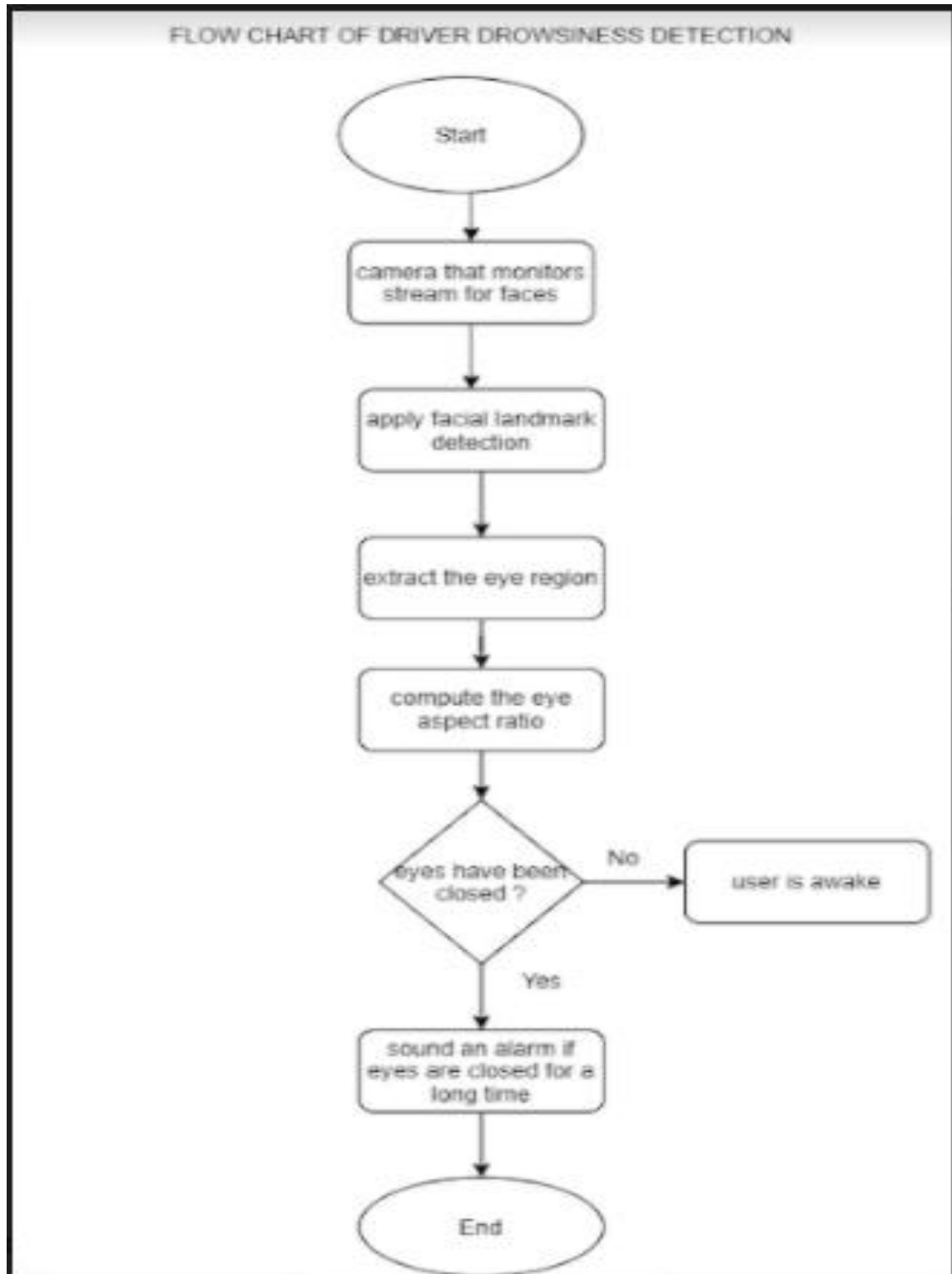
3.2.3 figure 5 :Use case Diagram

FLOWCHART OF DRIVER DROWSINESS DETECTION SYSTEM

set up a camera that monitors a stream for faces

facial landmark localization feature for extracting eye region

control of feature for computing eye region

showing the user that eye is closed or not

control of feature of sending a signal like alarm if eyes are closed

User
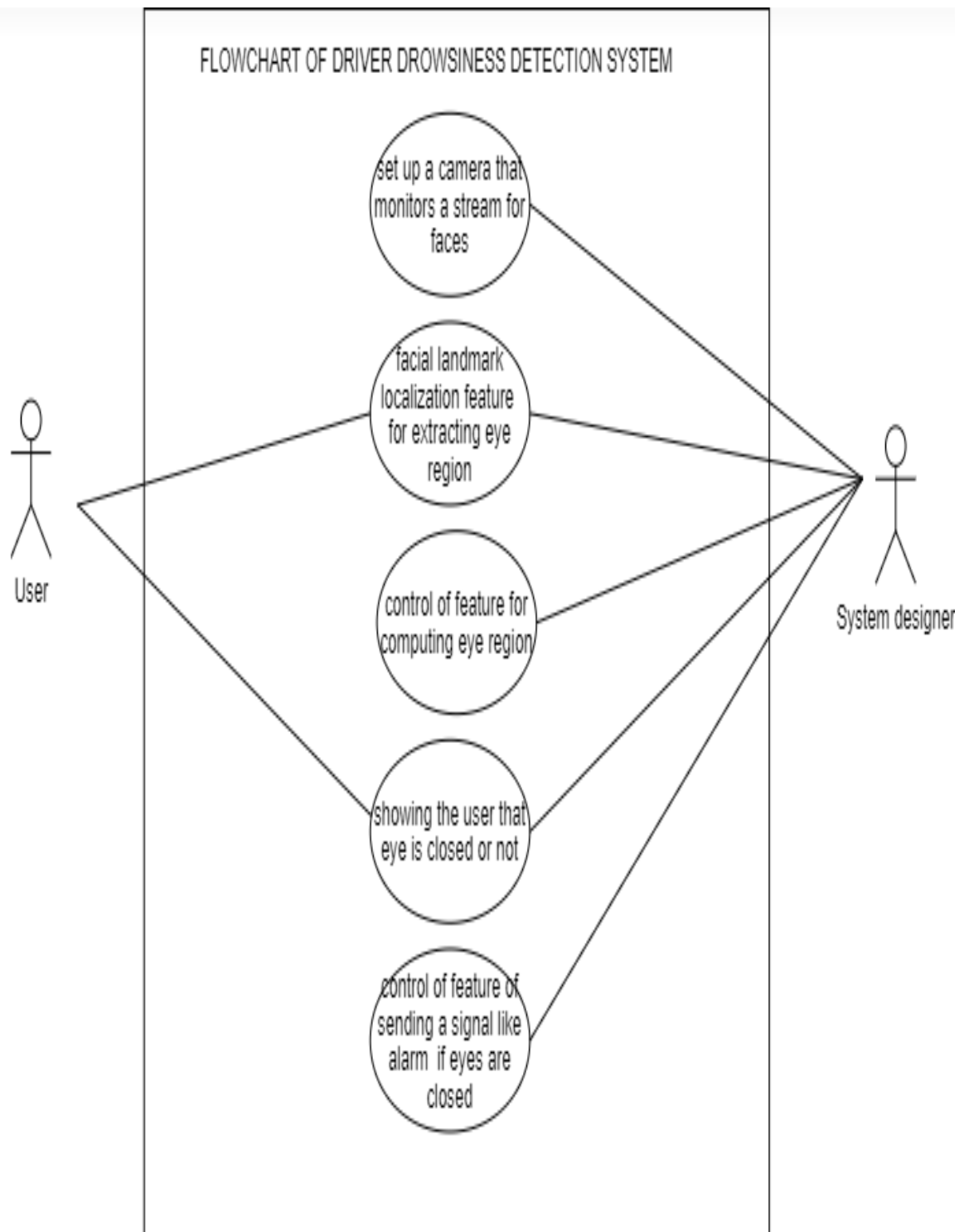
System designer

CHAPTER- 4

PERFORMANCE ANALYSIS

4.1 IMPLEMENTATION AND SYSTEM DESIGN

Windows user

If you are windows user, then follow the below steps:

1 Open command prompt

2 Run following command:

```
$ python -m pip install -upgrade pip
```

3 Install opencv using following command:

```
$ pip install opencv-python
```

Fig-6   pic of procedure of installing opencv

Install

Everything is looking good so far. Now we can install dlib into our python environment. First of all, you need to install CMake library.

```
pip install cmake
```

Then, you can install dlib library using `pip install`.

```
pip install dlib
```

Fig-7   pic of procedure of installing dlib

Fig-8 pic of procedure of installing scipy

You can install packages via the command line by entering:

```
python -m pip install --user numpy scipy matplotlib ipython jupyter pandas sympy nose
```

```python
driver_drowsiness.py  4  ●

Driver-Drowsiness-Detection-master >  driver_drowsiness.py >  blinked
 1
 2    import cv2
 3
 4    import numpy as np
 5
 6    import dlib
 7
 8    from imutils import face_utils
 9
10
11
12    cap = cv2.VideoCapture(0)
13
14
15    detector = dlib.get_frontal_face_detector()
16    predictor = dlib.shape_predictor("shape_predictor_68_face_landmarks.dat")
17
18
19    sleep = 0
20    drowsy = 0
21    active = 0
22    status=""
23    color=(0,0,0)
24
25    def compute(ptA,ptB):
26        dist = np.linalg.norm(ptA - ptB)
27        return dist
28
29    def blinked(a,b,c,d,e,f):
30        up = compute(b,d) + compute(c,e)
31        down = compute(a,f)
32        ratio = up/(2.0*down)
33
```

Fig- 9 Code on visual studio platform

```python
35        if(ratio>0.25):
36            return 2
37        elif(ratio>0.21 and ratio<=0.25):
38            return 1
39        else:
40            return 0
41
42
43    while True:
44        _, frame = cap.read()
45        gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
46
47        faces = detector(gray)
48
49        for face in faces:
50            x1 = face.left()
51            y1 = face.top()
52            x2 = face.right()
53            y2 = face.bottom()
54
55            face_frame = frame.copy()
56            cv2.rectangle(face_frame, (x1, y1), (x2, y2), (0, 255, 0), 2)
57
58            landmarks = predictor(gray, face)
59            landmarks = face_utils.shape_to_np(landmarks)
60
61
62            left_blink = blinked(landmarks[36],landmarks[37],
63                landmarks[38], landmarks[41], landmarks[40], landmarks[39])
64            right_blink = blinked(landmarks[42],landmarks[43],
65                landmarks[44], landmarks[47], landmarks[46], landmarks[45])
66
```

Fig-10 Code on Visual studio Platform

```python
        if(left_blink==0 or right_blink==0):
            sleep+=1
            drowsy=0
            active=0
            if(sleep>6):
                status="SLEEPING !!!"
                color = (255,0,0)

        elif(left_blink==1 or right_blink==1):
            sleep=0
            active=0
            drowsy+=1
            if(drowsy>6):
                status="Drowsy !"
                color = (0,0,255)

        else:
            drowsy=0
            sleep=0
            active+=1
            if(active>6):
                status="Active :)"
                color = (0,255,0)

        cv2.putText(frame, status, (100,100), cv2.FONT_HERSHEY_SIMPLEX, 1.2, color,3)

        for n in range(0, 68):
            (x,y) = landmarks[n]
            cv2.circle(face_frame, (x, y), 1, (255, 255, 255), -1)

    cv2.imshow("Frame", frame)
    cv2.imshow("Result of detector", face_frame)
```

Fig-11 Code on Visual studio platform

```python
                            active=0
                            if(sleep>6):
                                status="SLEEPING !!!"
                                color = (255,0,0)

                    elif(left_blink==1 or right_blink==1):
                            sleep=0
                            active=0
                            drowsy+=1
                            if(drowsy>6):
                                status="Drowsy !"
                                color = (0,0,255)

                    else:
                            drowsy=0
                            sleep=0
                            active+=1
                            if(active>6):
                                status="Active :)"
                                color = (0,255,0)

                    cv2.putText(frame, status, (100,100), cv2.FONT_HERSHEY_SIMPLEX, 1.2, color,3)

                    for n in range(0, 68):
                            (x,y) = landmarks[n]
                            cv2.circle(face_frame, (x, y), 1, (255, 255, 255), -1)

            cv2.imshow("Frame", frame)
            cv2.imshow("Result of detector", face_frame)
            key = cv2.waitKey(1)
            if key == 27:
                    break
```
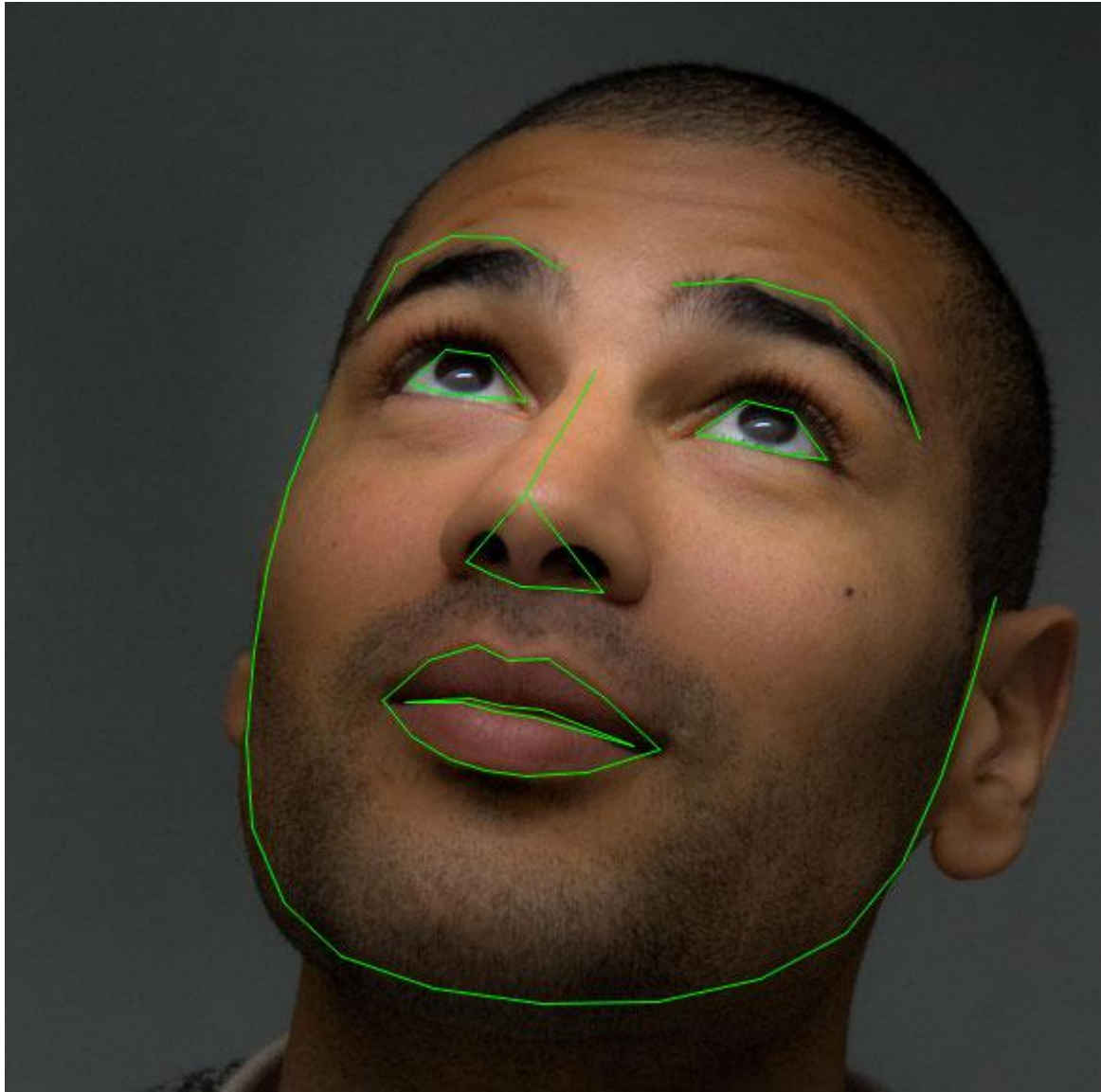
Fig-12 Code on Visual Studio platform

Fig 13. Facial Landmarks

The devices offered by Android, with formats, Activities, and information structures, appear to guide us toward the Model–see regulator (generally known as MVC) which is a product configuration design ordinarily used to create UserInterfaces which splits the well connected program logic into three well interconnected kind of components.All This is done to create isolation for portrayals of the data from the way in which the data introduces itself to and get acknowledged from that client. This kind of example is used to plan the design or layout of the page.

Customarily used in area of work related to graphical User Interfaces (GUIs), this particular example has become quite popular for planning applications such as web applications.

design. MVC is a strong, set up example that expects to disengage the various functions of an application. This is known as partition of concerns (SoC) which is a plan standard for isolating a PC program into particular segments with the end goal that each segment tends to a different concern. A worry is a bunch of data that influences the code of a PC program. A worry can be as broad as "the subtleties of the equipment for an application", or as explicit as "the name of which class to start up". A program that typifies SoC well is known as a modular[1] program. Measured quality, and consequently detachment of concerns, is accomplished by typifying data inside a part of code that has an all around characterized interface. Embodiment is a methods for data stowing away. Layered plans in data frameworks are another exemplification of partition of concerns (e.g., introduction layer, business rationale layer, information access layer, determination layer).

Partition of concerns brings about more levels of opportunity for some part of the program's plan, sending, or use. Regular among these is expanded opportunity for improvement and upkeep of code. At the point when concerns are all around isolated, there are more open doors for module update, reuse, and free turn of events. Concealing the execution subtleties of modules behind an interface empowers improving or adjusting a solitary concern's part of code without knowing the subtleties of different segments and without rolling out comparing improvements to those different areas. Modules can likewise uncover various adaptations of an interface, which expands the opportunity to

update a perplexing framework in piecemeal design without break loss of usefulness.

Detachment of concerns is a type of deliberation. Likewise with most reflections, isolating concerns implies adding extra code interfaces, by and large making more code to be executed. So regardless of the numerous advantages of all around isolated worries, there is frequently a related execution punishment

MVC design makes three layers:

Model

View

Regulator

Each layer is liable for a part of the application. Model reacts to business logic or space logic i.e it is that piece of the or part of program which lets this present reality business decide in which way the information can be made, put away, and changed. It stands alone from the other kind of the product that worries about its low-level subtleties of dealing with an information base or showing the UI, framework foundation, or by and large interfacing different pieces of the program

View is the UI, and Controller intervenes View admittance to Model.

4.2 TESTING

Planning

This includes composing and evaluating the unit, incorporation, useful, approval and acknowledgment test plans. Arranging is kind of testing of an Application.

Execution

This includes executing these different sorts of tests plans, estimating, gathering the information and confirming the information in the event that it meets the complete quality measures according to in the quality arrangement. Information gathered is utilized to roll out legitimate improvements in the arrangement identified with its turn of events and its testing. We have utilized the readied documentation for the testing of Application.

Functional testing

The another degree of testing is the useful kind of testing which incorporates coordinated and framework testing. The reconciliation testing many tried modules is joined into subsystems, which are then tried. The objective there is to check whether the modules can be joined appropriately, the significance is given on testing interfaces between modules. This movement can be considered as testing just as plan, and consequently the significance on testing module connections just as in framework testing the whole programming framework is tried. The refered record for this specific cycle is a necessary archive, and the objective is to check whether the product meet the specific prerequisites or not. This is essentially an approval work out.

Structural testing

The tenderfoot degree of testing is otherwise called primary testing whose other name is unit trying. In this various types of modules are tried against the details delivered during plan for the modules. Primary testing is fundamental for confirmation of the code that is delivered during the coding stage and henceforth our principle is to test the inward rationale of the modules.

Unit Testing

This testing centers around check exertion on the littlest piece of Campus Portal application planned on the product segment or module. In this we can take the User Authentication module as a unit testing part. Utilizing segment level, portrayal as a guide, a crucial control way is tried to uncover the blunders. The module interface is tried to demonstrate that that data appropriately goes all through the that specific program unit under test. Information structure is analyzed to ensure that information put away incidentally kept up its honesty during all the means in execution of the calculation. Limit conditions are tried to guarantee that the module is working appropriately at limits which are set up to restrict or confine preparing. All autonomous ways through control structure are practiced to guarantee that all assertions in the module are executed at any rate once. At last totally related mistake taking care of ways are likewise tried. In unit testing of shopping center sites we tried every single page of the site exclusively. On the off chance that blunder was available likewise we ensured that specific mistake was revised that mistake then just we moved to the next part for example testing of next page.

Integration Testing

In this cycle of testing it is an augmented way to deal with development of program structure. Modules are coordinated moving descending start with the principle control module. Modules subordinate structure to the fundamental control module is consolidated into the structure. This type of testing is acted in five stages: - . Fundamental module "Understudy" is tried in the wake of coordinating and connecting the pages of online accommodation and records. In the wake of testing the primary module we continue to different modules individually. Different modules are educator and validation. Tests are led as every segment is incorporated. On finishing each set of tests another stub is supplanted.

Top-Down Integration Testing

In very much figured program structure dynamic happens at upper levels in chain of importance and consequently experienced first. On the off chance that significant control issues do exist, early acknowledgment is fundamental. This is named as.

Bottom-up integration testing

It starts development and testing with nuclear modules as the segments are incorporated from the base up, preparing needed for parts subordinate to a given level is consistently accessible and the requirement for nails is disposed of.

System Testing

Here full programming framework is already tried and tested. The thing i.e reference report for that particular cycle is almost the important record, and the main aim is to almost check whether the programming fulfills its requirements. Here full Software has been tested & tried against requirements of its venture and it already checked that if all important things of undertaking have yet fulfilled or not. Finally when unit testing and reconciliation testing is finished then we go for framework testing for example in the wake of joining all modules of the site of shopping center we test it for the best possible working and legitimate information stream between various modules of the task. On the off chance that the dataflow and the tasks between various modules are working accurately, at that point the item is prepared to convey to the client.

Acceptance Testing

Affirmation Testing is performed with reasonable data of the client to show that the item is working adequately. Testing here is revolved around outside lead of the structure; within reasoning of the program isn't pushed. Tests should be picked so the greatest number of qualities of a uniformity class is rehearsed immediately. The testing stage is a huge bit of programming improvement. It is the path toward finding bungles and missing exercises and moreover a complete check to choose if the objectives are met and the customer necessities are satisfied. The client tests the site of the motel to check the need given to the item designer's gathering and the working of the genuine assignment. If the site fulfills the requirements of the client the it satisfies the affirmation testing and if client find something mistakenly in the thing, by then he can demand that the creators right that issue in errand.

CHAPTER- 5

CONCLUSION

5.1 SUMMARY

At the end of this project work, I was able to design and develop software that can successfully handle all the things which user wanted from the system that is each and every feature of the system should function properly like for example if the user is falling asleep for more than 8 frames then system should detect that user is falling asleep and he is at risk so our system should sound an immediate alarm to grab that person's attention and to make him/her alert and prevent the him/her from the accidents and this all will only work if our system works properly. In the process of the design,the system developer should see that his system is providing all the things to the user for which purpose the system was made is sole responsibility of system developer.This work will also serve as a stepping-stone for people who wish to research more on this topic. Other benefits are:

1. It will act as a life saver for the people who falls asleep while driving accidently and will also prevent them from lethal accidents.

2. In addition to that the no of accident cases will go down with the increase in usage of the system.

5.2 CONCLUSION

The improvement of the Driver Drowsiness Detection framework included numerous stages. The methodology utilized might be a top-down one focusing on what first, at that point how and moving to progressive degrees of subtleties. The primary stage began by applying facial milestone confinement for extricating the eye areas from the face .Once we got our eye regions which we require, we had the option to figure the eye proportion to work out if the eyes were shut or not .we saw that if the eyes were shut for an adequately long enough time of your time , we were have the option to anticipate that the client is was in danger of nodding off or not and relying upon that we had the option to sound an alert to catch the eye of the client .throughout this investigation, numerous issues were found to have prevented the viability of the current sluggishness framework . These issues, data needs and exercises were archived and later utilized on the

grounds that the reason for framework plan, which quickly followed the essential stage.

5.3 RECOMMENDATIONS

It is known that for any meaningful computer-based information management to be integrated into any system,the system developer needs to handle the system very properly. The System Designer should see that his System is providing all the things to the user for which purpose the system was made is sole responsibility of the System developer. each and every feature of the system should function properly like for example if the driver is feeling sleepy the system should immediately alert the driver by the alarm and etc.this all will only work if the system works properly.

I would recommend all others who want to work on this project that there are various features on which we have to think about i.e when we are not using this system and car is parked and person is just sitting inside it so our system should need to be shut down automatically , system should not continuously be showing to other person that he is drowsy or not and the other thing is the blinking time sometimes normally also a person's eye blinks so our system should be smart enough to neglect that normal blink and detect only sleepiness or drowsiness of the person who is using it.

REFERENCES

[1]https://data-flair.training/blogs/python-project-driver-drowsiness-detection-system/

[2] https://www.pyimagesearch.com/2017/05/08/drowsiness-detection-opencv/

[3]https://www.bosch-mobility-solutions.com/en/products-and-services/passenger-cars-and-light-commercial-vehicles/driver-assistance-systems/driver-drowsiness-detection/

[4]https://towardsdatascience.com/drowsiness-detection-with-machine-learning-765a16ca208a

[6] https://www.sciencedirect.com/science/article/pii/S1877050918304137

[7] https://link.springer.com/article/10.1007/s42979-020-00306-9

[8]https://arxiv.org/abs/2002.03728

[9] https://ieeexplore.ieee.org/document/6602353

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