

```
In [ ]: # Install TensorFlow
# !pip install -q tensorflow-gpu==2.0.0-beta1

try:
    %tensorflow_version 2.x # Colab only.
except Exception:
    pass

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

`%tensorflow_version` only switches the major version: `1.x` or `2.x`.
You set: `2.x` # Colab only.`. This will be interpreted as: `2.x`.

TensorFlow 2.x selected.
2.0.0-rc0

```
In [ ]: # Load in the data
mnist = tf.keras.datasets.mnist

(x_train, y_train), (x_test, y_test) = mnist.load_data()
x_train, x_test = x_train / 255.0, x_test / 255.0
print("x_train.shape:", x_train.shape)
```

Downloading data from <https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz>
11493376/11490434 [=====] - 0s 0us/step
x_train.shape: (60000, 28, 28)

```
In [ ]: # Build the model
model = tf.keras.models.Sequential([
    tf.keras.layers.Flatten(input_shape=(28, 28)),
    tf.keras.layers.Dense(128, activation='relu'),
    tf.keras.layers.Dropout(0.2),
    tf.keras.layers.Dense(10, activation='softmax')
])
```

```
In [ ]: # Compile the model
model.compile(optimizer='adam',
              loss='sparse_categorical_crossentropy',
              metrics=['accuracy'])
```

```
In [ ]: # Train the model
r = model.fit(x_train, y_train, validation_data=(x_test, y_test), epochs=10)
```

Train on 60000 samples, validate on 10000 samples
Epoch 1/10

WARNING:tensorflow:Entity <function Function._initialize_uninitialized_variables.<locals>._initialize_variables at 0x7fa310296c80> could not be transformed and will be executed as-is. Please report this to the AutoGraph team. When filing the bug, set the verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full output. Cause: module 'gast' has no attribute 'Num'

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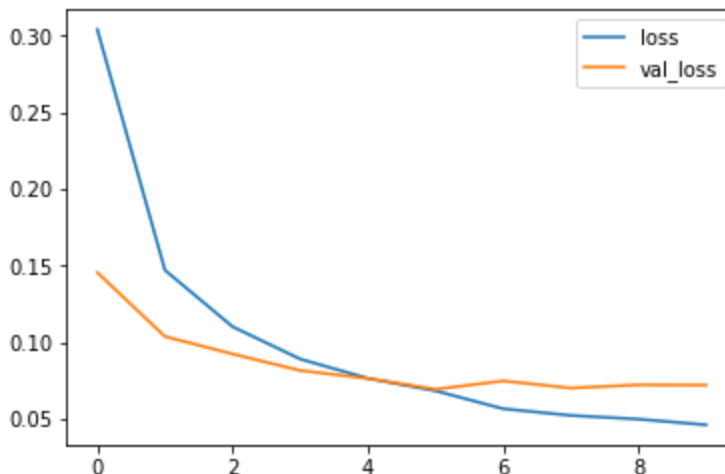
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```
60000/60000 [=====] - 8s 134us/sample - loss: 0.3042 - accuracy: 0.9109 - val_loss: 0.1454 - val_accuracy: 0.9561
Epoch 2/10
60000/60000 [=====] - 7s 122us/sample - loss: 0.1469 - accuracy: 0.9558 - val_loss: 0.1036 - val_accuracy: 0.9693
Epoch 3/10
60000/60000 [=====] - 7s 115us/sample - loss: 0.1100 - accuracy: 0.9680 - val_loss: 0.0922 - val_accuracy: 0.9723
Epoch 4/10
60000/60000 [=====] - 7s 110us/sample - loss: 0.0889 - accuracy: 0.9722 - val_loss: 0.0814 - val_accuracy: 0.9747
Epoch 5/10
60000/60000 [=====] - 7s 112us/sample - loss: 0.0763 - accuracy: 0.9767 - val_loss: 0.0762 - val_accuracy: 0.9769
Epoch 6/10
60000/60000 [=====] - 7s 110us/sample - loss: 0.0682 - accuracy: 0.9785 - val_loss: 0.0692 - val_accuracy: 0.9788
Epoch 7/10
60000/60000 [=====] - 7s 110us/sample - loss: 0.0565 - accuracy: 0.9816 - val_loss: 0.0746 - val_accuracy: 0.9781
Epoch 8/10
60000/60000 [=====] - 7s 110us/sample - loss: 0.0521 - accuracy: 0.9829 - val_loss: 0.0700 - val_accuracy: 0.9789
Epoch 9/10
60000/60000 [=====] - 7s 109us/sample - loss: 0.0497 - accuracy: 0.9842 - val_loss: 0.0720 - val_accuracy: 0.9790
Epoch 10/10
60000/60000 [=====] - 7s 110us/sample - loss: 0.0460 - accuracy: 0.9846 - val_loss: 0.0719 - val_accuracy: 0.9792
```

In []:

```
# Plot loss per iteration
import matplotlib.pyplot as plt
plt.plot(r.history['loss'], label='loss')
plt.plot(r.history['val_loss'], label='val_loss')
plt.legend()
```

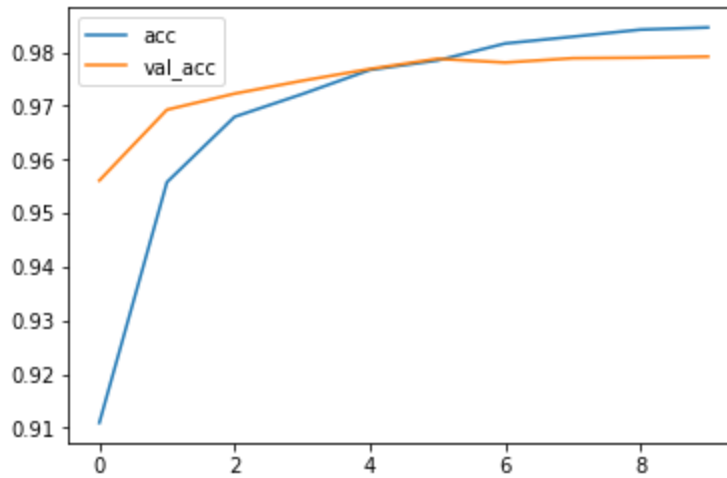
Out[]: <matplotlib.legend.Legend at 0x7fa2c8840e48>



In []:

```
# Plot accuracy per iteration
plt.plot(r.history['accuracy'], label='acc')
plt.plot(r.history['val_accuracy'], label='val_acc')
plt.legend()
```

```
Out[ ]: <matplotlib.legend.Legend at 0x7fa2c876e358>
```



```
In [ ]: # Evaluate the model
print(model.evaluate(x_test, y_test))
```

This image shows a full page of primary-ruled notebook paper. It features horizontal dashed lines for writing and two vertical solid lines on each side to define margins. The paper is white and contains no text or other markings.

[illegible]

This image shows a full page of blank primary-ruled paper. It features multiple sets of horizontal lines designed for handwriting practice. Each set consists of three lines: a solid top line, a dashed middle line, and a solid bottom line. These sets are repeated vertically down the entire page, providing ample space for practicing letter formation and alignment. The paper is white, and the lines are printed in a light gray or blue color. There are no margins, text, or other markings on the page.

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[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

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[illegible]

[illegible]

[illegible]

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[illegible]

[illegible]

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[illegible]

[illegible]

[illegible]

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[illegible]

[illegible]

[illegible]

[illegible]

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[illegible]

This image shows a full page of primary-ruled paper. It features multiple sets of horizontal lines designed to help young learners write neatly. Each set consists of three lines: a solid top line, a dashed middle line, and a solid bottom line. These sets are repeated down the entire page, providing ample space for handwriting practice. The paper is white, and the lines are printed in a light gray or blue color. There are no margins, text, or other markings on the page.

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[illegible]

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[illegible]

This image shows a full page of a document template. It features a series of evenly spaced, light gray horizontal lines across the entire width of the page, providing a guide for writing. The background is white, and there are no margins, headers, or footers visible.

```
# Convert the model to TFLite format

# Create a converter object
converter = tf.lite.TFLiteConverter.from_keras_model(model)

# Convert the model
tflite_model = converter.convert()
```

```
# Save to file
with open("converted_model.tflite", "wb") as f:
    f.write(tflite_model)
```

WARNING:tensorflow:Entity <function Function._initialize_uninitialized_variables.<locals>.<locals>.initialize_variables at 0x7fa3103f3048> could not be transformed and will be executed as-is. Please report this to the AutoGraph team. When filing the bug, set the verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full output. Cause: module 'gast' has no attribute 'Num'

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In []:

```
# Check if it exists
!ls
```

converted_model.tflite keras_model.h5 sample_data