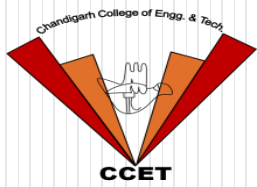


Chandigarh College of Engineering & Technology (CCET -Degree Wing)
(A Govt. College under Chandigarh UT Administration, Chandigarh)
Sector-26, Chandigarh - 160019

PEN AND PAINT

PRESENTED TO:
DR. GULSHAN GOYAL

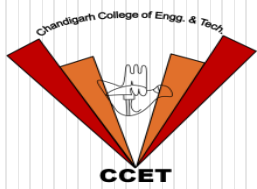
PRESENTED BY :
KRITI AGGARWAL
CO19335
CSE, 1ST YEAR



Chandigarh College of Engineering & Technology (CCET -Degree Wing)
(A Govt. College under Chandigarh UT Administration, Chandigarh) ,Sector-26, Chandigarh -
160019

- INTRODUCTION AND CONCEPT
- TARGET AUDIENCE
- TECHNOLOGIES USED
- MODULES & FEATURES
- WORKING PROTOTYPE
- FEASIBILITY & COMPETITION
- SCOPE FOR FUTURE DEVELOPMENT
- CONCLUSION

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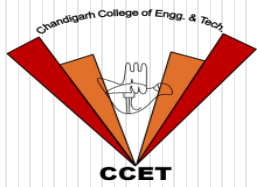


ACKNOWLEDGEMENT

This program is made as a part of IPD training project . I take this opportunity to express my profound gratitude and deep regards to my mentor Dr. Gulshan Goyal for his exemplary guidance.

I also want to thank Dr. M.S. Gujral, Principal, CCET (Degree Wing) for always enlightening our path and providing numerous opportunities for the students in the institute.

I am very grateful that I got a chance to explore my creativity and expand my knowledge.



WHAT IS PEN AND PAINT ?

PEN AND PAINT is a program that allows you to write on the screen by detecting and following the motion of the blue coloured object with the help of opencv.

CONCEPT

- This program is made to meet the current needs of people who do not want to buy expensive touchscreen laptops or other accessories.
- It allows you to enjoy working on laptop and gives the feel of traditional drawing using pen and paper .
- It is simple and easy because it just requires a blue object and the program to be able to draw without touching the screen or the mouse.

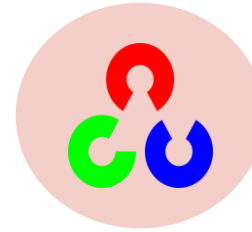
TARGET AUDIENCE

| STUDENTS & TEACHERS | BEGINNER - ARTISTS | MOUTH & FOOT ARTISTS |
|---|---|---|
| Teachers can use this program as a virtual whiteboard to draw diagram and solve equations etc. For subjects like math where writing the equations and jotting down the symbols is very crucial this program can be a life saver for both teachers and students. | It can be used by be beginner artists to practice drawing on pictures without expensive drawing tabs. Also it is a paperless solution for practice doodling and idea drawing. | It can be a motivating factor and a platform for people with special needs since it can be easily used by people without having to move the mouse because of the colour object motion recognition feature . |

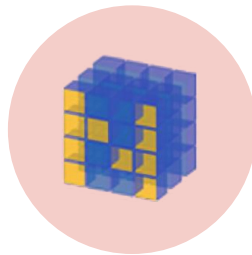
TECHNOLOGIES USED



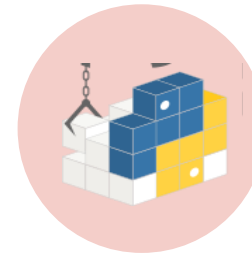
Python 3.8.3 (32 bits)



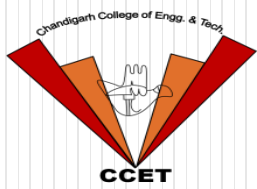
OpenCV 4.4.0



NumPy 1.19.0



Printy 2.1.1



PYTHON

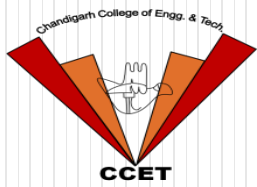
Python is an interpreted, high-level, general-purpose programming language ;
Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant whitespace. It is also famous for its advanced libraries .

OPENCV

OpenCV is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez. The library is cross-platform and free for use under the open-source BSD license.

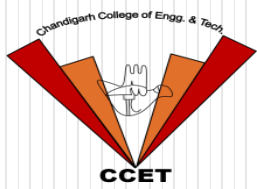
NUMPY

NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays. The ancestor of NumPy, Numeric, was originally created by Jim Hugunin.



PRINTY

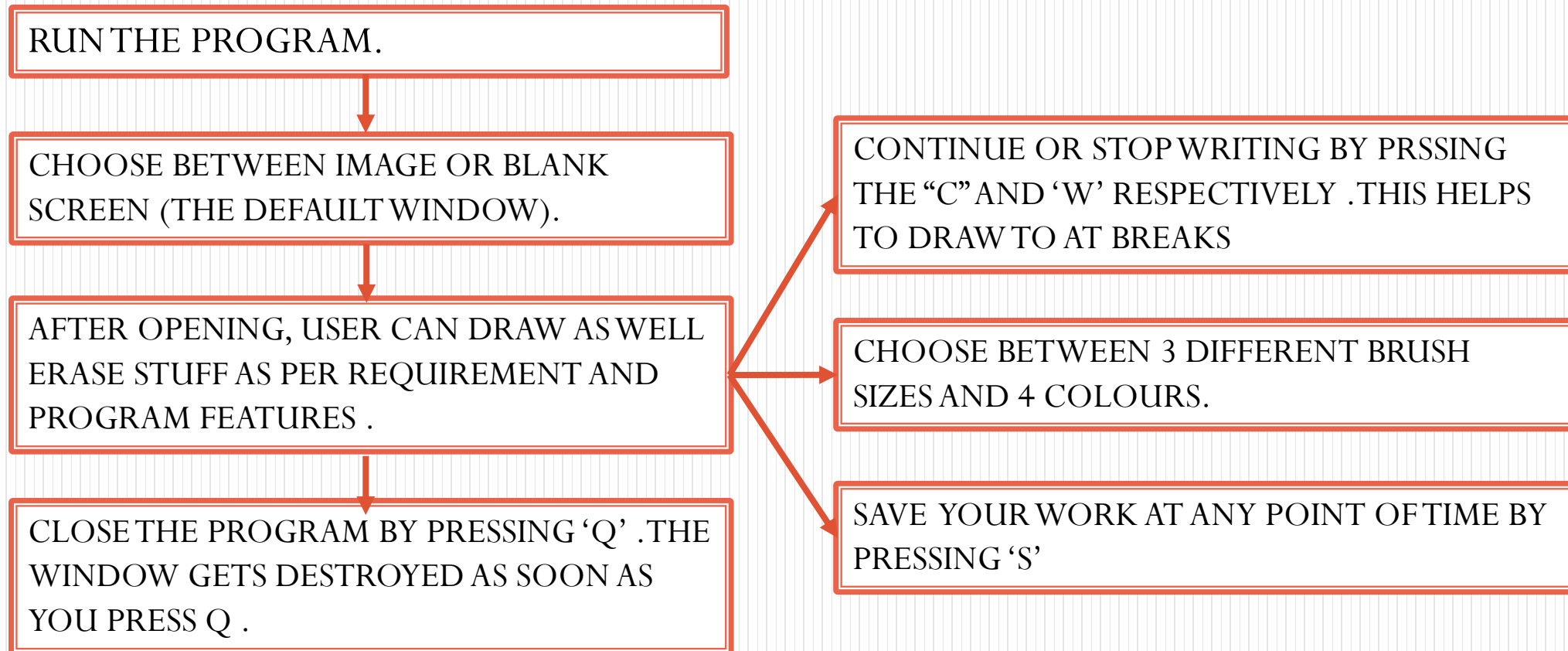
Printy is a light and cross-platform library that extends the functionalities of the built-in functions `print()` and `input()`. It is very simple and easy to use and lets us colorize and apply some standard formats to the text with an intuitive and friendly API based on flags.



WORKING

- This program identifies the blue colour objects through computer vision.
- It then finds the object with largest contour and marks a circle around it.
- As soon as the user presses 'c' it starts to draw on the screen by following the motion of the circled object.
- The program also allows the users to open image of their choice and save their result at any point of time.

BLOCK DIAGRAM



FEATURES

| COMMON | DIFFERENT |
|---|---|
| <ul style="list-style-type: none">✓ FOUR DIFFERENT COLOUR OPTIONS.✓ A SEPERATE PAINT SCREEN FROM THE WEBCAM WINDOW✓ ERASER✓ CLEAN ALL✓ QUIT PROGRAM BY PRESSING 'q' | <ul style="list-style-type: none">✓ DIFFERENT BACKGROUND OF USERS CHOICE FOR THE PAINT WINDOW.✓ 3 DIFFERENT BRUSH SIZE✓ OPTION TO SAVE AT ANY POINT OF TIME IN DESIRED FORMAT✓ STOP AND CONTINUE THE WRITING BY PRESSING 'w' AND 'c' |

THE PRINTY LIBRARY

ipd stuff >  project.py > ...

```
1  #pen and paint
2  # features:
3  # multiple colours _done_
4  # seperate pain screen _done_
5  # erase _done_
6  # clean all _done_
7  # image or white background ? _done_
8  # save the final image _done_
9  # 3 different brush sizes _done_
10 # wait feature i.e. holding the screen to take brake from drawing operation _done_
11
12 #libraries
13 import cv2
14 import numpy as np
15 from printy import printy
16 *****
17 #opening program
18 printy('[cBD]*****WELCOME TO PEN AND PAINT*****@')
19 printy('[mI]This program allows you to draw on the screen by moving the coloured cap in air.@')
20 answer=input('Do you want to see help module :[y/n]')
21 if answer=='y':
22     printy('[o]1.Press q for exit , s for save ,c for enabling pen and w for disabling pen.@ ')
23     printy('[o]2.The default colour of cap that is detected is blue.@')
24     printy('[o]3.A yellow circle gets drawn around the cap that acts as the pointer.@ ')
25     printy('[o]4.Move the pointer circle to chhose from options given on top and also for drawing on screen.@')
26     printy('[o]5.To save paint window you need to specify the complete filename \ (eg:image.jpg\ ) in terminal.@')
27 u=input('Do you want to open some image as background:[y/n] ')
28 if u=='y':
29     address=input('Enter complete address of the image by opening the image and copying its path:  ')
30
```

THE PAINT WINDOW

```
#####
```

```
#setting up the painting screen look
```

```
if u=='n' :
    paintWindow = np.zeros((471,636,3)) + 255    #creating an matrix #white colour
else :
    paintWindow = np.zeros((471,636,3))
    paintWindow=cv2.imread(address)

paintWindow = cv2.rectangle(paintWindow, (40,1), (140,65),(122,122,122), 2)
paintWindow = cv2.rectangle(paintWindow, (160,1), (200,65), colors[0], -1)
paintWindow = cv2.rectangle(paintWindow, (210,1), (250,65), colors[1], -1)
paintWindow = cv2.rectangle(paintWindow, (260,1), (300,65), colors[2], -1)
paintWindow = cv2.rectangle(paintWindow, (310,1), (350,65), colors[3], -1)
paintWindow = cv2.rectangle(paintWindow, (370,1), (410,65), (122,122,122), 2)
paintWindow = cv2.line(paintWindow,(500,32),(530,32),(0,0,0),2)
paintWindow = cv2.line(paintWindow,(550,32),(580,32),(0,0,0),4)
paintWindow = cv2.line(paintWindow,(600,32),(630,32),(0,0,0),6)
cv2.putText(paintWindow, "CLEAR ALL", (49, 33), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 0, 0), 2, cv2.LINE_AA)
cv2.putText(paintWindow, "RUB", (372, 33), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 0, 0), 2, cv2.LINE_AA)
cv2.namedWindow('Paint', cv2.WINDOW_AUTOSIZE)
```


THE WEBCAM FRAME

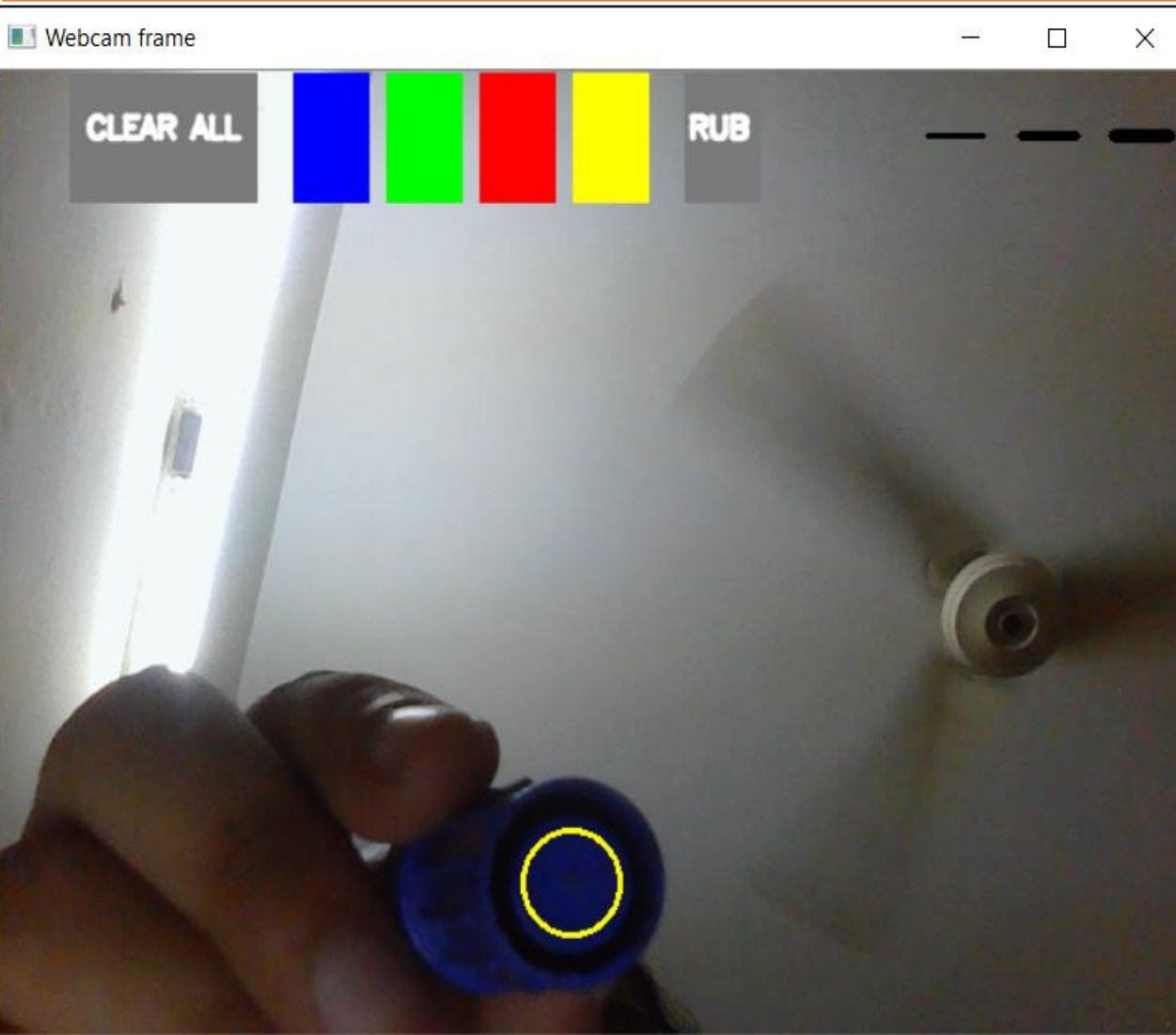
```
73  #*****
74  #for webcam window
75
76  # Load the video
77  camera = cv2.VideoCapture(0)
78  camera.set(10,3000) # brightness
79  # This is the canvas on which we will draw upon
80  canvas = None
81  # Keep looping
82  while True:
83      # Grab the current paintWindow
84      (grabbed, frame) = camera.read()
85      frame = cv2.flip(frame, 1)
86      # Initilize the canvas as a black image
87
88      if canvas is None:
89          canvas = np.zeros_like(frame)
90
91      hsv = cv2.cvtColor(frame, cv2.COLOR_BGR2HSV)
92
93      # Add the coloring options to the frame
94
95      frame = cv2.rectangle(frame, (40,1), (140,65), (122,122,122), -1)
96      frame = cv2.rectangle(frame, (160,1), (200,65), colors[0], -1)
97      frame = cv2.rectangle(frame, (210,1), (250,65), colors[1], -1)
98      frame = cv2.rectangle(frame, (260,1), (300,65), colors[2], -1)
99      frame = cv2.rectangle(frame, (310,1), (350,65), colors[3], -1)
100     frame = cv2.rectangle(frame, (370,1), (410,65), (122,122,122), -1)
```

```
C:\Windows\py.exe
*****WELCOME TO PEN AND PAINT*****
This program allows you to draw on the screen by moving the coloured cap in air.
Do you want to see help module :[y/n]y
1.Press q for exit , s for save ,c for enabling pen and w for disabling pen.
2.The default colour of cap that is detected is blue.
3.A yellow circle gets drawn around the cap that acts as the pointer.
4.Move the pointer circle to choose from options given on top and also for drawing on screen.
5.To save paint window you need to specify the complete filename \(\eg:image.jpg\) in terminal.
Do you want to open some image as background:[y/n]
```

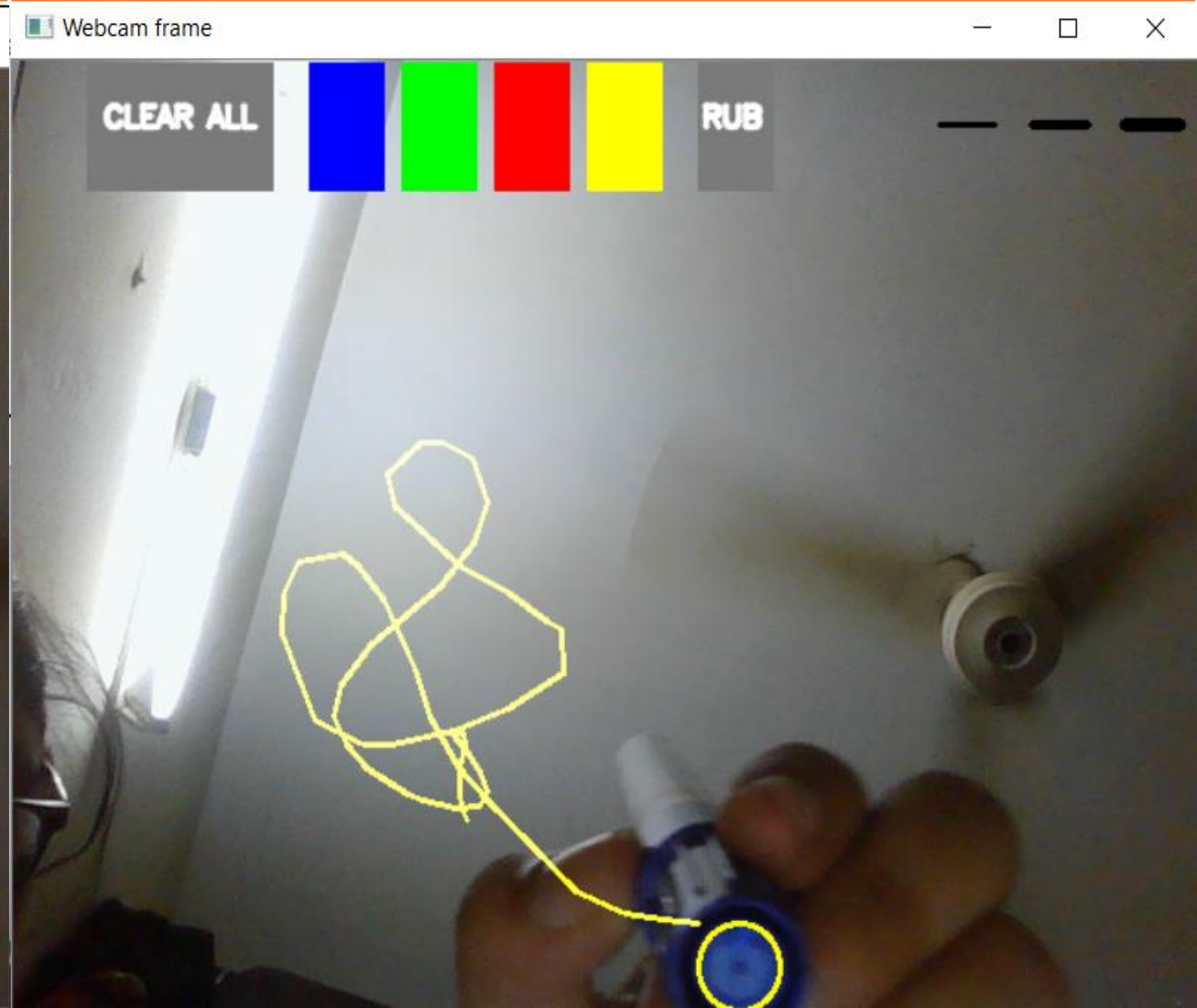
THE TERMINAL

WEB CAM FRAME

The object detection



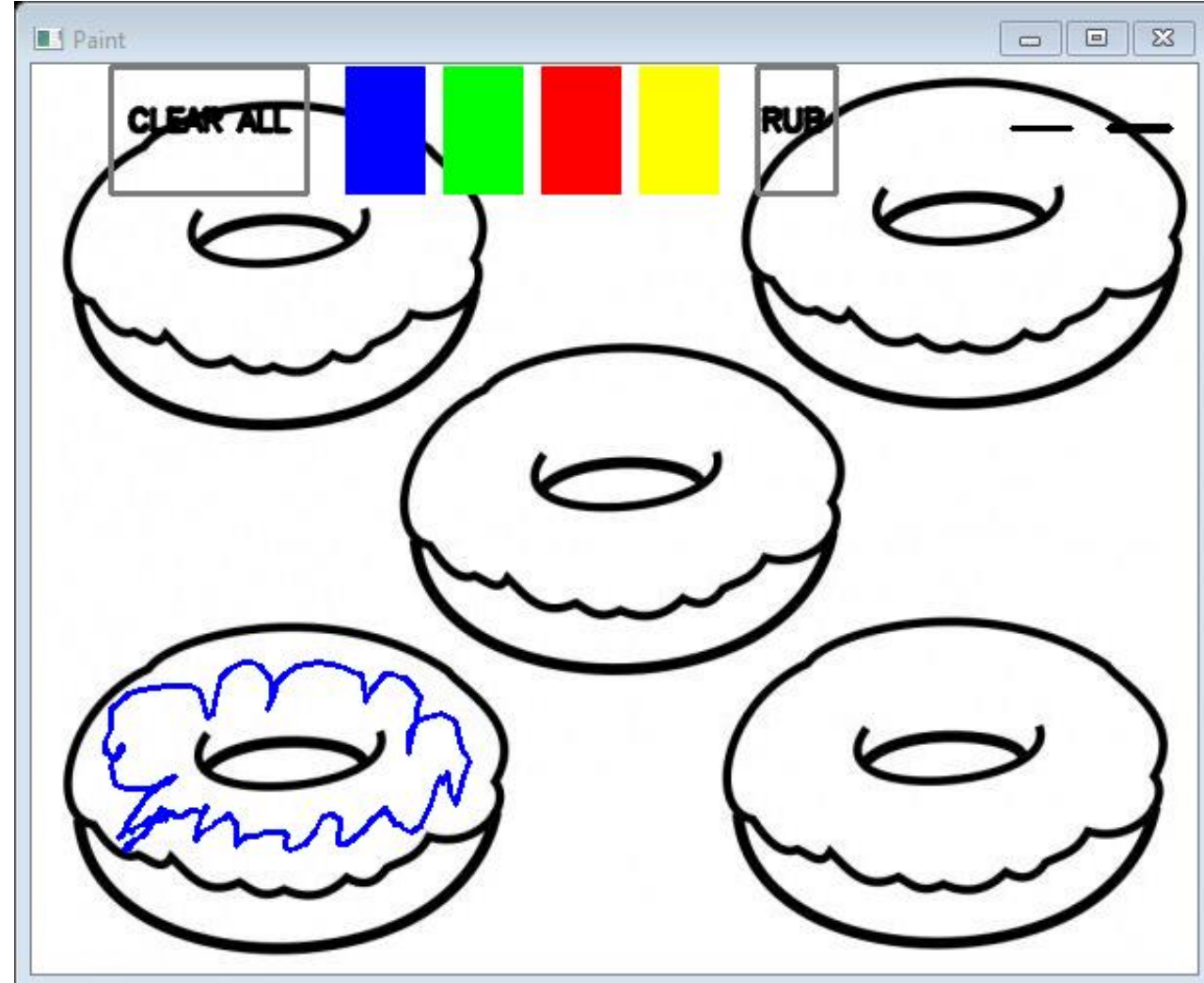
Drawing along with object



THE PAINT WINDOW

DEFAULT BACKGROUND

IMAGE AS BACKGROUND





CLEAR ALL

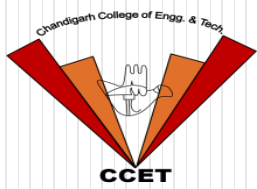
RUB

Kaviti

SAVED IMAGE

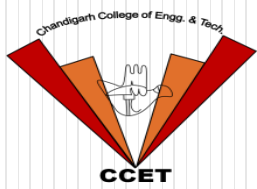
FEASIBILITY

| COMMON | DIFFERENT |
|--|---|
| THE PROJECT IS ECONOMICALLY FEASIBLE AS IT DOES NOT CONTAIN MUCH COMPLICATIONS AND CAN BE USED BY VARIOUS EDUCATIONAL INSTITUTES FOR BENEFIT OF STUDENTS OR BY LEARNING ARTISTS WITHOUT PROCURING MUCH COST. | BUILT USING PYTHON AND IT'S LIBRARIES LIKE OPENCV, NUMPY AND PRINTY ,THIS PROGRAM IS EASY TO UNDERSTAND AND MODIFY. THE ADVANCED LIBRARY OF PYTHON MAKES IT POSSIBLE TO INTEGRATE COMPUTER VISION, IT TECHICALLY FEASIBLE. |



SCOPE FOR FUTURE GROWTH

- ❖ Python is an easy to learn language and there is no end to enhancements one can do in their program.
- ❖ This project can be easily integrated into the online learning platforms as it eliminates the disadvantage of not having blackboard and touch screen laptops/computers.
- ❖ Due to its flexibility there is a lot freedom for modifying to match the institutional requirements.



FUTURE GROWTH STRATEGY

WEB

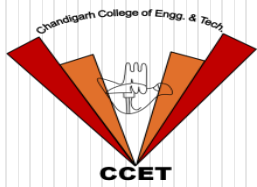
We can move this on to web platforms to allow everybody to access it without having to install python .

APP

We can convert this into an application that allows user to work in offline mode and share online .

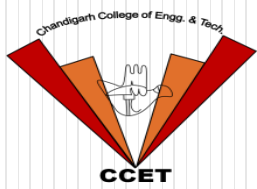
MORE FEATURES

Using more advanced concepts and libraries we can add more drawing options, improve the look and feel.



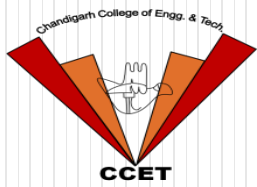
CONCLUSION

THE PROJECT PEN AND PAINT IS TRULY COMPATIBLE TO FUFILL THE DEMANDS OF INDIVIDUALS AND THE NEEDS OF ONLINE TEACHING PLATFORMS. THIS PROJECT CAN BE USED TO TRANFORM THE TRADITIONAL PAINTING APPLICATIONS INTO A MUCH ADVANCED COMUTER VISION APPLICATION THAT CAN MEET THE NEEDS OF TOUCHSCREEN ON A NON-TOUCH SCREEN PLATFORM WITHOUT ANY ADDITIONAL EXPENSE.



REFERENCES

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- <https://www.youtube.com/watch?v=N81PCpADwKQ><https://www.javatpoint.com/opencv>
- <https://www.python.org/downloads/windows>
- <https://code.visualstudio.com/docs/?dv=win>
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- <https://docs.python.org/release/3.8.3/glossary.html>
- <https://opencv.org/>
- <https://numpy.org/doc/stable/>



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THANKYOU