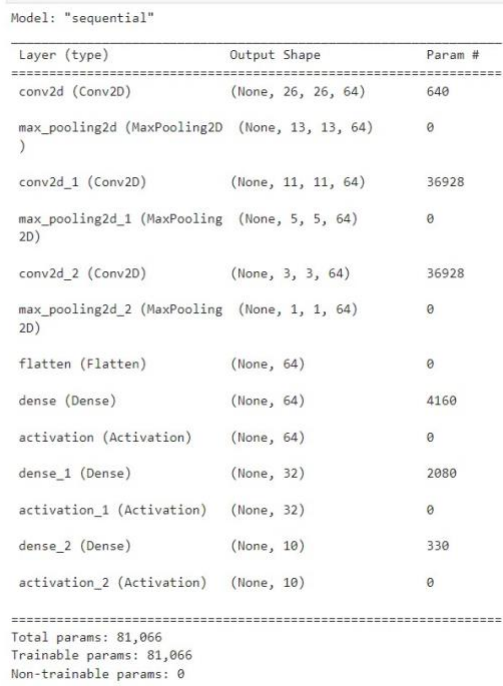



## Project Development Phase Model Performance Test

|               |  |
|---------------|--|
| Date          | 19 November 2022   |
| Team ID       | PNT2022TMID40505   |
| Project Name  | Project – A novel method for handwritten digit recognition system. |
| Maximum Marks | 10 Marks   |

### Model Performance Testing:

Project team shall fill the following information in model performance testing template.

| S.No. | Parameter | Values                                 | Screenshot   |
|-------|-----------|--|--|
| 1.    | Metrics   | <b>Regression Model:</b> model summary |  <pre> Model: "sequential" Layer (type)                Output Shape              Param # ===== conv2d (Conv2D)              (None, 26, 26, 64)        640 max_pooling2d (MaxPooling2D) (None, 13, 13, 64)        0 conv2d_1 (Conv2D)            (None, 11, 11, 64)        36928 max_pooling2d_1 (MaxPooling2D) (None, 5, 5, 64)        0 conv2d_2 (Conv2D)            (None, 3, 3, 64)          36928 max_pooling2d_2 (MaxPooling2D) (None, 1, 1, 64)        0 flatten (Flatten)            (None, 64)                0 dense (Dense)                (None, 64)                4160 activation (Activation)       (None, 64)                0 dense_1 (Dense)              (None, 32)                2080 activation_1 (Activation)     (None, 32)                0 dense_2 (Dense)              (None, 10)                330 activation_2 (Activation)     (None, 10)                0 ===== Total params: 81,066 Trainable params: 81,066 Non-trainable params: 0 </pre> |

|    |                |  |   |
|----|----------------|--|---|
| 2. | Accuracy       | Accuracy of 99.21% is achieved.              | <pre> Epoch 1/10 1125/1125 [=====] - 43s 37ms/step - loss: 0.3674 - accuracy: 0.8839 - val_loss: 0.1889 - val_accuracy: 0.9452 Epoch 2/10 1125/1125 [=====] - 44s 39ms/step - loss: 0.1151 - accuracy: 0.9643 - val_loss: 0.1069 - val_accuracy: 0.9679 Epoch 3/10 1125/1125 [=====] - 42s 38ms/step - loss: 0.0821 - accuracy: 0.9745 - val_loss: 0.0724 - val_accuracy: 0.9774 Epoch 4/10 1125/1125 [=====] - 43s 38ms/step - loss: 0.0639 - accuracy: 0.9803 - val_loss: 0.0748 - val_accuracy: 0.9774 Epoch 5/10 1125/1125 [=====] - 43s 38ms/step - loss: 0.0512 - accuracy: 0.9839 - val_loss: 0.0748 - val_accuracy: 0.9762 Epoch 6/10 1125/1125 [=====] - 46s 41ms/step - loss: 0.0431 - accuracy: 0.9860 - val_loss: 0.0760 - val_accuracy: 0.9782 Epoch 7/10 1125/1125 [=====] - 60s 53ms/step - loss: 0.0347 - accuracy: 0.9884 - val_loss: 0.0810 - val_accuracy: 0.9786 Epoch 8/10 1125/1125 [=====] - 64s 57ms/step - loss: 0.0282 - accuracy: 0.9909 - val_loss: 0.0697 - val_accuracy: 0.9809 Epoch 9/10 1125/1125 [=====] - 52s 46ms/step - loss: 0.0243 - accuracy: 0.9919 - val_loss: 0.0730 - val_accuracy: 0.9797 Epoch 10/10 1125/1125 [=====] - 42s 37ms/step - loss: 0.0229 - accuracy: 0.9921 - val_loss: 0.0620 - val_accuracy: 0.9837  lut[26]: </pre> |
| 3. | Tune the model | Dataset is tested and digits are recognized. | <pre> In [101... img = Image.open(streaming_body_1).convert("L") img = img.resize( (28,28) )  In [102... img  Out[102...   In [103... im2arr = np.array(img) im2arr = im2arr.reshape(1, 28, 28, 1)  In [104... pred = model.predict(im2arr) print(pred)  [[0. 0. 0. 0. 0. 0. 0. 1. 0.]]  In [105... print(np.argmax(pred, axis=1))  [0]  In [ ]: </pre>  |

