SRM INSTITUTE OF SCIENCE & TECHNOLOGY
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SCHOOL OF COMPUTING

DEPARTMENT OF NETWORKING AND COMMUNICATION

Sketching and Painting an Image

18CSC305J

Artificial Intelligence

Team Member :

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Problem Statement:

While editing photos, we usually apply filters to edit the photos directly and get a sketch representation or a pastel paint representation of the image.

In this project we design a program which discovers the working behind such existing filters and shows the intermediate steps as well before giving the sketch form and pastel paint form.

Description:

Since our project involves image processing we have used OpenCV and Adaptive Thresholding for its development. Rather than making it as a web application we are making an open source software which runs without the requirement of internet and the source code can be modified by user based on his requirements.

So we first take the image as an input, and break it into smaller parts using adaptive thresholding and assign a number to each part.

Then downscale the image and apply a bilateral filter to get a cartoon like effect.

We convert the image to grayscale and then we apply the media blur filter in order to get a blurred effect on the photo. This will help us in making the sketch.

Next step is to identify the edges in the image, which is basically used to get the sketch form of the image.

Then add this to the previously modified images to get a sketch effect. We use Adaptive Threshold for to do this step. Adaptive thresholding breaks the image into small regions and assigns a number to each region.

The painted image is an advanced form of the sketch image obtained.

We compile the final images obtained from the previous steps to get the final output as a painted image.

Source Code:

```
import cv2 #for image processing

import easygui #to open the filebox

import numpy as np #to store image

import imageio #to read image stored at particular path


import sys

import matplotlib.pyplot as plt

import os

import tkinter as tk

from tkinter import filedialog

from tkinter import *

from PIL import ImageTk, Image


top=tk.Tk()

top.geometry('400x400')

top.title('Cartoonify Your Image !')

top.configure(background='white')

label=Label(top,background='#CDCDCD', font=('calibri',20,'bold'))


def upload():

    ImagePath=easygui.fileopenbox()

    cartoonify(ImagePath)
```

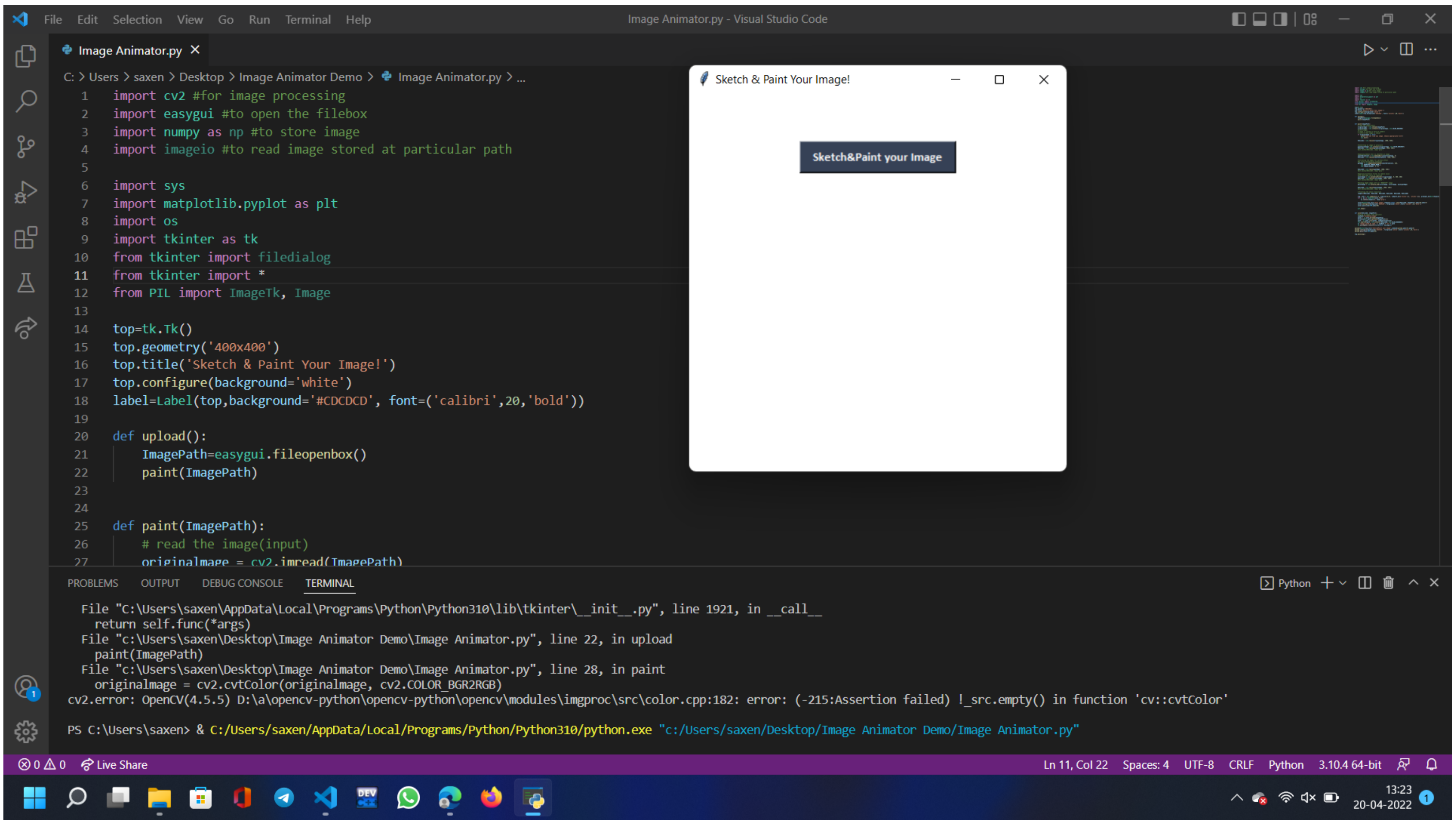
```
def cartoonify(ImagePath):
    # read the image
    originalmage = cv2.imread(ImagePath)
    originalmage = cv2.cvtColor(originalmage, cv2.COLOR_BGR2RGB)
    #print(image)  # image is stored in form of numbers

    # confirm that image is chosen
    if originalmage is None:
        print("Can not find any image. Choose appropriate file")
        sys.exit()

    ReSized1 = cv2.resize(originalmage, (960, 540))
    #plt.imshow(ReSized1, cmap='gray')


    #converting an image to grayscale
    grayScaleImage= cv2.cvtColor(originalmage, cv2.COLOR_BGR2GRAY)
    ReSized2 = cv2.resize(grayScaleImage, (960, 540))
    #plt.imshow(ReSized2, cmap='gray')


    #applying median blur to smoothen an image
    smoothGrayScale = cv2.medianBlur(grayScaleImage, 5)
    ReSized3 = cv2.resize(smoothGrayScale, (960, 540))
    #plt.imshow(ReSized3, cmap='gray')
```

```
#retrieving the edges for cartoon effect
#by using thresholding technique
getEdge = cv2.adaptiveThreshold(smoothGrayScale, 255,
   cv2.ADAPTIVE_THRESH_MEAN_C,
   cv2.THRESH_BINARY, 9, 9)

ReSized4 = cv2.resize(getEdge, (960, 540))
#plt.imshow(ReSized4, cmap='gray')

#applying bilateral filter to remove noise
#and keep edge sharp as required
colorImage = cv2.bilateralFilter(originalImage, 9, 300, 300)
ReSized5 = cv2.resize(colorImage, (960, 540))
#plt.imshow(ReSized5, cmap='gray')


#masking edged image with our "BEAUTIFY" image
cartoonImage = cv2.bitwise_and(colorImage, colorImage, mask=getEdge)

ReSized6 = cv2.resize(cartoonImage, (960, 540))
#plt.imshow(ReSized6, cmap='gray')

# Plotting the whole transition
images=[ReSized1, ReSized2, ReSized3, ReSized4, ReSized5, ReSized6]
```

```
    fig, axes = plt.subplots(3,2, figsize=(8,8), subplot_kw={'xticks':[], 'yticks':
[]}, gridspec_kw=dict(hspace=0.1, wspace=0.1))
    for i, ax in enumerate(axes.flat):
        ax.imshow(images[i], cmap='gray')

    save1=Button(top,text="Save cartoon image",command=lambda:
save(ReSized6, ImagePath),padx=30,pady=5)
    save1.configure(background='#364156',
foreground='white',font=('calibri',10,'bold'))
    save1.pack(side=TOP,pady=50)

    plt.show()


def save(ReSized6, ImagePath):
    #saving an image using imwrite()
    newName="cartoonified_Image"
    path1 = os.path.dirname(ImagePath)
    extension=os.path.splitext(ImagePath)[1]
    path = os.path.join(path1, newName+extension)
    cv2.imwrite(path, cv2.cvtColor(ReSized6, cv2.COLOR_RGB2BGR))
    I= "Image saved by name " + newName +" at "+ path
    tk.messagebox.showinfo(title=None, message=I)

upload=Button(top,text="Cartoonify an
Image",command=upload,padx=10,pady=5)
```

```
upload.configure(background='#364156',
foreground='white',font=('calibri',10,'bold'))

upload.pack(side=TOP,pady=50)


top.mainloop()
```

Output:



```
import cv2 #for image processing
import easygui #to open the filebox
import numpy as np #to store image
import imageio #to read image stored at particular path

import sys
import matplotlib.pyplot as plt
import os
import tkinter as tk
from tkinter import filedialog
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from PIL import ImageTk, Image

top=tk.Tk()
top.geometry('400x400')
top.title('Sketch & Paint Your Image!')
top.configure(background='white')
label=Label(top,background='#CDCDCD', font=('calibri',20,'bold'))

def upload():
    ImagePath=easygui.fileopenbox()
    paint(ImagePath)


def paint(ImagePath):
    # read the image(input)
    originalmage = cv2.imread(ImagePath)
```

```
  File "C:\Users\saxen\AppData\Local\Programs\Python\Python310\lib\tkinter\__init__.py", line 1921, in __call__
    return self.func(*args)
  File "c:\Users\saxen\Desktop\Image Animator Demo\Image Animator.py", line 22, in upload
    paint(ImagePath)
  File "c:\Users\saxen\Desktop\Image Animator Demo\Image Animator.py", line 28, in paint
    originalmage = cv2.cvtColor(originalmage, cv2.COLOR_BGR2RGB)
cv2.error: OpenCV(4.5.5) D:\a\opencv-python\opencv-python\opencv\modules\imgproc\src\color.cpp:182: error: (-215:Assertion failed) !_src.empty() in function 'cv::cvtColor'

PS C:\Users\saxen> & C:/Users/saxen/AppData/Local/Programs/Python/Python310/python.exe "c:/Users/saxen/Desktop/Image Animator Demo/Image Animator.py"
```

Image Animator.py - Visual Studio Code
Sketch & Paint Your Image!
Sketch&Paint your Image

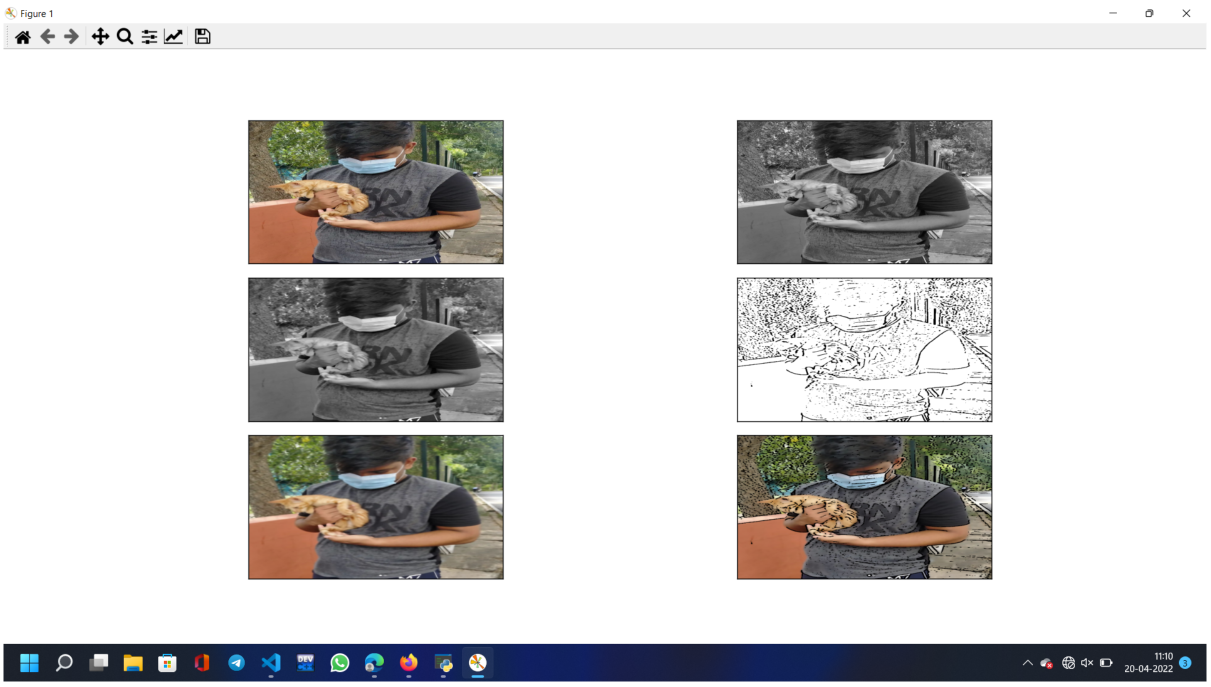


Figure 1
11:10
20-04-2022

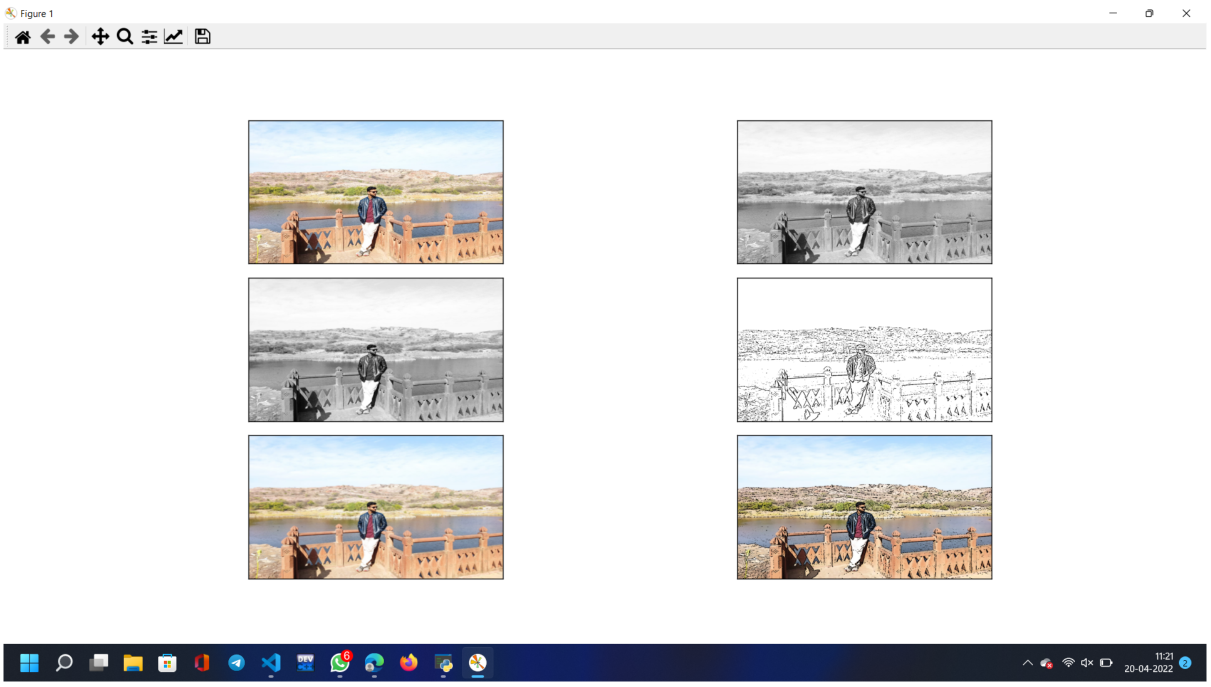
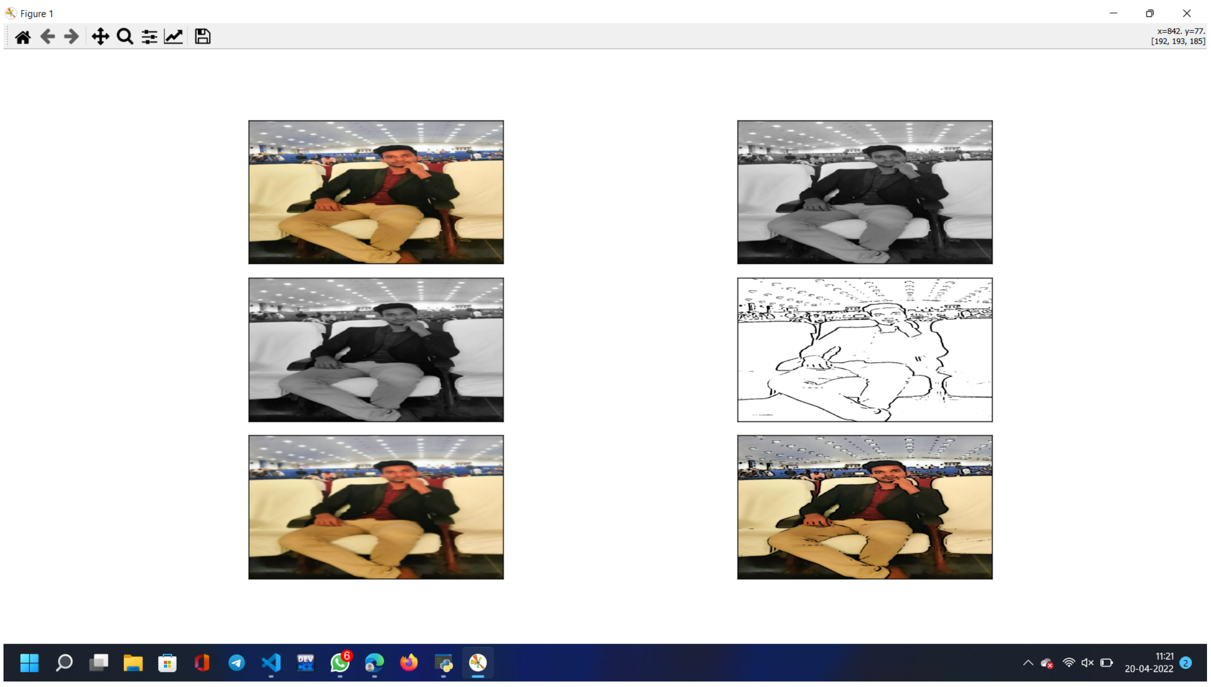


Figure 1
11:21
20-04-2022



Result:

The input images were sketched and filtered successfully.