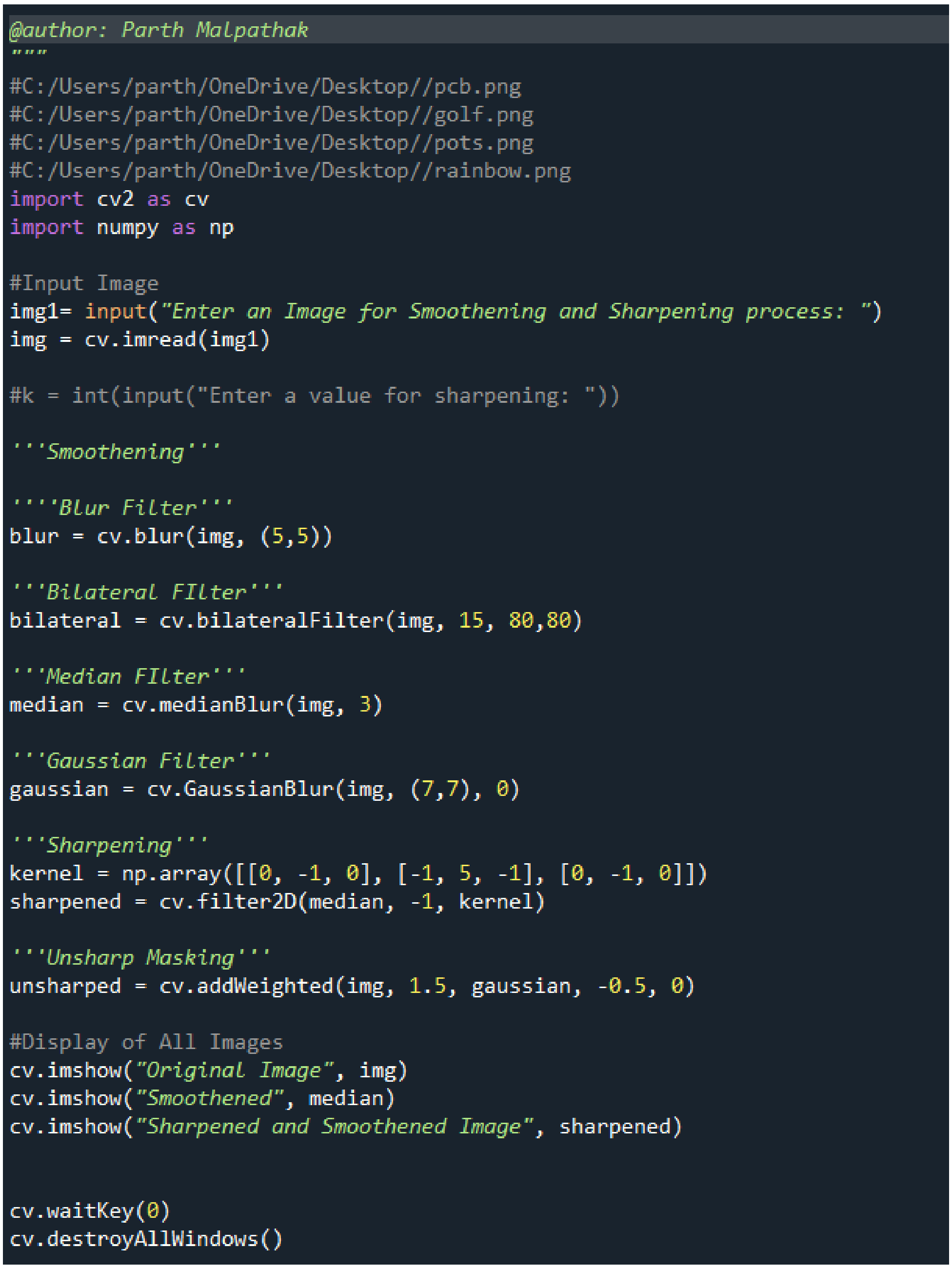
IMAGE IMPROVEMENT USING AREA TO PIXEL FILTERS

CODE:



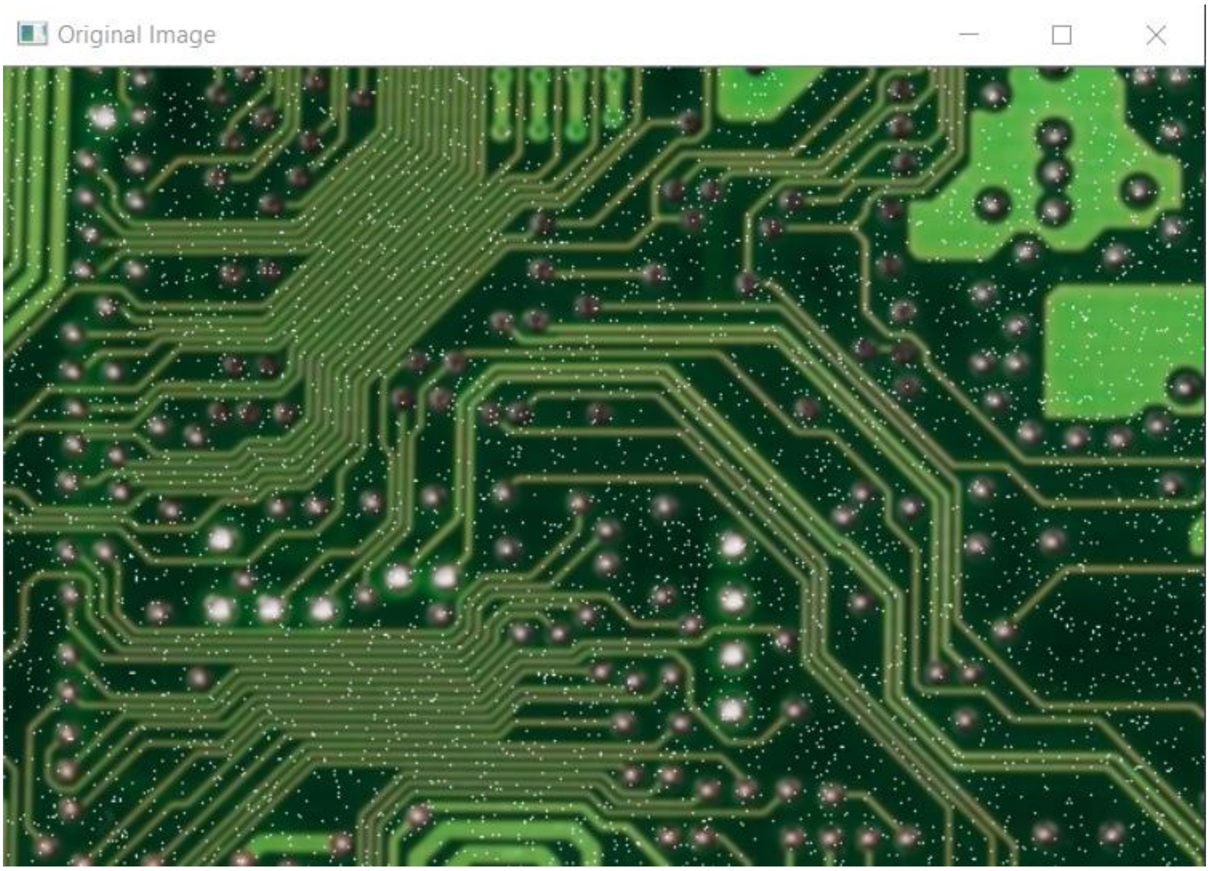
```
@author: Parth Malpathak
"""
#C:/Users/parth/OneDrive/Desktop//pcb.png
#C:/Users/parth/OneDrive/Desktop//golf.png
#C:/Users/parth/OneDrive/Desktop//pots.png
#C:/Users/parth/OneDrive/Desktop//rainbow.png
import cv2 as cv
import numpy as np

#Input Image
img1= input("Enter an Image for Smoothening and Sharpening process: ")
img = cv.imread(img1)

#k = int(input("Enter a value for sharpening: "))

'''Smoothening'''

''''Blur Filter'''
blur = cv.blur(img, (5,5))

'''Bilateral FIlter'''
bilateral = cv.bilateralFilter(img, 15, 80,80)

'''Median FIlter'''
median = cv.medianBlur(img, 3)

'''Gaussian Filter'''
gaussian = cv.GaussianBlur(img, (7,7), 0)

'''Sharpening'''
kernel = np.array([[0, -1, 0], [-1, 5, -1], [0, -1, 0]])
sharpened = cv.filter2D(median, -1, kernel)

'''Unsharp Masking'''
unsharped = cv.addWeighted(img, 1.5, gaussian, -0.5, 0)

#Display of All Images
cv.imshow("Original Image", img)
cv.imshow("Smoothened", median)
cv.imshow("Sharpened and Smoothened Image", sharpened)


cv.waitKey(0)
cv.destroyAllWindows()
```

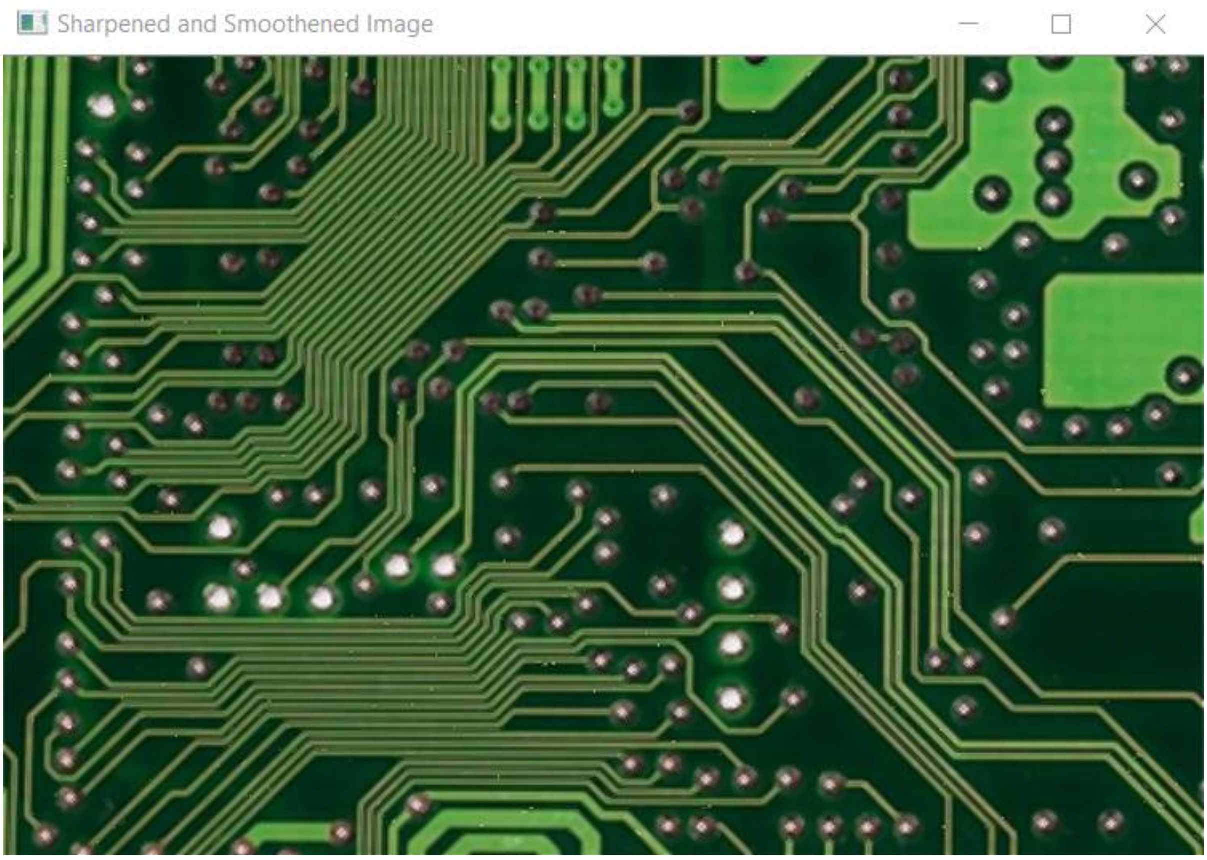
All types of filters mentioned in the question namely- Blur, Gaussian Blur, Median Filter, Bilateral Filter have been used in the program. Sharpening and unsharp masking is also included. The best- looking image was found by trying the best combinations out of all the possible options given.

OUTPUT:

PCB.png

Median filter was initially used after which the image was sharpened using cv.filter2D().

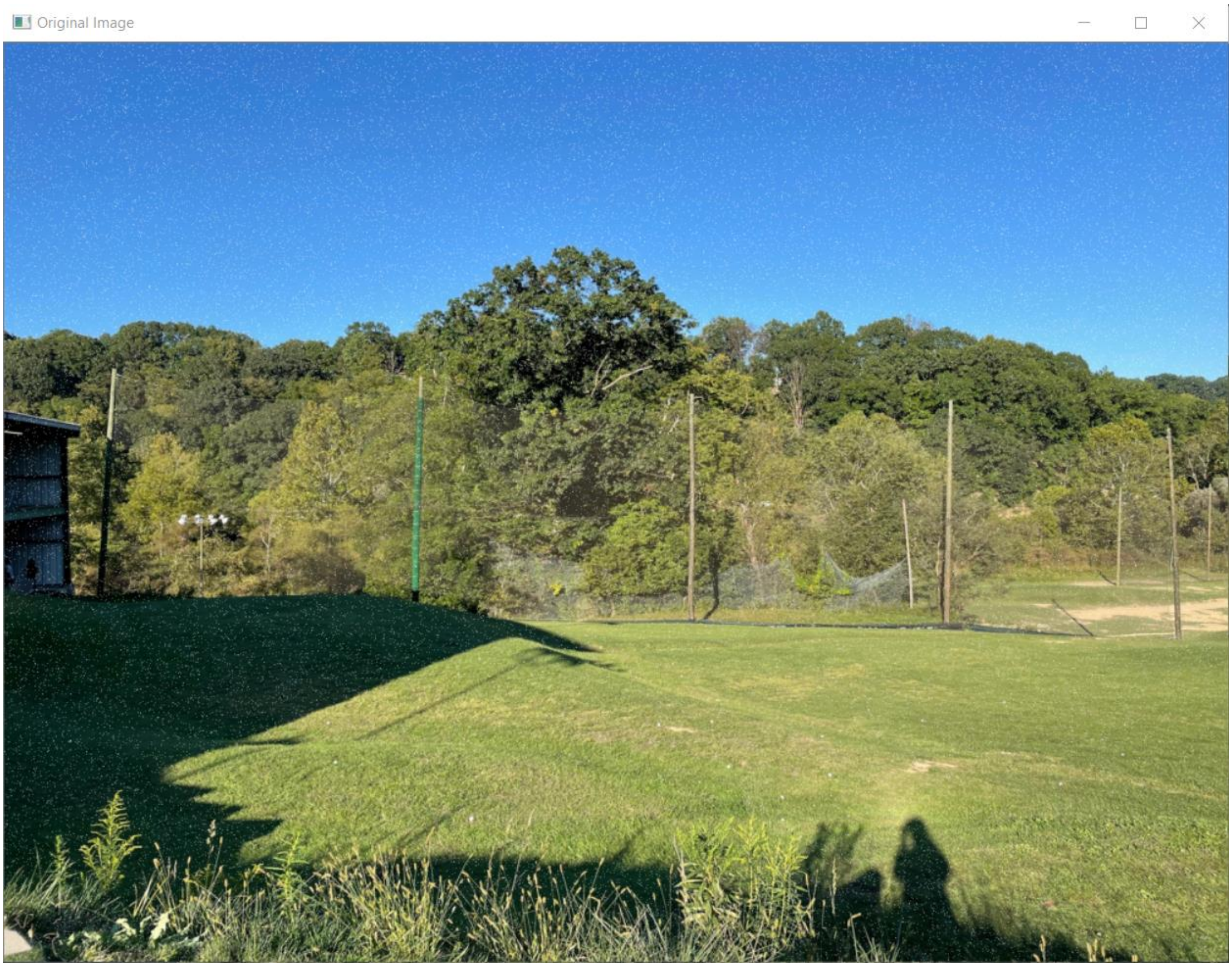


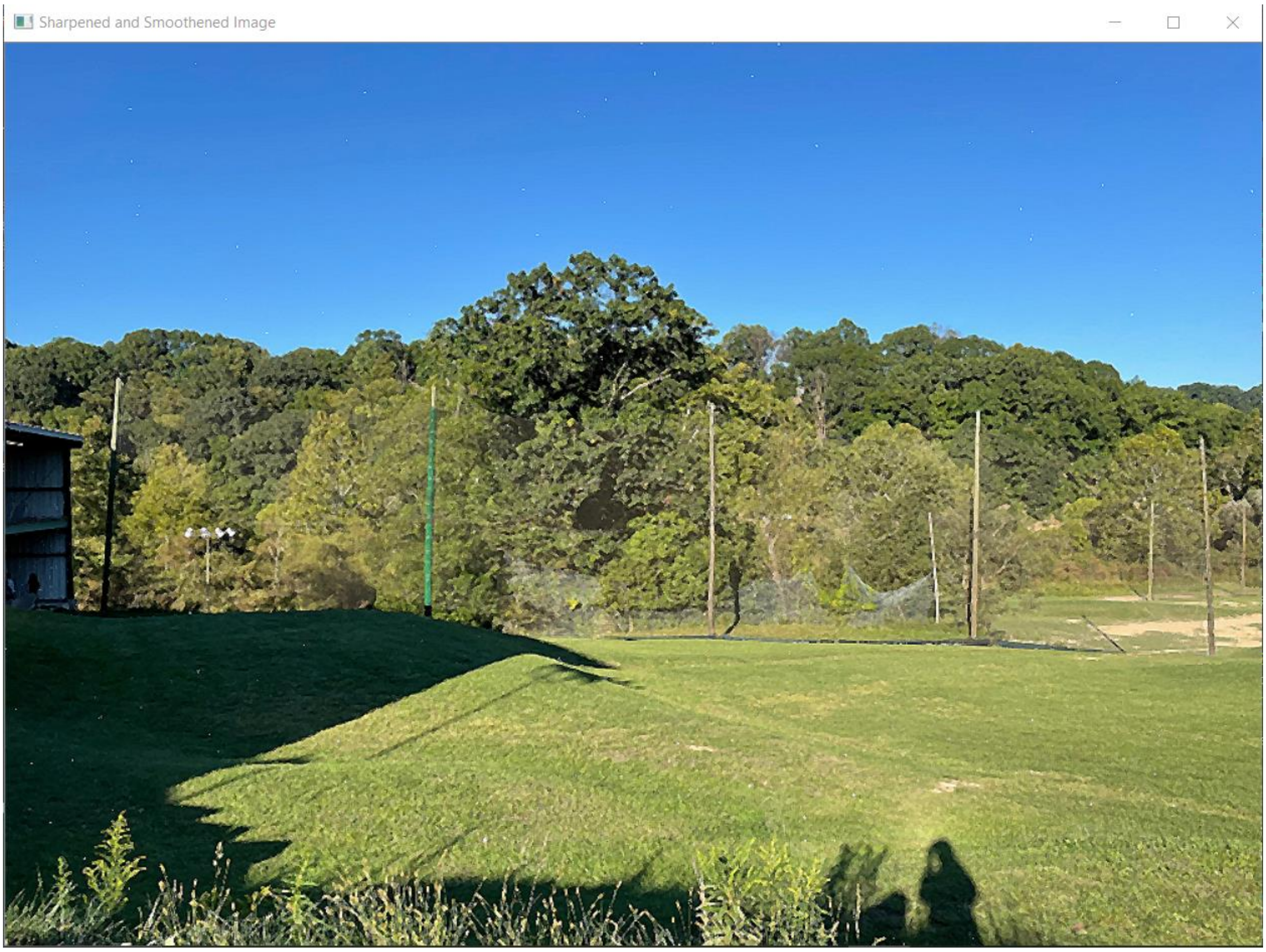


Sharpened and Smoothened Image

Golf.png:

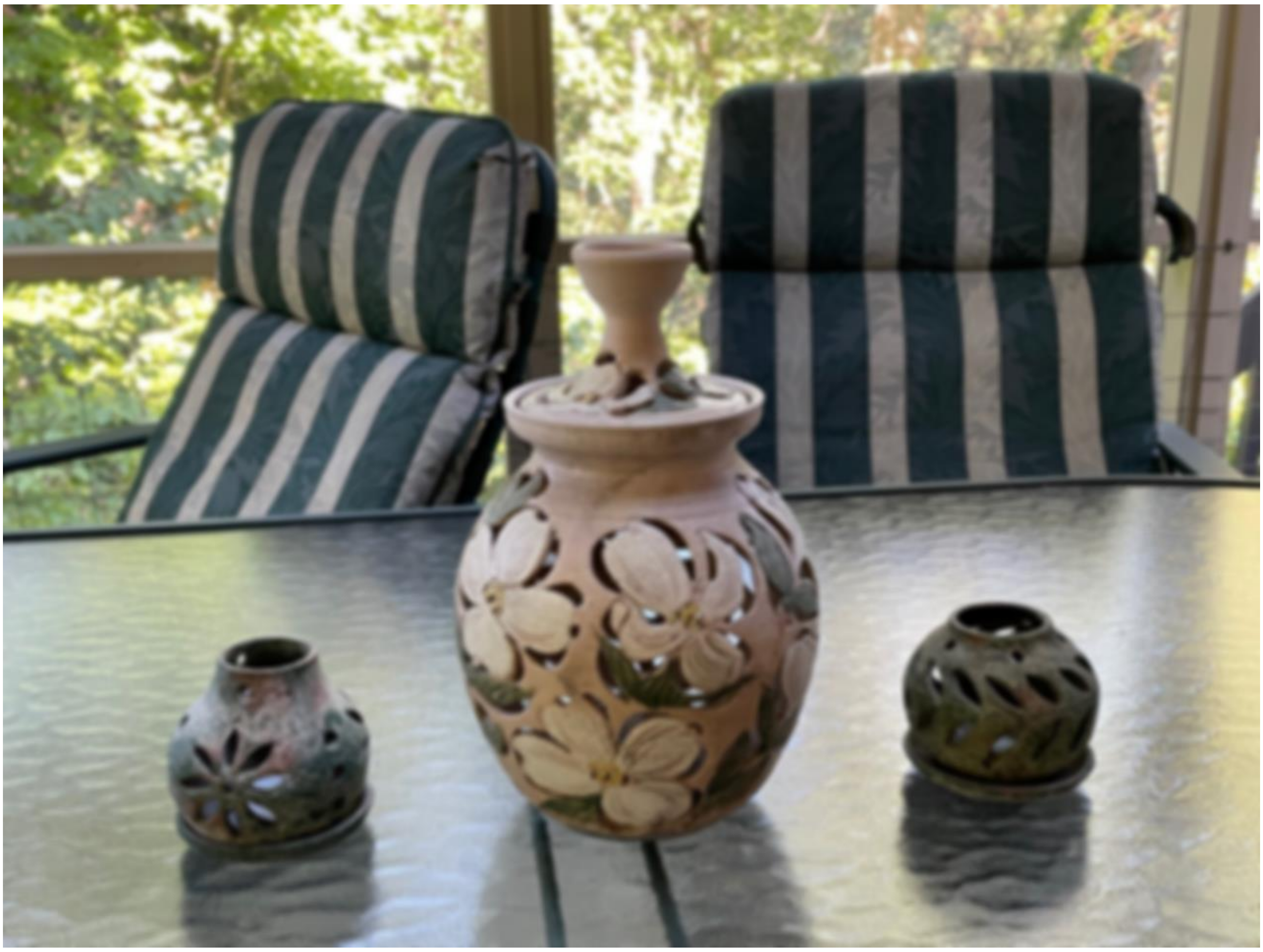
Median filter was initially used after which the image was sharpened using cv.filter2D().

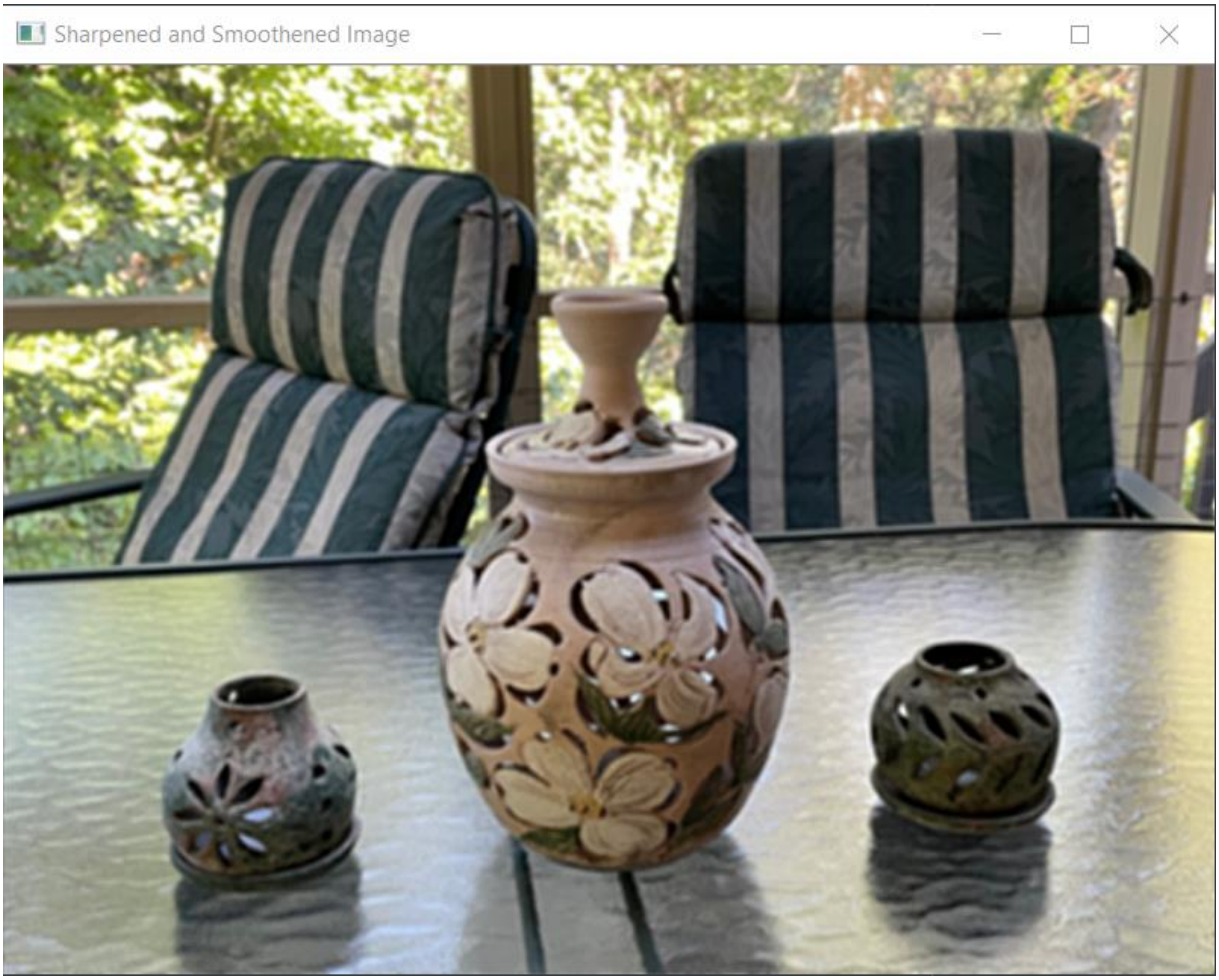



Sharpened and Smoothened Image

Pots.png:

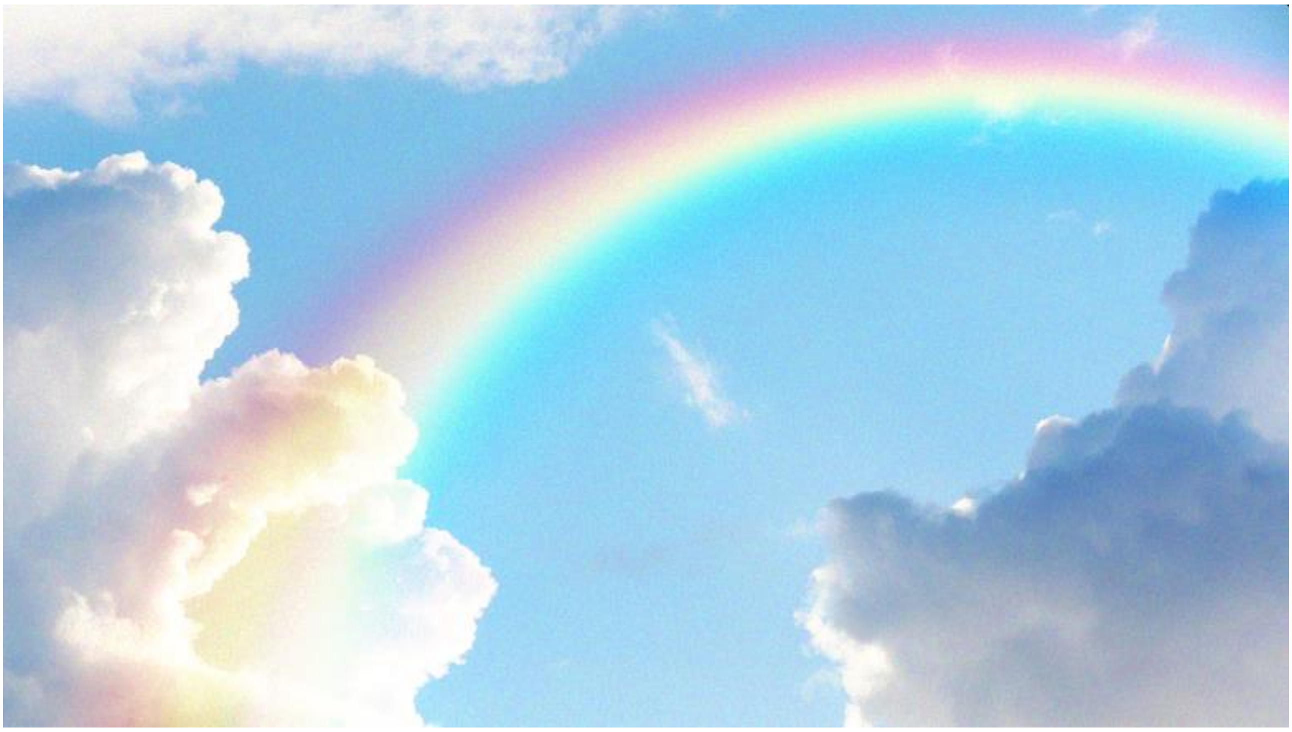
The given image was sharpened to achieve the desired results.

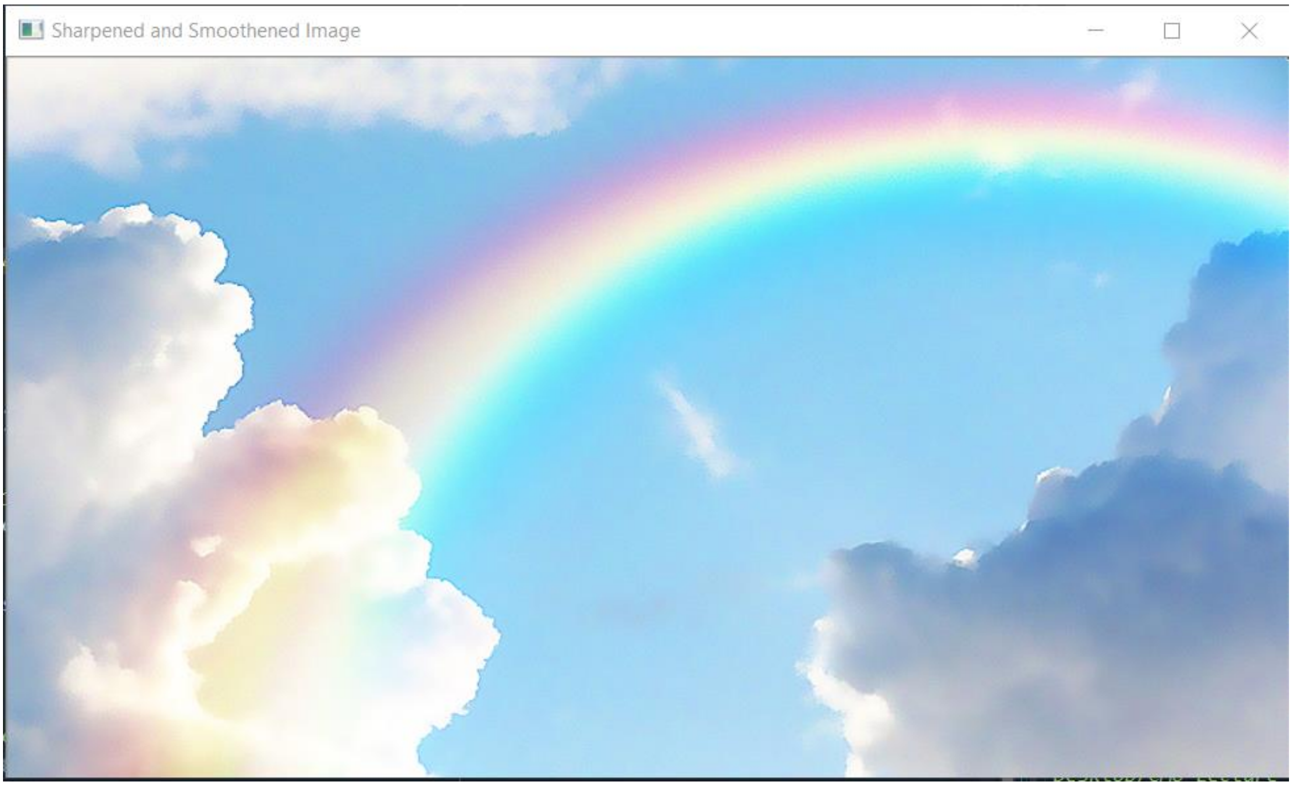



Sharpened and Smoothened Image

Rainbow.png:

Bilateral filter with diameter of 10, sigma color and sigma space of 40 was used along with the sharpening filter to achieve the improved image.





Operating System: Windows 10

IDE: Spyder for final presentation, Jupyter Notebook for trials and testing.

Number of hours spent: 4 hours