LIST OF ABBREVATIONS

CNN- Convolutional neural network

OpenCV -Open Source Computer Vision Library

SD- Secure Digital

MMC -Multi Media Card SoC System on a Chip

HCI- Human-Computer Interaction

PnP- Plug and Play

USB- Universal Serial Bus

IP- Internet Protocol

MATLAB- Matrix Laboratory

NumPy- Numeric Python

SciPy -Scientific Python

MatPlotLib -Plotting Library

SymPy -Symbolic Python

PyTest -Python Testing

GUI – GRAPHICAL USER INTERFACE

SOC - System On Chip

SD CARD- Secure Digital Card

MMC CARD - Multi Media Card

UI - USER INTERFACE

HID – HUMAN INTERFACE DEVICE

OS - OPERATING SYSTEM

RAM - Random Access Memory

LCD – Liquid Crystal Display

IDE – INTEGRATED DEVELOPMENT ENVIRONMENT.

CPU - central processing unit

Red Hat Enterprise Linux

SSD - Red Hat Enterprise Linux

CENTOS - Community Enterprise Operating System

IDLE - Integrated Development and Learning Environment

TCL/TK - Tool Command Language/Tool Kit

RGB - Red, Green, Blue

HRI – HUMAN ROBOT INTERACTION

OCR - Optical character recognition

XML - eXtensible Markup Language

LIST OF FIGURES:

CHAPTER – 1

INTRODUCTION

1.1OBJECTIVE:

The main objective of this project is to create an environment that's reasonable for everybody who is competent sufficient, we've outlined a framework that replaces the customary strategy of cursor movement using mouse with the help eyeball movement. This will offer assistance to individuals with body afflictions to induce to computers during this manner contributing to the event within the sphere of innovation and knowledge allegation.

1.2INTRODUCTION:

The world of computers has evolved ever since the previous couple of decades which we are seeing its advancements. we have got come an extended way and are advancing towards the long run, where anything and everything is accessed from anyplace, primarily centring on a device-less innovation that takes human motions to perform an activity. Deep learning plays a vital role in health care.

With its capacity to imitate human exercises it's demonstrated itself as an accommodating partner to the medical professional in diagnosing maladies and giving precise comes about and have progressed the quality of health care. So with the assistance of deep learning, we made a system that replaces the quality way of cursor movement utilizing a mouse with one’s eyeball movement.

Deep learning has been picked for this framework since, deep learning makes it possess counterfeit neural organize and learns on its claim though Machine learning takes choices supported positive and negative rewards which were procured by the framework. The self-learning mechanism in profound learning makes it reasonable for this system. The input of the system is gotten from the

live portable workstation camera without utilizing any outside equipment which makes the system taken a toll compelling.

Here the yield is accomplished by mapping eyeball movement with the cursor development. there's a challenge in procuring this where the framework should distinguish ordinary eye squinting with the flicker which we do for working cursor. Though there are many advancements, paralyzed people still find it difficult to use the computers by themselves. Through various kinds of illness, there are those who can only move with the help of some article.

This technology makes them control everything on the pc via eyeball movement for cursor control. it'll help them use the computers for his or her basic needs. In exceptional circumstances, paralyzed people need direction to carry out any work. a private should be with them to need care of their needs. By using the eyeball tracking system, we'll be ready to find the center of the eye, supported the centroid we are able to track the eyes of the paralyzed person.

This eyeball-tracking tool includes many applications like home mechanization using Python GUI mechanical control and virtual console application.

Individuals with physical disabilities and are finding it troublesome to work on computer is given an opportunity to share their considerations. this could be made conceivable by profound learning, a technology that imitates human behaviour and activities like picture recognition, discourse acknowledgment, interpreting a dialect, and so on.

This will be accommodating for the disabled individuals who are denied the possibility to utilize computers to create them share their thoughts with the world.

This framework relies on pictures recorded by the laptop or by the external camera to accumulate the eyeball movements. Utilizing these the eyeball movements are graphed to cursor movements and giving the functionalities of mouse-like cleared out press and right press utilizing your eyes. In common this

handle contains three stages: Input, Preparing, and Yield. Our system overcomes this challenge which makes our system way forward than other existing systems

1.3 SCOPE:

This project scope is to create a software which is used to manage the cursor and do other cursor operations by using facial gestures without the employment of mouse by using the eye ball movement. the eye ball movement graphs the cursor movement thus helps us to perform all the cursor operations. This sort of enhancement will increase comfort and reduce e-waste within the longer term but within the current, this type of framework will offer assistance to debilitated and physically challenged individuals to access computers.

CHAPTER 2

2.1LITERATURE REVIEW

2.1.1 Indicator management victimisation Eyeball Movement With Raspberry Pi

Author name: R.Rithi V.Manjuarasi M.Yesodha G.Renuka

Some folks cannot operate computers thanks to some health problem. the concept of eye controls is of nice use to not just for the longer term of natural input however a lot of significantly to the incapacitated and disabled. what is more implementing a dominant system in it permits them to work laptop while not the assistance of another person. This widget is most helpful for one who will operate indicator by movement of eye. during this project Camera is employed for capturing the image of eye movement. It initial find pupil centre position. Then totally different the various variation on pupil position gets different movement of indicator. The Implementation method for Pupil detection is finished victimisation Raspberry pi and on the terminal of Raspier image put in on raspberry pi. The Raspberry Pi may be a master card sized single laptop or SoC uses ARM1176JZF-S core. SoC, or System on a Chip, may be a methodology of inserting all necessary natural philosophy for running a laptop on one chip. Raspberry Pi desires associate OS to begin up. within the aim of value reduction, the Raspberry Pi omits any on-board non-volatile memory wont to store the boot loaders, Linux Kernels and file systems as seen in additional ancient embedded systems.

ADVANTAGE:

• this method is pricey and needs hardware installation and configuration.

DISADVANTAGE

• extremely correct Eye ball watching facility

2.1.2 Eyeball Movement based mostly indicator management victimisation Raspberry Pi and OpenCV

Author name: J. Sreedevi,M. Shreya Reddy, B.Satyanarayana An individual

Human laptop interference system is being introduced. In past times, as associate device the mouse and keyboard were employed by human laptop interference system. Those that square measure stricken by bound unwellness or health problem can not be ready to operate computers. the concept of dominant the computers with the eyes can serve an excellent use for incapacitated and disabled person. additionally this sort of management can eliminate the assistance needed by different person to handle the pc. This live are the foremost helpful for the one who is while not hands through that they will operate with the assistance of their eye movements. The movement of the indicator is directly related to the middle of the pupil. thus our opening move would be police investigation the middle of purpose pupil. This method of pupil detection is enforced victimisation the Raspberry Pi and OpenCV. The Raspberry Pi includes a SD/MMC card slot that is employed for putting the SD card. The SD card is boosted with the OS that's needed setting out of Raspberry Pi. The Raspberry PI can get dead once the applying program is loaded into it.

ADVANTAGE:

• this method is pricey and needs hardware installation and configuration.

DISADVANTAGE

• economical face detection system

2.1.3 Real Time Implementation Of Eye trailing System victimisation Arduino Uno based mostly Hardware Interface

Author name: Sowmiya V Dr.R.Jegannathan

Eye trailing system has vie a major role in several of today's applications starting from military applications to automotive industries and aid sectors. during this paper, a unique system for eye trailing and estimation of its direction of movement is performed. The planned system is enforced in real time victimisation associate Arduino uno microcontroller and a Zigbee wireless device. Experimental results show a productive eye trailing and movement estimation in real time situation victimisation the planned hardware interface.

ADVANTAGE:

• want for the employment of external devices, value is higher.

DISADVANTAGE:

• User friendly UI interface.

2.1.4 Indicator dominant with the assistance Of Eye

Author name: Ms Poonam Potraje faculty member .P.S. Kulkarni

In this paper, we tend to square measure planning to introduced a way for human laptop interface with the assistance of eye which means the pupils of eye. Conventionally, we tend to use keyboard associated mouse to form the interaction between the system and therefore the user as an device. The goal of this paper is

to gift a hand free interaction device for the those that have bound medical issue or reasonably incapacity. This instrumentation is planned to alter the standard video display inform devices for the those that have bound incapacity. The paper provides a proposal to manage the indicator of the pc with the assistance of users eye. This application permits the user to use the pc system with the assistance of users vision and move the indicator as per the direction that square measure given by the user. Aim of this application is to introduced a coffee value based mostly system for the those that have the incapacity and connect them with the $64000 world.

ADVANTAGE:

• Not a extremely user friendly approach involves complicated effort from the users

DISADVANTAGE:

• No external hardware needed

2.1.5 Optical Mouse Sensor For instinctive reflex Detection And Pupil Tracking: Application during a Low-Cost Eye-Controlled Pointing Device

Author name: Arulmozhi.K Dharshini.K Kaviyasree.P Seetha.J

In this paper, a brand-new application of the optical mouse sensor is presented. The optical mouse is employed as a main low-cost infrared vision system of a brand-new proposal of a head mounted human-computer interaction (HCI) device controlled by eye movements. The default optical mouse sensor lens and illumination source are replaced so as to enhance its field of view and capture entire eye images. A complementary 8-bit microcontroller is employed to amass and process these images with two optimized algorithms to detect forced eye

blinks and pupil displacements which are translated to computer pointer actions. This proposal introduces an affordable and approachable plug and play (PnP) device for people with severe disability within the upper extremities, neck, and head. The presented pointing device performs standard mouse actions with no extra software required. It uses the human interface device (HID) standard class of the universal serial bus (USB) increasing its compatibility for many computer platforms. This new device approach is geared toward improving comfortability and portability of this commercial devices with simple installation and calibration. Several performance tests were finished different volunteer users obtaining a median pupil detection error of 0.34 pixels with a successful detection in 82.6% of all mouse events requested by means of pupil tracking.

ADVANTAGE:

• Uses open-source software and effective implementation method

DISADVANTAGE:

• Incompatible with windows OS , Need for external costly hardware

2.1.6 A Review Paper on Mouse Pointer Movement Using Eye Tracking System and Voice Recognition

Author name: Harsh Mendapara

The field of human computer interaction has been undergoing a brand new renaissance lately. While many companies have and are still spending millions to develop highly visually appealing GUIs and state-of–art interaction systems for the common users since the inception of desktops, the event of interaction

systems for the disabled has taken a kick starter recently. the attention gaze system could be a communication and system for people with complex physical disabilities i.e. you'll run system together with your eyes. We all are blessed to work the pc with ease using our hands. But there are some who can't use their hands and for them the voice guided systems are in use for quite it slow now. But just in case of paralytic patients with no mobility and speech while their brains and vision are functional, they can't utilize their intelligence and stay unemployed.

2.1.7 ENHANCED CURSOR CONTROL USING EYE MOUSE-2020

AUTHOR NAME: M.S Bennet Praba

In today's era, the combination of Iris Tracking and gaze estimation shows a person's interest. Cursor control using Eye Mouse is process of performing mouse function using Iris Tracking. Iris Tracking is the process of determining the point of gaze or the motion of an eye. In this paper, we have focused on a web-camera-based gaze estimation algorithm. The proposed algorithm describes the implementation of both iris and movement of cursor according to iris position which can be used to control the cursor on the screen. We are proposing combined use of Viola-jones algorithm and Hough man Circle Detection Algorithm to make existing system faster and more efficient. Eye mouse will help the people who are suffering from decease like Amyotrophic lateral sclerosis.

2.1.8 Mouse Pointer Control Using Eye Movements-2019

AUTHOR NAME: Papiya Mahajan

This paper presents an eye gaze tracking system which has been developed to help physically challenged people for the readily access of a computer. The system is a computer interface which provides the function of a mouse, based on eye actions such as blink, gestures and gaze. The idea behind this system is to enhance the interaction of a person with the computer. Eye gaze tracking is a process of detecting and measuring the eye movements. This system explores the potential of the human eye gaze which can be used as a pointing device on the computer.

2.1.9 Controlling Computer System using Eye Movement-2021

AUTHOR NAME: Soufyane Ayanouz

In this paper, a human computer interface using eye movement is introduced. This eye tracking technique provide hand free access to the handicapped people. In this technique we use eyes instead of input devices. This system tracks the users eye movement with a camera mounted over user's face and translate them into the movement of mouse cursor on screen and also detect user's eye staring on icon and translate it into click operation on screen.

2.1.10 Cursor Controlling with the Help of Eye-2021

AUTHOR NAME: Vaibhav Tode

In this paper, we are going to introduced a technique for human computer interface with the help of eye that means the pupils of eye. Conventionally, we use keyboard and mouse to make the interaction between the system and the user

as an input device. The goal of this paper is to present a hand free interaction device for the people who have certain medical issue or kind of disability. This equipment is planned to change the conventional computer screen pointing devices for the people who have certain disability. The paper gives a proposal to control the cursor of the computer with the help of users eye. This application allows the user to use the computer system with the help of users eyesight and move the cursor as per the direction that are given by the user.

2.2 FEASIBILITY STUDY

As the name implies, a practicableness analysis is employed to work out the viability of an idea, like making certain a project is wrongfully and technically possible yet as economically excusable. It tells North American nation whether or not a project is definitely worth the investment—in some cases, a project might not be accomplishable. There is several reasons for this, including requiring too several resources, that not solely prevents those resources from performing arts alternative tasks however conjointly could value over Associate in Nursing organization would earn back by usurping a project that isn't profitable.

2.2.1 Technical Feasibility

This assessment focuses on the technical resources on the market to the organization. It helps organizations verify whether or not the technical resources meet capability 16 and whether or not the technical team is capable of changing the ideas into operating systems. Technical feasibleness conjointly involves the analysis of the hardware, software, and alternative technical needs of the planned system. As an exaggerated example, a corporation wouldn't need to do to place Star Trek's transporters in their building— presently, this project isn't technically possible.

2.2.2 Economic Feasibility

This assessment typically involves a cost/ blessings analysis of the project, helping organizations make sure the viability, cost, and blessings associated with a project before financial resources ar assigned. It in addition is associate independent project assessment and enhances project credibility—helping decision-makers make sure the positive economic blessings to the organization that the projected project can give.

2.2.3 Legal Feasibility

This assessment investigates whether or not or not any aspect of the projected project conflicts with legal wants like segmentation laws, info protection acts or social media laws. Let’s say an organization has to construct a different building in a specific location. A feasibility study could reveal the organization’s ideal location isn’t zoned for that sort of business. That organization has merely saved considerable time and energy by learning that their project wasn't potential right from the beginning. Operational feasibility This assessment involves enterprise a study to research and make sure whether—and but well—the organization’s wishes could also be met by finishing the project.

2.2.4 Operational Feasibility

This assessment studies in addition examine but a project organize satisfies the necessities well-known at intervals the wants analysis section of system development.

2.2.5 Scheduling Feasibility

This assessment is that the foremost vital for project success; finally, a project will fail if not completed on time. In programming feasibility, an organization estimates what proportion time the project will fancy complete. once these areas have all been examined, the feasibility analysis helps confirm any constraints the projected project would possibly face, including: • Internal Project Constraints: Technical, Technology, Budget, Resource, etc. • Internal company Constraints: financial, Marketing, Export, etc. • External Constraints: provide, setting, Laws, and laws, etc

CHAPTER – 3

ANALYSIS AND DESIGN

3.1 SYSTEM ANALYSIS:

3.1.1 EXISTING SYSTEM:

In today's era, the mixture of Iris Tracking and gaze estimation shows a person's interest. Cursor control using Eye Mouse is process of performing mouse function using Iris Tracking. Iris Tracking is that the process of determining the purpose of gaze or the motion of a watch. during this paper, we've got focused on a web-camera-based gaze estimation algorithm. The proposed algorithm describes the implementation of both iris and movement of cursor per iris position which might be wont to control the cursor on the screen.

DISADVANTAGES:

• The main limitation of Naive Bayes is that the assumption of independent predictor features.

• If a categorical variable features a category within the test dataset, which wasn't observed in training dataset, then the model will assign a 0 (zero) probability and can be unable to create a prediction.

3.1.2 PROPOSED SYSTEM:

This paper presents a watch gaze tracking system which has been developed to assist physically challenged people for the readily access of a computer. The system may be a computer interface which provides the function of a mouse, supported eye actions like blink, gestures and gaze. the thought behind this method is to reinforce the interaction of an individual with the pc. Eye gaze

tracking may be a process of detecting and measuring the attention movements. this method explores the potential of the human eye gaze which may be used as a pointing device on the pc.

ADVANTAGES:

• It reduces man error and increases proficiency.

• It may be used easily.

• Not expensive that's it's low cost only a webcam is required.

3.2 SYSTEM SPECIFICATION

SYSTEM SPECIFICATION

3.2.1 HARDWARE CONFIGURATION:

• Processor - I5

• Speed - 3 GHz

• RAM - 8 GB(min)

• Hard Disk - 500 GB

• Key Board - Standard Windows Keyboard

• Mouse - Two or Three Button Mouse

• Monitor - LCD

3.2.2 SOFTWARE CONFIGURATION

• Operating System: Linux, Windows/7/10

• Server: Anaconda, Jupyter,pycharm

• Front End: tkinter |GUI toolkit

• Server-side Script: Python, AIML

DOMAIN OF THE PROJECT

3.2.2.1 PYTHON:

Python is AN interpreter, object-oriented, high-level programing language with dynamic linguistics. Its high-level inbuilt knowledge structures, combined with dynamic writing and dynamic binding; build it terribly enticing for fast Application Development, similarly as to be used as a scripting or glue language to attach existing elements along.

Python's easy, simple to find out syntax emphasizes readability and so reduces the value of program maintenance. Python supports modules and packages, which inspires program modularity and code utilise. The Python interpreter and therefore the intensive customary library area unit offered in supply or binary kind for gratis for all major platforms, and may be freely distributed.

Often, programmers fall gaga with Python due to the hyperbolic productivity it provides. Since there's no compilation step, the edit-test-debug cycle is improbably quick. Debugging Python programs is easy: a bug or unhealthy input can ne'er cause a segmentation fault. Instead, once the interpreter discovers a blunder, it raises AN exception. once the program does not catch the exception, the interpreter prints a stack trace.

A supply level programme permits review of native and world variables, analysis of impulsive expressions, setting breakpoints, stepping through the code a line at a time, and so on. The programme is written in Python itself, testifying to Python's self-examining power.

On the opposite hand, typically the fastest thanks to rectify a program is to feature many print statements to the source: the quick edit-test-debug cycle makes this

easy approach terribly effective. It ranges from easy automation tasks to gambling, net development, and even advanced enterprise systems. These area unit the areas wherever this technology continues to be the king with no or very little competence: Machine learning because it contains a excess of libraries implementing machine learning algorithms.

Python may be a one-stop search and comparatively simple to find out, so quite widespread currently. What different reasons exist for such universal quality of this programing language and what corporations have leveraged its opportunities to the max? Let's say that. Python technology is kind of widespread among programmers, however the observe shows that business house owners also are Python development believers and permanently reason. computer code developers adore it for its simple syntax and name united of the simplest programming languages to find out.

Business house owners or CTOs appreciate the very fact that there's a framework for just about something – from net apps to machine learning. Moreover, it's not simply a language however a lot of a technology platform that has close through a big collaboration from thousands of individual skilled developers forming a large and peculiar community of aficionados. therefore, what's python used for and what area unit the tangible edges the language brings to people who determined to use it? Below we're aiming to discover that. Productivity and Speed it's a widespread theory at intervals development circles that developing Python applications is around up to ten times quicker than developing a similar application in Java or C/C++.

The spectacular profit in terms of your time saving are often explained by the clean object-oriented style, increased method management capabilities, and robust integration and text process capacities. Moreover, its own unit testing framework contributes considerably to its speed and productivity.

3.2.2.2 PYCHARM:

PyCharm could be a dedicated Python Integrated Development surroundings (IDE) providing a good vary of essential tools for Python developers, tightly integrated to make convenient surroundings for productive Python, web, and knowledge science development. Choose the simplest PyCharm for you. PyCharm is accessible in 3 editions:

- **Community (free and open-sourced):** for good and intelligent Python development, as well as code help, refactoring, visual debugging, and version management integration.

- **Professional (paid) :** for skilled Python, web, and knowledge science development, as well as code help, refactoring, visual debugging, version management integration, remote configurations, deployment, support for standard net frameworks, like Django and Flask, info support, scientific tools (including Jupiter notebook support), huge knowledge tools.

- **Edu (free and open-sourced):** for learning programming languages and connected technologies with integrated academic tools. For details, see the editions comparison matrix.

Supported languages

To start developing in Python with PyCharm you wish to transfer and install Python from python.org counting on your platform. PyCharm supports the subsequent versions of Python: Python a pair of: version 2.7

Python three: from the version 3.6 up to the version 3.10

Besides, within the skilled edition, one will develop Django, Flask, and Pyramid applications. Also, it absolutely supports hypertext mark-up language (including HTML5), CSS, JavaScript, and XML: these languages square measure bundled within the IDE via plugins and square measure switched on for you by default. Support for the opposite languages and frameworks can even be additional via plugins (go to Settings | Plugins or PyCharm | Preferences | Plugins for macOS users, to seek out a lot of or set them up throughout the primary IDE launch).

Requirement	Minimum	Recommended
RAM	4 GB of free RAM	8 GB of total system RAM
CPU	Any modern CPU	Multi-core CPU. PyCharm supports multithreading for different operations and processes making it faster the more CPU cores it can use.
Disk space	2.5 GB and another 1 GB for caches	SSD drive with at least 5 GB of free space
Monitor resolution	1024x768	1920×1080
Operating system	Officially released 64-bit versions of the following: Microsoft Windows 8 or later macOS 10.13 or later Any Linux distribution that supports Gnome, KDE, or Unity DE. PyCharm is not available for some Linux distributions, such as RHEL6 or CentOS6, that do not include GLIBC 2.14 or later. Pre-release versions are not supported.	Latest 64-bit version of Windows, macOS, or Linux (for example, Debian, Ubuntu, or RHEL)

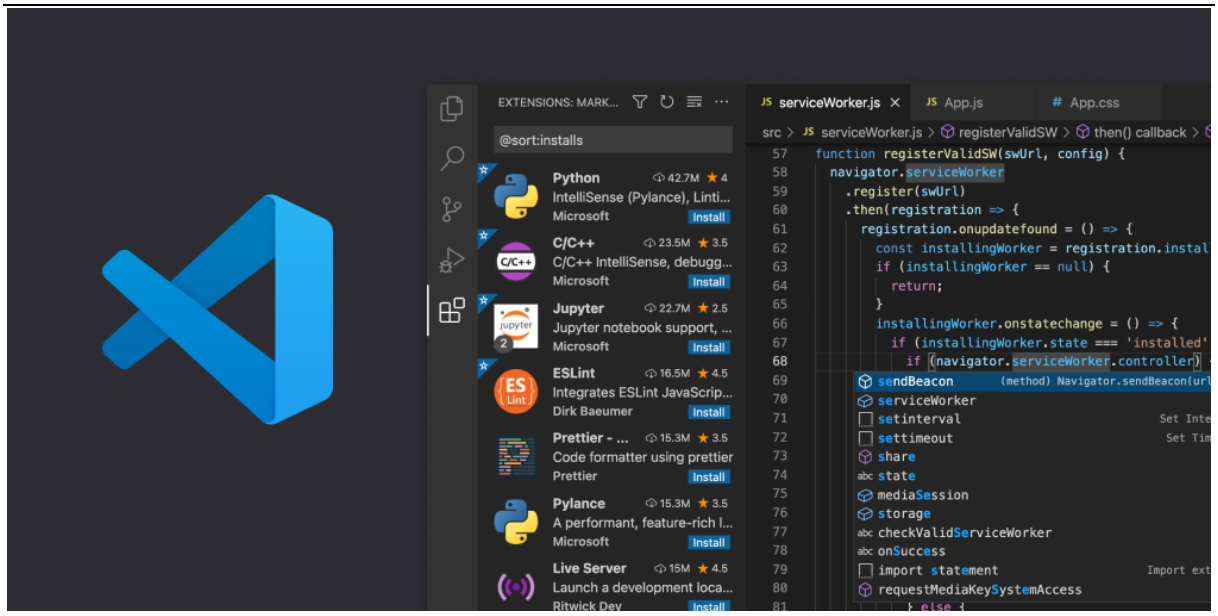
3.2.2.3 SUPPORTED PLATFORMS

VISUAL STUDIO:

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. it's accustomed develop computer programs, further as websites, web apps, web services and mobile apps. Visual Studio uses Microsoft software development platforms like Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. It can produce both native code and managed code.

Visual Studio includes a code editor supporting IntelliSense (the code completion component) still as code refactoring. The integrated debugger works both as a source-level debugger and a machine-level debugger. Other built-in tools include a code profiler, designer for building GUI applications, web designer, class designer, and database schema designer. It accepts plug-ins that expand the functionality at almost every level—including adding support for source control systems (like Subversion and Git) and adding new toolsets like editors and visual designers for domain-specific languages or toolsets for other aspects of the software development lifecycle (like the Azure DevOps client: Team Explorer).

Visual Studio supports 36 different programming languages and allows the code editor and debugger to support (to varying degrees) nearly any programming language, provided a language-specific service exists. Built-in languages include C,[6] C++, C++/CLI, Visual Basic .NET, C#, F#,[7] JavaScript, TypeScript, XML, XSLT, HTML, and CSS. Support for other languages like Python,[8] Ruby, Node.js, and M among others is offered via plug-ins. Java (and J#) were supported within the past.



VISUAL STUDIO

FEATURES

Features include:

- An editor with syntax lightness, contemplation, code completion • Support for multiple IPython consoles
- The ability to explore and edit variables from a graphical user interface • A facilitate pane able to retrieve and render wealthy text documentation on functions, categories and strategies mechanically or on-demand
- A programme connected to IPdb, for gradual execution
- Static code analysis, battery-powered by Pylint
- A run-time Profiler, to benchmark code
- Project support, permitting work on multiple development efforts at the same time
- A intrinsical file adventurer, for interacting with the classification system and managing comes

- A "Find in Files" feature, permitting full regular expression search over a such that scope
- An on-line facilitate browser, permitting users to go looking and consider Python and package documentation within the IDE
- A history log, recording each user command entered in every console
- An internal console, providing contemplation and management over Spyder's own operation

SPYDER

Spyder is an open-source cross-platform integrated development environment (IDE) for scientific programming within the Python language. Spyder integrates with variety of prominent packages within the scientific Python stack, including NumPy, SciPy, Matplotlib, pandas, IPython, SymPy and Cython, moreover as other open-source software. it's released under the MIT license. Initially created and developed by Pierre Raybaut in 2009, since 2012 Spyder has been maintained and continuously improved by a team of scientific Python

developers and also the community.

Spyder is extensible with first-party and third-party plugins, includes support for interactive tools for data inspection and embeds Python-specific code quality assurance and introspection instruments, like Pyflakes, Pylint and rope. it's available cross-platform through Anaconda, on Windows, on macOS through MacPorts, and on major Linux distributions like Arch Linux, Debian, Fedora, Gentoo Linux, openSUSE and Ubuntu.
Spyder uses Qt for its GUI and is designed to use either of the PyQt or PySide Python bindings. QtPy, a thin abstraction layer developed by the Spyder project

and later adopted by multiple other packages, provides the flexibility to use either backend.

PLUGINS

- Available plugins include:

  • Spyder-Unit test, that integrates the favoured unit testing frameworks Pytest, Unit test and Nose with Spyder

  • Spyder-Notebook, permitting the viewing and redaction of Jupyter Notebooks at intervals the IDE

- Download Spyder Notebook
- Using conda: conda install spyder-notebook -c spyder-ide
- Using pip: pip install spyder-notebook
    - Spyder-Reports, sanctionative use of literate programming techniques in Python
    - Spyder-Terminal, adding the power to open, management and manage cross-platform system shells at intervals Spyder
- Download Spyder Terminal
- Using conda: conda install spyder-terminal -c spyder-ide ¬ Using pip: pip install spyder-terminal
    - Spyder-Vim, containing commands and shortcuts emulating the Vim text editor

- Spyder-AutoPEP8, which might mechanically adapt code to the quality liveliness eight code vogue
- Spyder-Line-Profiler and Spyder-Memory-Profiler, extending the intrinsical identification practicality to incorporate testing a personal line, and measurement memory usage

3.2.2.5 ANACONDA PYTHON

Anaconda® could be a package manager, Associate in Nursing atmosphere manager, a Python/R knowledge science distribution, and a group of over seven,500+ ASCII text file packages. boa is free and straightforward to put in, and it offers free community support. Get the boa Cheat Sheet then transfer boa. Want to put in conda and use conda to put in simply the packages you need? Get Miniconda.

Anaconda Navigator or conda?

After you put in boa or Miniconda, if you favour a desktop graphical computer program (GUI) then use Navigator. If you favour to use boa prompt (or terminal on UNIX system or macOS), then use that and conda. you'll be able to additionally switch between them. You can install, remove, or update any boa package with a couple of clicks in Navigator, or with one conda command in boa Prompt (terminal on UNIX system or macOS).

- To strive Navigator, when putting in boa, click the Navigator icon on your operational system's program menu, or in boa prompt (or terminal on UNIX system or macOS), run the command anaconda-navigator.
- To strive conda, when putting in boa or Miniconda, take the 20-minute conda take a look at drive and transfer a conda cheat sheet.

  Packages on the market in boa
  - Over 250 packages area unit mechanically put in with boa.

- Over 7,500 further ASCII text file packages (including R) will be singly put in from the boa repository with the conda install command.

- Thousands of alternative packages area unit on the market from boa.org.
  - You will transfer alternative packages mistreatment the pip install command that's put in with boa. Pip packages offer several of the options of conda packages and in some cases they'll work along. However, the preference ought to be to put in the conda package if it's on the market.
  - You can even create your own custom packages mistreatment the conda build command, and you'll be able to share them with others by uploading them to boa.org, PyPI, or alternative repositories.

Previous versions

Previous versions of boa area unit on the market within the archive. For an inventory of packages enclosed in every previous version, see recent package lists. Anaconda2 includes Python a pair of.7 and Anaconda3 includes Python three.7. However, it doesn't matter that one you transfer, as a result of you'll be able to produce new environments that embody any version of Python pre-packaged with conda. See Managing Python with conda.

tkinter – Python

Tk/Tcl has long been AN integral a part of Python. It provides a strong and platform freelance windowing toolkit, that's accessible to Python programmers victimisation the tkinter package, and its extension, the tkinter.tix and also the tkinter.ttk modules.

The tkinter package may be a skinny object-oriented layer on high of Tcl/Tk. To use tkinter, you don't ought to write Tcl code, however you'll ought to consult the Tk documentation, and infrequently the Tcl documentation. tkinter may be a set of wrappers that implement the Tk widgets as Python categories.

tkinter's chief virtues area unit that it's quick, which it always comes bundled with Python. though its customary documentation is weak, smart material is obtainable, that includes: references, tutorials, a book et al. tkinter is additionally illustrious for having AN obsolete look and feel, that has been immensely improved in Tk eight.5. notwithstanding, there are a unit several alternative GUI library that you simply may be inquisitive about. The Python wiki lists many different GUI frameworks and tools.

Main tkinter module.

tkinter.colorchooser

Dialog to let the user opt for a color.

tkinter.commondialog

Base category for the dialogs outlined within the alternative modules listed here.

tkinter.filedialog

Common dialogs to permit the user to specify a file to open or save.

tkinter.font

Utilities to assist work with fonts.

tkinter.messagebox

Access to plain tk dialog boxes.

tkinter.scrolledtext

Text gismo with a vertical scroll bar inbuilt.

tkinter.simpledialog

Basic dialogs and convenience functions.

tkinter.ttk

Themed gismo set introduced in Tk eight.5, providing fashionable alternatives for several of the classic widgets within the main tkinter module.

Additional modules:

_tkinter A binary module that contains the low-level interface to Tcl/Tk. it's mechanically foreign by the most tkinter module, and may ne'er be used directly

by application programmers. it's sometimes a shared library (or DLL), however would possibly in some cases be statically connected with the Python interpreter. idlelib Python's Integrated Development and Learning surroundings (IDLE). Based on tkinter. tkinter. Constants Symbolic constants which will be employed in place of strings once passing varied parameters to Tkinter calls. Automatically foreign by the most tkinter module. tkinter.dnd (experimental) Drag-and-drop support for tkinter. this can become deprecated once it's replaced with the Tk DND. tkinter.tix (deprecated) AN older third-party Tcl/Tk package that adds many new widgets. higher alternatives for many is found in tkinter.ttk. turtle Turtle graphics during a Tk window.

CHAPTER-4

MODULES AND IMPLEMENTAION

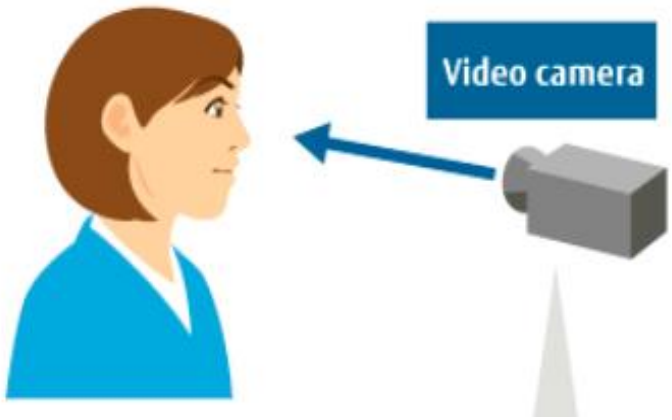
4.1 MODULES

- Input video
- Face and eye Detection
- Controlling cursor

4.1.2 MODULE: 1

INPUT VIDEO

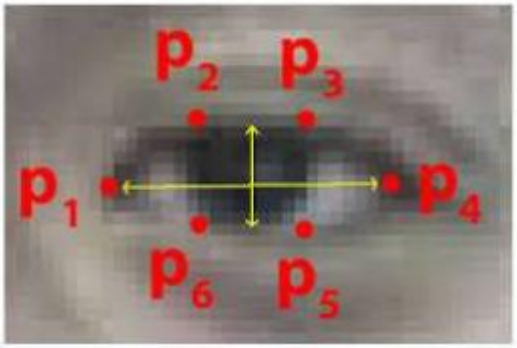
The input video processing means, performing operations on the video frame by frame. Frames are nothing but just the particular instance of the video in a single point of time. We may have multiple frames even in a single second. Frames can be treated as similar to an image. In this input video that can detect a person's presence frame and follow what they are looking at in real-time. The technology converts eye movements into a data stream that contains information such as pupil position, the gaze vector for each eye, and gaze point.



Video capturing

4.1.1 MODULE: 2

FACE AND EYE DETECTION



EYE MARKINGS

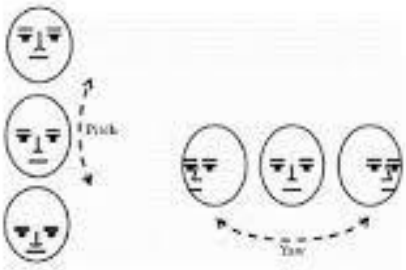
To detect and track eye images with complex background, distinctive features of user eye are used. Generally, an eye-tracking and detection system can be divided into four steps: Face detection, eye region detection, pupil detection and eye tracking.

4.1.3 MODULE: 3

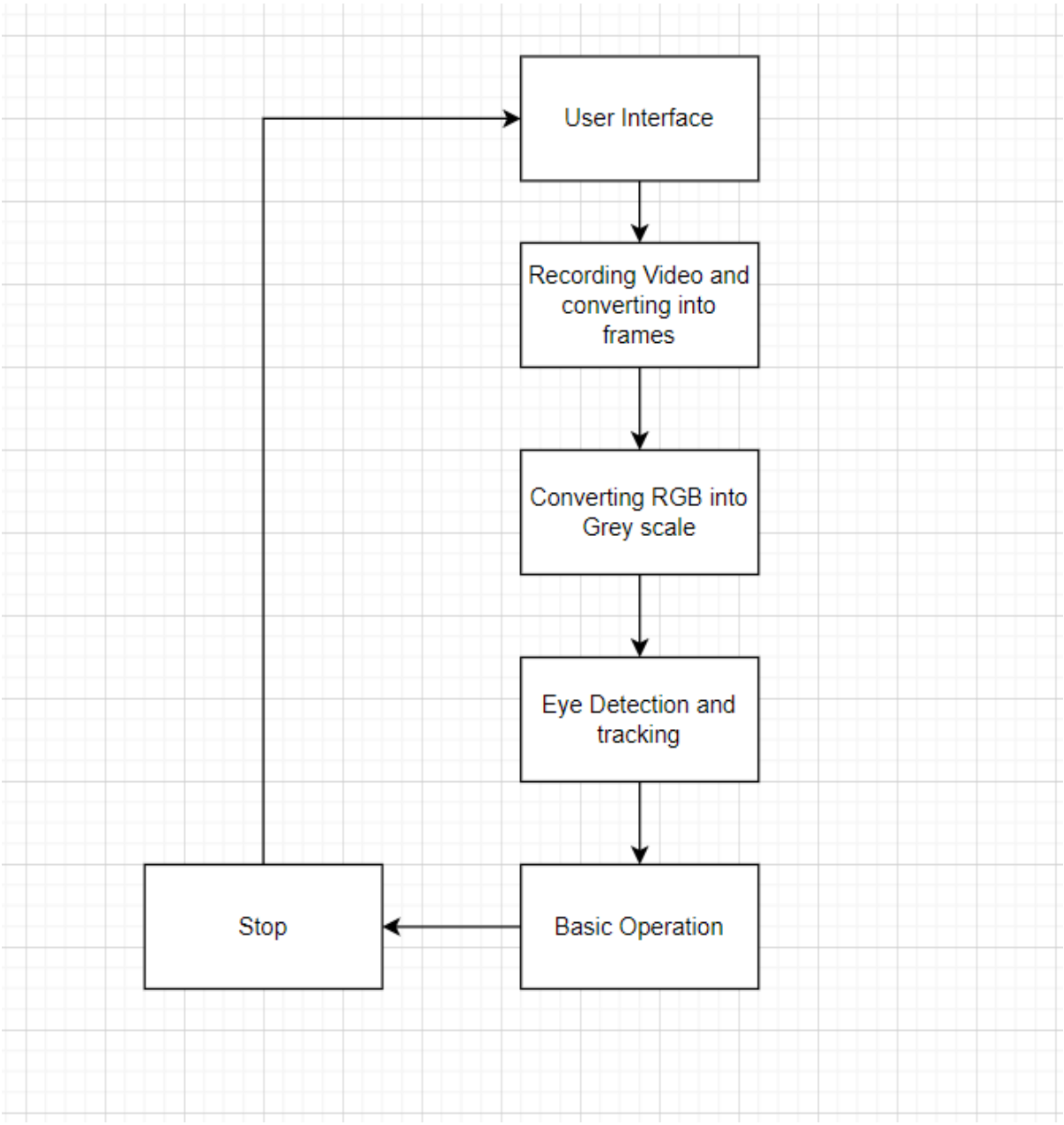
CONTROLLING CURSOR

To control the mouse with your eyes on the screen where you want the cursor to be placed. The eye control mouse lets you fine-tune the position of the mouse cursor and then right-click, left-click, or double-click the mouse. The cursor movement of computer is *controlled* by *eye* movement *using* Open CV. Camera detects the *Eye* ball movement which can be processed

FUNCTIONALITIES PROVIDED:

Action	Function
 Opening Mouth	Activate / Deactivate Mouse Control
 Right Eye Wink	Right Click
 Left Eye Wink	Left Click
 Squinting Eyes	Activate / Deactivate Scrolling
 Head Movements (Pitch and Yaw)	Scrolling / Cursor Movement

4.2 ARCHITECTURE DIAGRAM



4.3 IMPLEMENTATION:

Eye tracking technology, that is predicated on an eye fixed huntsman that measures the movement associate degreed positions of the attention has vie an more and more vital role in science, marketing, and user interfaces. Eye trackers have existed for variety of years, but, early within the development of the sector of eye chase, the utilization of eye trackers was mostly confined to laboratory experiments to look at the character of human eye movements, instead of to use these movements as associate degree actual management medium at intervals a human-computer interaction (HCI). as a result of the value of eye trackers was around thirty,000 a decade past, it had been too pricy to think about use in real user-computer interfaces. ancient user interfaces give far more information measure from laptop to user, like pictures, animations, videos, and different media which might output giant amounts of data chop-chop.

Whereas there square measure hardly any means that of inputting comparably giant amounts of data from users. The conception of HCI is to extend the information measure from user to laptop with additional natural and additional convenient communication mechanisms. the attention is one among our chiefly input mediums, and regarding eighty to ninety % of the skin world data is obtained from the human eye.

For multimedia system communication from user to laptop, the attention movements may be considered an important period input medium, that is particularly vital for folks with motor incapacity. The analysis of eye chase technique in user-computer dialogue is especially centred on incorporating eye movements into the multimedia system communication with laptop during a convenient and natural manner.

Generally, the foremost intuitive answer for incorporating eye movements into user-computer dialogue would be substituted with an eye fixed huntsman directly for a manual input supply, like a mouse. By putting in an eye fixed huntsman and exploitation its, coordinate output stream as a virtual mouse, the moving of user's gaze would directly cause the mouse pointer to manoeuvre. however, the natural hand moving a mouse is incredibly completely different from the attention movement to regulate virtual mouse.

There square measure important variations between the mouse and eye position to be thought of in planning eye chase primarily based system for user-computer dialogue. so as to produce acceptable communication, many improved eyes chase primarily based management systems were developed. Nehete et al designed an eye fixed chase mouse that permits users to speak with laptop through active quality like eye movement or nose movement.

Missimer and Betke additionally created a system that uses the top position to regulate the mouse pointer and simulates the left-click and right-click of the mouse by blinking left or right monocular. Although the attention management systems mentioned higher than square measure of profit for users with physical or psychological feature handicaps to move with computers fittingly, the designed eye trackers square measure quite difficult and pricy.

Users ought to wear inconvenient devices and build specific actions to regulate the system. To lower the brink of usability for user, MastaLomaster developed a paradigm of eye system that's supported cheap eye trackers. The system supports most industrial cheap eye trackers, like Tobii EyeX and Eye Tribe.

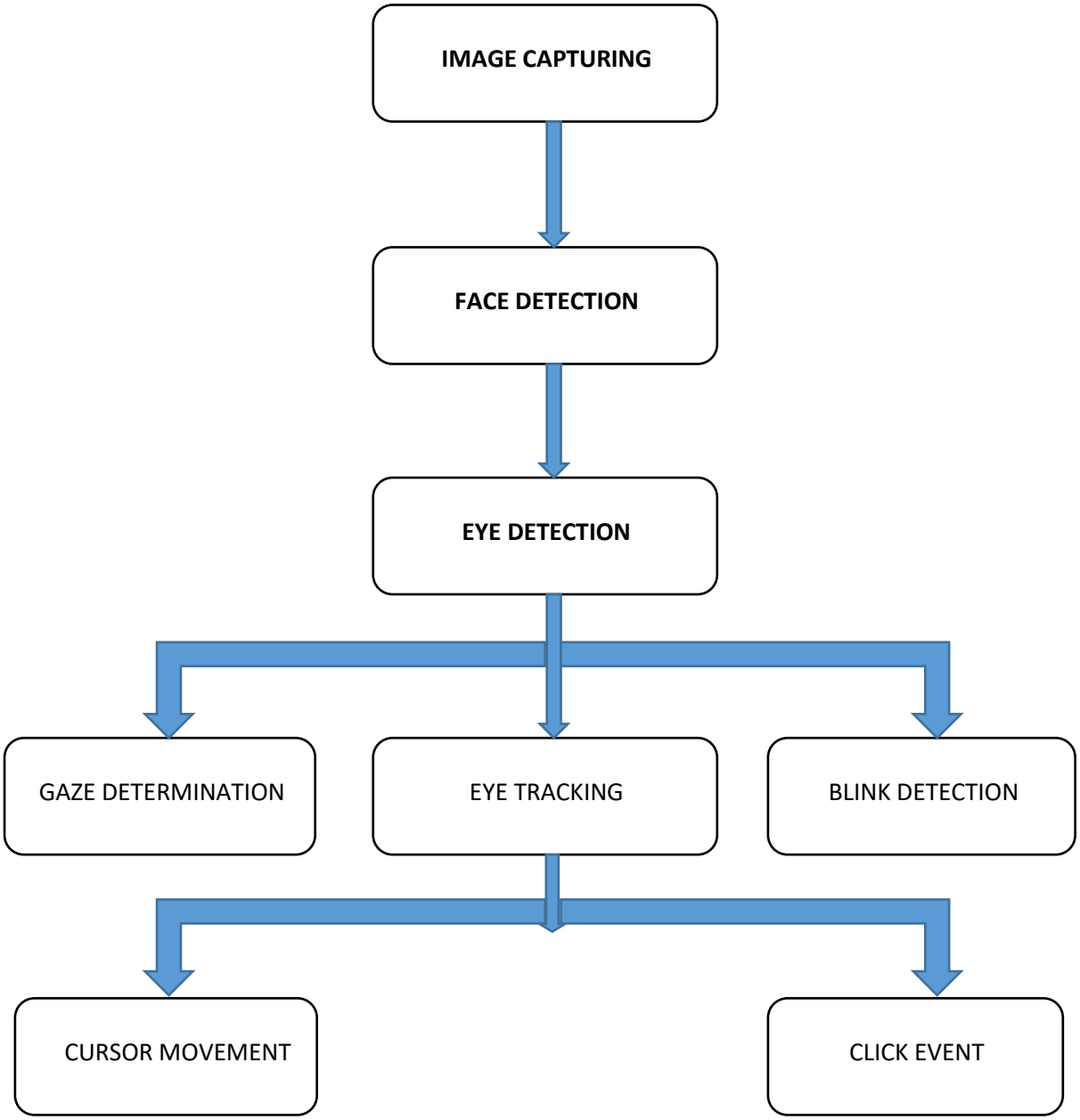
However, user ought to select the specified operate initial then do the $64000 interaction with laptop, which matches against user intuition and it's not natural to use. In order to produce additional natural and additional convenient communication mechanisms, we tend to gift an eye fixed chase primarily based

system for user-computer dialogue during this paper. The system combines each the mouse functions and keyboard functions, in order that users will use our system to realize most of the inputs to the pc while not ancient input instrumentation. it had been orienting towards rising the reliableness, mobility, and value for user to move with laptop by solely exploitation their eyes.

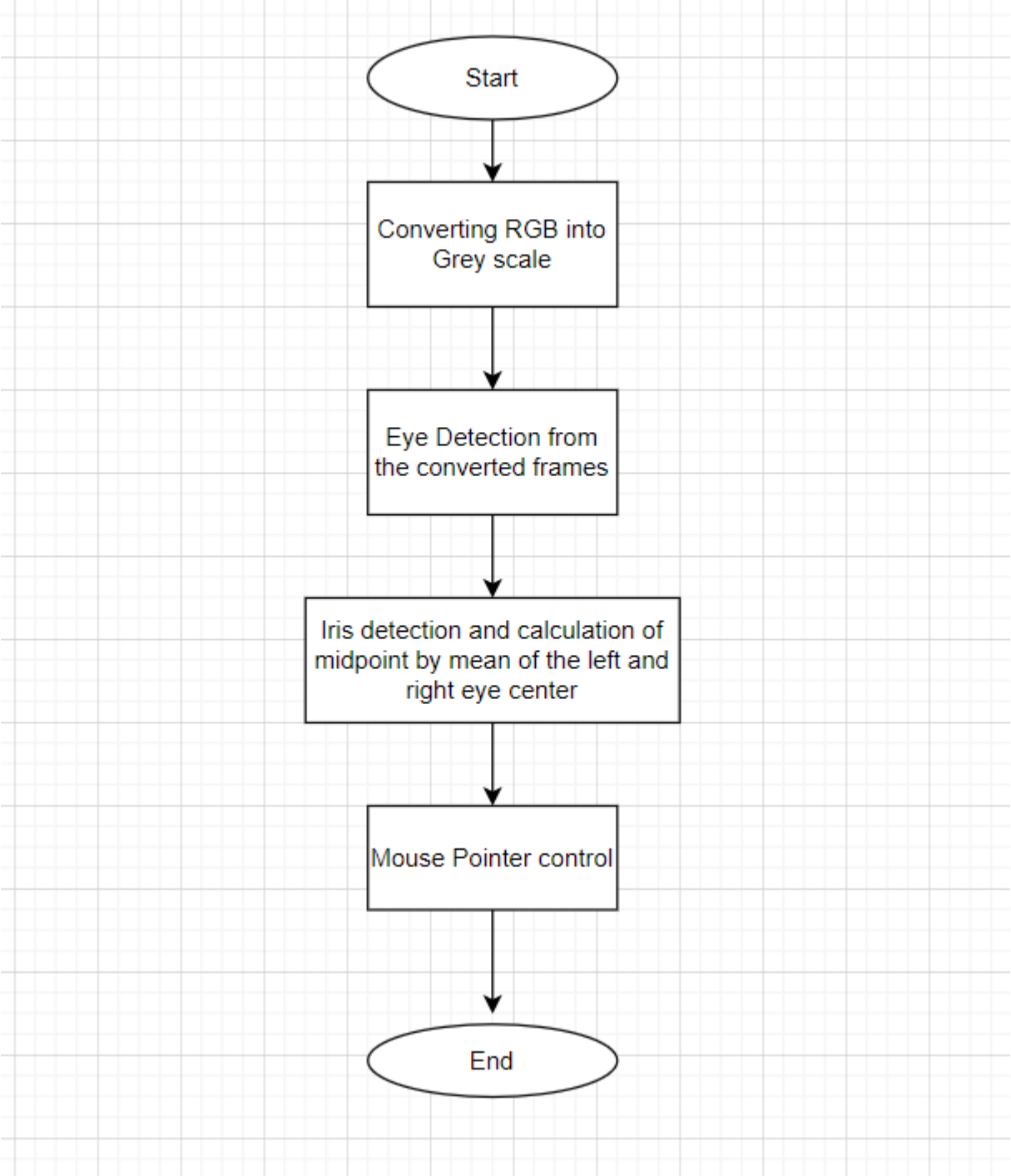
The contributions of this work can be any delineated very well by satisfying the subsequent requirements: Instead of exploitation difficult designed instrumentation, the projected system would supply extraordinarily light-weight devices that square measure additional convenient for user to use. The projected system is orienting towards the likelihood of being employed wide, that supports most of the cheap eye trackers that square measure cheap for the bulk of users.

The projected system realizes all of the functions of normal input sources, as well as mouse and keyboard. User will expeditiously move with laptop by solely exploitation their eyes. The projected system provides additional natural and additional convenient communication mechanism for user-computer dialogue and will additionally avoid annoying user with unwanted responses to their actions.

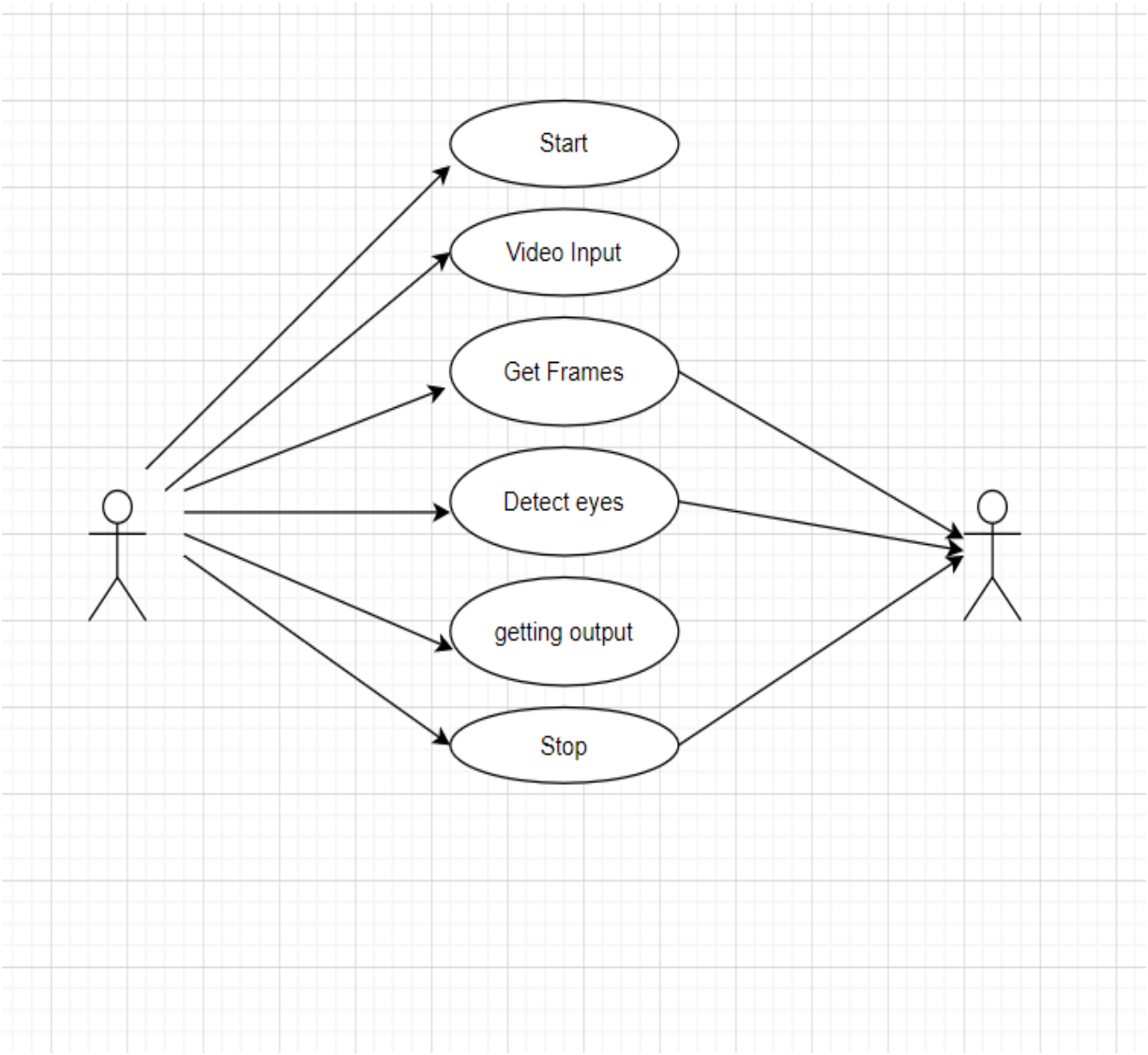
Methodology:



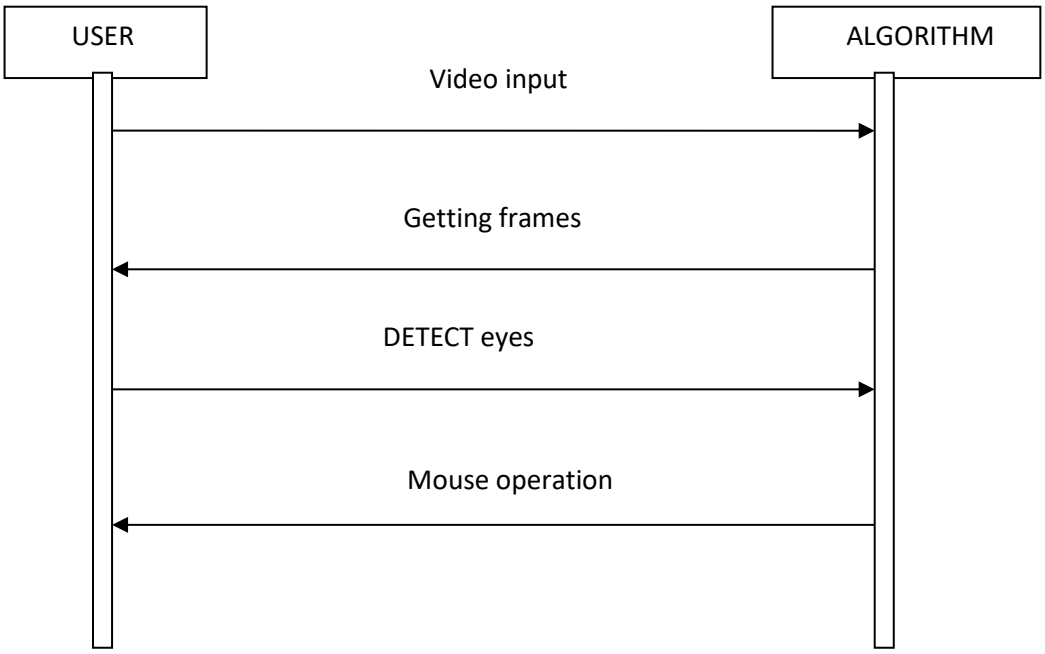
4.3.1 DATAFLOW DIAGRAM



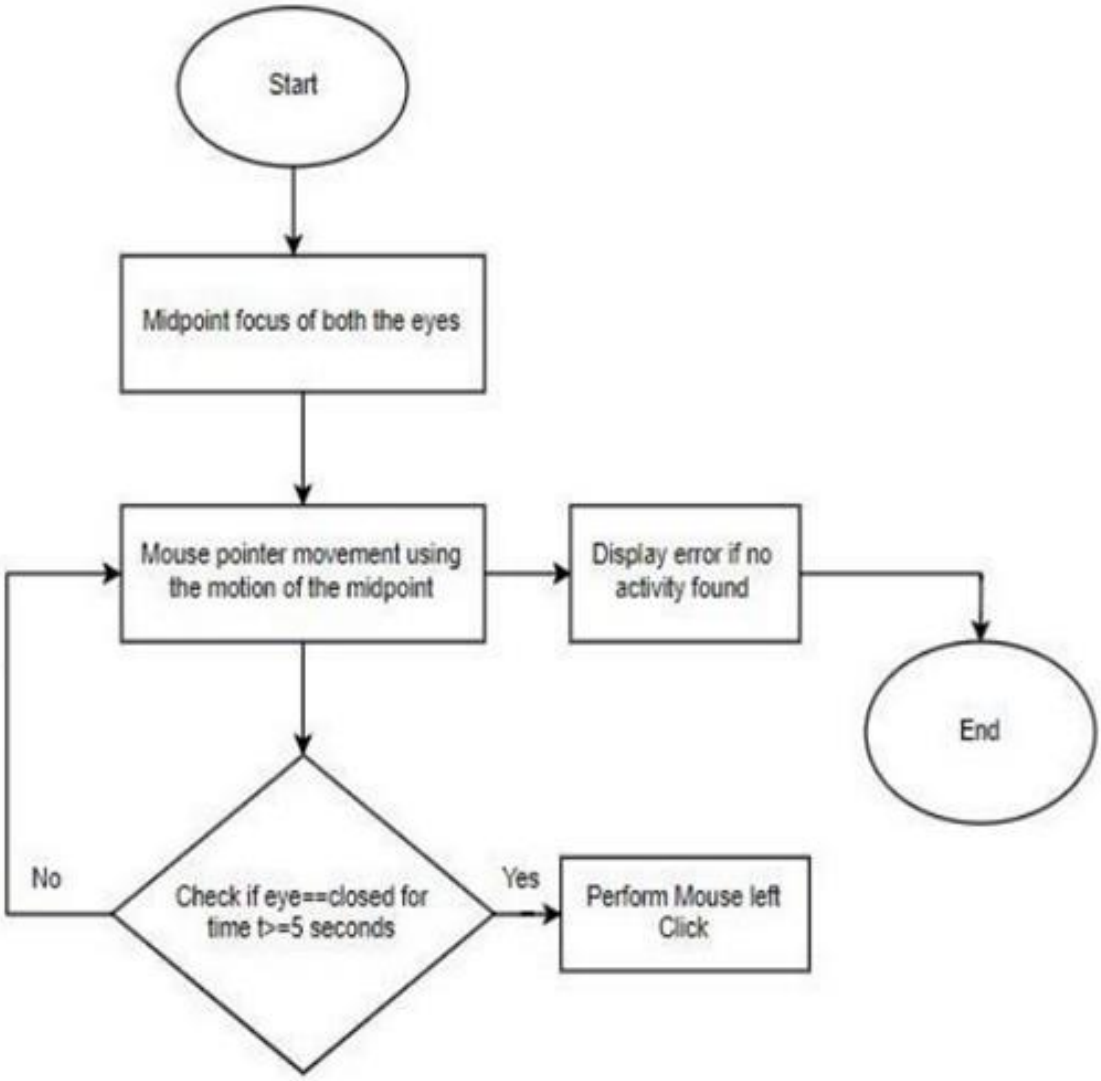
USE CASE DIAGRAM:



4.3.3 SEQUENCE DIAGRAM



4.3.4 ER-DIAGRAM



CHAPTER-5

PACKAGES AND SAMPLE CODE

5.1 PACKAGES:

5.1.1 OPENCV USING PYTHON

OpenCV could be a vast ASCII text file library for pc vision, machine learning, and image process. OpenCV supports a large kind of programming languages like Python, C++, Java, etc. It will method pictures and videos to identify objects, faces, or perhaps the handwriting of an individuals. When it is integrated with numerous libraries, like NumPy that could be a extremely optimized library for numerical operations, then the amount of weapons will increase in your Arsenal i.e. no matter operations one will neutralise NumPy may be combined with OpenCV.

OpenCV could be a cross-platform library victimization which is able to develop period computer vision applications. It primarily focuses on image process, video capture and analysis as well as options like face detection and object detection. Let’s begin the chapter by shaping the term "Computer Vision".

Computer Vision

Computer Vision is also outlined as a discipline that explains the simplest way to reconstruct, interrupt, and perceive a 3D scene from its second pictures, in terms of the properties of the structure gift inside the scene. It deals with modelling and replicating human vision victimization pc software system and hardware.

HAAR CASCADE CLASSIFIERS

Haar Cascade classifiers area unit an honest means for object detection. This technique was proposed by Paul Viola and archangel Jones in their paper fast Object Detection using a Boosted Cascade of simple options. Haar Cascade may be a machine learning-based approach wherever many positive and negative images area unit accustomed train the classifier

. • Positive pictures – These pictures contain the pictures that we have a tendency to want our classifier to identify.

• Negative pictures – pictures of everything else, that do not contain the item we have a tendency to would like to sight.

Haar Cascade Algorithm:

The primary step is to assemble the Haar options. A Haar feature is largely calculations that area unit performed on contiguous rectangular regions at a specific area in an exceedingly detection window. The calculation includes summing the constituent force in each region and calculative the contrasts between the entireties.

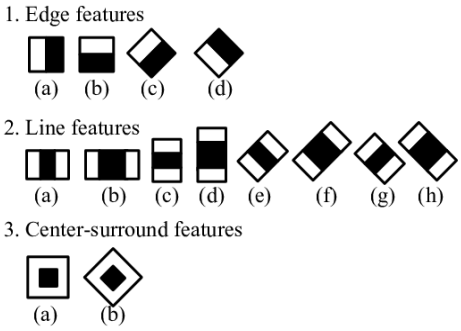
The algorithmic program may be explained in four stages:

Calculating Haar options

Creating Integral pictures

Using Adaboost

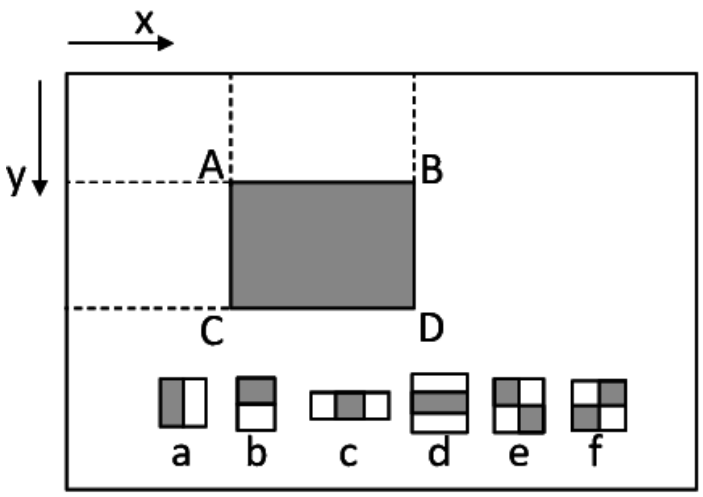
Creating integral image



Without going into as well much of the arithmetic behind it, necessarily pictures basically speed up the calculation of these Haar highlights. Rather than

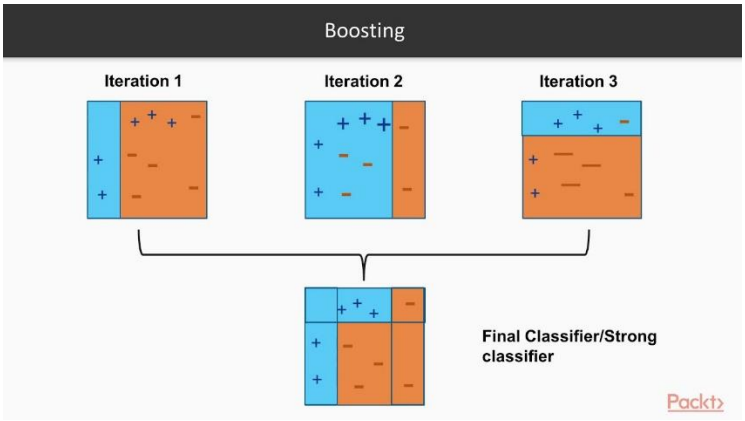
computing at each pixel, it instep makes sub-rectangles and makes cluster references for each of those sub-rectangles. These are at that point utilized to compute the Haar features.

Ababoost training



To decide the most excellent highlights that represent an object from the hundreds of thousands of Haar features we utilize Adaboost training that chooses the finest highlights and trains the classifiers. It uses a combination of "weak classifiers" to make a "strong classifier" that the calculation can utilize to distinguish objects and describes the powerless and solid classifier combination.

Cascade classifier



The cascade classifier is made up of collection of frail learners show at each organize. Based on this expectation, the classifier either chooses to show an object was found which is positive or move on to the following region which is negative.

Pyautogui:

PyAutoGUI could be a cross-platform interface automation Python module for human beings. it's wont to management the mouse & keyboard programmatically.

Dlib:

Dlib is in the main a C++ library, however, you will use kind of its tools from python applications. This page documents the python API for operating with these dlib tools. If you haven't done thus already, you should probably examine the python example programs initial before consulting this reference. These example programs are very little mini-tutorials for victimisation dlib from python. they are listed on the left of the most dlib online page.

Dlib 68 points Face landmark Detection with OpenCV and Python

The computer engineer researching however they determine the face of a person's in AN image. For this, we'd wish to spot initial wherever the face is found among the whole image. The face detector is that the strategy that locates the face of a human during a image and returns as a bounding box or parallelogram box values Dlib's 68 Face Features:

The below image is AN example of a Dlib's sixty-eight points model. There we'll see those points from one to sixty-eight. however generally we tend to don't would like all sixty-eight feature points, then for that, we'll liquidate the next post, however we tend to ar able to customise those points according to our necessities. throughout this post, we only visiting see concerning sixty-eight Dlib's points for clear understanding. Facial landmark points detection through Dlib's sixty-eight Model:

There ar principally 2 steps to notice face landmarks during a image that ar given below:

Face detection: Face detection is that the primary ways that find a personality's face and come back a worth in x, y, w, h which can be a rectangle.

Face landmark: when obtaining matters of a face during a image, then we've got to through points within that rectangle.

There ar several ways of face detector however we tend to focus throughout this post solely one that is Dlib's methodology. Like, OpenCV uses ways LBP cascades and HAAR and Dlib's use ways HOG (Histogram of bound Gradients) and SVM (Support Vector Machine).

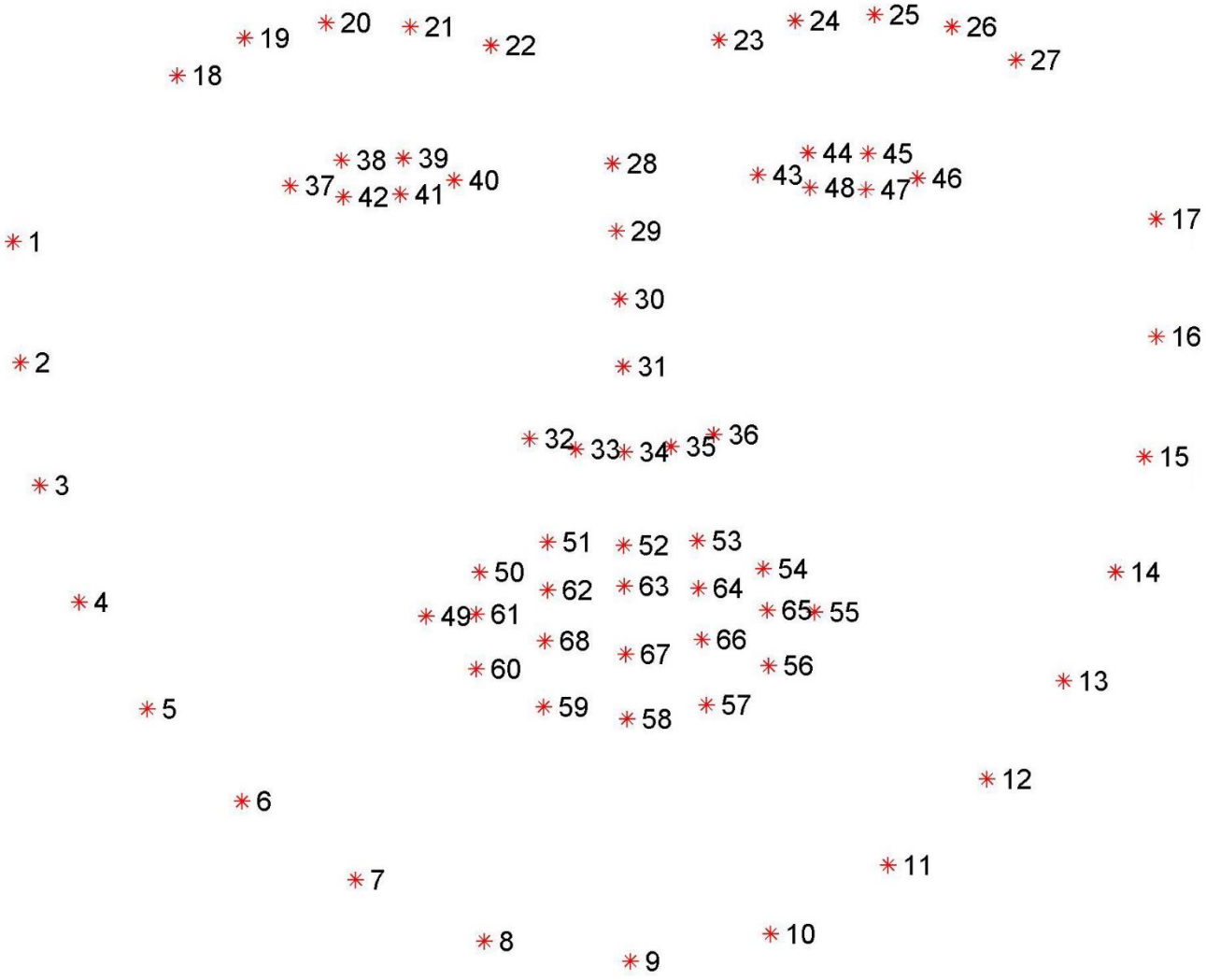
Dlib's sixty-eight Facial landmark Detection in Python:

The code in python is given below and same code you will transfer from here All codes ar given with correct comment so as that you're going to perceive each every and every line of code simply means.

Python: facial_68_landmark.py

This python code file name is facial_68_landmark.py

Dlib has already a pre-built model which can notice the face. that is why among the below python code facial_68_landmark.py line variety twenty-five, we tend to ar simply accessing directly that model and making an object face Landmark Detector. among the below code, we tend to ar initial uploading a picture than making an attempt to face thereon whole image. when obtaining the face position from the image, we tend to come back the parallelogram price wherever face resides. And on its parallelogram is known as detection of face. Now, in code line variety fifty-four we tend to ar using that parallelogram price and image among the operate to notice face landmarks.



68 POINT FACIAL LANDMARKER

Imutils:

A series of convenience functions to make basic image processing functions such as translation, rotation, resizing, skeletonization, and displaying Matplotlib images easier with OpenCV and both Python 2.7 and Python 3.

5.2 SAMPLE CODE:

```
from imutils import face_utils
from utils import *
import numpy as np #for maths operations
import pyautogui as pag #for mouse controll
import imutils #for resize input frame
import dlib #for recognize face
import cv2 #accessing camera

# Thresholds and consecutive frame length for triggering the mouse action.
MOUTH_AR_THRESH = 0.3
MOUTH_AR_CONSECUTIVE_FRAMES = 5
EYE_AR_THRESH = 0.20
EYE_AR_CONSECUTIVE_FRAMES = 5
WINK_AR_DIFF_THRESH = 0.001
WINK_AR_CLOSE_THRESH = 0.2
WINK_CONSECUTIVE_FRAMES = 4

# Initialize the frame counters for each action as well as
# Booleans used to indicate if action is performed or not

MOUTH_COUNTER = 0
EYE_COUNTER = 0
WINK_COUNTER = 0
INPUT_MODE = False
EYE_CLICK = False
LEFT_WINK = False
RIGHT_WINK = False
```

```
SCROLL_MODE = False
ANCHOR_POINT = (0, 0)
WHITE_COLOR = (255, 255, 255)
YELLOW_COLOR = (0, 255, 255)
RED_COLOR = (0, 0, 255)
GREEN_COLOR = (0, 255, 0)
BLUE_COLOR = (255, 0, 0)
BLACK_COLOR = (0, 0, 0)

# Initialize Dlib&#39;s face detector (HOG-based) and then create
# The facial landmark predictor
shape_predictor                                                    =
&quot;model/shape_predictor_68_face_landmarks.dat&quot;
detector = dlib.get_frontal_face_detector()
predictor = dlib.shape_predictor(shape_predictor)

# Grab the indexes of the facial landmarks for the left and
# Right eye, nose and mouth respectively
(lStart,                                lEnd)                      =
face_utils.FACIAL_LANDMARKS_IDXS[&quot;left_eye&quot;]
(rStart,                                rEnd)                      =
face_utils.FACIAL_LANDMARKS_IDXS[&quot;right_eye&quot;]
(nStart,                                nEnd)                      =
face_utils.FACIAL_LANDMARKS_IDXS[&quot;nose&quot;]
(mStart,                                mEnd)                      =
face_utils.FACIAL_LANDMARKS_IDXS[&quot;mouth&quot;]



# Video capture
```

```
vid = cv2.VideoCapture(0)
resolution_w = 1366
resolution_h = 768
cam_w = 640
cam_h = 480
unit_w = resolution_w / cam_w
unit_h = resolution_h / cam_h
while True:
    print(WINK_COUNTER,&quot;WINK_COUNTER&quot;)
     print(WINK_CONSECUTIVE_FRAMES,&quot;WINK_CONSECUTIVE_
FRAMES&quot;)

    # Grab the frame from the threaded video file stream, resize
    # it, and convert it to grayscale
    # channels)
    _, frame = vid.read()
    frame = cv2.flip(frame, 1)
    frame = imutils.resize(frame, width=cam_w, height=cam_h)
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)

    # Detect faces in the grayscale frame
    rects = detector(gray, 0)
    # Loop over the face detections
    if len(rects) &gt; 0:
        rect = rects[0]

 else:
        cv2.imshow(&quot;Frame&quot;, frame)
        key = cv2.waitKey(1) &amp; 0xFF
```

```
 continue
# Determine the facial landmarks for the face region, then
 # convert the facial landmark (x, y)-coordinates to a NumPy
    # array
    shape = predictor(gray, rect)
    shape = face_utils.shape_to_np(shape)

    # Extract the left and right eye coordinates, then use the
    # coordinates to compute the eye aspect ratio for both eyes
    mouth = shape[mStart:mEnd]
    leftEye = shape[lStart:lEnd]
    rightEye = shape[rStart:rEnd]
    nose = shape[nStart:nEnd]

    # Because I flipped the frame, left is right, right is left.
    temp = leftEye
    leftEye = rightEye
    rightEye = temp

    # Average the mouth aspect ratio together for both eyes
    mar = mouth_aspect_ratio(mouth)
    leftEAR = eye_aspect_ratio(leftEye)
    rightEAR = eye_aspect_ratio(rightEye)

ear = (leftEAR + rightEAR) / 2.0
    diff_ear = np.abs(leftEAR - rightEAR)
    nose_point = (nose[3, 0], nose[3, 1])

# Compute the convex hull for the left and right eye, then
```

```
 # visualize each of the eyes
 mouthHull = cv2.convexHull(mouth)
 leftEyeHull = cv2.convexHull(leftEye)
 rightEyeHull = cv2.convexHull(rightEye)
 cv2.drawContours(frame, [mouthHull], -1, YELLOW_COLOR, 1)
 cv2.drawContours(frame, [leftEyeHull], -1, YELLOW_COLOR, 1)
 cv2.drawContours(frame, [rightEyeHull], -1, YELLOW_COLOR, 1)
 for (x, y) in np.concatenate((mouth, leftEye, rightEye), axis=0):
    cv2.circle(frame, (x, y), 2, GREEN_COLOR, -1)

 # Check to see if the eye aspect ratio is below the blink
 # threshold, and if so, increment the blink frame counter
 if diff_ear &gt; WINK_AR_DIFF_THRESH:
    if leftEAR &lt; rightEAR:
       if leftEAR &lt; EYE_AR_THRESH:
          WINK_COUNTER += 1
          if WINK_COUNTER &gt; WINK_CONSECUTIVE_FRAMES:
             pag.click(button=&#39;left&#39;)
             WINK_COUNTER = 0
    elif leftEAR &gt; rightEAR:
       if rightEAR &lt; EYE_AR_THRESH:
          WINK_COUNTER += 1

if WINK_COUNTER &gt; WINK_CONSECUTIVE_FRAMES:
             pag.click(button=&#39;right&#39;)
             WINK_COUNTER = 0
    else:
       WINK_COUNTER = 0
```

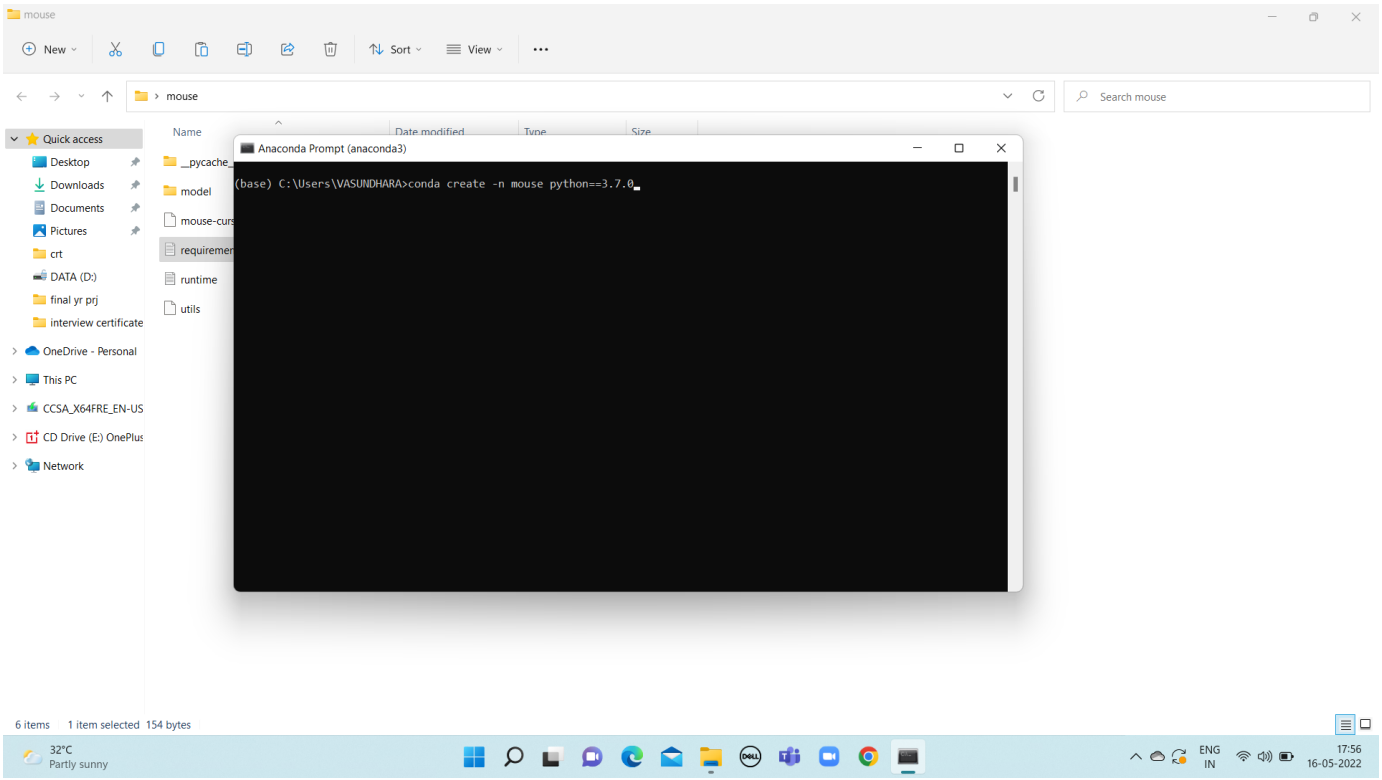
```
else:
        if ear &lt;= EYE_AR_THRESH:
            EYE_COUNTER += 1
            if EYE_COUNTER &gt; EYE_AR_CONSECUTIVE_FRAMES:
                SCROLL_MODE = not SCROLL_MODE


  # INPUT_MODE = not INPUT_MODE
                EYE_COUNTER = 0

 # nose point to draw a bounding box around it
        else:
            EYE_COUNTER = 0
            WINK_COUNTER = 0
    if mar &gt; MOUTH_AR_THRESH:
        MOUTH_COUNTER += 1
      if MOUTH_COUNTER &gt;= MOUTH_AR_CONSECUTIVE_FRAMES:

 # if the alarm is not on, turn it on
            INPUT_MODE = not INPUT_MODE

# SCROLL_MODE = not SCROLL_MODE
            MOUTH_COUNTER = 0
            ANCHOR_POINT = nose_point
    else:
        MOUTH_COUNTER = 0

if INPUT_MODE:
        cv2.putText(frame, &quot;READING INPUT!&quot;, (10, 30),
```

```
cv2.FONT_HERSHEY_SIMPLEX, 0.7, RED_COLOR, 2)
 x, y = ANCHOR_POINT
  nx, ny = nose_point
        w, h = 60, 35
        multiple = 1
        cv2.rectangle(frame, (x - w, y - h), (x + w, y + h), GREEN_COLOR, 2)
        cv2.line(frame, ANCHOR_POINT, nose_point, BLUE_COLOR, 2)
        dir = direction(nose_point, ANCHOR_POINT, w, h)
  cv2.putText(frame, dir.upper(), (10, 90), cv2.FONT_HERSHEY_SIMPLEX,
0.7, RED_COLOR, 2)
        drag = 18

if dir == &#39;right&#39;:
            pag.moveRel(drag, 0)
        elif dir == &#39;left&#39;:
            pag.moveRel(-drag, 0)
        elif dir == &#39;up&#39;:
            if SCROLL_MODE:
                pag.scroll(40)

    else:
                pag.moveRel(0, -drag)
        elif dir == &#39;down&#39;:
            if SCROLL_MODE:
                pag.scroll(-40)
            else:
                pag.moveRel(0, drag)
     if SCROLL_MODE:
        cv2.putText(frame, &#39;SCROLL MODE IS ON!&#39;, (10, 60),
```

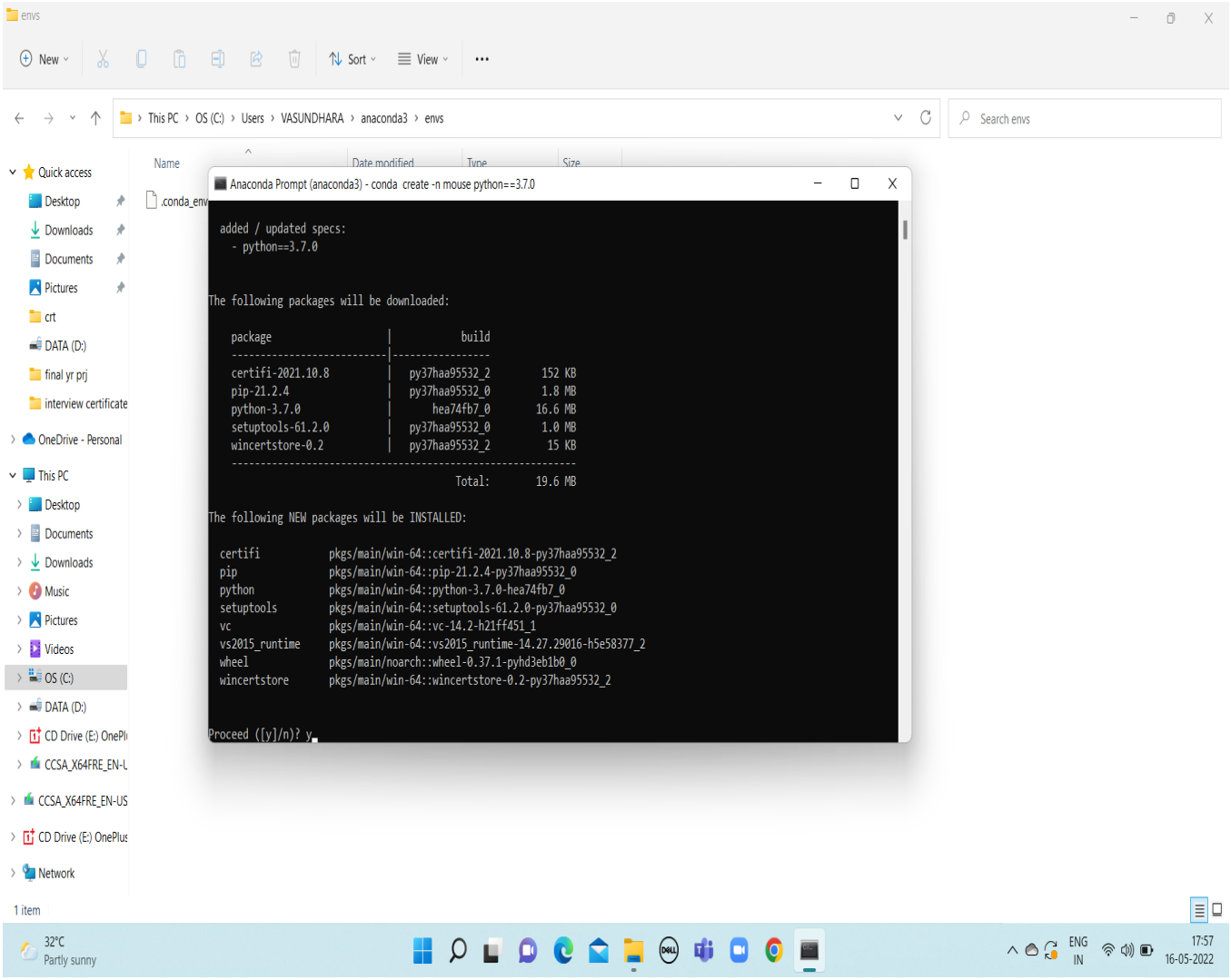
```
cv2.FONT_HERSHEY_SIMPLEX, 0.7, RED_COLOR, 2)

  # cv2.putText(frame, &quot;MAR: {:.2f}&quot;.format(mar), (500, 30),
    #             cv2.FONT_HERSHEY_SIMPLEX, 0.7, YELLOW_COLOR, 2)
     # cv2.putText(frame, &quot;Right EAR: {:.2f}&quot;.format(rightEAR),
(460, 80),

    #             cv2.FONT_HERSHEY_SIMPLqEX, 0.7, YELLOW_COLOR, 2)
    # cv2.putText(frame, &quot;Left EAR: {:.2f}&quot;.format(leftEAR), (460,
130),

    #             cv2.FONT_HERSHEY_SIMPLEX, 0.7, YELLOW_COLOR, 2)
    # cv2.putText(frame, &quot;Diff EAR: {:.2f}&quot;
.format(np.abs(leftEAR - rightEAR)), (460, 80),

 #             cv2.FONT_HERSHEY_SIMPLEX, 0.7, (0, 0, 255), 2)
    # Show the frame
    cv2.imshow(&quot;Frame&quot;, frame)
    key = cv2.waitKey(1) &amp; 0Xff

    # If the `Esc` key was pressed, break from the loop
    if key == 27:
        break
# Do a bit of cleanup
cv2.destroyAllWindows()
vid.release()
```

5.3 OUTPUT

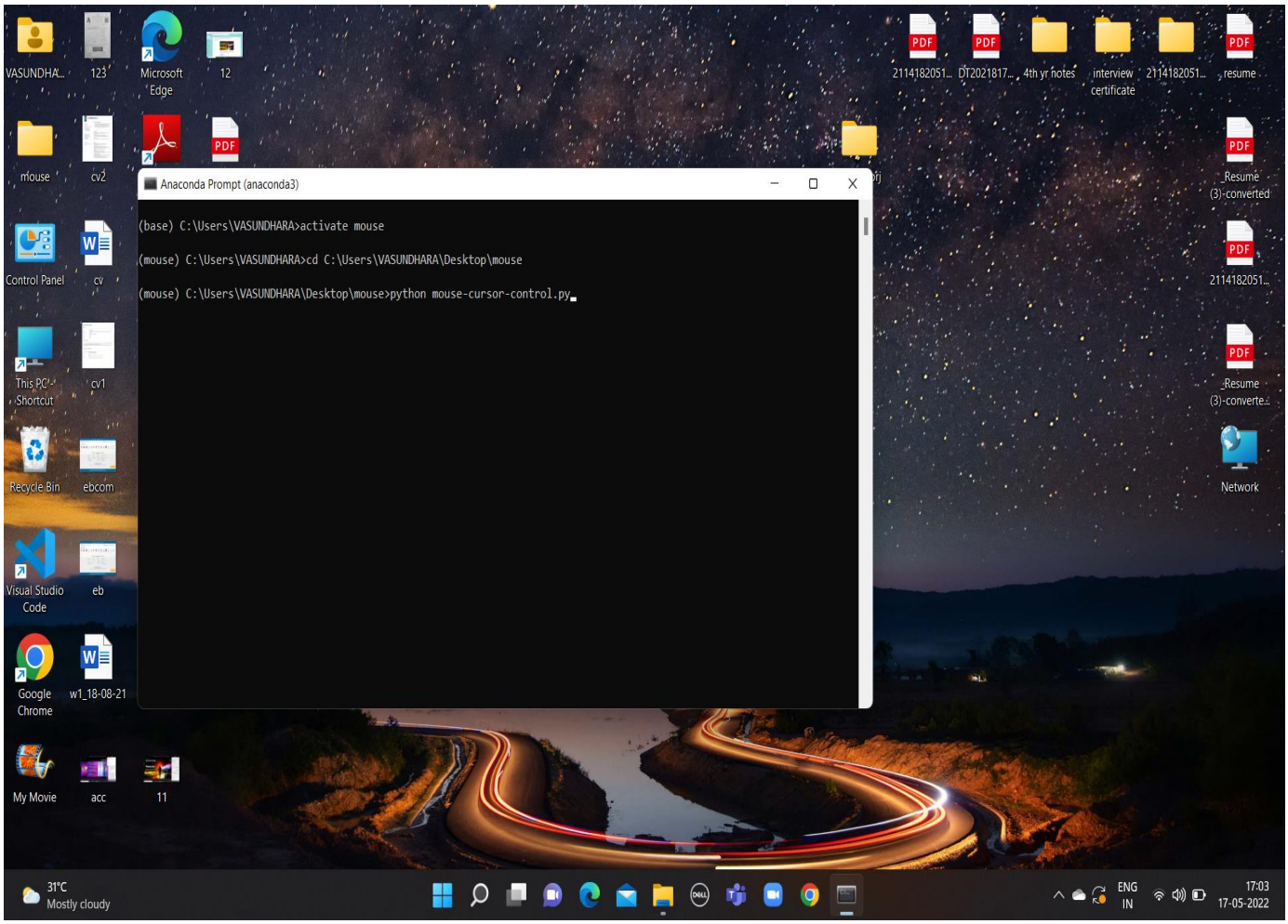
CREATING AN ENVIRONMENT:



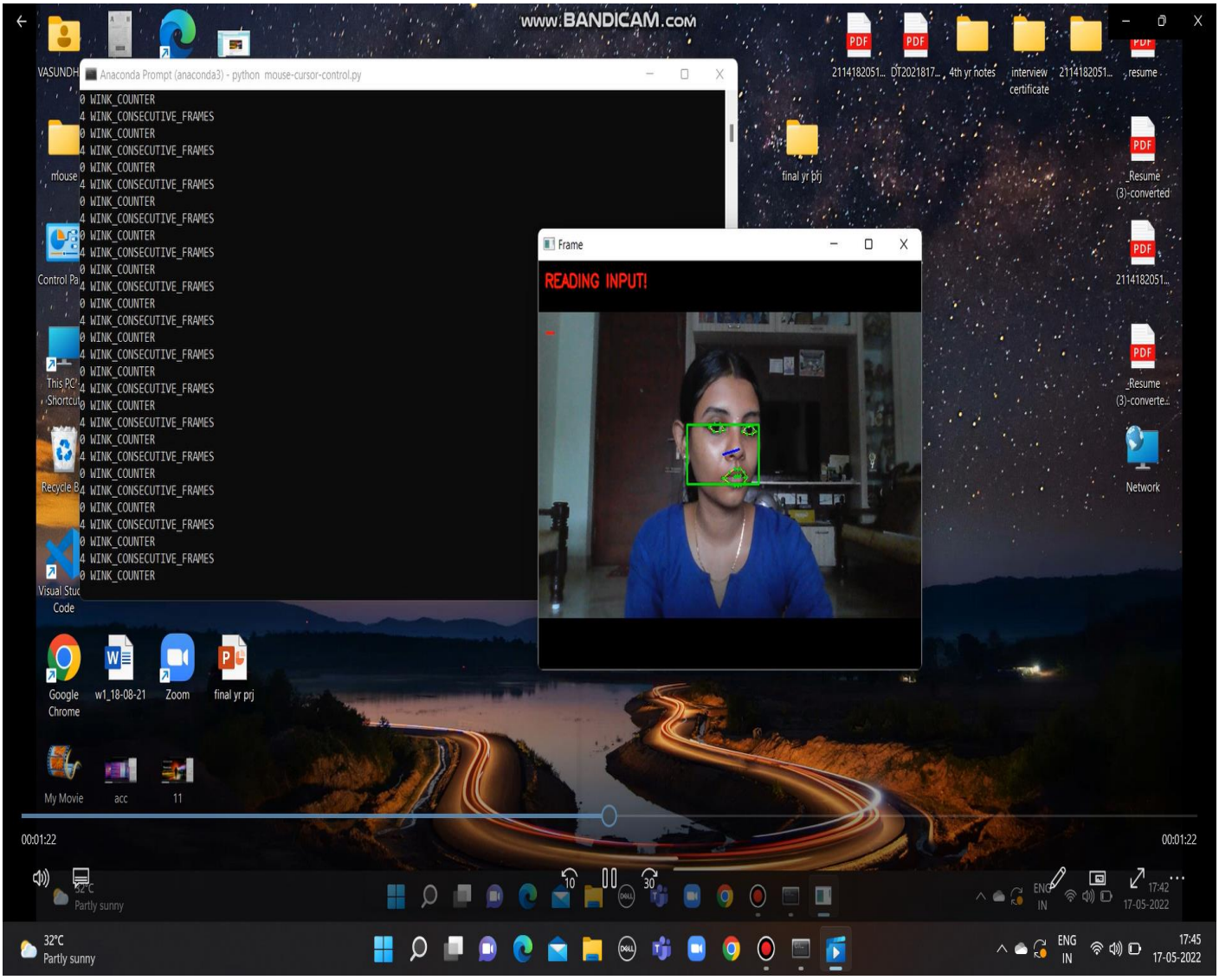
DOWNLOADING THE LIBRARIES :



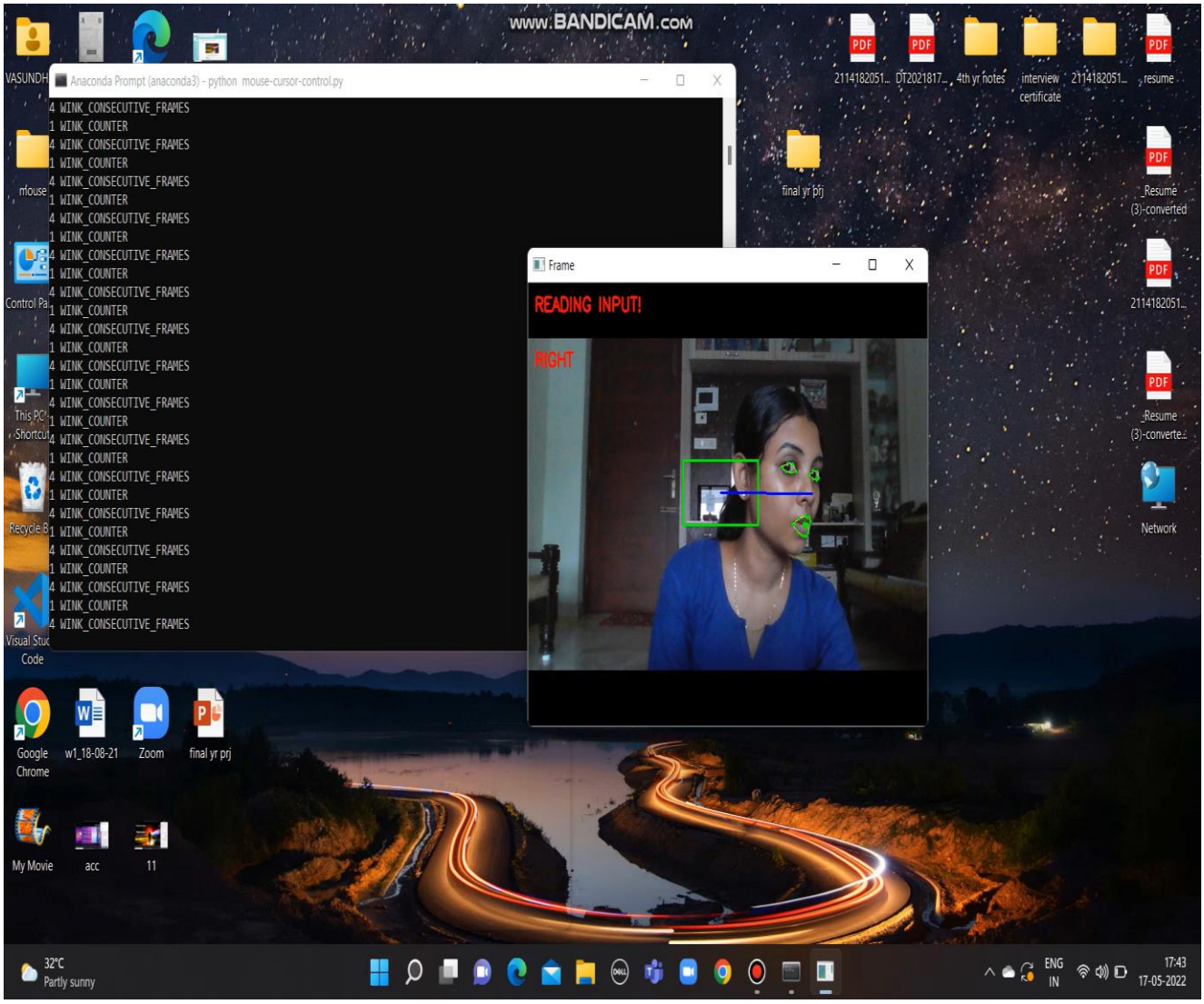
ACTIVATION OF THE ENVIRONMENT AND PROGRAM EXECUTION



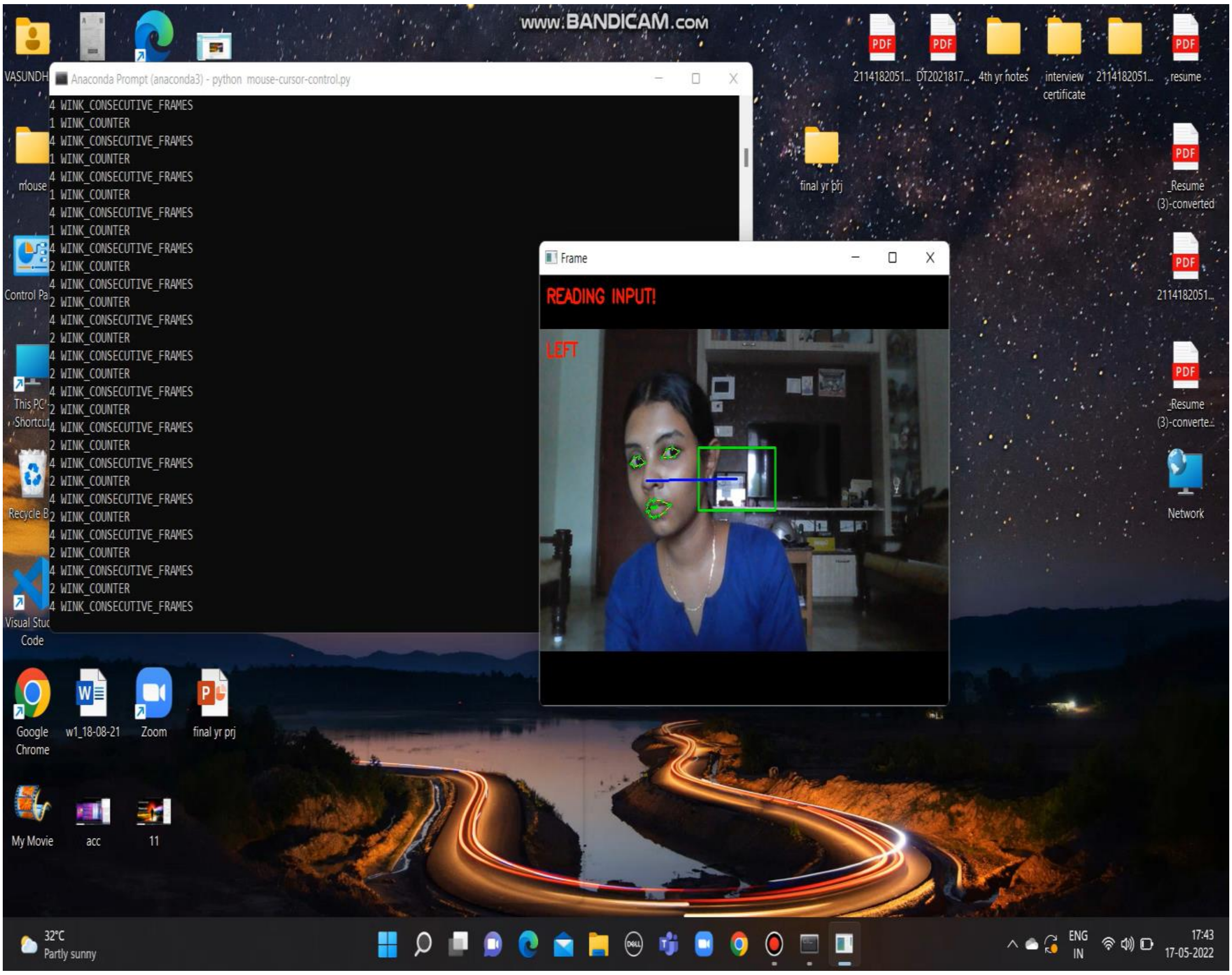
CASE 1: READING INPUT



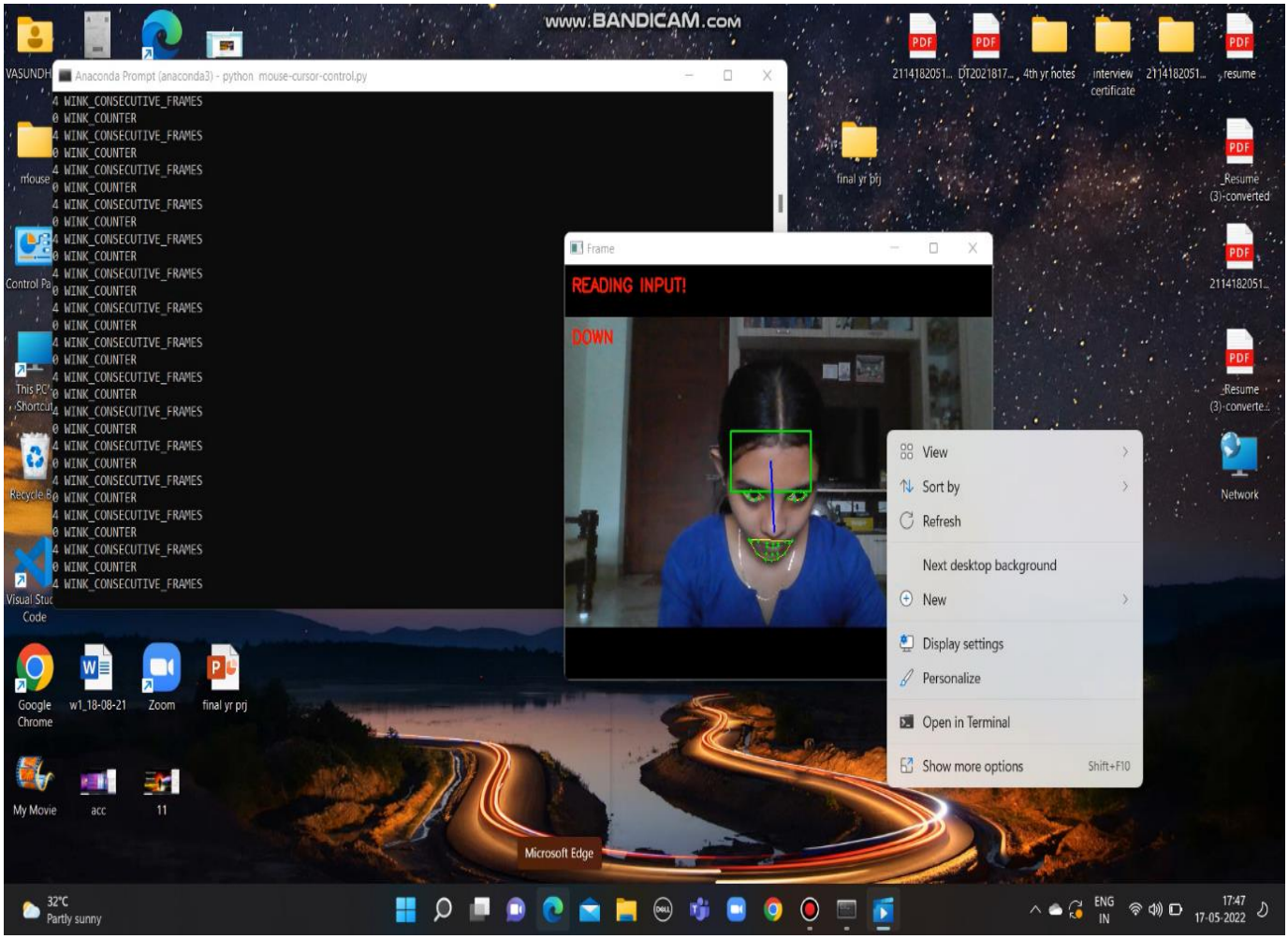
CASE 2: CURSOR RIGHT MOVEMENT



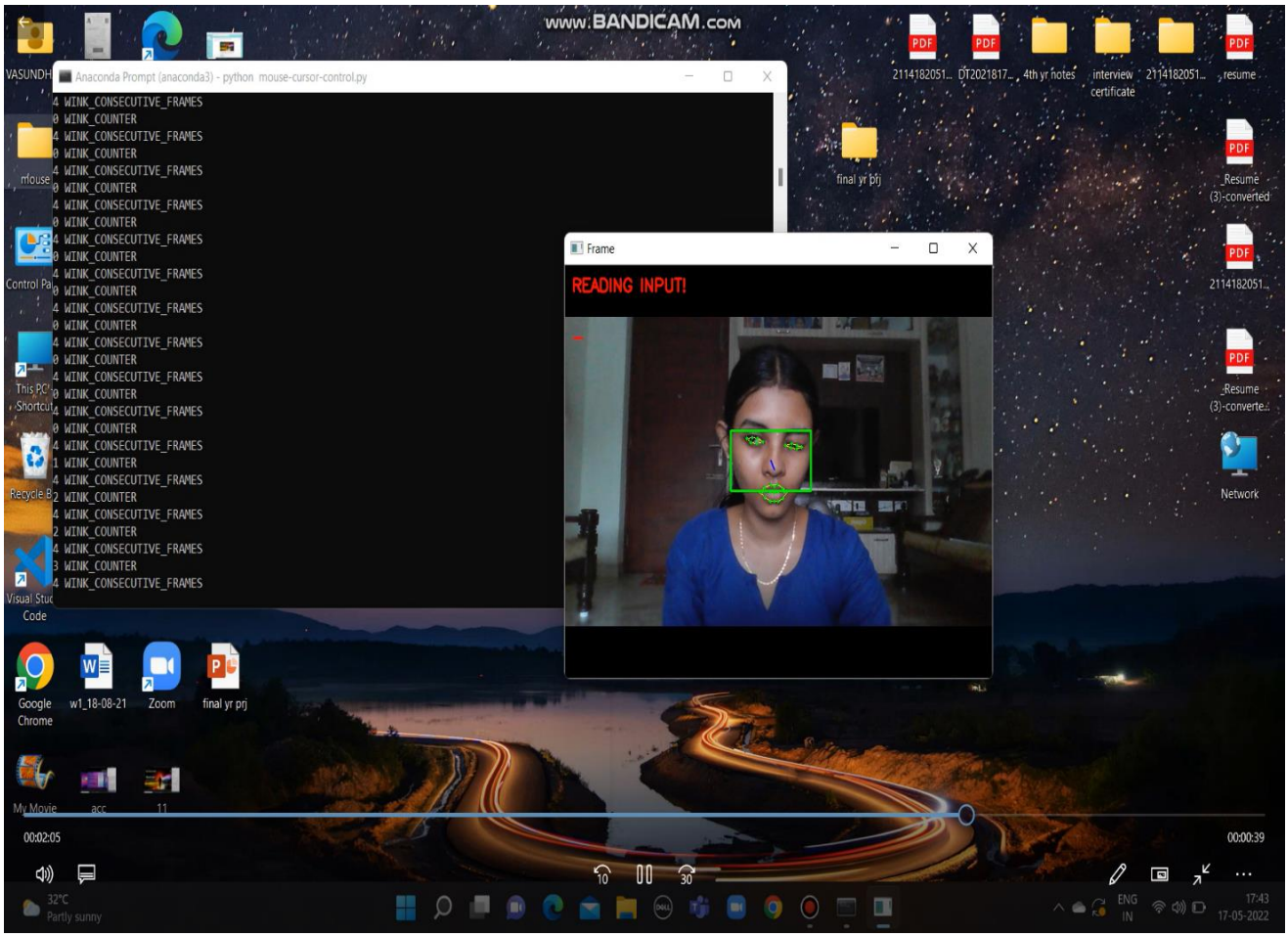
CASE 3: CURSOR LEFT MOVEMENT

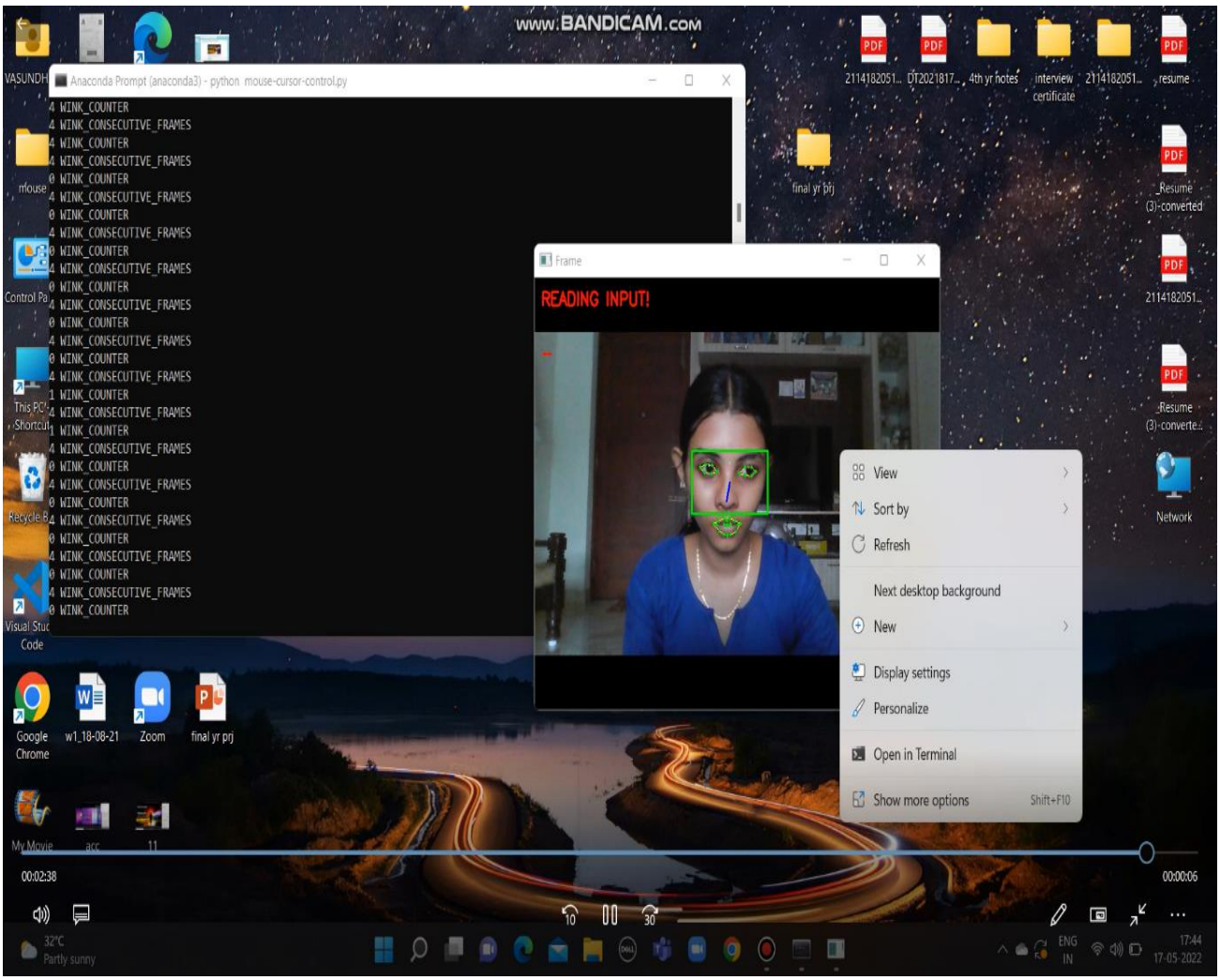


CASE 4: CURSOR DOWN MOVEMENT



CASE 5: CURSOR CLICK MOVEMENT




www.BANDICAM.com
Anaconda Prompt (anaconda3) - python mouse-cursor-control.py
WINK_COUNTER
WINK_CONSECUTIVE_FRAMES
Frame
READING INPUT!
View
Sort by
Refresh
Next desktop background
New
Display settings
Personalize
Open in Terminal
Show more options
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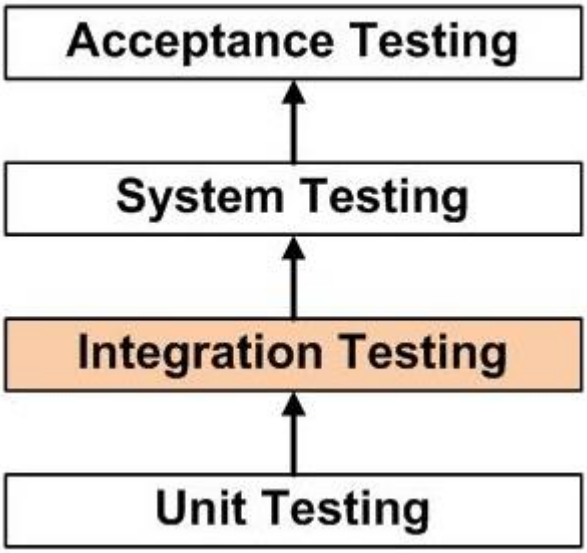
CHAPTER-6

6.1 SYSTEM TESTING AND MAINTENANCE:

Testing is very important to the success of the system. System testing makes a logical assumption that if all components of the system square measure correct, the goal square measure planning to be with success achieved. inside the checking method we have a tendency to test the actual system in a company and gather errors from the new system operates totally potency as stated. System testing is that the stage of implementation, that is aimed to creating sure that the system works accurately and with efficiency. within the checking method we have a tendency to test the actual system during a company and gather errors from the new system and take initiatives to correct the identical. All the front-end and back-end property square measure tested to require care that the new system operates totally potency as declared. System testing is that the stage of implementation, that is intermeshed toward guaranteeing that the system works accurately and with efficiency. The main objective of testing is to uncover errors from the system. For the uncovering method we've to convey correct input data to the system. So, we should always have a lot of acutely aware to convey input data. it is important to relinquish correct inputs to economical testing. Testing is finished for each module. when testing all the modules, the modules are integrated and checking of the last word system is completed with the test knowledge, specially designed to denote that the system can operate with success all told its aspects conditions. so the system testing could also be a confirmation that 72 each one is correct and an opportunity to denote the user that the system works. Inadequate testing or non-testing leads to errors which can seem few months later. This will produce 2 issues, Time delay between the cause and look of the matter. The impact of the system errors on files and records inside the

system. the aim of the system testing is to ponder all the seemingly variations to that it will be steered and push the system to its limits. The testing method focuses on logical intervals of the software system guaranteeing that everyone the statements square measure tested and on the perform intervals (i.e.,) conducting tests to uncover errors and make certain that outlined inputs can produce actual results that settle for as true with the required results. Testing ought to be done exploitation the two common steps Unit testing and Integration testing. inside the project system testing is made as follows: The procedure level testing is made initial. By giving improper inputs, the errors occurred square measure noted and eliminated. This often can be the last word step in system life cycle. Here we have a tendency to implement the tested error-free system into real-life atmosphere and build necessary changes, that runs in an online fashion. Here system maintenance is completed each month or year supported company policies, and is checked for errors like runtime errors, future errors and alternative maintenances like table verification and reports. Integration Testing could also be grade of software system testing wherever individual units square measure combined and tested as a bunch. The purpose of this level is to indicate faults inside the interaction between integrated units. check drivers and check stubs square measure accustomed assist in Integration testing. Integration Testing may be a level of software testing where individual units are combined and tested as a bunch.



The purpose of this level is to show faults within the interaction between integrated units. Test drivers and test stubs are wont to assist in Integration testing.

6.2METHOD

Any of recording equipment Testing, White Box Testing, and grey Box Testing methods may be used. Normally, the strategy depends on your definition of 'unit'.

TASKS:

- Integration Test Plan
  - ♣ Prepare
  - ♣ Review
  - ♣ Rework
  - ♣ Baseline
- Integration Test Cases/Scripts
  - ♣ Prepare
  - ♣ Review

- ♣ Rework
- ♣ Baseline

- Integration Test
  - ♣ Perform

6.3 UNIT TESTING:

Unit testing verification efforts on the littlest unit of software design, module. this is often called “Module Testing”. The modules are tested separately. This testing is dole out during programming stage itself. In these testing steps, each module is found to be working satisfactorily as relevance the expected output from the module.

6.4 RECORDING MACHINE TESTING:

Black box testing, also referred to as Behavioural Testing, may be a software testing method within which the inner structure/ design/ implementation of the item being tested isn't known to the tester. These tests may be functional or non-functional, though usually functional.

6.5 WHITE-BOX TESTING

White-box testing (also named as clear box testing, glass box testing, transparent box testing, and structural testing) can be a technique of testing software that tests internal structures or workings of associate degree application, as opposition its practicality (i.e., black-box testing)

6.6 GREY BOX TESTING

Grey box testing is a technique to check the applying with having a limited knowledge of the inner workings of an application. To check the net Services application usually the grey box testing is employed.

Grey box testing is performed by end-users and also by testers and developers.

6.7 INTEGRATION TESTING:

Integration testing is a systematic technique for constructing tests to uncover error associated within the interface. within the project, all the modules are combined so the complete programmer is tested as an entire. Within the integration-testing step, all the error uncovered is corrected for the following testing steps. Software integration testing is that the incremental integration testing of two or more integrated software components on one platform to provide failures caused by interface defects. The task of the mixing test is to test that components or software applications, e.g. components in a very software package or – one intensify – software applications at the corporate level – interact without error.

6.8ACCEPTANCE-TESTING

User Acceptance Testing is a critical phase of any project and requires significant participation by the tip user. It also ensures that the system meets the functional requirements.

- Acceptance testing for Data Synchronization:
  The Acknowledgements are received by the Sender Node after the Packets are received by the Destination Node.
- The Route add operation is completed only if there's a Route request in need.
- The Status of Nodes information is completed automatically within the Cache Updating process.

6.9 BUILD THE TEST PLAN

Any project can be divided into units that may be further performed for detailed processing. Then a testing strategy for every of this unit is meted out. Unit testing helps to identity the possible bugs within the individual component, therefore the component that has bugs is identified and may be rectified from errors.

CHAPTER 7

CONCLUSION AND SUMMARY

CONCLUSION

A system that allows a disabled person to interact with the computer was successfully developed and tested. The method are often further enhanced to be used in many other applications. The system are often adapted to assist the disabled to regulate home appliances like TV sets, lights, doors etc. The system can also be adapted to be used by individuals suffering from complete paralysis, to operate and control a wheelchair. the attention mouse may be used to detect drowsiness of drivers so as to prevent vehicle accidents. the attention movement detection and tracking have also potential use in gaming and virtual reality.

ENHANCEMENT

Future work may include improving the robustness against the lighting conditions. By using the highly qualified camera operate the operation to urge more accurate result. Adding the scrolling movement (Using nose) functionality. Also add the speech module which can operated by users mouse and launch on the start of the PC. Also, we will add scrolling functionality by using face movements and permit this application for taking part in games and banking sector also.

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