PRE-PROCESSING DATA TIDAK TERSTRUKTUR

1. Data Citra

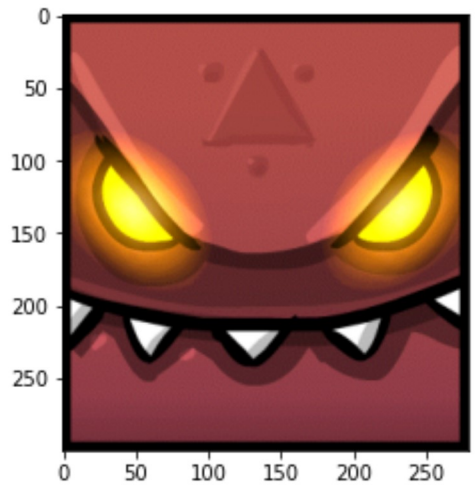
1.1. Import Library

```
import os
import cv2
import numpy as np
from PIL import Image
from skimage import io
import matplotlib.pyplot as plt
from keras.preprocessing.image import img_to_array, ImageDataGenerator
from tensorflow.keras.applications.resnet_v2 import preprocess_input as preprocess_resnetv2
```

1.2. Import gambar dengan method `.imread()` dari package `cv2`

```
img = cv2.imread("/content/drive/MyDrive/Saved-Pictures/IMG20200529075545 (1).jpg")
plt.imshow(img)
```

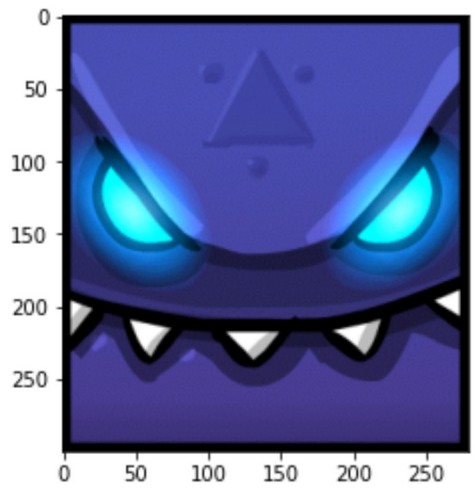
```
<matplotlib.image.AxesImage at 0x7f2b0496d910>
```



1.3. Mengubah komposisi warna dari BGR menjadi RGB menggunakan method `.cvtColor()`

```
img_rgb = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
plt.imshow(img_rgb)
```

```
<matplotlib.image.AxesImage at 0x7f2b048d8250>
```



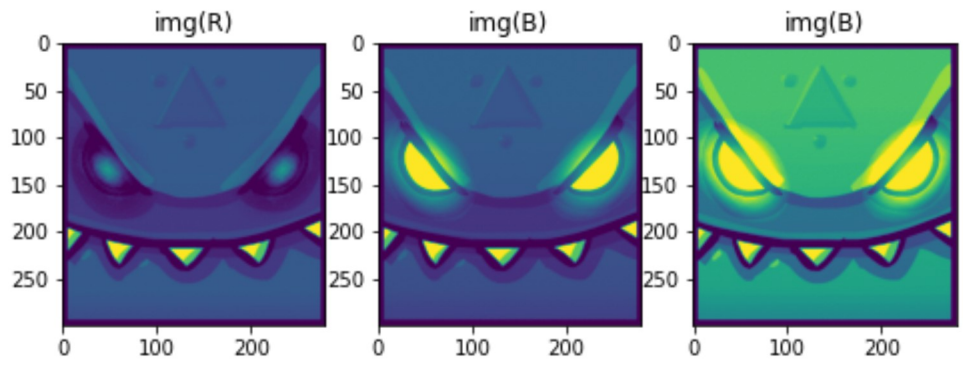
1.4. Membagi channel warna dari `img_rgb` ke dalam variabel `r, g, b`, yang merepresentasikan warna channel mereka yaitu red, green, dan blue menggunakan method `.split()`

```
r, g, b = cv2.split(img_rgb)
fig, ax = plt.subplots(1, 3, figsize=(8, 8))

ax[0].imshow(r)
```

```
ax[2].set_title('img(B)')
```

```
Text(0.5, 1.0, 'img(B)')
```



1.5. Menampilkan `img_rgb` dalam bentuk array dua dimensi menggunakan method `.img_to_array()`

```
img_array = img_to_array(img_rgb)
print(img_array)
```

```
[[[0. 0. 0.]
  [0. 0. 0.]
  [0. 0. 0.]
  ...
  [0. 0. 0.]
  [0. 0. 0.]
  [0. 0. 0.]]

 [[0. 0. 0.]
  [0. 0. 0.]
  [0. 0. 0.]
  ...
  [0. 0. 0.]
  [0. 0. 0.]
  [0. 0. 0.]]

 [[0. 0. 0.]
  [0. 0. 0.]
  [0. 0. 0.]
  ...
  [0. 0. 0.]
  [0. 0. 0.]
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 ...

 [[0. 0. 0.]
  [0. 0. 0.]
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  [0. 0. 0.]
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  ...
  [0. 0. 0.]
  [0. 0. 0.]
  [0. 0. 0.]]]
```
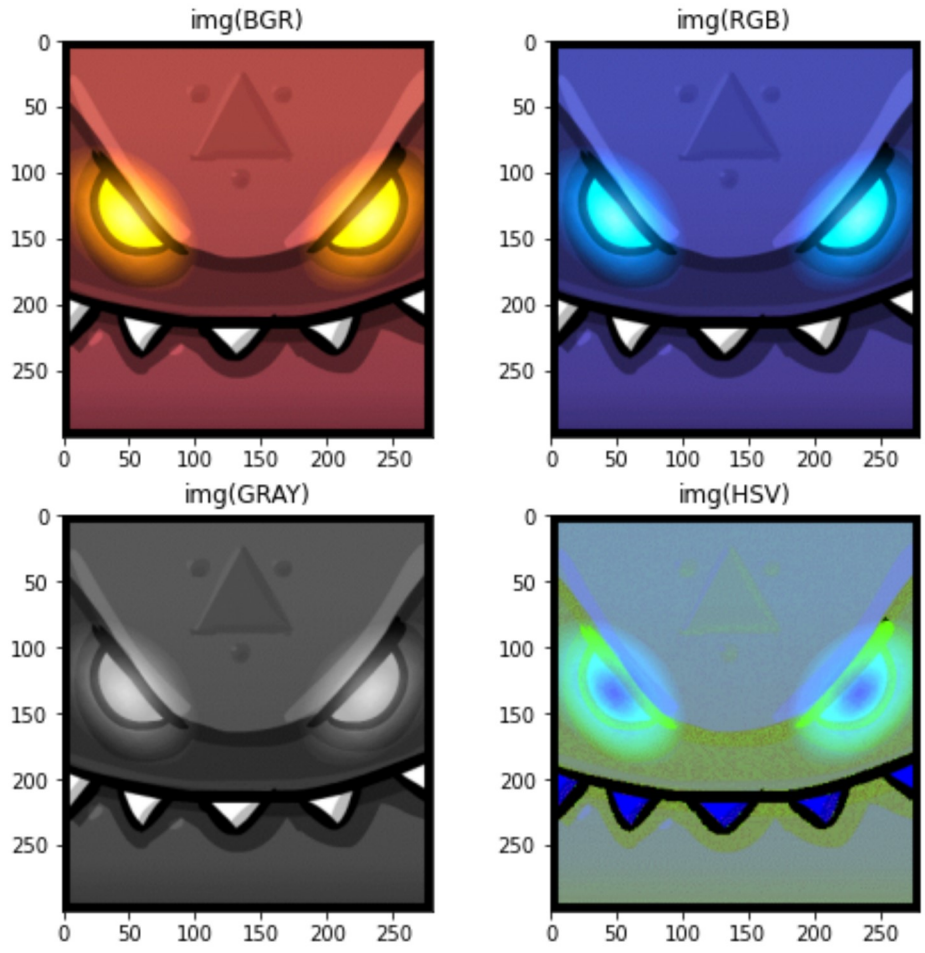

1.6. Mengubah komposisi channel warna `img` dan `img_rgb` menjadi beberapa jenis seperti Grayscale dengan `.COLOR_BGR2GRAY` dan `.COLOR_GRAY2RGB` serta HSV dengan `.COLOR_RGB2HSV`

```
plt.imshow(img)
plt.title('img(BGR)')

ax = fig.add_subplot(2, 2, 2)
plt.imshow(img_rgb)
plt.title('img(RGB)')

ax = fig.add_subplot(2, 2, 3)
plt.imshow(img_grayscale)
plt.title('img(GRAY)')

ax = fig.add_subplot(2, 2, 4)
plt.imshow(img_hsv)
plt.title('img(HSV)')
```

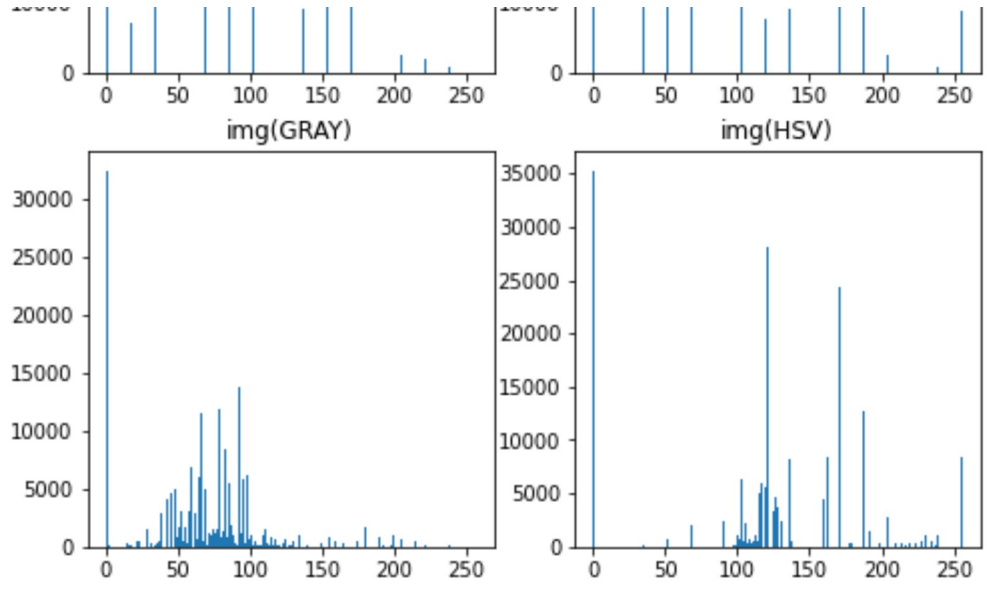
```
Text(0.5, 1.0, 'img(HSV)')
```



1.7. Menampilkan histogram dari citra yang telah diubah pada langkah `1.6`

```
# grayscale
img_grayscale_temp = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
img_grayscale = cv2.cvtColor(img_grayscale_temp, cv2.COLOR_GRAY2RGB)

# hsv
img_hsv = cv2.cvtColor(img_rgb, cv2.COLOR_RGB2HSV)
```

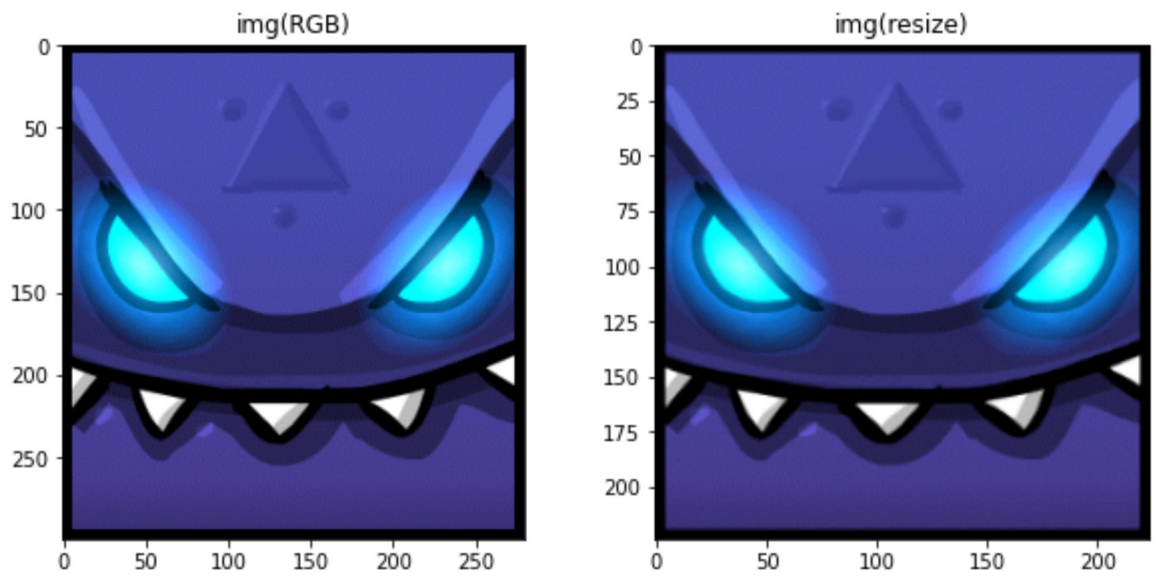
```
# plotting
fig = plt.figure(num=None, figsize=(8, 8))

ax = fig.add_subplot(2, 2, 1)
plt.hist(img.ravel(),256,[0,256])
plt.title('img(BGR)')

ax = fig.add_subplot(2, 2, 2)
plt.hist(img_rgb.ravel(),256,[0,256])
plt.title('img(RGB)')

ax = fig.add_subplot(2, 2, 3)
```



1.8. Melakukan pengubahan ukuran citra dengan method `.resize()`

```
img_resize = cv2.resize(img_rgb, (224, 224))

fig = plt.figure(num=None, figsize=(10, 10))

ax = fig.add_subplot(2, 2, 1)
plt.imshow(img_rgb)
plt.title('img(RGB)')

ax = fig.add_subplot(2, 2, 2)
plt.imshow(img_resize)
plt.title('img(resize)')
```

```
Text(0.5, 1.0, 'img(resize)')
```



1.9. Membuat direktori `augmented_dir`

```
base_dir = '/content/drive/MyDrive/Colab Notebooks/Pengantar-Data-Mining'
augmented_dir = os.path.join(base_dir, 'augmented_result')
os.mkdir(augmented_dir)
```

```
dataset.append(np.array(image))
x = np.array(dataset)
```

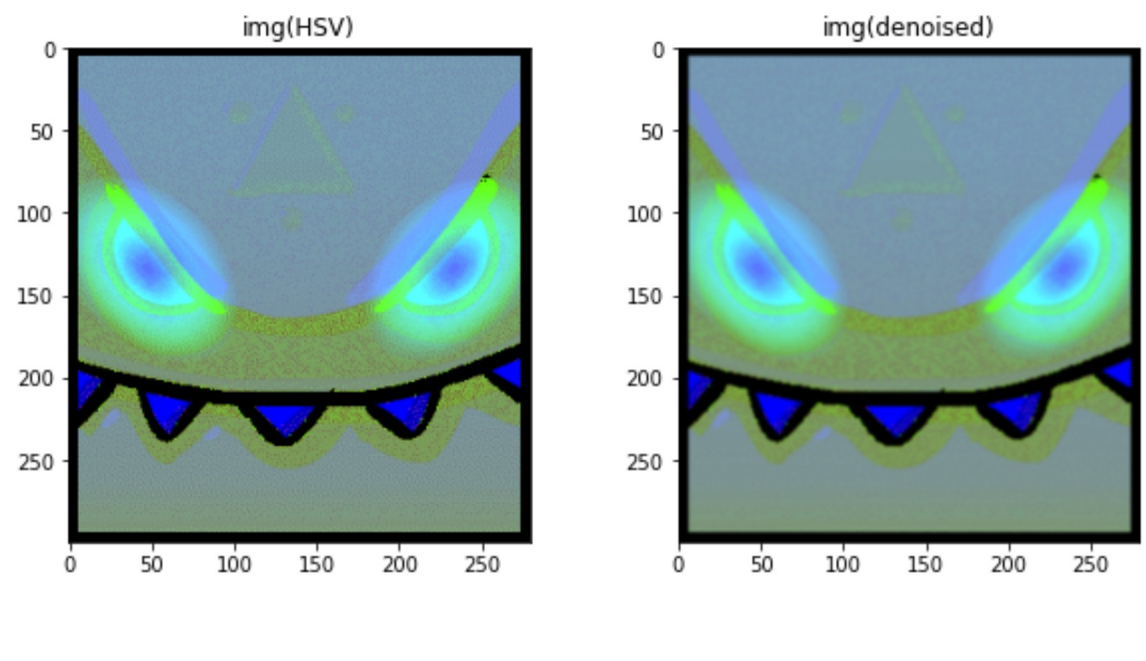
1.12. Perulangan untuk memproses gambar yang telah diimport kemudian disimpan di dalam direktori `augmented_result` yang telah dibuat sebelumnya, serta disimpan dengan nama file yang diberi prefix `aug_rslt` kemudian format file `.png`

```
i = 0
for j in datagen.flow(x, batch_size=32,
                      save_to_dir="/content/drive/MyDrive/Colab Notebooks/Pengantar-Data-Mining/augmented_result
                      save_prefix="aug_rslt", save_format=".png"):
  i += 1
  if i > 30:
    break
```

1.13. Melakukan denoising pada citra, yaitu proses menghilangan noise dengan menggunakan method `.GaussianBlur()`

```
img_denoise = cv2.GaussianBlur(img_hsv, (3, 3), 0)
rgb_dst = cv2.fastNlMeansDenoisingColored(img_denoise, None, 10, 10, 7, 15)

fig = plt.figure(num=None, figsize=(10, 10))

ax = fig.add_subplot(2, 2, 1)
plt.imshow(img_hsv)
plt.title('img(HSV)')

ax = fig.add_subplot(2, 2, 2)
plt.imshow(img_denoise)
plt.title('img(denoised)')
```

```
Text(0.5, 1.0, 'img(denoised)')
```



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