

COMPUTER VISION PRACTICAL DOCUMENTATION

Name : DEVU VIJAYAN

Place : NSTI W TRIVANDRUM

AIM: Loading Image Formats Tutorial

LIST OF HARDWARE/SOFTWARE USED:

- ☐ Windows OS
- ☐ VS Code

PROCEDURE:

- Step 1: Open VS code
- Step 2: Create a new Python file
- Step 3: Type the code to execute the program.
- Step 4: Save and run the code

CODE:

#Import libraries

```
import cv2
import matplotlib.pyplot as plt
```

Load an image using OpenCV

```
image_path = "hd1.jpg"
image_cv2 = cv2.imread(image_path)
```

Convert the image from BGR to RGB

```
image_cv2_rgb = cv2.cvtColor(image_cv2, cv2.COLOR_BGR2RGB)
```

Display the image

```
plt.imshow(image_cv2)
plt.title('Image loaded with OpenCV')
plt.show()
```

```
from PIL import Image
```

```
# Load an image using PIL
```

```
image_pil = Image.open(image_path)
```

```
# Display the image
```

```
plt.imshow(image_pil)
```

```
plt.title('Image loaded with PIL')
```

```
plt.show()
```

```
import imageio
```

```
# Load an image using imageio
```

```
image_imageio = imageio.imread(image_path)
```

```
# Display the image
```

```
plt.imshow(image_imageio)
```

```
plt.title('Image loaded with imageio')
```

```
plt.show()
```

```
# PNG image path
```

```
image_path_png = "hd2.png"
```

```
image_path_jpg = "img1.jpg"
```

```
# OpenCV
```

```
image_cv2_png = cv2.imread(image_path_png)
```

```
image_cv2_png_rgb = cv2.cvtColor(image_cv2_png, cv2.COLOR_BGR2RGB)
```

```
plt.imshow(image_cv2_png_rgb)
```

```
plt.title('PNG loaded with OpenCV')
```

```
plt.show()
```

```
# PIL
```

```
image_pil_png = Image.open(image_path_png)
```

```
plt.imshow(image_cv2_png_rgb)
```

```
plt.title('PNG loaded with OpenCV')
```

```
plt.show()
```

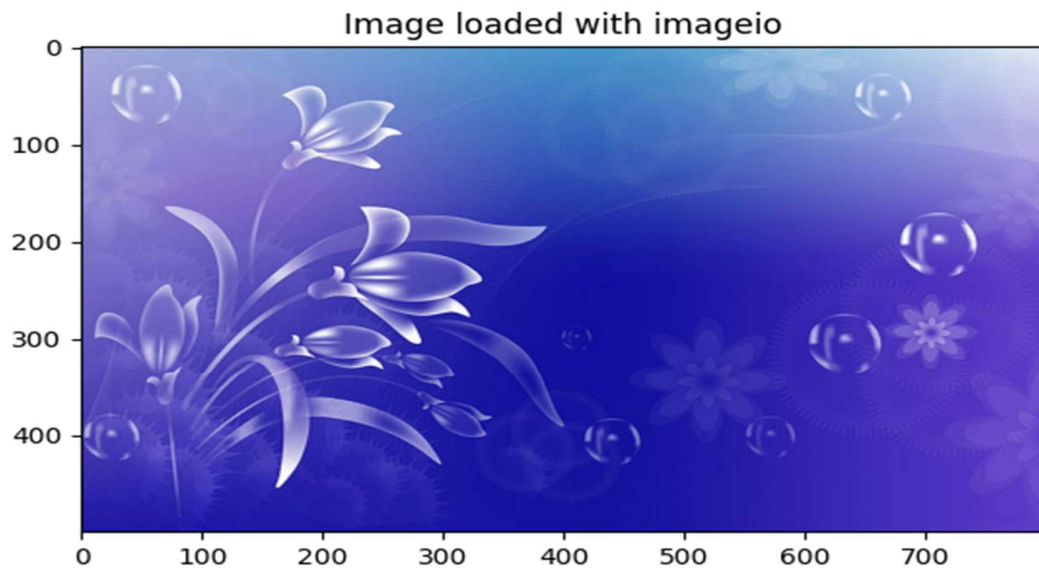
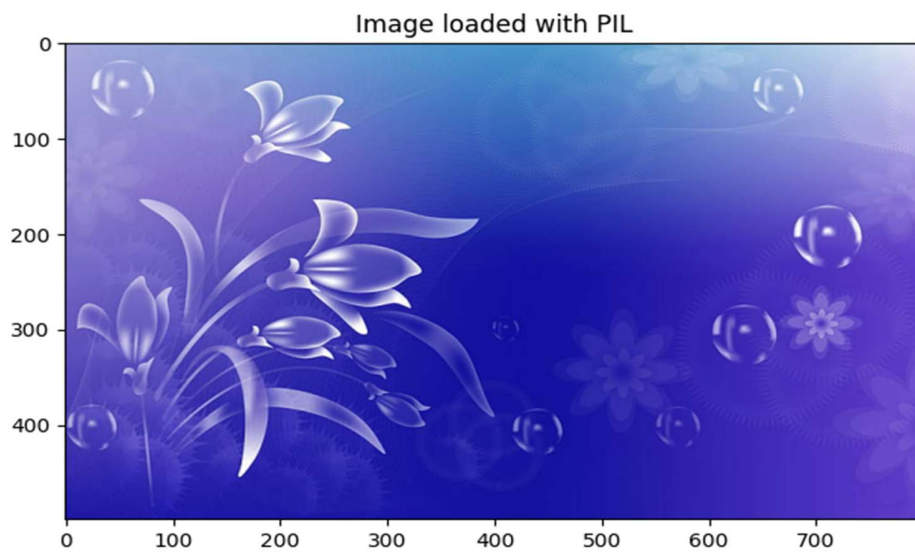
```
# imageio
```

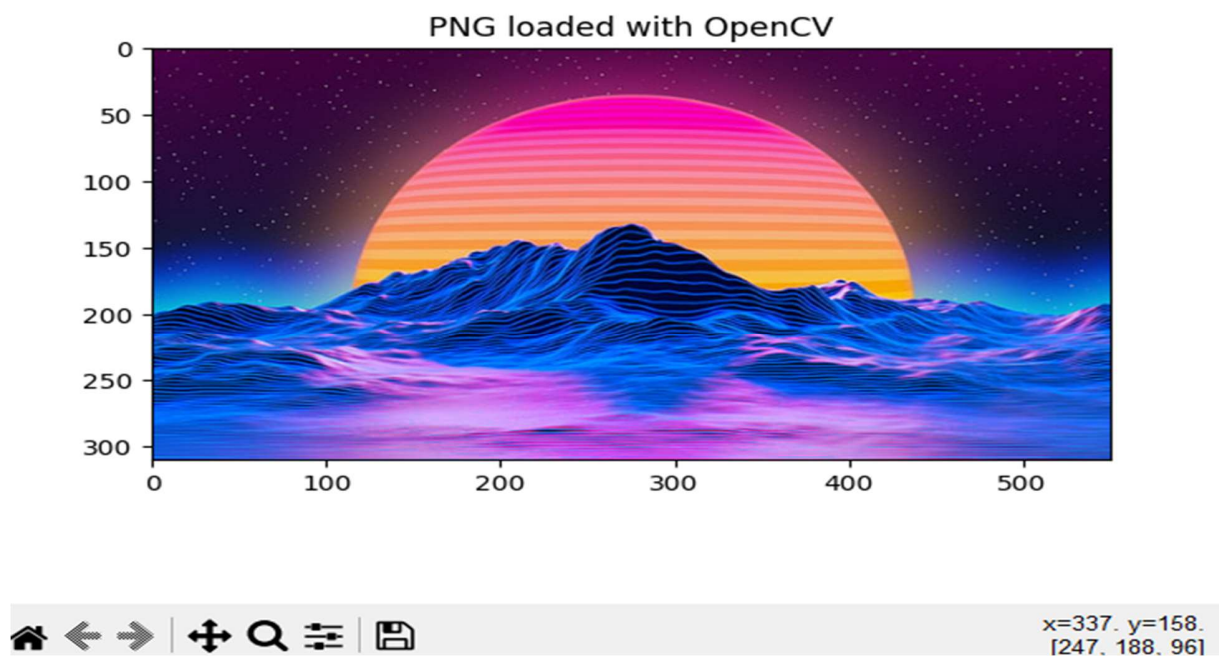
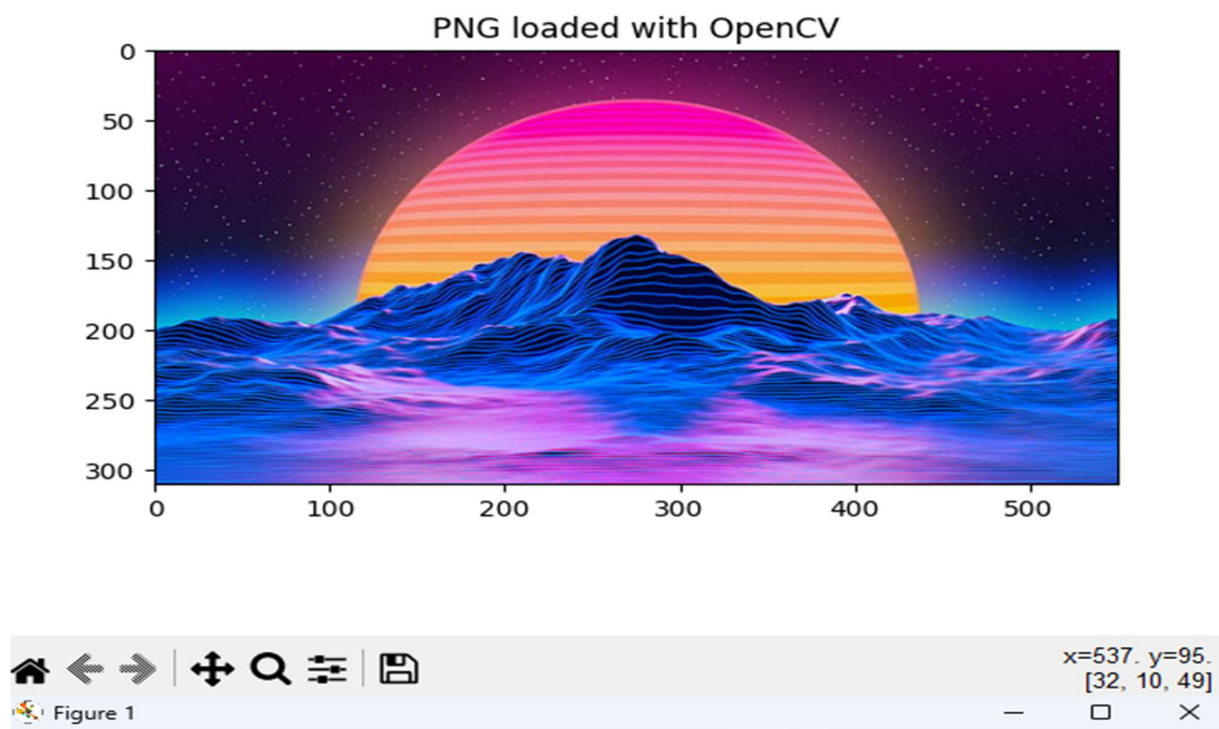
```
image_imageio_png = imageio.imread(image_path_png)
```

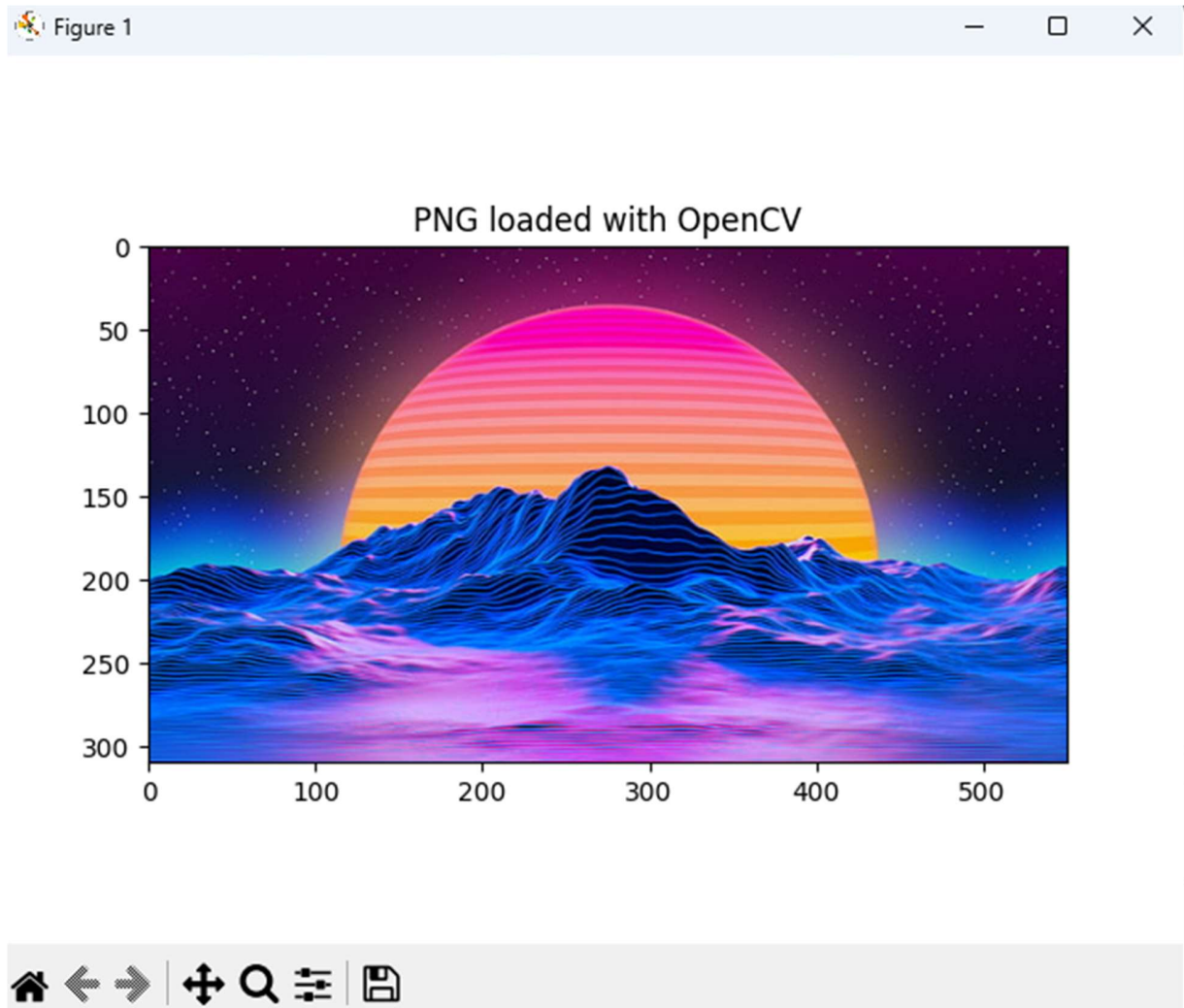
```
plt.imshow(image_cv2_png_rgb)
```

```
plt.title('PNG loaded with OpenCV')  
plt.show()
```

OUTPUT:







Result:

This program executed successfully.

Question 2. Image Resizing, Cropping, and Rotation

LIST OF HARDWARE/SOFTWARE USED:

- ☐ Windows OS

□ VS Code

PROCEDURE:

Step 1: Open VS code
Step 2: Create a new Python file
Step 3: Type the code to execute the program.
Step 4: Save and run the code

CODE:

Load the necessary library

```
import cv2
import matplotlib.pyplot as plt
```

Load an image

```
image = cv2.imread('img.jpg')
```

Convert the image from BGR (OpenCV format) to RGB (Matplotlib format)

```
image_rgb = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
```

Resize image to 256x256 pixels

```
resized_image = cv2.resize(image_rgb, (125, 128))
```

Display the original and resized images

```
plt.figure(figsize=(10, 5))
plt.subplot(1, 2, 1)
plt.title('Original Image')
plt.imshow(image_rgb)
plt.axis('off')
plt.subplot(1, 2, 2)
plt.title('Resized Image (125x128)')
plt.imshow(resized_image)
plt.axis('off')
plt.show()
```

Save or display the resized image

```
# cv2.imwrite('resized_image.jpg', resized_image)
```

Crop image to a region (x, y, width, height)

```
cropped_image = image_rgb[50:130, 50:200]
```

```
# Display the original and resized images
```

```
plt.figure(figsize=(10, 5))  
plt.subplot(1, 2, 1)  
plt.title('Original Image')  
plt.imshow(image_rgb)  
plt.axis('off')  
plt.subplot(1, 2, 2)  
plt.title('cropped_image')  
plt.imshow(cropped_image)  
plt.axis('off')  
plt.show()
```

```
# Rotate image by 45 degrees
```

```
(h, w) = image_rgb.shape[:2]  
center = (w // 2, h // 2)  
M = cv2.getRotationMatrix2D(center, 45, 1.0)  
rotated_image = cv2.warpAffine(image_rgb, M, (w, h))
```

```
# Display the original and resized images
```

```
plt.figure(figsize=(10, 5))  
plt.subplot(1, 2, 1)  
plt.title('Original Image')  
plt.imshow(image_rgb)  
plt.axis('off')  
plt.subplot(1, 2, 2)  
plt.title('rotated_image')  
plt.imshow(rotated_image)  
plt.axis('off')  
plt.show()
```

OUTPUT:

Figure 1



Result:

This program executed successfully.

Question 3. Image Denoising

LIST OF HARDWARE/SOFTWARE USED:

- ☐ Windows OS
- ☐ VS Code

PROCEDURE:

- Step 1: Open VS code
- Step 2: Create a new Python file
- Step 3: Type the code to execute the program.
- Step 4: Save and run the code

CODE:

```
# import necessary libraries
import cv2
import matplotlib.pyplot as plt

# Load an image
image = cv2.imread('hd2.png')

# Convert the image from BGR (OpenCV format) to RGB (Matplotlib format)
image_rgb = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)

# Apply Gaussian blur to denoise
denoised_image = cv2.GaussianBlur(image_rgb, (11, 11), 0)

# Display the original and resized images
```

```
plt.figure(figsize=(10, 5))
plt.subplot(1, 2, 1)
plt.title('Original Image')
plt.imshow(image_rgb)
plt.axis('off')
plt.subplot(1, 2, 2)
plt.title('denoised_image')
plt.imshow(denoised_image)
plt.axis('off')
plt.show()
```

Convert to grayscale

```
gray_image = cv2.cvtColor(image_rgb, cv2.COLOR_BGR2GRAY)
```

Apply histogram equalization

```
equalized_image = cv2.equalizeHist(gray_image)
```

Display the original and resized images

```
plt.figure(figsize=(10, 5))
plt.subplot(1, 2, 1)
plt.title('Gray Image')
plt.imshow(gray_image, cmap="gray")
plt.axis('off')
plt.subplot(1, 2, 2)
plt.title('equalized_image')
plt.imshow(equalized_image, cmap="gray")
plt.axis('off')
plt.show()
```

OUTPUT:-

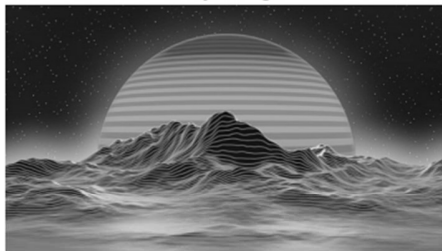
Original Image



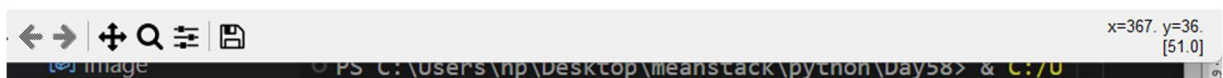
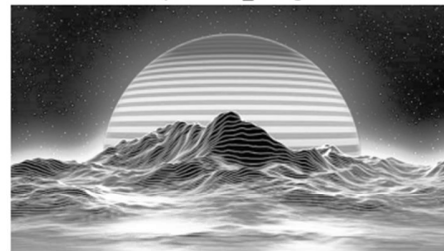
denoised_image



Gray Image



equalized_image



Result:

This program executed successfully.