

```
import tensorflow as tf
print(tf.__version__)
```

2.12.0

```
!pip install tensorflow
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: tensorflow in /usr/local/lib/python3.9/dist-packages (2.12.0)
Requirement already satisfied: typing-extensions>=3.6.6 in /usr/local/lib/python3.9/dist-packages (from tensorflow) (4.5.0)
Requirement already satisfied: six>=1.12.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow) (1.16.0)
Requirement already satisfied: flatbuffers>=2.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow) (23.3.3)
Requirement already satisfied: tensorflow-estimator<2.13,>=2.12.0 in /usr/local/lib/python3.9/dist-packages (from tensorflow) (2.12.0)
Requirement already satisfied: protobuf!=4.21.0,!4.21.1,!4.21.2,!4.21.3,!4.21.4,!4.21.5,<5.0.0dev,>=3.20.3 in /usr/local/lib/python3.9/dist-packages (from tensorflow) (3.3.0)
Requirement already satisfied: opt-einsum>=2.3.2 in /usr/local/lib/python3.9/dist-packages (from tensorflow) (3.3.0)
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Requirement already satisfied: jax>=0.3.15 in /usr/local/lib/python3.9/dist-packages (from tensorflow) (0.4.8)
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```

```
!pip install --upgrade tensorflow
```

```
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Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.9/dist-packages (from requests<3,>=2.21.0->tensorflow) (1.26.15)
Requirement already satisfied: MarkupSafe>=2.1.1 in /usr/local/lib/python3.9/dist-packages (from werkzeug>=1.0.1->tensorflow) (2.1.3)
Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.9/dist-packages (from importlib-metadata>=4.4->tensorflow) (3.15.0)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in /usr/local/lib/python3.9/dist-packages (from pyasn1-modules>=0.2.1->tensorflow) (0.5.1)
Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.9/dist-packages (from requests-oauthlib>=0.7.0->tensorflow) (3.2.2)
```

```
import tensorflow as tf
import keras as k
```

```
from keras.models import Sequential
from keras.layers import Conv2D,MaxPooling2D,Flatten,Dense,Dropout
```

```
from keras.models import load_model
```

```
model = Sequential()
model.add(Conv2D(32, (5, 5), activation='relu', input_shape=(64, 64, 3)))
model.add(MaxPooling2D((2, 2), strides=2))
model.add(Conv2D(64, (5, 5), activation='relu'))
model.add(MaxPooling2D((2, 2), strides=2))
model.add(Flatten())
model.add(Dense(32, activation='relu'))
model.add(Dropout(0.4))
model.add(Dense(2, activation='softmax'))
```

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

```
import tensorflow as tf
from keras.models import load_model
```

```
train_data = tf.keras.preprocessing.image_dataset_from_directory('/content/drive/MyDrive/data/train', image_size=(64, 64), batch_size=32)
test_data = tf.keras.preprocessing.image_dataset_from_directory('/content/drive/MyDrive/data/test', image_size=(64, 64), batch_size=32)
```

```
Found 40 files belonging to 2 classes.
Found 20 files belonging to 2 classes.
```

```
num_iterations = [100, 200, 300]
```

```
for iterations in num_iterations:
    print(f"Training for {iterations} iterations...")
    model.fit(train_data, epochs=iterations)
```

```
Training for 100 iterations...
Epoch 1/100
2/2 [=====] - 27s 187ms/step - loss: 51.6694 - accuracy: 0.5000
Epoch 2/100
2/2 [=====] - 0s 10ms/step - loss: 64.4328 - accuracy: 0.4750
Epoch 3/100
2/2 [=====] - 0s 9ms/step - loss: 4.5605 - accuracy: 0.5250
Epoch 4/100
2/2 [=====] - 0s 11ms/step - loss: 2.7348 - accuracy: 0.5500
Epoch 5/100
```

```

2/2 [=====] - 0s 9ms/step - loss: 0.6589 - accuracy: 0.6250
Epoch 6/100
2/2 [=====] - 0s 9ms/step - loss: 0.6931 - accuracy: 0.5000
Epoch 7/100
2/2 [=====] - 0s 9ms/step - loss: 0.6933 - accuracy: 0.5000
Epoch 8/100
2/2 [=====] - 0s 9ms/step - loss: 0.7623 - accuracy: 0.4500
Epoch 9/100
2/2 [=====] - 0s 8ms/step - loss: 0.6931 - accuracy: 0.5000
Epoch 10/100
2/2 [=====] - 0s 8ms/step - loss: 0.6931 - accuracy: 0.5000
Epoch 11/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 12/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 13/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 14/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 15/100
2/2 [=====] - 0s 10ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 16/100
2/2 [=====] - 0s 8ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 17/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 18/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 19/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 20/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 21/100
2/2 [=====] - 0s 10ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 22/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 23/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 24/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 25/100
2/2 [=====] - 0s 10ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 26/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 27/100
2/2 [=====] - 0s 9ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 28/100
2/2 [=====] - 0s 10ms/step - loss: 0.6932 - accuracy: 0.5000
Epoch 29/100

```

```

# Evaluate the model
loss, accuracy = model.evaluate(test_data)
print(f"Final accuracy after {iterations} iterations: {accuracy}")
print(f"Final loss after {iterations} iterations: {loss}")

```

```

1/1 [=====] - 8s 8s/step - loss: 0.6931 - accuracy: 0.5000
Final accuracy after 300 iterations: 0.5
Final loss after 300 iterations: 0.6931483149528503

```

