VISUALIZATION

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```python
plt.style.use("dark_background")
```

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GENERAL

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```python
sns.countplot(Main_Train_Data["CATEGORY"])
plt.show()
```

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```python
Main_Train_Data['CATEGORY'].value_counts().plot.pie(figsize=(5,5))
plt.show()
```

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IMAGES

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```python
figure = plt.figure(figsize=(10,10))
x = cv2.imread(Main_Train_Data["PNG"][0])
plt.imshow(x)
plt.xlabel(x.shape)
plt.title(Main_Train_Data["CATEGORY"][0])
```

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```python
figure = plt.figure(figsize=(10,10))
x = cv2.imread(Main_Train_Data["PNG"][993])
plt.imshow(x)
plt.xlabel(x.shape)
plt.title(Main_Train_Data["CATEGORY"][993])
```

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```python
figure = plt.figure(figsize=(10,10))
```

```python
x = cv2.imread(Main_Train_Data["PNG"][20])
plt.imshow(x)
plt.xlabel(x.shape)
plt.title(Main_Train_Data["CATEGORY"][20])
```

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```python
figure = plt.figure(figsize=(10,10))
x = cv2.imread(Main_Train_Data["PNG"][48])
plt.imshow(x)
plt.xlabel(x.shape)
plt.title(Main_Train_Data["CATEGORY"][48])
```

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```python
fig, axes = plt.subplots(nrows=5,
                ncols=5,
                figsize=(10,10),
                subplot_kw={"xticks":[],"yticks":[]})


for i,ax in enumerate(axes.flat):
    ax.imshow(cv2.imread(Main_Train_Data["PNG"][i]))
    ax.set_title(Main_Train_Data["CATEGORY"][i])
plt.tight_layout()
plt.show()
```

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```python
fig, axes = plt.subplots(nrows=5,
                ncols=5,
                figsize=(10,10),
                subplot_kw={"xticks":[],"yticks":[]})
```

```python
for i,ax in enumerate(axes.flat):
    x = cv2.imread(Main_Train_Data["PNG"][i])
    x = cv2.cvtColor(x,cv2.COLOR_RGB2BGR)
    ax.imshow(x)
    ax.set_title(Main_Train_Data["CATEGORY"][i])
plt.tight_layout()
plt.show()
```

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DETERMINATION TRAIN AND TEST DATA

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IMAGE GENERATOR

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```python
Train_Generator = ImageDataGenerator(rescale=1./255,
                    shear_range=0.3,
                    zoom_range=0.2,
                    brightness_range=[0.2,0.9],
                    rotation_range=30,
                    horizontal_flip=True,
                    vertical_flip=True,
                    fill_mode="nearest",
                    validation_split=0.1)
```

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```python
Test_Generator = ImageDataGenerator(rescale=1./255)
```

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SPLITTING TRAIN AND TEST

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```python
Train_Data,Test_Data = train_test_split(Main_Train_Data,train_size=0.9,random_state=42,shuffle=True
)
```

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```python
print("TRAIN SHAPE: ",Train_Data.shape)
```

```python
print("TEST SHAPE: ",Test_Data.shape)
```

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```python
print(Train_Data.head(-1))
```

```python
print("----"*20)
```

```python
print(Test_Data.head(-1))
```

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```python
print(Test_Data["CATEGORY"].value_counts())
```

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```python
encode = LabelEncoder()
```

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```python
For_Prediction_Class = encode.fit_transform(Test_Data["CATEGORY"])
```

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How Generator Applied Image Look Like

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```python
example_Image = Train_Data["PNG"][99]
```

```python
Load_Image = image.load_img(example_Image,target_size=(200,200))
```

```python
Array_Image = image.img_to_array(Load_Image)
```

```python
Array_Image = Array_Image.reshape((1,) + Array_Image.shape)
```

```python
i = 0
```

```python
for batch in Train_Generator.flow(Array_Image,batch_size=1):
    plt.figure(i)
    IMG = plt.imshow(image.array_to_img(batch[0]))
```

```
        i += 1
        if i % 4 == 0:
            break
plt.show()
```

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APPLYING GENERATOR AND TRANSFORMATION TO TENSOR

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```
Train_IMG_Set =
Train_Generator.flow_from_dataframe(dataframe=Train_Data,
                        x_col="PNG",
                        y_col="CATEGORY",
                        color_mode="rgb",
                        class_mode="categorical",
                        batch_size=32,
                        subset="training")
```

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```
Validation_IMG_Set =
Train_Generator.flow_from_dataframe(dataframe=Train_Data,
                        x_col="PNG",
                        y_col="CATEGORY",
                        color_mode="rgb",
                        class_mode="categorical",
                        batch_size=32,
                        subset="validation")
```

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```
Test_IMG_Set = Test_Generator.flow_from_dataframe(dataframe=Test_Data,
                        x_col="PNG",
                        y_col="CATEGORY",
```

```python
                              color_mode="rgb",
                              class_mode="categorical",
                              batch_size=32)
```

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CHECKING

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```python
for data_batch,label_batch in Train_IMG_Set:
    print("DATA SHAPE: ",data_batch.shape)
    print("LABEL SHAPE: ",label_batch.shape)
    break
```

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```python
for data_batch,label_batch in Validation_IMG_Set:
    print("DATA SHAPE: ",data_batch.shape)
    print("LABEL SHAPE: ",label_batch.shape)
    break
```

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```python
for data_batch,label_batch in Test_IMG_Set:
    print("DATA SHAPE: ",data_batch.shape)
    print("LABEL SHAPE: ",label_batch.shape)
    break
```

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```python
print("TRAIN: ")
print(Train_IMG_Set.class_indices)
print(Train_IMG_Set.classes[0:5])
print(Train_IMG_Set.image_shape)
print("---"*20)
print("VALIDATION: ")
```

```python
print(Validation_IMG_Set.class_indices)
print(Validation_IMG_Set.classes[0:5])
print(Validation_IMG_Set.image_shape)
print("---"*20)
print("TEST: ")
print(Test_IMG_Set.class_indices)
print(Test_IMG_Set.classes[0:5])
print(Test_IMG_Set.image_shape)
```