

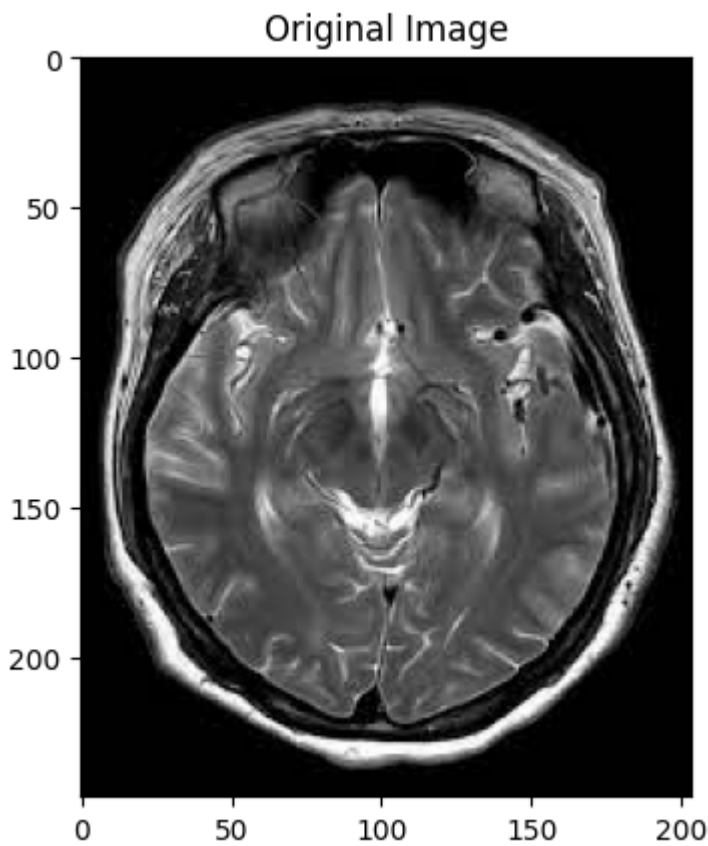
IMAGE PROCESSING USING NUMPY LIBRARY IN PYTHON

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In [43]: import numpy as np
import matplotlib.pyplot as plt
from PIL import Image
import cv2
from scipy.ndimage import gaussian_filter

# Read the image
img = Image.open(r"C:\Users\navin\Downloads\Ct_Brain.jpg")

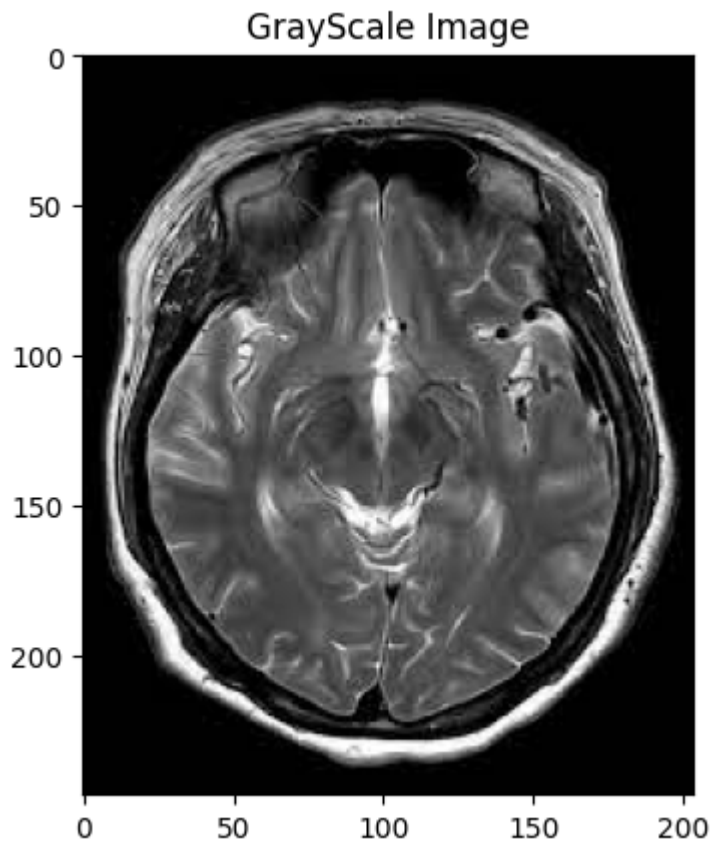
# Convert the image to a NumPy array
img_array = np.array(img)

# Display the image
plt.title('Original Image')
plt.imshow(img_array)
plt.axis('on')
plt.show()
```



```
In [33]: # Convert the image to grayscale
gray_img = np.dot(img_array[...,:3], [0.2989, 0.5870, 0.1140])

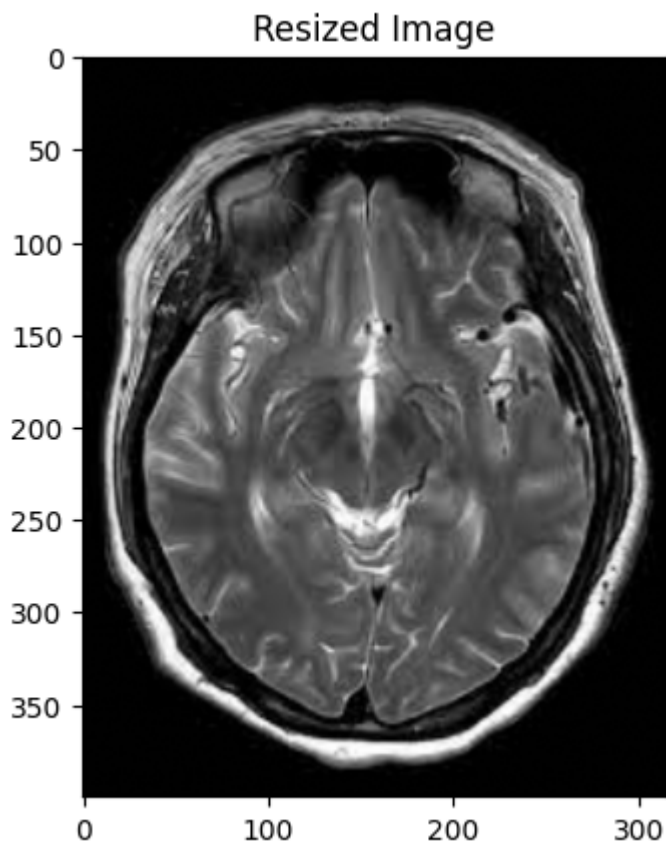
# Display the grayscale image
plt.title('GrayScale Image')
plt.imshow(gray_img, cmap='gray')
plt.axis('on')
plt.show()
```



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In [32]: from skimage.transform import resize

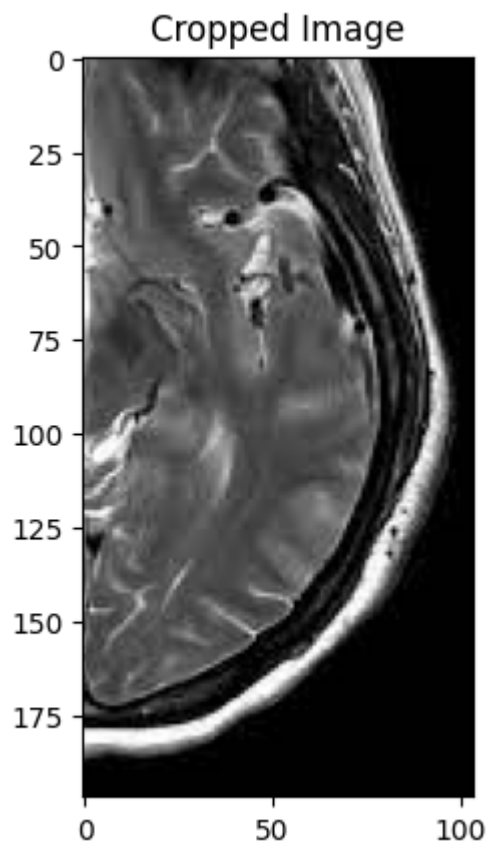
# Resize the image
new_height, new_width = 400, 315
resized_img = resize(img_array, (new_height, new_width), anti_aliasing=True)

# Display the resized image
plt.title('Resized Image')
plt.imshow(resized_img)
plt.axis('on')
plt.show()
```



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In [31]: # Crop the image
cropped_img = img_array[50:350, 100:400]

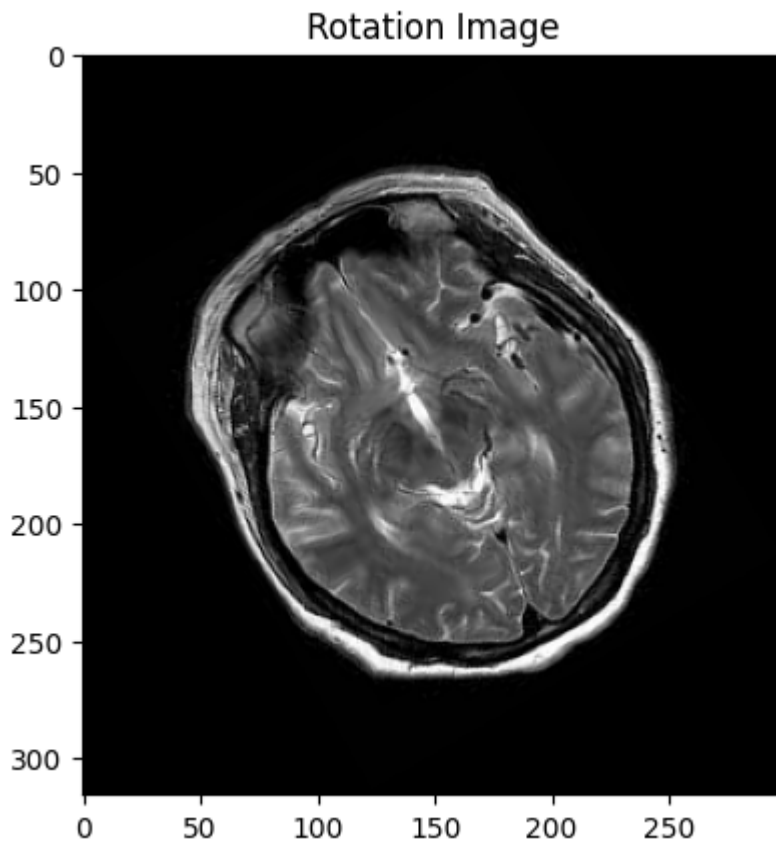
# Display the cropped image
plt.title('Cropped Image')
plt.imshow(cropped_img)
plt.axis('on')
plt.show()
```



```
In [30]: from scipy import ndimage

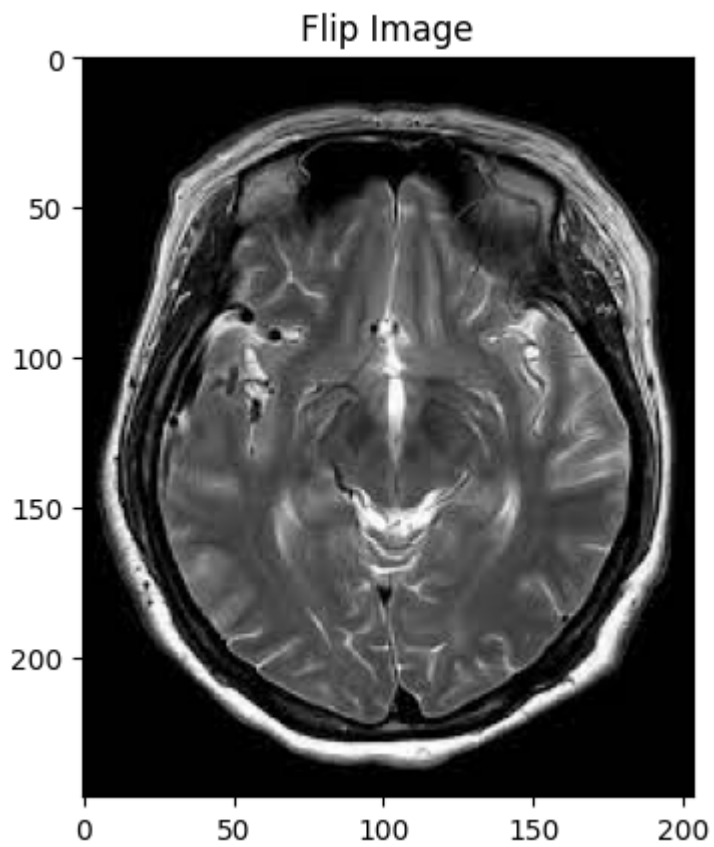
# Rotate the image
rotated_img = ndimage.rotate(img_array, 30)

# Display the rotated image
plt.title('Rotation Image')
plt.imshow(rotated_img)
plt.axis('on')
plt.show()
```



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In [36]: # Flip the image horizontally
         flipped_img = np.fliplr(img_array)

         # Display the flipped image
         plt.title('Flip Image')
         plt.imshow(flipped_img)
         plt.axis('on')
         plt.show()
```



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In [45]: # Apply Gaussian filter
sigma = 1.5
filtered_img = gaussian_filter(img, sigma=sigma)

# Display the filtered image
plt.title('Blur Image')
plt.imshow(filtered_img)
plt.axis('on')
plt.show()
```

Blur Image

