Assignment : Lab_1-Reading an image

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1.Take a head shot picture of yourself I. Read and display the image

In [8]:
```
import cv2
import matplotlib.pyplot as plt

# Replace 'Sharath_DIP.jpeg' with the full path to your image file
file_path = 'Sharath_DIP.jpg'

# Read the image using OpenCV
image = cv2.imread(file_path)

# Convert the image from BGR to RGB (OpenCV reads images in BGR format)
image = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)

# Display the image using Matplotlib
plt.imshow(image)
plt.axis('off')  # Hide the axes
plt.show()
```

In [21]:
```
output_file_path = 'Sharath_DIPP.jpg'
cv2.imwrite(output_file_path, cv2.cvtColor(image, cv2.COLOR_RGB2BGR))
```

Out[21]:
```
True
```

II. Print the coordinates

In [12]:
```
import cv2

file_path = 'Sharath_DIP.jpg'

# Read the image using OpenCV
image = cv2.imread(file_path)

# Check if the image is loaded successfully
if image is None:
    print("Error: Unable to load the image.")
else:
    # Get the dimensions (height and width) of the image
    height, width, _ = image.shape

    # Print the dimensions
    print("Image Height:", height)
    print("Image Width:", width)
```

```
Image Height: 1280
Image Width: 1029
```

III. Print the picture intensity

In [15]:
```
b, g, r = cv2.split(image)

r_intensity_values = []
g_intensity_values = []
b_intensity_values = []

    # Iterate over the first 100 pixels of each band
for i in range(100):
        r_intensity_values.append(r[0, i])
        g_intensity_values.append(g[0, i])
        b_intensity_values.append(b[0, i])

    # Print the intensity values for each band
print("Red Intensity Values (first 100 pixels):", r_intensity_values)
print("Green Intensity Values (first 100 pixels):", g_intensity_values)
print("Blue Intensity Values (first 100 pixels):", b_intensity_values)
```

```
Red Intensity Values (first 100 pixels): [255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255]
Green Intensity Values (first 100 pixels): [255, 255, 255, 255, 255, 255, 255, 255, 2
55, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 2
55, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 2
55, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 2
55, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 2
55, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 2
55, 255, 255, 255, 255, 255, 255]
Blue Intensity Values (first 100 pixels): [255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 25
5, 255, 255, 255, 255, 255, 255]
```

IV. Is this a digital image? Explain why.

Answer: Yes, this qualifies as a digital image. It's loaded into memory as a digital representation when we open it using the PIL library in Python. From this digital representation, we can extract color and intensity information to analyze or manipulate the image as necessary.

2.Convert the Picture from 1 above to gray color and display

In [14]:
```python
import cv2
import matplotlib.pyplot as plt

file_path = 'Sharath_DIP.jpeg'

# Read the image using OpenCV
img = cv2.imread(file_path, cv2.IMREAD_GRAYSCALE)

# Check if the image is loaded successfully
if img is None:
    print("Error: Unable to load the image.")
else:
    # Display the grayscale image using Matplotlib
    plt.imshow(img, cmap='gray')
    plt.axis('off')  # Turn off axis
    plt.show()
```

In [22]:
```
output_file_path = 'Sharath_DIP.jpg'
cv2.imwrite(output_file_path, cv2.cvtColor(image, cv2.COLOR_BGR2GRAY))
```

Out[22]:
```
True
```

I. Print the coordinates.

In [17]:
```
img_gray = cv2.imread(file_path, cv2.IMREAD_GRAYSCALE)

if img_gray is None:
    print("Error: Unable to load the image.")
else:

    height, width = img_gray.shape[:2]


    print("Image Width:", width)
    print("Image Height:", height)
```

```
Image Width: 1029
Image Height: 1280
```

II. Print the picture intensity

In [20]:
```
import numpy as np

file_path = 'Sharath_DIP.jpg'
# Read the image using OpenCV
img_gray = cv2.imread(file_path, cv2.IMREAD_GRAYSCALE)

# Check if the image is loaded successfully
if img_gray is None:
    print("Error: Unable to load the image.")
else:
    # Convert the grayscale image to a NumPy array
    img_gray_array = np.array(img_gray)

    # Flatten the array to obtain intensity values of all pixels
    intensity_values = img_gray_array.flatten()

    # Print the intensity values
    print("Intensity Values:", intensity_values)
```

```
Intensity Values: [255 255 255 ... 227 227 227]
```

III. Is this a digital image? Explain why

Answer: Yes,Indeed, much like colored (RGB) images, grayscale images are digitally stored and processed. A grayscale picture is considered a digital image since it is represented and manipulated using digital techniques and technologies.

1. Is there any difference between the co-ordinates from 1 and 2? Explain.

Answer: No, The coordinates of pixels remain consistent between grayscale and colored images, as both types utilize the same underlying pixel grid.

1. Is there any difference between the pixel values from 1 and 2? Explain.

Answer: Yes, Differences can arise between the pixel values of grayscale and colored (RGB) images due to their distinct representations. In grayscale images, each pixel possesses a lone intensity value, whereas in colored images, pixels comprise three intensity values—representing the contributions of red, green, and blue.