```
 1 C:\Users\adity\PycharmProjects\
   pythonProject\.venv\Scripts\python.exe
    "C:\Users\adity\PycharmProjects\
   pythonProject\MachineLearningProjects\
   NEAREST NEIGHBOUR FOR HANDWRITTEN DIGIT
    RECOGNITION.py"
 2 Training dataset dimensions:  (7500,
   784)
 3 Number of training labels:  7500
 4 Testing dataset dimensions:  (1000, 784
   )
 5 Number of testing labels:  1000
 6 Training set distribution:
 7 {0: 750, 1: 750, 2: 750, 3: 750, 4: 750
   , 5: 750, 6: 750, 7: 750, 8: 750, 9:
   750}
 8 Test set distribution:
 9 {0: 100, 1: 100, 2: 100, 3: 100, 4: 100
   , 5: 100, 6: 100, 7: 100, 8: 100, 9:
   100}
10 Label 0
11 Distance from 7 to 1:  5357193.0
12 Distance from 7 to 2:  12451684.0
13 Distance from 7 to 7:  5223403.0
14 A success case:
15 NN classification:  0
16 True label:  0
17 The test image:
18 Label 0
19 The corresponding nearest neighbor
   image:
```

```
20 A failure case:
21 NN classification:  2
22 True label:  3
23 The test image:
24 Label 3
25 The corresponding nearest neighbor
   image:
26 Error of nearest neighbor classifier:
   0.046
27 Classification time (seconds):  39.
   961766719818115
28 Time to build data structure (seconds
   ):  0.5216913223266602
29 Time to classify test set (seconds):  5
   .485460042953491
30 Ball tree produces same predictions as
   above?  True
31 Time to build data structure (seconds
   ):  0.858741036987305
32 Time to classify test set (seconds):  6
   .606089115142822
33 KD tree produces same predictions as
   above?  True
34
35 Process finished with exit code 0
36
```