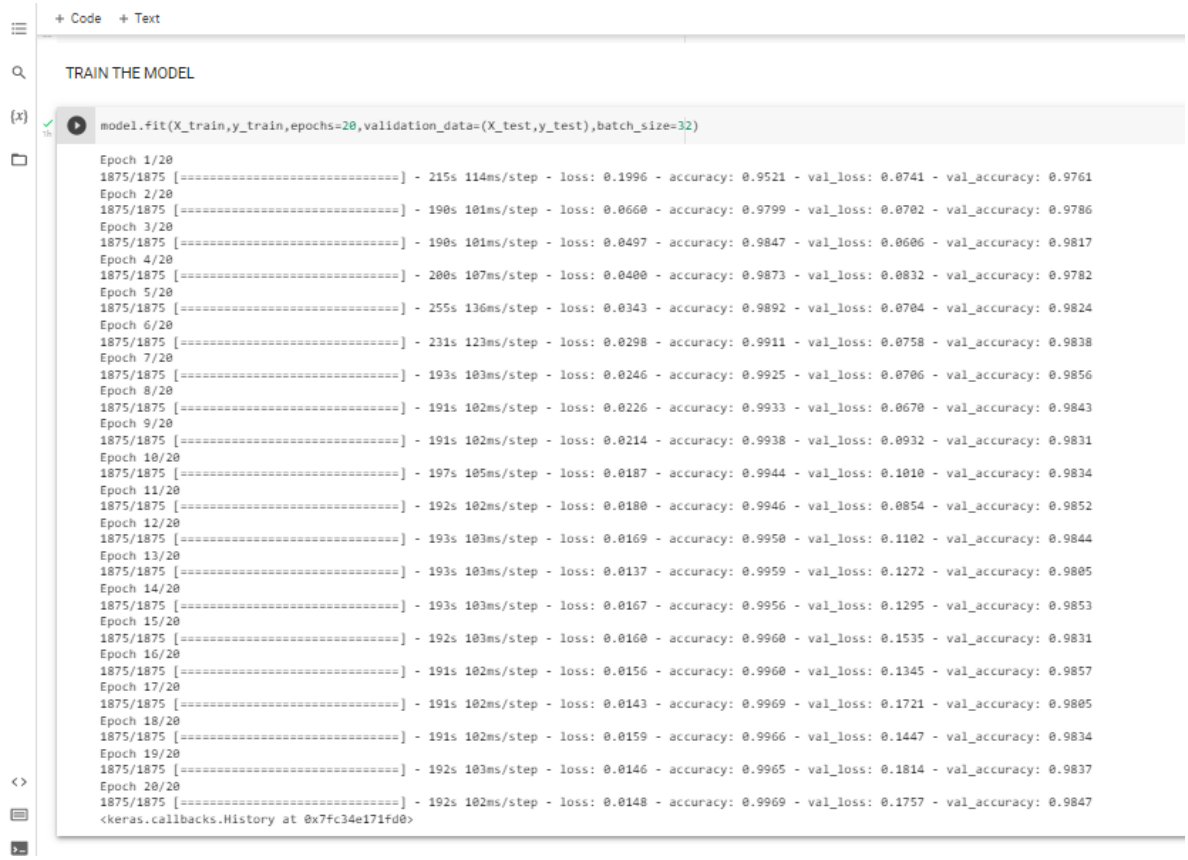
A Novel Method for Handwritten Digit Recognition System

Train The Model



+ Code + Text

TRAIN THE MODEL

```
model.fit(X_train,y_train,epochs=20,validation_data=(X_test,y_test),batch_size=32)
```

```
Epoch 1/20
1875/1875 [==============================] - 215s 114ms/step - loss: 0.1996 - accuracy: 0.9521 - val_loss: 0.0741 - val_accuracy: 0.9761
Epoch 2/20
1875/1875 [==============================] - 190s 101ms/step - loss: 0.0660 - accuracy: 0.9799 - val_loss: 0.0702 - val_accuracy: 0.9786
Epoch 3/20
1875/1875 [==============================] - 190s 101ms/step - loss: 0.0497 - accuracy: 0.9847 - val_loss: 0.0606 - val_accuracy: 0.9817
Epoch 4/20
1875/1875 [==============================] - 200s 107ms/step - loss: 0.0400 - accuracy: 0.9873 - val_loss: 0.0832 - val_accuracy: 0.9782
Epoch 5/20
1875/1875 [==============================] - 255s 136ms/step - loss: 0.0343 - accuracy: 0.9892 - val_loss: 0.0704 - val_accuracy: 0.9824
Epoch 6/20
1875/1875 [==============================] - 231s 123ms/step - loss: 0.0298 - accuracy: 0.9911 - val_loss: 0.0758 - val_accuracy: 0.9838
Epoch 7/20
1875/1875 [==============================] - 193s 103ms/step - loss: 0.0246 - accuracy: 0.9925 - val_loss: 0.0706 - val_accuracy: 0.9856
Epoch 8/20
1875/1875 [==============================] - 191s 102ms/step - loss: 0.0226 - accuracy: 0.9933 - val_loss: 0.0670 - val_accuracy: 0.9843
Epoch 9/20
1875/1875 [==============================] - 191s 102ms/step - loss: 0.0214 - accuracy: 0.9938 - val_loss: 0.0932 - val_accuracy: 0.9831
Epoch 10/20
1875/1875 [==============================] - 197s 105ms/step - loss: 0.0187 - accuracy: 0.9944 - val_loss: 0.1010 - val_accuracy: 0.9834
Epoch 11/20
1875/1875 [==============================] - 192s 102ms/step - loss: 0.0180 - accuracy: 0.9946 - val_loss: 0.0854 - val_accuracy: 0.9852
Epoch 12/20
1875/1875 [==============================] - 193s 103ms/step - loss: 0.0169 - accuracy: 0.9950 - val_loss: 0.1102 - val_accuracy: 0.9844
Epoch 13/20
1875/1875 [==============================] - 193s 103ms/step - loss: 0.0137 - accuracy: 0.9959 - val_loss: 0.1272 - val_accuracy: 0.9805
Epoch 14/20
1875/1875 [==============================] - 193s 103ms/step - loss: 0.0167 - accuracy: 0.9956 - val_loss: 0.1295 - val_accuracy: 0.9853
Epoch 15/20
1875/1875 [==============================] - 192s 103ms/step - loss: 0.0160 - accuracy: 0.9960 - val_loss: 0.1535 - val_accuracy: 0.9831
Epoch 16/20
1875/1875 [==============================] - 191s 102ms/step - loss: 0.0156 - accuracy: 0.9960 - val_loss: 0.1345 - val_accuracy: 0.9857
Epoch 17/20
1875/1875 [==============================] - 191s 102ms/step - loss: 0.0143 - accuracy: 0.9969 - val_loss: 0.1721 - val_accuracy: 0.9805
Epoch 18/20
1875/1875 [==============================] - 191s 102ms/step - loss: 0.0159 - accuracy: 0.9966 - val_loss: 0.1447 - val_accuracy: 0.9834
Epoch 19/20
1875/1875 [==============================] - 192s 103ms/step - loss: 0.0146 - accuracy: 0.9965 - val_loss: 0.1814 - val_accuracy: 0.9837
Epoch 20/20
1875/1875 [==============================] - 192s 102ms/step - loss: 0.0148 - accuracy: 0.9969 - val_loss: 0.1757 - val_accuracy: 0.9847
<keras.callbacks.History at 0x7fc34e171fd0>
```