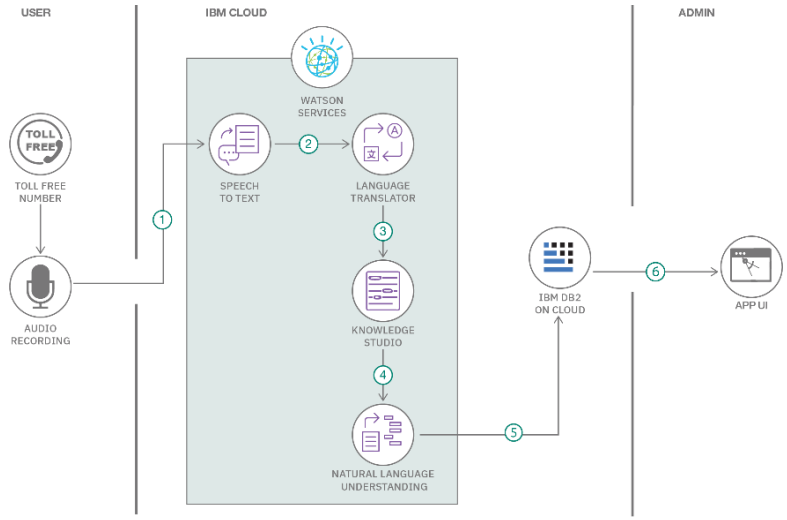
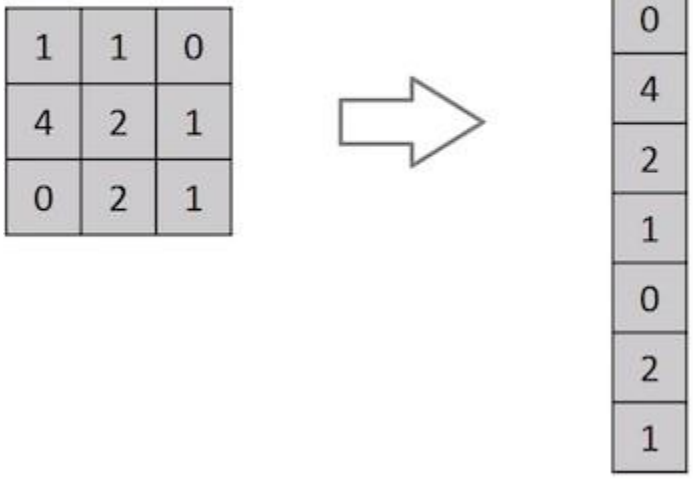
Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	03 October 2022
Team ID	PNT2022TMID39460
Project Name	Project – A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM
Maximum Marks	4 Marks

Technical Architecture

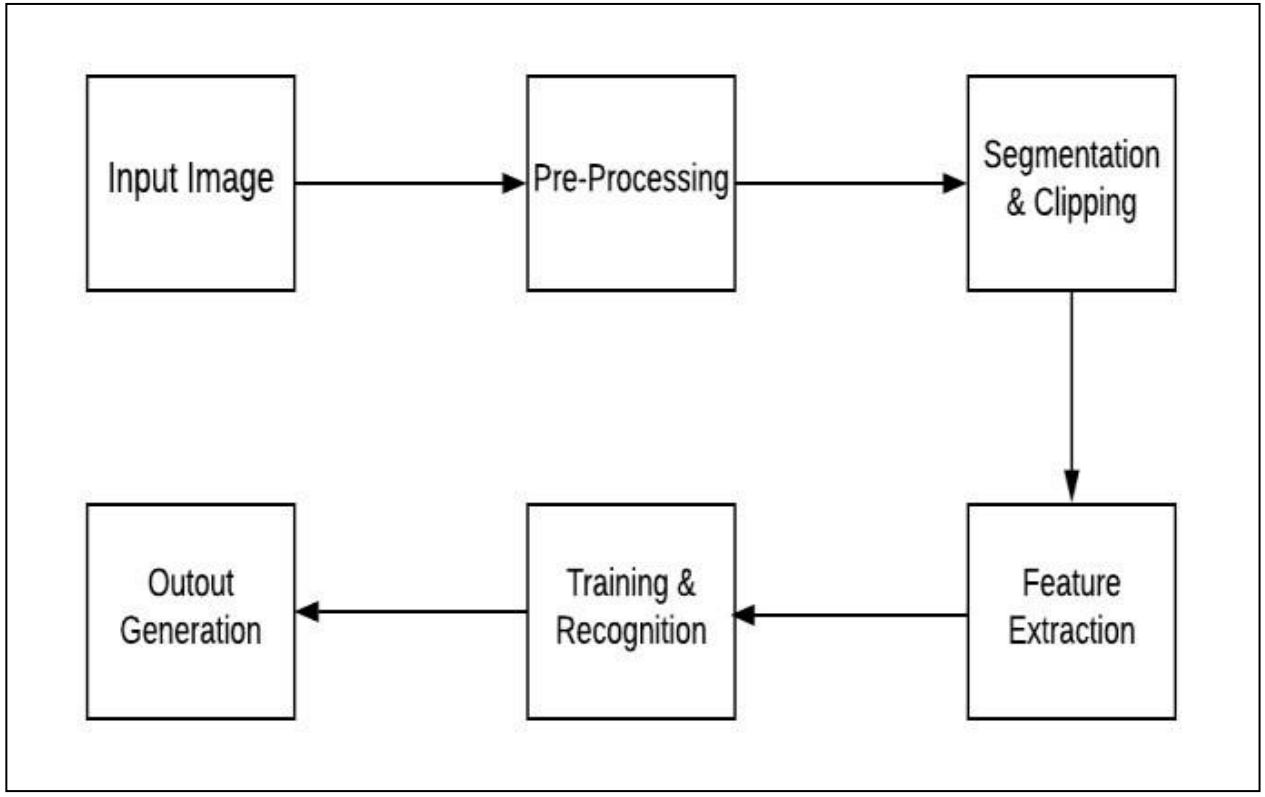


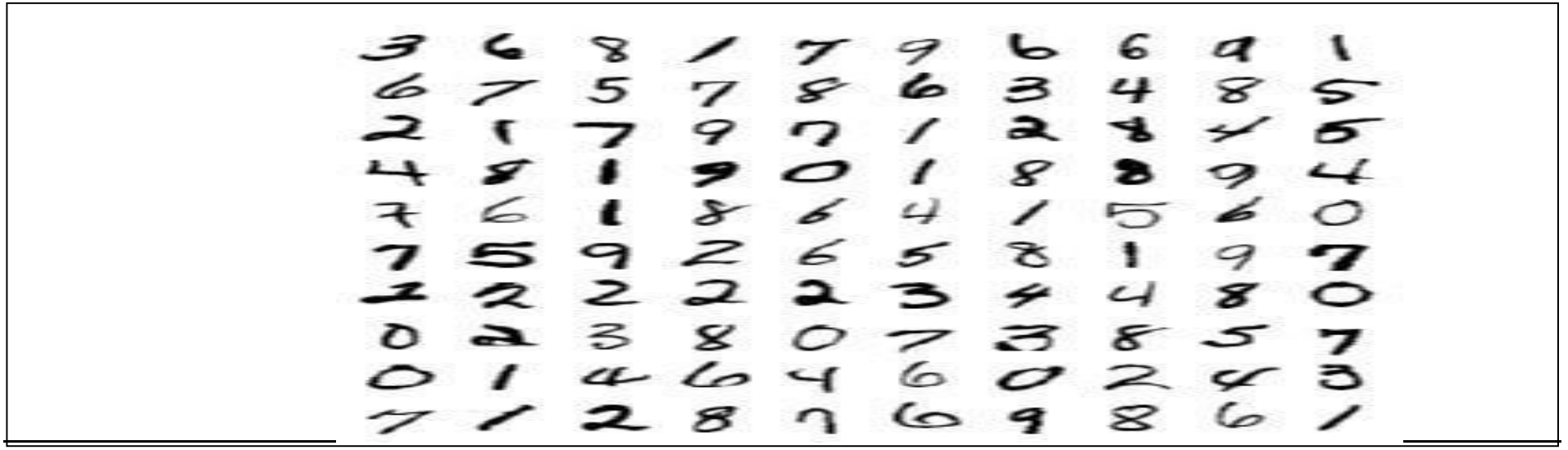


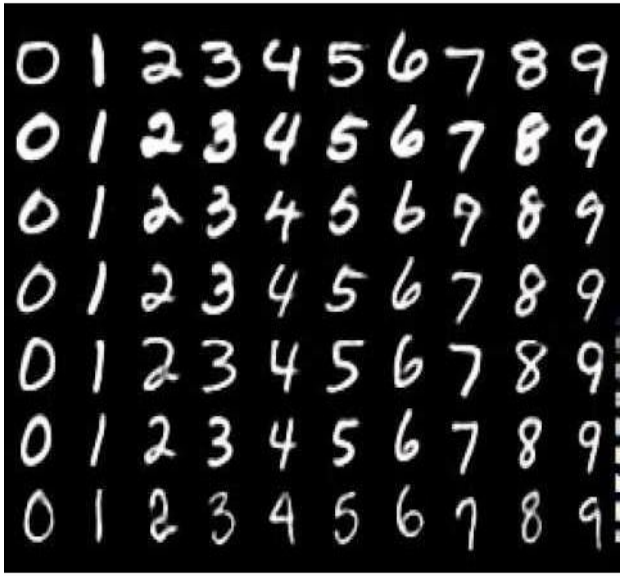
INTRODUCTION

Digit Recognition is nothing but recognizing or identifying the digits in any document. Digit recognition framework is simply the working of a machine to prepare itself or interpret the digits.

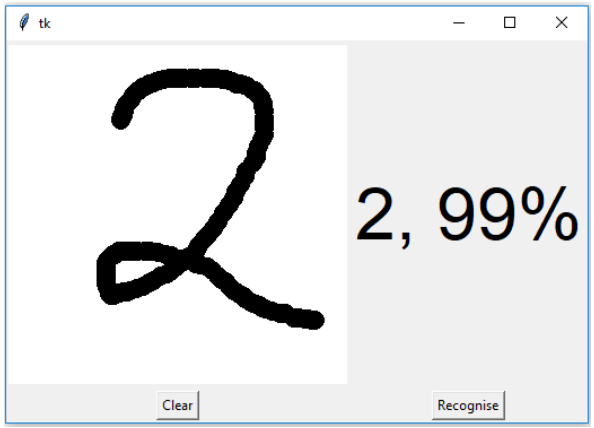
Handwritten Digit Recognition is the capacity of a computer to interpret the manually written digits from various sources like messages, bank cheques, papers, pictures, and so forth and in various situations for web based handwriting recognition on PC tablets, identifying number plates of vehicles, handling bank cheques, digits entered in any forms etc.

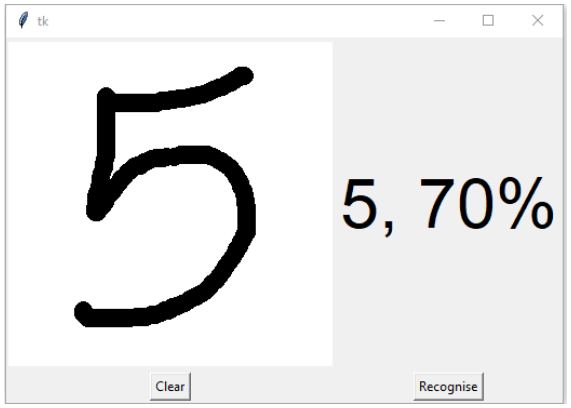






```
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 26, 26, 32)        320
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 13, 13, 32)        0
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 11, 11, 64)        18496
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 9, 9, 64)          36928
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 4, 4, 64)          0
_________________________________________________________________
flatten (Flatten)            (None, 1024)              0
_________________________________________________________________
dense (Dense)                (None, 100)               102500
_________________________________________________________________
dense_1 (Dense)              (None, 10)                1010
=================================================================
Total params: 159,254
Trainable params: 159,254
Non-trainable params: 0
```


tk
2, 99%
Clear
Recognise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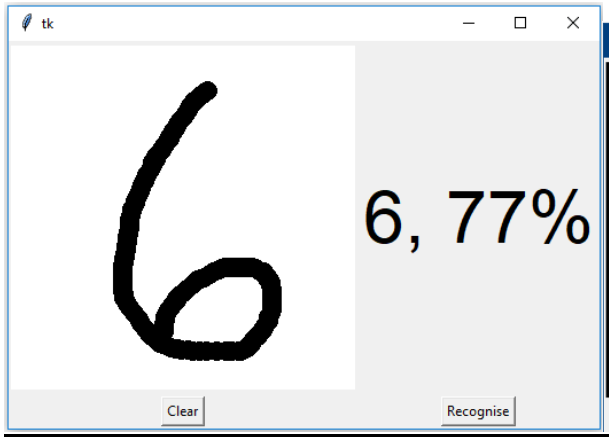
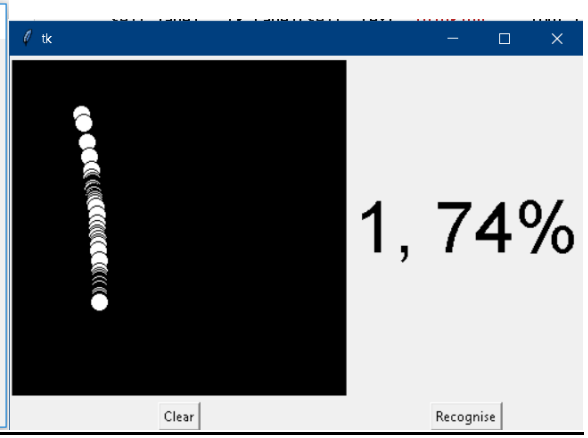
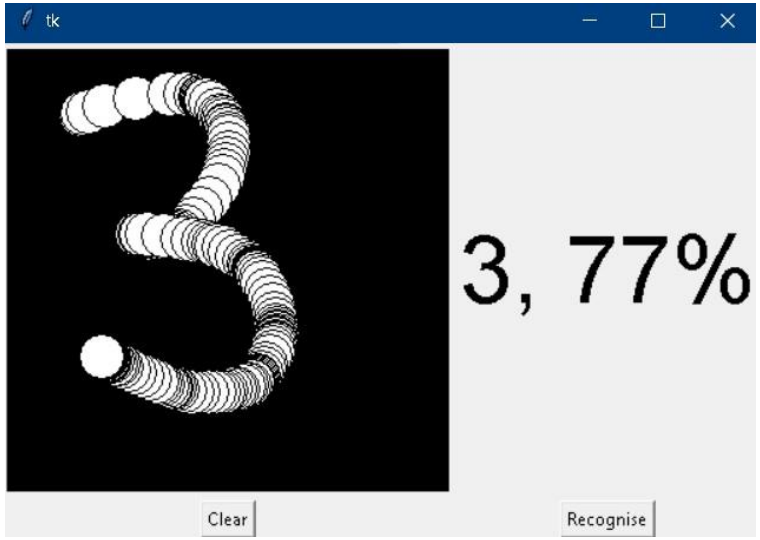
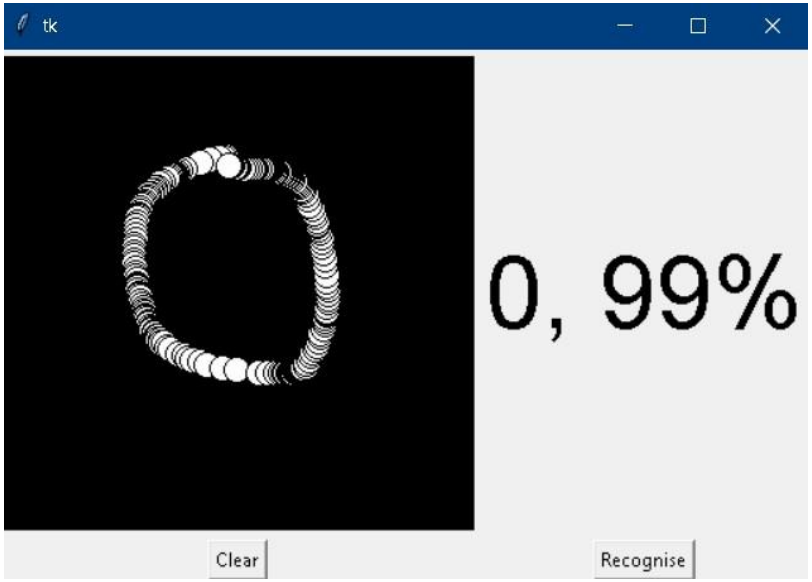
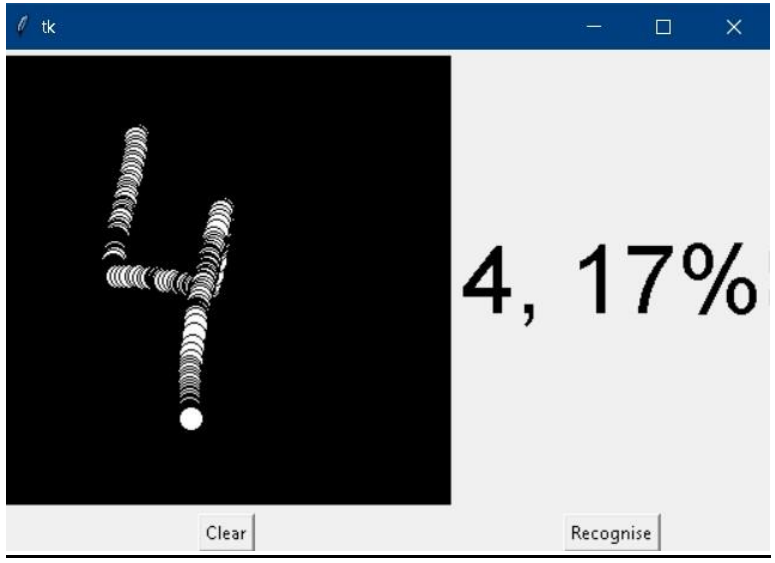
5, 70%
Clear
Recognise

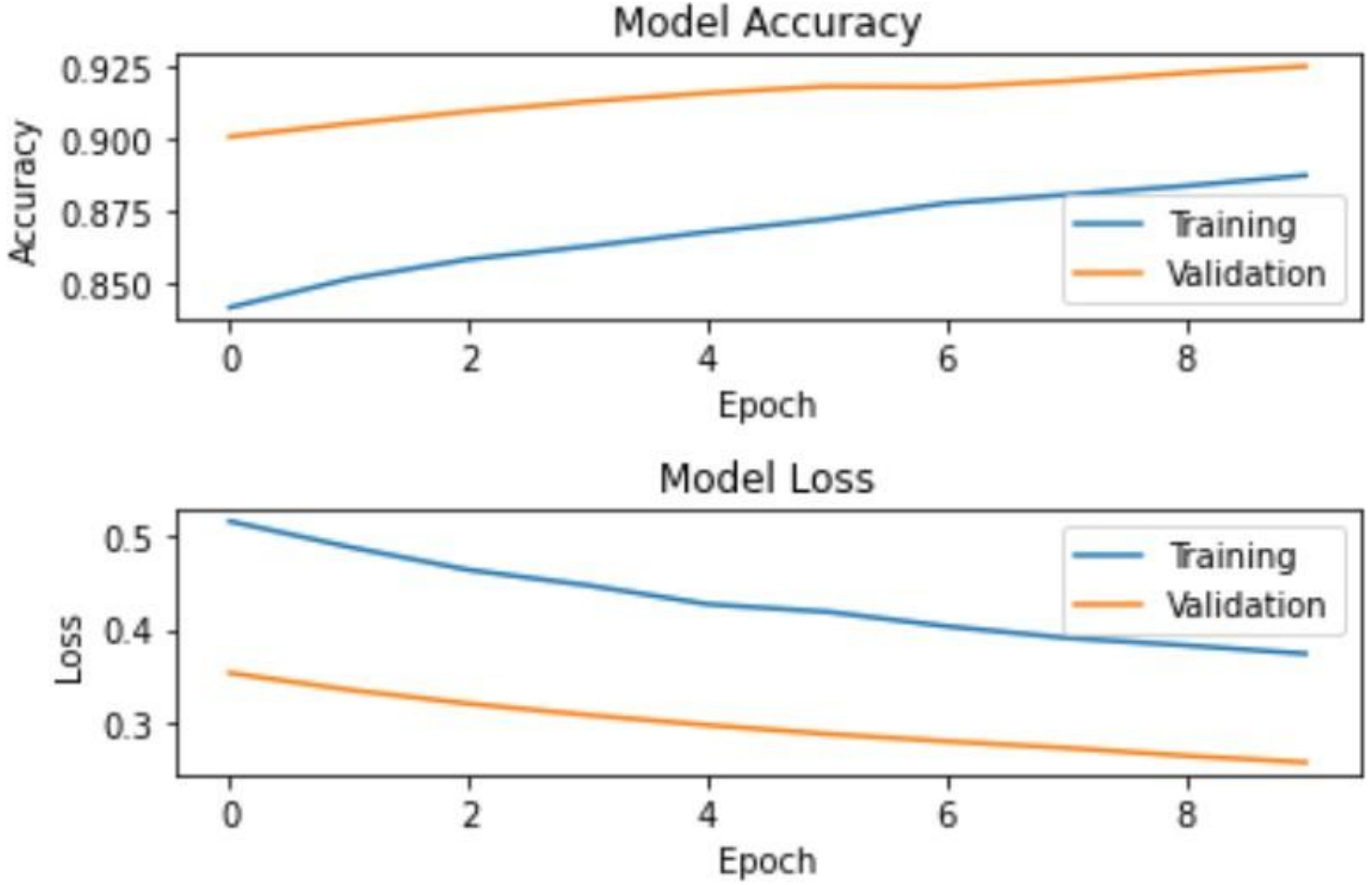

tk
6, 77%
Clear
Recognise

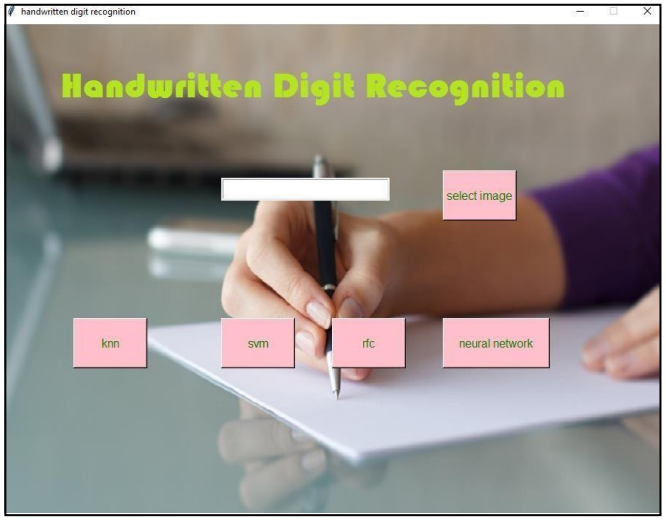

tk
1, 74%
Clear
Recognise

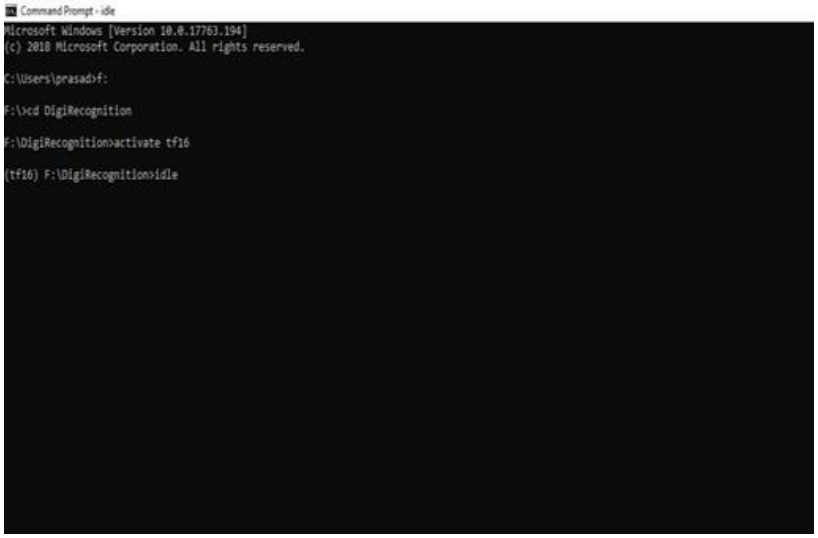

tk
3, 77%
Clear
Recognise


tk
0, 99%
Clear
Recognise

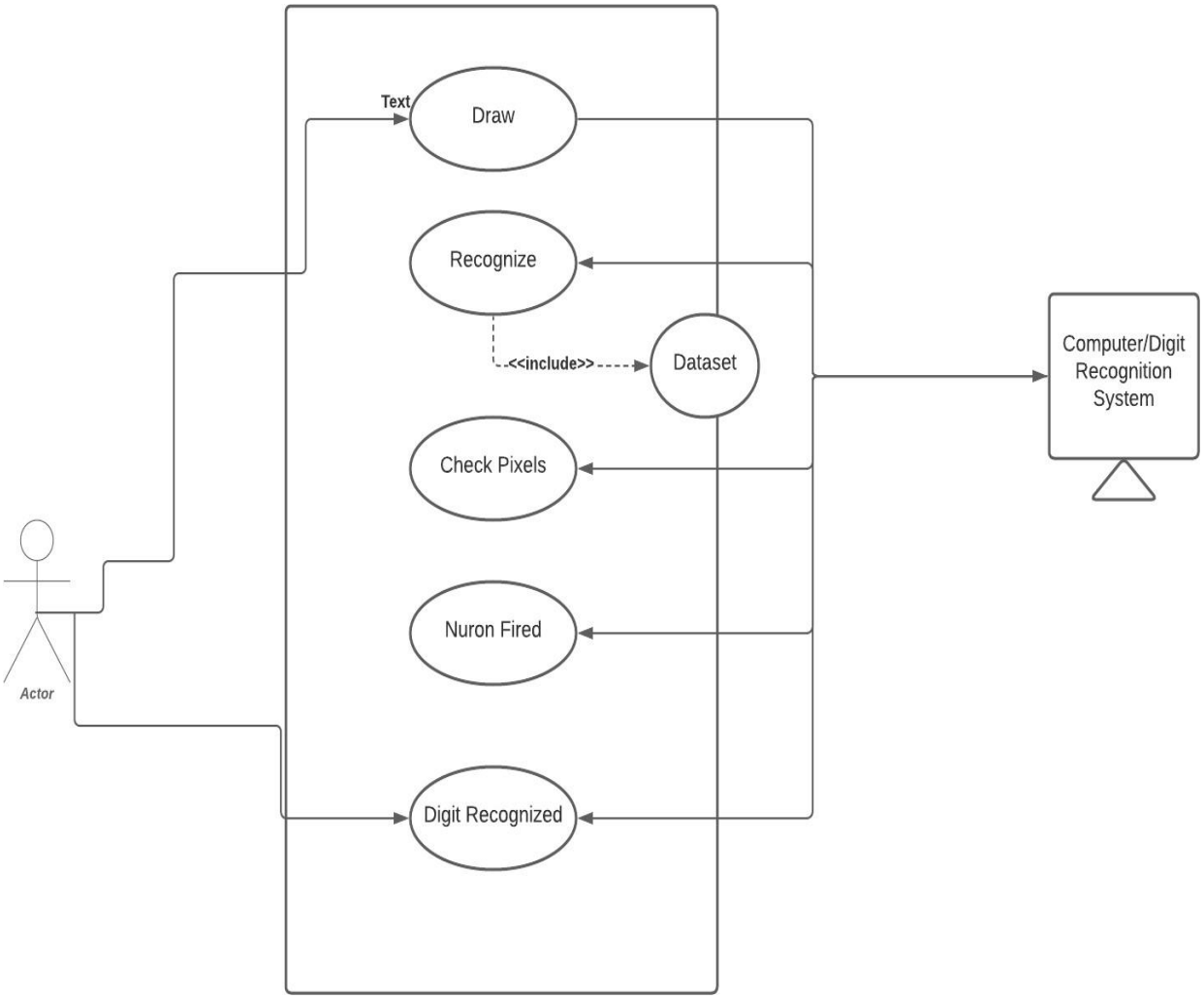

tk
4, 17%
Clear
Recognise

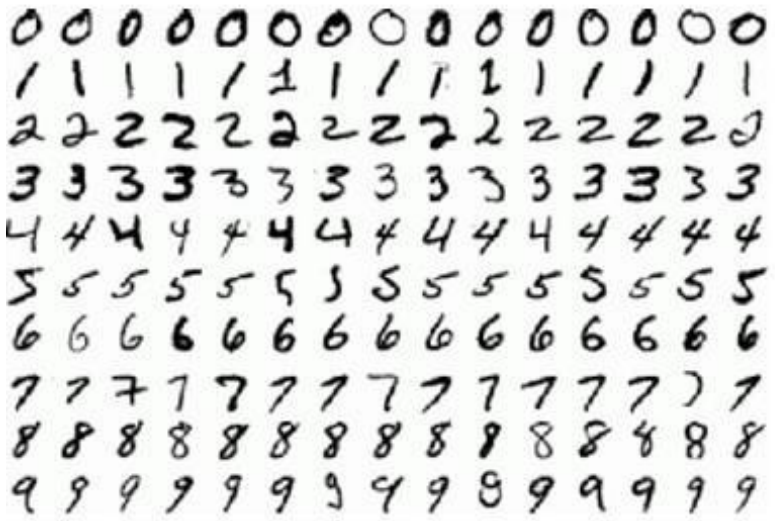

Model Accuracy
Accuracy
0.925
0.900
0.875
0.850
0
2
4
6
8
Epoch
Training
Validation
Model Loss
Loss
0.5
0.4
0.3
0
2
4
6
8
Epoch
Training
Validation



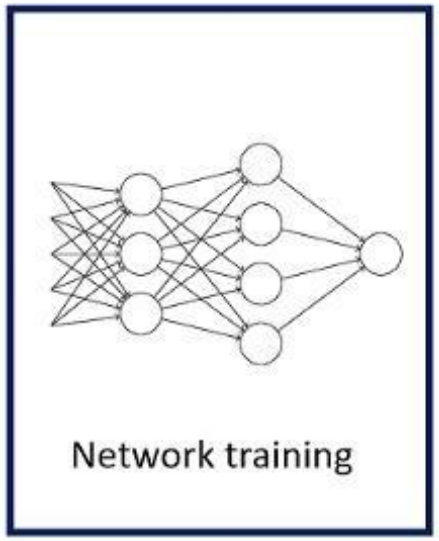



```
training data points: 1212
validation data points: 135
testing data points: 450
EVALUATION ON TESTING DATA
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        43
           1       0.95      1.00      0.97        37
           2       1.00      1.00      1.00        38
           3       0.98      0.98      0.98        46
           4       0.98      0.98      0.98        55
           5       0.98      1.00      0.99        59
           6       1.00      1.00      1.00        45
           7       1.00      0.98      0.99        41
           8       0.97      0.95      0.96        38
           9       0.96      0.94      0.95        48

   micro avg       0.98      0.98      0.98       450
   macro avg       0.98      0.98      0.98       450
weighted avg       0.98      0.98      0.98       450

Digit is: 4
```


Text
Draw
Recognize
<<include>>
Dataset
Check Pixels
Nuron Fired
Digit Recognized
Actor
Computer/Digit Recognition System



Data & Labels



0
1
2
3
4
5
6
7
8
9