```
!pip install tensorflow matplotlib
```

```
Requirement already satisfied: tensorflow in /usr/local/lib/python3.11/dist-packages (2.18.0)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.11/dist-packages (3.10.0)
Requirement already satisfied: absl-py>=1.0.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (1.4.0)
Requirement already satisfied: astunparse>=1.6.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (1.6.3)
Requirement already satisfied: flatbuffers>=24.3.25 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (25.2.10)
Requirement already satisfied: gast!=0.5.0,!=0.5.1,!=0.5.2,>=0.2.1 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (0.6
Requirement already satisfied: google-pasta>=0.1.1 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (0.2.0)
Requirement already satisfied: libclang>=13.0.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (18.1.1)
Requirement already satisfied: opt-einsum>=2.3.2 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (3.4.0)
Requirement already satisfied: packaging in /usr/local/lib/python3.11/dist-packages (from tensorflow) (24.2)
Requirement already satisfied: protobuf!=4.21.0,!=4.21.1,!=4.21.2,!=4.21.3,!=4.21.4,!=4.21.5,<6.0.0dev,>=3.20.3 in /usr/local/lib/py
Requirement already satisfied: requests<3,>=2.21.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (2.32.3)
Requirement already satisfied: setuptools in /usr/local/lib/python3.11/dist-packages (from tensorflow) (75.2.0)
Requirement already satisfied: six>=1.12.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (1.17.0)
Requirement already satisfied: termcolor>=1.1.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (3.0.1)
Requirement already satisfied: typing-extensions>=3.6.6 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (4.13.2)
Requirement already satisfied: wrapt>=1.11.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (1.17.2)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (1.71.0)
Requirement already satisfied: tensorboard<2.19,>=2.18 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (2.18.0)
Requirement already satisfied: keras>=3.5.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (3.8.0)
Requirement already satisfied: numpy<2.1.0,>=1.26.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (2.0.2)
Requirement already satisfied: h5py>=3.11.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (3.13.0)
Requirement already satisfied: ml-dtypes<0.5.0,>=0.4.0 in /usr/local/lib/python3.11/dist-packages (from tensorflow) (0.4.1)
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Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.11/dist-packages (from matplotlib) (1.3.2)
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Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.11/dist-packages (from matplotlib) (4.57.0)
Requirement already satisfied: kiwisolver>=1.3.1 in /usr/local/lib/python3.11/dist-packages (from matplotlib) (1.4.8)
Requirement already satisfied: pillow>=8 in /usr/local/lib/python3.11/dist-packages (from matplotlib) (11.1.0)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.11/dist-packages (from matplotlib) (3.2.3)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.11/dist-packages (from matplotlib) (2.8.2)
Requirement already satisfied: wheel<1.0,>=0.23.0 in /usr/local/lib/python3.11/dist-packages (from astunparse>=1.6.0->tensorflow) (0
Requirement already satisfied: rich in /usr/local/lib/python3.11/dist-packages (from keras>=3.5.0->tensorflow) (13.9.4)
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Requirement already satisfied: optree in /usr/local/lib/python3.11/dist-packages (from keras>=3.5.0->tensorflow) (0.15.0)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.21.0->tensor
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Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.21.0->tensorflow)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.21.0->tensorflow)
Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.11/dist-packages (from tensorboard<2.19,>=2.18->tensorflow
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in /usr/local/lib/python3.11/dist-packages (from tensorboard<2
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Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.11/dist-packages (from rich->keras>=3.5.0->tensorflow
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.11/dist-packages (from rich->keras>=3.5.0->tensorfl
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.11/dist-packages (from markdown-it-py>=2.2.0->rich->keras>=3.5.0
```

```
from google.colab import files
uploaded = files.upload()  # ZIP dosyanı buradan yükle (örneğin: dataset.zip)
```

Dosyaları Seç odev2_den…1i.folder.zip

- **odev2_denem.v1i.folder.zip**(application/x-zip-compressed) - 174608382 bytes, last modified: 20.04.2025 - 100% done

```
Saving odev2_denem.v1i.folder.zip to odev2_denem.v1i.folder.zip
```

```
import zipfile
import os

with zipfile.ZipFile("odev2_denem.v1i.folder.zip", 'r') as zip_ref:
    zip_ref.extractall("dataset")

# Klasör yapısını kontrol et
os.listdir("dataset")
```

```
['valid', 'test', 'README.roboflow.txt', 'README.dataset.txt', 'train']
```

```
from tensorflow.keras.preprocessing.image import ImageDataGenerator

img_size = (64, 64)
batch_size = 32

train_dir = "dataset/train"
valid_dir = "dataset/valid"  # Eğer "test" varsa ona göre değiştir

train_datagen = ImageDataGenerator(rescale=1./255)
valid_datagen = ImageDataGenerator(rescale=1./255)

train_data = train_datagen.flow_from_directory(
```

```
    train_dir,
    target_size=img_size,
    batch_size=batch_size,
    class_mode='categorical'
)

valid_data = valid_datagen.flow_from_directory(
    valid_dir,
    target_size=img_size,
    batch_size=batch_size,
    class_mode='categorical'
)
```

```
Found 3129 images belonging to 8 classes.
Found 299 images belonging to 8 classes.
```

```
from tensorflow.keras import layers, models

model = models.Sequential([
    layers.Conv2D(32, (3, 3), activation='relu', input_shape=(64, 64, 3)),
    layers.MaxPooling2D(2, 2),
    layers.Conv2D(64, (3, 3), activation='relu'),
    layers.MaxPooling2D(2, 2),
    layers.Flatten(),
    layers.Dense(128, activation='relu'),
    layers.Dense(len(train_data.class_indices), activation='softmax')  # 8 sınıf için
])

model.compile(optimizer='adam',
              loss='categorical_crossentropy',
              metrics=['accuracy'])

model.summary()

history = model.fit(
    train_data,
    epochs=10,
    validation_data=valid_data
)
```

```
/usr/local/lib/python3.11/dist-packages/keras/src/layers/convolutional/base_conv.py:107: UserWarning: Do not pass an `input_shape`/`
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
```

Model: "sequential"

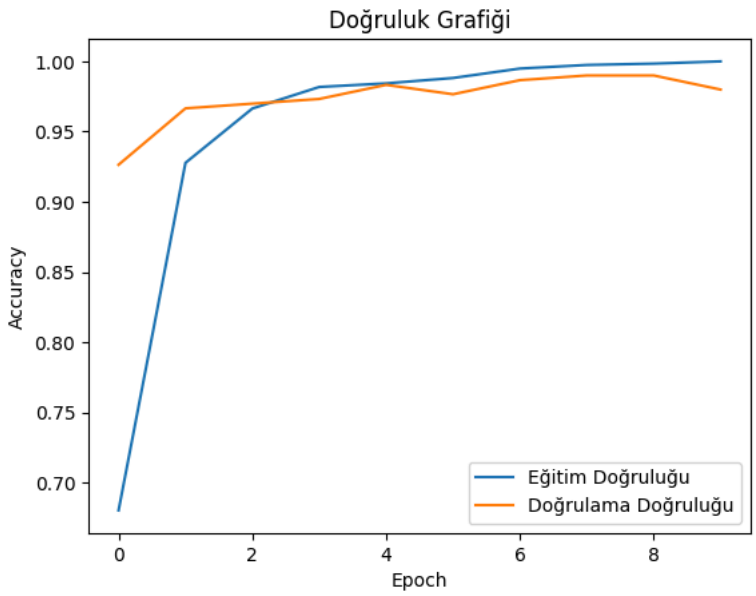
Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 62, 62, 32)	896
max_pooling2d (MaxPooling2D)	(None, 31, 31, 32)	0
conv2d_1 (Conv2D)	(None, 29, 29, 64)	18,496
max_pooling2d_1 (MaxPooling2D)	(None, 14, 14, 64)	0
flatten (Flatten)	(None, 12544)	0
dense (Dense)	(None, 128)	1,605,760
dense_1 (Dense)	(None, 8)	1,032

Total params: 1,626,184 (6.20 MB)
Trainable params: 1,626,184 (6.20 MB)
Non-trainable params: 0 (0.00 B)

```
/usr/local/lib/python3.11/dist-packages/keras/src/trainers/data_adapters/py_dataset_adapter.py:121: UserWarning: Your `PyDataset` cl
  self._warn_if_super_not_called()
Epoch 1/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 28s 265ms/step - accuracy: 0.5007 - loss: 1.3332 - val_accuracy: 0.9264 - val_loss: 0.2034
Epoch 2/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 25s 260ms/step - accuracy: 0.9180 - loss: 0.2480 - val_accuracy: 0.9666 - val_loss: 0.1115
Epoch 3/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 26s 260ms/step - accuracy: 0.9637 - loss: 0.1203 - val_accuracy: 0.9699 - val_loss: 0.0791
Epoch 4/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 25s 259ms/step - accuracy: 0.9864 - loss: 0.0538 - val_accuracy: 0.9732 - val_loss: 0.0678
Epoch 5/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 26s 267ms/step - accuracy: 0.9860 - loss: 0.0495 - val_accuracy: 0.9833 - val_loss: 0.0624
Epoch 6/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 26s 264ms/step - accuracy: 0.9881 - loss: 0.0359 - val_accuracy: 0.9766 - val_loss: 0.0548
Epoch 7/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 26s 264ms/step - accuracy: 0.9943 - loss: 0.0224 - val_accuracy: 0.9866 - val_loss: 0.0386
Epoch 8/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 27s 272ms/step - accuracy: 0.9956 - loss: 0.0197 - val_accuracy: 0.9900 - val_loss: 0.0347
Epoch 9/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 26s 262ms/step - accuracy: 0.9996 - loss: 0.0045 - val_accuracy: 0.9900 - val_loss: 0.0222
Epoch 10/10
98/98 ━━━━━━━━━━━━━━━━━━━━ 26s 268ms/step - accuracy: 1.0000 - loss: 0.0037 - val_accuracy: 0.9799 - val_loss: 0.0588
```

```
import matplotlib.pyplot as plt

plt.plot(history.history['accuracy'], label='Eğitim Doğruluğu')
plt.plot(history.history['val_accuracy'], label='Doğrulama Doğruluğu')
plt.title('Doğruluk Grafiği')
plt.xlabel('Epoch')
plt.ylabel('Accuracy')
plt.legend()
plt.show()
```




```
from google.colab import files
uploaded = files.upload()
```

Dosyaları Seç avsar (7).jpg

- **avsar (7).jpg**(image/jpeg) - 87741 bytes, last modified: 13.04.2025 - 100% done

```
Saving avsar (7).jpg to avsar (7).jpg
```

```
from tensorflow.keras.preprocessing import image
import numpy as np

img_size = (64, 64)  # Modelde kullandığın boyutla aynı olmalı

# Yüklenen dosyanın adını alalım
img_path = list(uploaded.keys())[0]

img = image.load_img(img_path, target_size=img_size)
img_array = image.img_to_array(img) / 255.0
img_array = np.expand_dims(img_array, axis=0)

# Tahmin
prediction = model.predict(img_array)
predicted_class = list(train_data.class_indices.keys())[np.argmax(prediction)]
```