

untitled3

November 19, 2023

```
[1]: pip install tensorflow
```

```
Requirement already satisfied: tensorflow in
c:\users\vaishnavi\anaconda3\lib\site-packages (2.14.0)
Requirement already satisfied: tensorflow-intel==2.14.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow) (2.14.0)
Requirement already satisfied: absl-py>=1.0.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (2.0.0)
Requirement already satisfied: astunparse>=1.6.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (1.6.3)
Requirement already satisfied: flatbuffers>=23.5.26 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (23.5.26)
Requirement already satisfied: gast!=0.5.0,!0.5.1,!0.5.2,>=0.2.1 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (0.5.4)
Requirement already satisfied: google-pasta>=0.1.1 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (0.2.0)
Requirement already satisfied: h5py>=2.9.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (3.9.0)
Requirement already satisfied: libclang>=13.0.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (16.0.6)
Requirement already satisfied: ml-dtypes==0.2.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (0.2.0)
Requirement already satisfied: numpy>=1.23.5 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (1.24.3)
Requirement already satisfied: opt-einsum>=2.3.2 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (3.3.0)
Requirement already satisfied: packaging in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
```

tensorflow-intel==2.14.0->tensorflow) (21.3)
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 c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (4.25.0)
Requirement already satisfied: setuptools in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (68.0.0)
Requirement already satisfied: six>=1.12.0 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
tensorflow-intel==2.14.0->tensorflow) (1.16.0)
Requirement already satisfied: termcolor>=1.1.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (2.3.0)
Requirement already satisfied: typing-extensions>=3.6.6 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (4.7.1)
Requirement already satisfied: wrapt<1.15,>=1.11.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (1.14.1)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.23.1 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (0.31.0)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (1.59.2)
Requirement already satisfied: tensorboard<2.15,>=2.14 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (2.14.1)
Requirement already satisfied: tensorflow-estimator<2.15,>=2.14.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (2.14.0)
Requirement already satisfied: keras<2.15,>=2.14.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from tensorflow-
intel==2.14.0->tensorflow) (2.14.0)
Requirement already satisfied: wheel<1.0,>=0.23.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from
astunparse>=1.6.0->tensorflow-intel==2.14.0->tensorflow) (0.38.4)
Requirement already satisfied: google-auth<3,>=1.6.3 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from
tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow) (2.23.4)
Requirement already satisfied: google-auth-oauthlib<1.1,>=0.5 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from
tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow) (1.0.0)
Requirement already satisfied: markdown>=2.6.8 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from
tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow) (3.4.1)
Requirement already satisfied: requests<3,>=2.21.0 in

c:\users\vaishnavi\anaconda3\lib\site-packages (from
 tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow) (2.31.0)
 Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from
 tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow) (0.7.2)
 Requirement already satisfied: werkzeug>=1.0.1 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from
 tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow) (2.2.3)
 Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in
 c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
 packaging->tensorflow-intel==2.14.0->tensorflow) (3.0.9)
 Requirement already satisfied: cachetools<6.0,>=2.0.0 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from google-
 auth<3,>=1.6.3->tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow)
 (5.3.2)
 Requirement already satisfied: pyasn1-modules>=0.2.1 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from google-
 auth<3,>=1.6.3->tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow)
 (0.2.8)
 Requirement already satisfied: rsa<5,>=3.1.4 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from google-
 auth<3,>=1.6.3->tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow)
 (4.9)
 Requirement already satisfied: requests-oauthlib>=0.7.0 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from google-auth-
 oauthlib<1.1,>=0.5->tensorboard<2.15,>=2.14->tensorflow-
 intel==2.14.0->tensorflow) (1.3.1)
 Requirement already satisfied: charset-normalizer<4,>=2 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from
 requests<3,>=2.21.0->tensorboard<2.15,>=2.14->tensorflow-
 intel==2.14.0->tensorflow) (2.0.4)
 Requirement already satisfied: idna<4,>=2.5 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from
 requests<3,>=2.21.0->tensorboard<2.15,>=2.14->tensorflow-
 intel==2.14.0->tensorflow) (3.4)
 Requirement already satisfied: urllib3<3,>=1.21.1 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from
 requests<3,>=2.21.0->tensorboard<2.15,>=2.14->tensorflow-
 intel==2.14.0->tensorflow) (1.26.16)
 Requirement already satisfied: certifi>=2017.4.17 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from
 requests<3,>=2.21.0->tensorboard<2.15,>=2.14->tensorflow-
 intel==2.14.0->tensorflow) (2023.7.22)
 Requirement already satisfied: MarkupSafe>=2.1.1 in
 c:\users\vaishnavi\anaconda3\lib\site-packages (from
 werkzeug>=1.0.1->tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow)
 (2.1.1)
 Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in

```
c:\users\vaishnavi\anaconda3\lib\site-packages (from
pyasn1-modules>=0.2.1->google-
auth<3,>=1.6.3->tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow)
(0.4.8)
Requirement already satisfied: oauthlib>=3.0.0 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from requests-
oauthlib>=0.7.0->google-auth-
oauthlib<1.1,>=0.5->tensorboard<2.15,>=2.14->tensorflow-
intel==2.14.0->tensorflow) (3.2.2)
Note: you may need to restart the kernel to use updated packages.
```

```
[2]: pip install matplotlib
```

```
Requirement already satisfied: matplotlib in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (3.6.2)
Requirement already satisfied: contourpy>=1.0.1 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
matplotlib) (1.0.6)
Requirement already satisfied: cyclers>=0.10 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
matplotlib) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
matplotlib) (4.38.0)
Requirement already satisfied: kiwisolver>=1.0.1 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
matplotlib) (1.4.4)
Requirement already satisfied: numpy>=1.19 in
c:\users\vaishnavi\anaconda3\lib\site-packages (from matplotlib) (1.24.3)
Requirement already satisfied: packaging>=20.0 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
matplotlib) (21.3)
Requirement already satisfied: pillow>=6.2.0 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
matplotlib) (9.3.0)
Requirement already satisfied: pyparsing>=2.2.1 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
matplotlib) (3.0.9)
Requirement already satisfied: python-dateutil>=2.7 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from
matplotlib) (2.8.2)
Requirement already satisfied: six>=1.5 in
c:\users\vaishnavi\appdata\roaming\python\python311\site-packages (from python-
dateutil>=2.7->matplotlib) (1.16.0)
Note: you may need to restart the kernel to use updated packages.
```

```
[3]: pip install random
```

Note: you may need to restart the kernel to use updated packages.

ERROR: Could not find a version that satisfies the requirement random (from versions: none)

ERROR: No matching distribution found for random

```
[4]: pip install random2
```

Collecting random2Note: you may need to restart the kernel to use updated packages.

```
Using cached random2-1.0.1.zip (21 kB)
Preparing metadata (setup.py): started
Preparing metadata (setup.py): finished with status 'done'
Building wheels for collected packages: random2
  Building wheel for random2 (setup.py): started
  Building wheel for random2 (setup.py): finished with status 'done'
  Created wheel for random2: filename=random2-1.0.1-py3-none-any.whl size=12062
sha256=b9358487fb6a638ec952b9f10e6beb165f4a23a6dee9cda22c20f0ffb881deeb
  Stored in directory: c:\users\vaishnavi\appdata\local\pip\cache\wheels\2b\18\5
e\32f6c0300383bc12df64426318ae4c47a3ae3068c1a8dff179
Successfully built random2
Installing collected packages: random2
Successfully installed random2-1.0.1
```

```
[6]: import tensorflow as tf
      from tensorflow import keras
      import matplotlib.pyplot as plt
      import random
```

```
[7]: mnist = tf.keras.datasets.mnist
      (x_train,y_train), (x_test,y_test) = mnist.load_data()
      x_train = x_train / 255
      x_test = x_test / 255
```

```
[8]: model = keras.Sequential([
      keras.layers.Flatten(input_shape=(28,28)),
      keras.layers.Dense(128, activation="relu"),
      keras.layers.Dense(10,activation="softmax")
    ])
      model.summary()
```

Model: "sequential"

Layer (type)	Output Shape	Param #
flatten (Flatten)	(None, 784)	0

dense (Dense)	(None, 128)	100480
dense_1 (Dense)	(None, 10)	1290

```
=====
Total params: 101770 (397.54 KB)
Trainable params: 101770 (397.54 KB)
Non-trainable params: 0 (0.00 Byte)
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```

```
[9]: model.compile(optimizer="sgd",
                  loss="sparse_categorical_crossentropy",
                  metrics=['accuracy'])

history=model.fit(x_train,y_train,validation_data=(x_test,y_test),epochs=2)
```

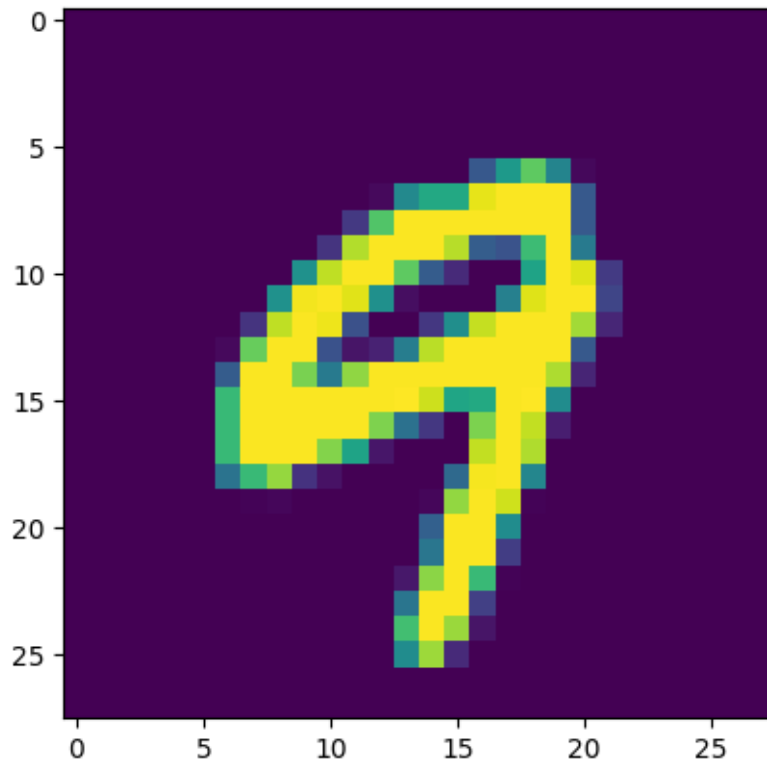
```
Epoch 1/2
1875/1875 [=====] - 4s 2ms/step - loss: 0.6570 -
accuracy: 0.8352 - val_loss: 0.3544 - val_accuracy: 0.9034
Epoch 2/2
1875/1875 [=====] - 4s 2ms/step - loss: 0.3334 -
accuracy: 0.9066 - val_loss: 0.2896 - val_accuracy: 0.9189
```

```
[10]: test_loss,test_acc=model.evaluate(x_test,y_test)
print("Loss=%.3f" %test_loss)
print("Accuracy=%.3f" %test_acc)
```

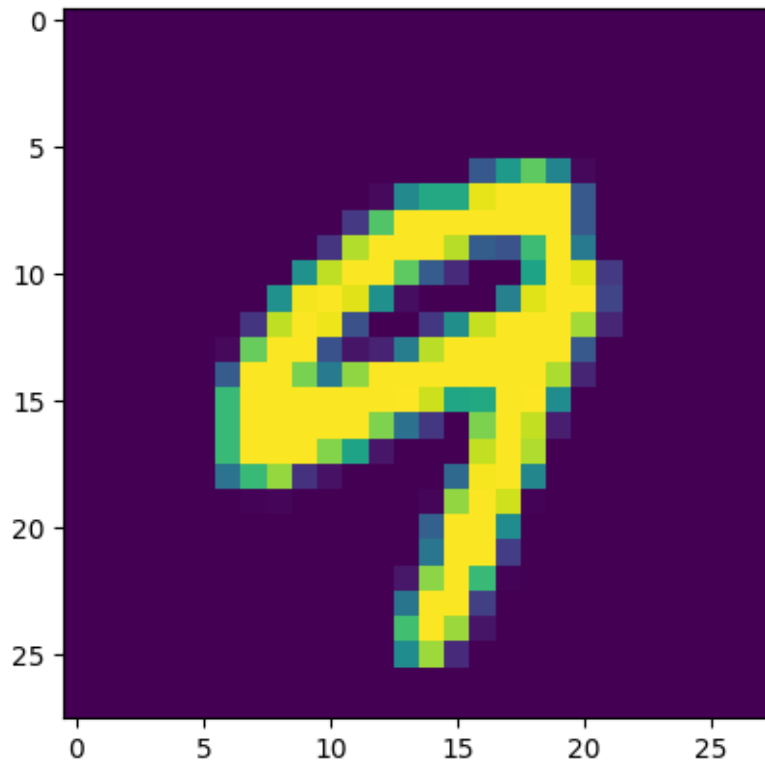
```
313/313 [=====] - 0s 2ms/step - loss: 0.2896 -
accuracy: 0.9189
Loss=0.290
Accuracy=0.919
```

```
[11]: n=random.randint(0,9999)
plt.imshow(x_test[n])
plt.show()
predicted_value=model.predict(x_test)
plt.imshow(x_test[n])
plt.show()

print("Predicted value:",predicted_value[n])
```

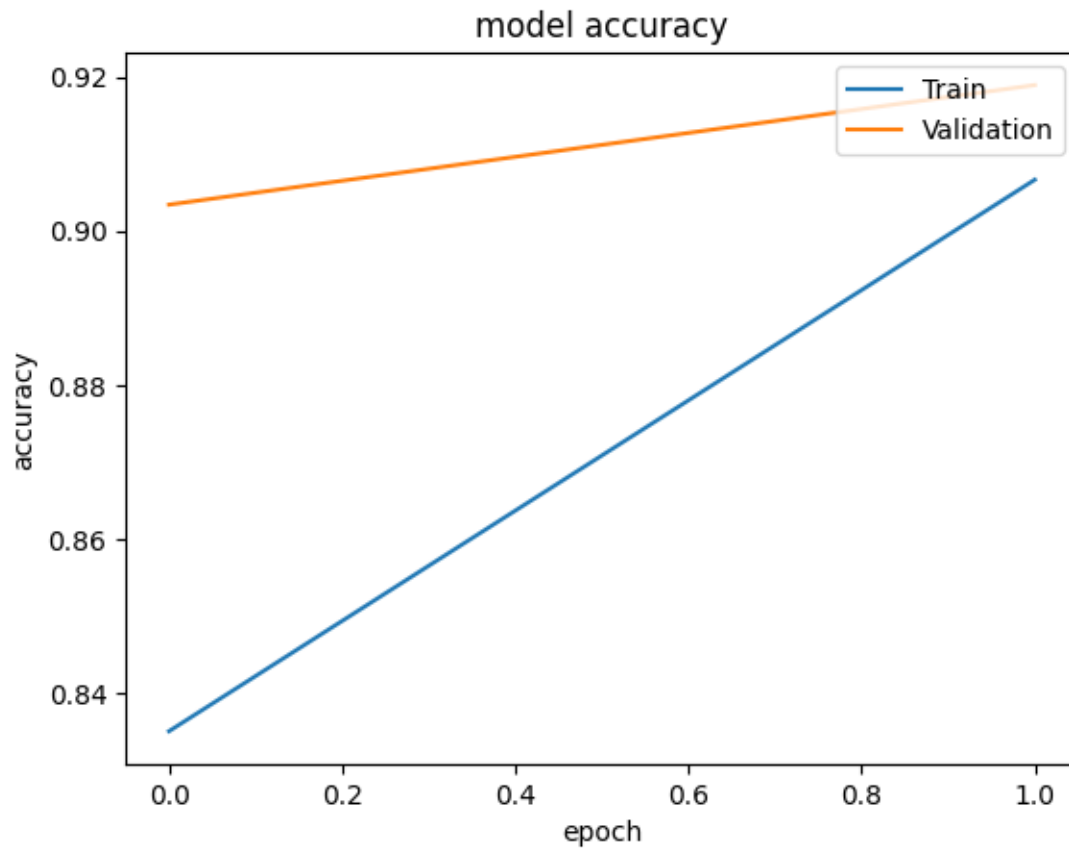


313/313 [=====] - 1s 2ms/step

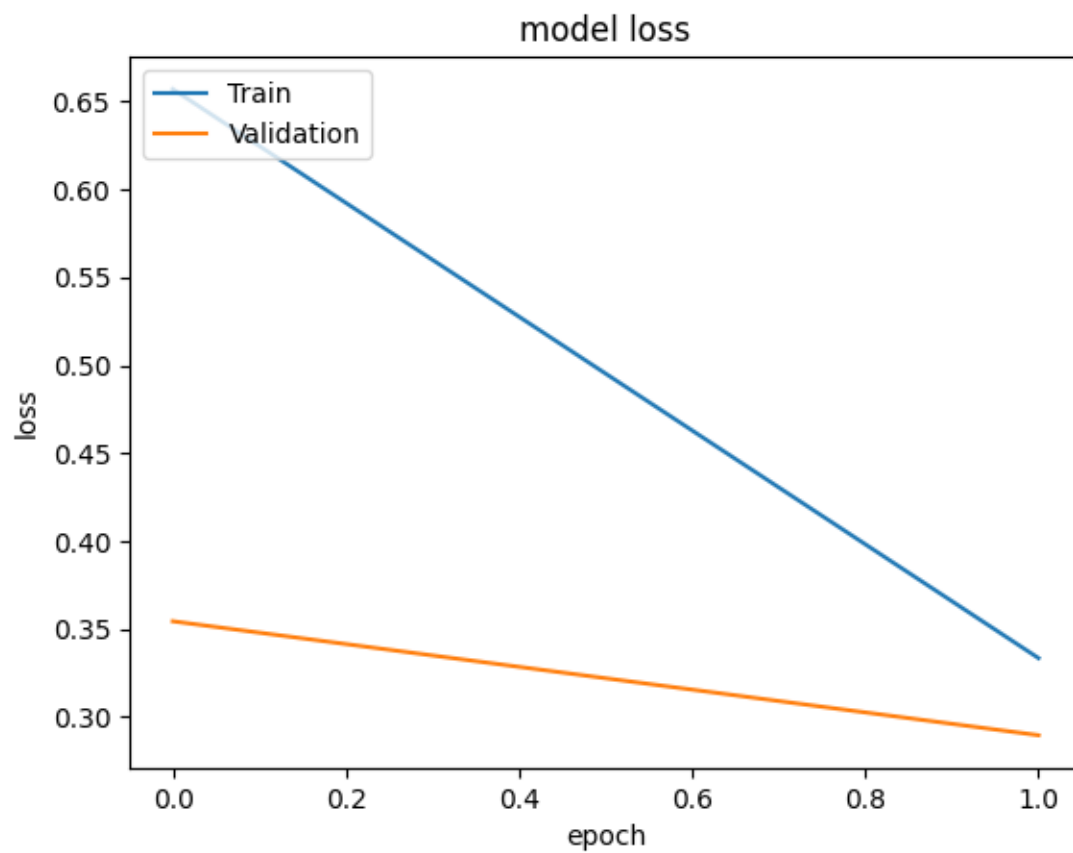


Predicted value: [7.4830932e-05 8.2275761e-08 8.5876964e-06 3.2814187e-05
 4.6871457e-02
 4.9765451e-05 3.7597441e-05 3.8969543e-04 4.6173963e-04 9.5207345e-01]

```
[12]: plt.plot(history.history['accuracy'])
plt.plot(history.history['val_accuracy'])
plt.title('model accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['Train', 'Validation'], loc='upper right')
plt.show()
```

```
[13]: plt.plot(history.history['loss'])
plt.plot(history.history['val_loss'])
plt.title('model loss')
plt.ylabel('loss')
plt.xlabel('epoch')
plt.legend(['Train', 'Validation'], loc='upper left')
plt.show()
```



[]: