# LAPORAN TUGAS
## Workshop Citra Vision

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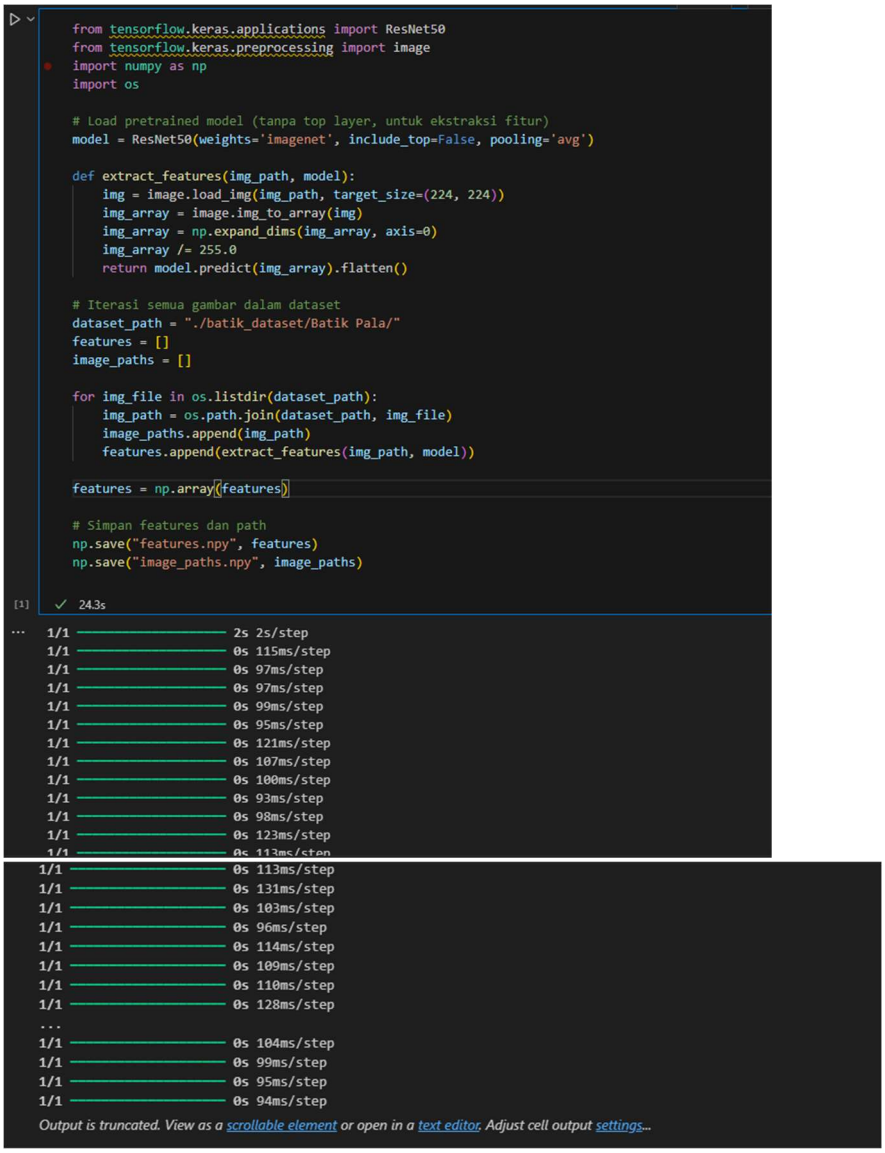
Link project : https://github.com/MastPutro/Mini-Project.git

1. **Preprocessing**

Input: Dataset gambar batik.

Proses:
Gunakan model pretrained ResNet untuk mengekstrak fitur dari gambar. Model ini biasanya mengambil gambar dan menghasilkan vektor berdimensi tetap.
Simpan setiap feature vector dalam format yang mudah diakses untuk pencarian, misalnya dalam database atau file.

Output: Dataset berupa kumpulan feature vector yang mewakili masing-masing gambar.



```
from tensorflow.keras.applications import ResNet50
from tensorflow.keras.preprocessing import image
import numpy as np
import os

# Load pretrained model (tanpa top layer, untuk ekstraksi fitur)
model = ResNet50(weights='imagenet', include_top=False, pooling='avg')

def extract_features(img_path, model):
    img = image.load_img(img_path, target_size=(224, 224))
    img_array = image.img_to_array(img)
    img_array = np.expand_dims(img_array, axis=0)
    img_array /= 255.0
    return model.predict(img_array).flatten()

# Iterasi semua gambar dalam dataset
dataset_path = "./batik_dataset/Batik Pala/"
features = []
image_paths = []

for img_file in os.listdir(dataset_path):
    img_path = os.path.join(dataset_path, img_file)
    image_paths.append(img_path)
    features.append(extract_features(img_path, model))

features = np.array(features)

# Simpan features dan path
np.save("features.npy", features)
np.save("image_paths.npy", image_paths)
```

```
[1]  ✓ 24.3s

...  1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step
     1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 115ms/step
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     1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 107ms/step
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     1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 98ms/step
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     1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 103ms/step
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     ...
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     Output is truncated. View as a scrollable element or open in a text editor. Adjust cell output settings...
```

## 2. Querying the Images Dataset

Input: Gambar query.

Proses:
Ekstrak fitur gambar query menggunakan model yang sama.
Hitung kemiripan antara fitur query dengan semua fitur dataset menggunakan cosine similarity
Ambil 10 gambar dengan skor kemiripan tertinggi.

Output: Daftar 10 gambar yang paling mirip.

- Input :

- Output :

```
from sklearn.metrics.pairwise import cosine_similarity

# Load extracted features and image paths
features = np.load("features.npy")
image_paths = np.load("image_paths.npy")

def find_similar_images(query_image_path, model, features, image_paths, top_n=10):
    query_features = extract_features(query_image_path, model)
    similarities = cosine_similarity([query_features], features)[0]
    indices = np.argsort(similarities)[::-1][:top_n]
    return [(image_paths[i], similarities[i]) for i in indices]

# Query image
query_image_path = "peh.jpg"
similar_images = find_similar_images(query_image_path, model, features, image_paths)

# Print results
for img_path, similarity in similar_images:
    print(f"Image: {img_path}, Similarity: {similarity:.4f}")
```

```
[2]  ✓ 3.4s

...  1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 95ms/step
Image: ./batik_dataset/Batik Pala/16.jpg, Similarity: 0.9993
Image: ./batik_dataset/Batik Pala/2.jpg, Similarity: 0.9942
Image: ./batik_dataset/Batik Pala/48.jpg, Similarity: 0.9939
Image: ./batik_dataset/Batik Pala/3.jpg, Similarity: 0.9925
Image: ./batik_dataset/Batik Pala/52.jpg, Similarity: 0.9912
Image: ./batik_dataset/Batik Pala/54.jpg, Similarity: 0.9912
Image: ./batik_dataset/Batik Pala/27.jpg, Similarity: 0.9909
Image: ./batik_dataset/Batik Pala/53.jpg, Similarity: 0.9882
Image: ./batik_dataset/Batik Pala/43.jpg, Similarity: 0.9880
Image: ./batik_dataset/Batik Pala/24.jpg, Similarity: 0.9876
```

### 3. Retrieved Images

Menampilkan hasil:

Gunakan pustaka seperti matplotlib untuk menampilkan gambar.

```python
import matplotlib.pyplot as plt

def display_similar_images(similar_images):
    plt.figure(figsize=(15, 10))
    for i, (img_path, similarity) in enumerate(similar_images):
        img = image.load_img(img_path, target_size=(224, 224))
        plt.subplot(2, 5, i + 1)
        plt.imshow(img)
        plt.title(f"Sim: {similarity:.4f}")
        plt.axis("off")
    plt.show()

display_similar_images(similar_images)
```

[3] ✓ 2.3s