Politechnika Wrocławska

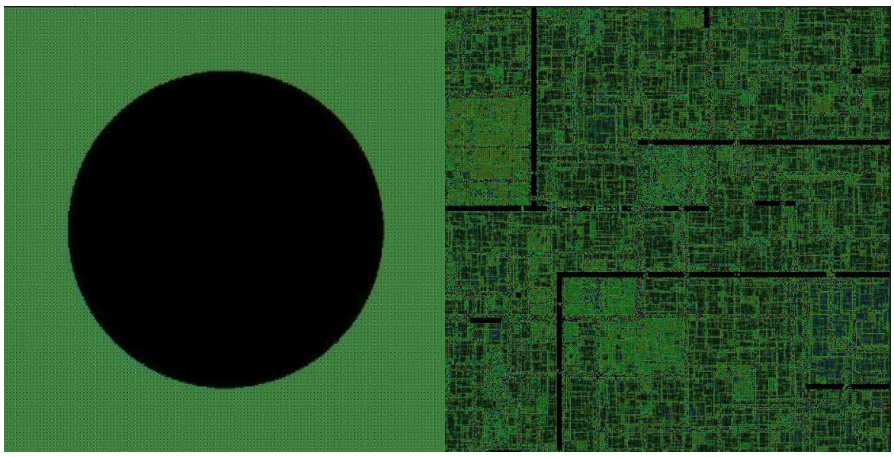
Sygnały i Obrazy Cyfrowe
Sprawozdanie

1. Demozikowanie

-Demozikowanie zostało wykonane dla filtru Bayera.

$$B = \begin{bmatrix} G & R \\ B & G \end{bmatrix}$$

Obrazy:

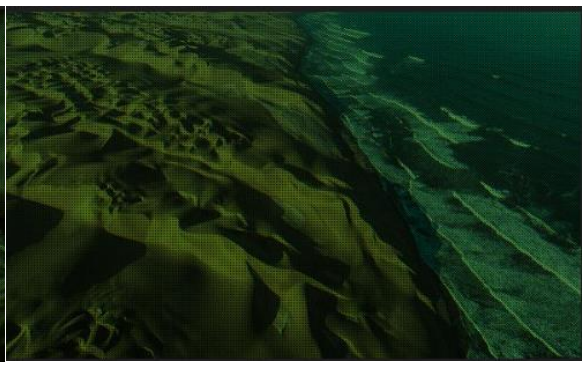


Rysunek 1 Circle

Rysunek 2 Mond

Rysunek 3 Milky-way

Rysunek 4 Panda



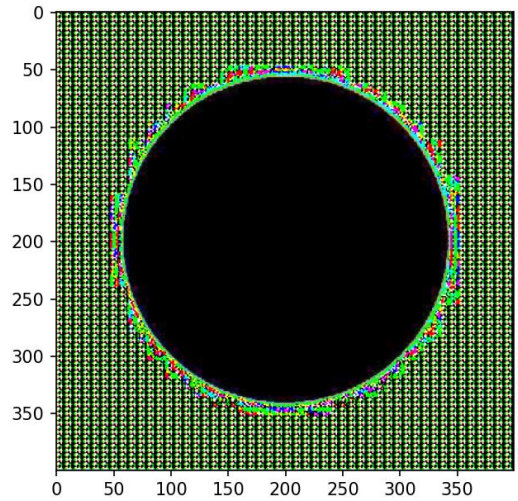
Rysunek 5 Namib

Kod do demozikowania:

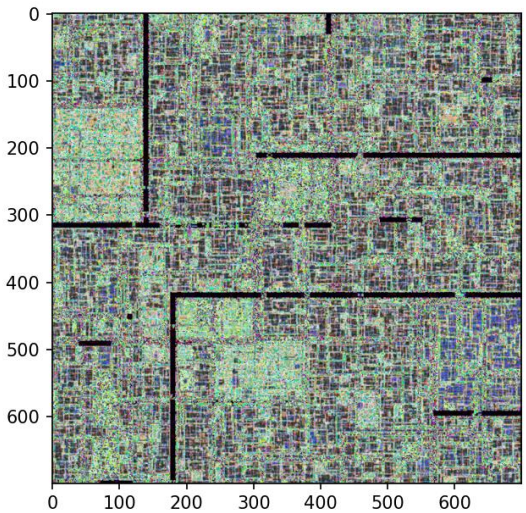
```
reconstructed_image = np.dstack([
    ndimage.convolve(image[:, :, channel], demosaicking_convolution_mask[:, :, channel], mode="constant", cval=0.0)
    for channel in range(3)
])
```

Wykonanie:

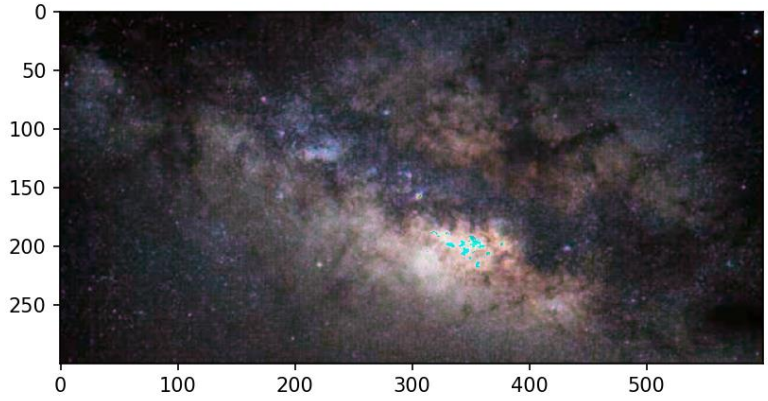
Circle:



Mond:

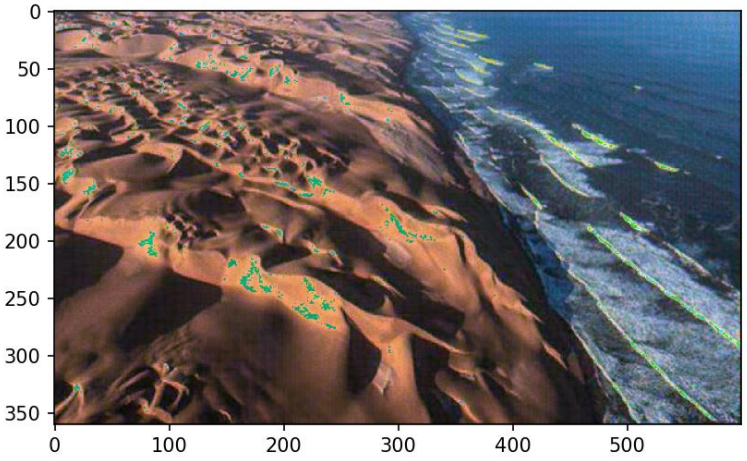


Milky-way:



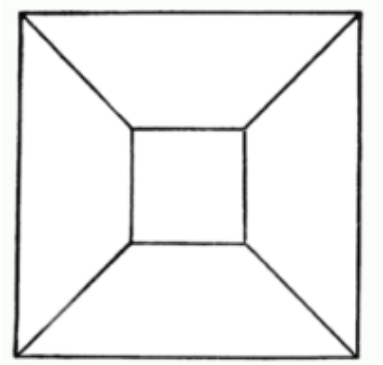
Panda:

Namib:



2. Zastosowania Konwolucji

Oryginalny obraz:

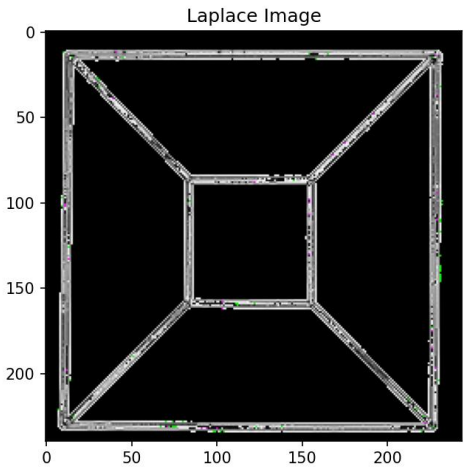


Wykrywanie krawędzi:

```
# Wykrywanie krawędzi przy użciu jądra Laplace
laplace_filter = np.array([[0, 1, 0], [1, -4, 1], [0, 1, 0]])

laplace_image = np.dstack([
    convolve(image[:, :, channel], laplace_filter, mode="constant", cval=0.0)
    for channel in range(3)
])

plt.imshow(laplace_image)
plt.title("Laplace Image")
plt.show(block=False)
plt.pause(5)
plt.close()
```

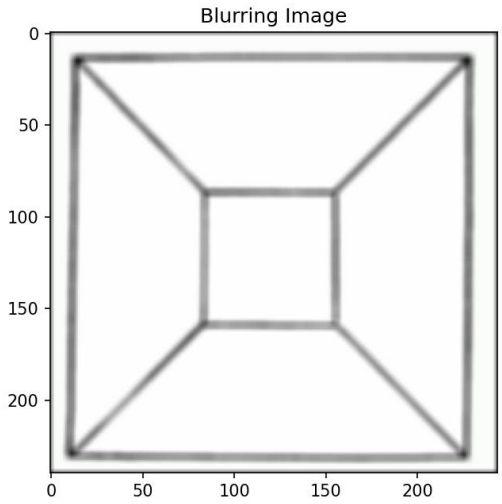


Rozmywanie obrazu:

```
# Rozmywanie obrazu
blurring_filter = np.full((5, 5), 1/25)

blurring_image = np.dstack([
    convolve(image[:, :, channel], blurring_filter, mode="constant", cval=0.0)
    for channel in range(3)
])

plt.imshow(blurring_image)
plt.title("Blurring Image")
plt.show(block=False)
plt.pause(5)
plt.close()
```



Wyostrzanie obrazu:

```
# Wyostrzanie obrazu
sharpen_filter = np.array([[0, -1, 0], [-1, 5, -1], [0, -1, 0]])

sharpen_image = np.dstack([
    convolve(image[:, :, channel], sharpen_filter, mode="constant", cval=0.0)
    for channel in range(3)
])

plt.imshow(sharpen_image)
plt.title("Sharpen Image")
plt.show(block=False)
plt.pause(5)
plt.close()
```