```
 1 C:\Python27\python.exe C:/Users/Fantacy/Desktop/MNIST/
   KNN_MNIST.py
 2 Data loading finished!
 3 I am running through the500th test, and now it is: 'Wed Sep
    18 02:17:51 2019'
 4 I am running through the1000th test, and now it is: 'Wed
   Sep 18 02:42:09 2019'
 5 I am running through the1500th test, and now it is: 'Wed
   Sep 18 03:06:17 2019'
 6 I am running through the2000th test, and now it is: 'Wed
   Sep 18 03:30:19 2019'
 7 I am running through the2500th test, and now it is: 'Wed
   Sep 18 03:54:19 2019'
 8 I am running through the3000th test, and now it is: 'Wed
   Sep 18 04:18:24 2019'
 9 I am running through the3500th test, and now it is: 'Wed
   Sep 18 04:42:27 2019'
10 I am running through the4000th test, and now it is: 'Wed
   Sep 18 05:06:27 2019'
11 I am running through the4500th test, and now it is: 'Wed
   Sep 18 05:30:29 2019'
12 I am running through the5000th test, and now it is: 'Wed
   Sep 18 05:54:32 2019'
13 I am running through the5500th test, and now it is: 'Wed
   Sep 18 06:18:36 2019'
14 I am running through the6000th test, and now it is: 'Wed
   Sep 18 06:42:54 2019'
15 I am running through the6500th test, and now it is: 'Wed
   Sep 18 07:07:43 2019'
16 I am running through the7000th test, and now it is: 'Wed
   Sep 18 07:33:26 2019'
17 I am running through the7500th test, and now it is: 'Wed
   Sep 18 08:00:15 2019'
18 I am running through the8000th test, and now it is: 'Wed
   Sep 18 08:30:11 2019'
19 Runtime is: 25175.3087455 seconds.
20 Walltime is: 'Wed Sep 18 08:52:38 2019'
21 When k = 1, the Confusion matrix is:
22 [772.0, 0.0, 7.0, 2.0, 2.0, 2.0, 2.0, 0.0, 5.0, 4.0]
23 [1.0, 900.0, 5.0, 4.0, 6.0, 0.0, 1.0, 6.0, 13.0, 0.0]
24 [0.0, 2.0, 787.0, 9.0, 0.0, 0.0, 0.0, 1.0, 4.0, 0.0]
25 [0.0, 1.0, 5.0, 831.0, 0.0, 17.0, 1.0, 2.0, 27.0, 6.0]
26 [0.0, 0.0, 0.0, 0.0, 750.0, 2.0, 1.0, 1.0, 3.0, 15.0]
27 [1.0, 0.0, 0.0, 15.0, 0.0, 749.0, 5.0, 0.0, 20.0, 3.0]
28 [2.0, 0.0, 2.0, 0.0, 3.0, 10.0, 826.0, 0.0, 3.0, 0.0]
29 [1.0, 2.0, 17.0, 7.0, 1.0, 0.0, 0.0, 871.0, 2.0, 17.0]
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30 [0.0, 2.0, 0.0, 7.0, 0.0, 2.0, 0.0, 0.0, 799.0, 1.0]
31 [1.0, 1.0, 1.0, 2.0, 19.0, 5.0, 0.0, 8.0, 9.0, 749.0]
32 When k = 3, the Confusion matrix is:
33 [774.0, 0.0, 9.0, 3.0, 2.0, 2.0, 3.0, 1.0, 3.0, 7.0]
34 [1.0, 898.0, 10.0, 3.0, 8.0, 1.0, 3.0, 9.0, 18.0, 1.0]
35 [0.0, 3.0, 781.0, 5.0, 0.0, 0.0, 0.0, 0.0, 5.0, 0.0]
36 [1.0, 2.0, 2.0, 836.0, 0.0, 10.0, 1.0, 0.0, 28.0, 8.0]
37 [0.0, 1.0, 1.0, 0.0, 750.0, 2.0, 0.0, 0.0, 3.0, 9.0]
38 [1.0, 0.0, 0.0, 16.0, 0.0, 754.0, 4.0, 0.0, 24.0, 3.0]
39 [1.0, 0.0, 1.0, 0.0, 4.0, 11.0, 825.0, 0.0, 3.0, 0.0]
40 [0.0, 3.0, 17.0, 7.0, 1.0, 0.0, 0.0, 869.0, 1.0, 14.0]
41 [0.0, 0.0, 2.0, 5.0, 0.0, 0.0, 0.0, 0.0, 792.0, 1.0]
42 [0.0, 1.0, 1.0, 2.0, 16.0, 7.0, 0.0, 10.0, 8.0, 752.0]
43 When k = 5, the Confusion matrix is:
44 [771.0, 0.0, 9.0, 4.0, 1.0, 2.0, 3.0, 1.0, 2.0, 7.0]
45 [1.0, 900.0, 12.0, 6.0, 10.0, 3.0, 3.0, 11.0, 19.0, 2.0]
46 [1.0, 4.0, 778.0, 6.0, 0.0, 0.0, 0.0, 0.0, 4.0, 0.0]
47 [1.0, 0.0, 3.0, 832.0, 0.0, 10.0, 0.0, 0.0, 24.0, 9.0]
48 [0.0, 1.0, 1.0, 0.0, 747.0, 1.0, 0.0, 1.0, 4.0, 6.0]
49 [1.0, 0.0, 0.0, 12.0, 0.0, 750.0, 4.0, 0.0, 27.0, 2.0]
50 [2.0, 0.0, 0.0, 1.0, 4.0, 11.0, 826.0, 0.0, 5.0, 0.0]
51 [0.0, 2.0, 19.0, 8.0, 2.0, 0.0, 0.0, 866.0, 2.0, 20.0]
52 [0.0, 0.0, 2.0, 4.0, 0.0, 0.0, 0.0, 0.0, 788.0, 1.0]
53 [1.0, 1.0, 0.0, 4.0, 17.0, 10.0, 0.0, 10.0, 10.0, 748.0]
54 When k = 7, the Confusion matrix is:
55 [772.0, 0.0, 11.0, 3.0, 1.0, 2.0, 4.0, 1.0, 2.0, 7.0]
56 [1.0, 900.0, 18.0, 8.0, 11.0, 3.0, 3.0, 15.0, 22.0, 2.0]
57 [0.0, 4.0, 768.0, 5.0, 0.0, 0.0, 0.0, 0.0, 4.0, 1.0]
58 [1.0, 0.0, 4.0, 835.0, 0.0, 9.0, 0.0, 0.0, 26.0, 11.0]
59 [0.0, 1.0, 0.0, 0.0, 747.0, 2.0, 0.0, 0.0, 5.0, 3.0]
60 [2.0, 0.0, 0.0, 10.0, 0.0, 755.0, 4.0, 0.0, 24.0, 2.0]
61 [2.0, 0.0, 0.0, 1.0, 4.0, 8.0, 825.0, 0.0, 6.0, 0.0]
62 [0.0, 2.0, 20.0, 8.0, 3.0, 0.0, 0.0, 862.0, 3.0, 21.0]
63 [0.0, 0.0, 3.0, 4.0, 0.0, 0.0, 0.0, 0.0, 787.0, 0.0]
64 [0.0, 1.0, 0.0, 3.0, 15.0, 8.0, 0.0, 11.0, 6.0, 748.0]
65 When k = 9, the Confusion matrix is:
66 [771.0, 0.0, 10.0, 3.0, 1.0, 2.0, 4.0, 1.0, 2.0, 7.0]
67 [1.0, 900.0, 19.0, 9.0, 10.0, 5.0, 4.0, 17.0, 22.0, 3.0]
68 [0.0, 3.0, 764.0, 5.0, 0.0, 0.0, 0.0, 0.0, 5.0, 0.0]
69 [0.0, 2.0, 5.0, 832.0, 0.0, 7.0, 0.0, 0.0, 28.0, 12.0]
70 [0.0, 1.0, 1.0, 0.0, 743.0, 3.0, 0.0, 0.0, 3.0, 4.0]
71 [2.0, 0.0, 1.0, 13.0, 0.0, 755.0, 5.0, 0.0, 25.0, 2.0]
72 [3.0, 0.0, 1.0, 0.0, 4.0, 8.0, 823.0, 0.0, 5.0, 0.0]
73 [0.0, 2.0, 20.0, 8.0, 2.0, 0.0, 0.0, 859.0, 3.0, 22.0]
74 [0.0, 0.0, 3.0, 4.0, 0.0, 0.0, 0.0, 0.0, 782.0, 0.0]
75 [1.0, 0.0, 0.0, 3.0, 21.0, 7.0, 0.0, 12.0, 10.0, 745.0]
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 76 When k = 11, the Confusion matrix is:
 77 [770.0, 0.0, 11.0, 3.0, 2.0, 2.0, 3.0, 1.0, 1.0, 7.0]
 78 [1.0, 900.0, 19.0, 12.0, 10.0, 5.0, 4.0, 16.0, 25.0, 4.0]
 79 [1.0, 3.0, 764.0, 4.0, 0.0, 0.0, 0.0, 0.0, 5.0, 1.0]
 80 [0.0, 2.0, 6.0, 830.0, 0.0, 8.0, 0.0, 0.0, 27.0, 12.0]
 81 [0.0, 1.0, 1.0, 0.0, 739.0, 2.0, 0.0, 0.0, 3.0, 3.0]
 82 [2.0, 0.0, 1.0, 13.0, 0.0, 753.0, 4.0, 0.0, 21.0, 2.0]
 83 [4.0, 0.0, 1.0, 0.0, 4.0, 10.0, 825.0, 0.0, 6.0, 0.0]
 84 [0.0, 2.0, 19.0, 9.0, 3.0, 0.0, 0.0, 860.0, 3.0, 20.0]
 85 [0.0, 0.0, 2.0, 4.0, 0.0, 0.0, 0.0, 0.0, 781.0, 0.0]
 86 [0.0, 0.0, 0.0, 2.0, 23.0, 7.0, 0.0, 12.0, 13.0, 746.0]
 87 When k = 13, the Confusion matrix is:
 88 [770.0, 0.0, 12.0, 3.0, 2.0, 3.0, 4.0, 1.0, 3.0, 7.0]
 89 [1.0, 900.0, 21.0, 12.0, 11.0, 7.0, 4.0, 17.0, 24.0, 4.0]
 90 [1.0, 3.0, 763.0, 4.0, 0.0, 0.0, 0.0, 0.0, 5.0, 1.0]
 91 [0.0, 1.0, 3.0, 828.0, 0.0, 10.0, 0.0, 0.0, 25.0, 12.0]
 92 [0.0, 2.0, 1.0, 0.0, 739.0, 2.0, 0.0, 0.0, 4.0, 5.0]
 93 [2.0, 0.0, 0.0, 13.0, 0.0, 746.0, 4.0, 0.0, 21.0, 2.0]
 94 [4.0, 0.0, 1.0, 0.0, 4.0, 11.0, 824.0, 0.0, 6.0, 0.0]
 95 [0.0, 2.0, 21.0, 10.0, 3.0, 1.0, 0.0, 860.0, 3.0, 19.0]
 96 [0.0, 0.0, 2.0, 5.0, 0.0, 0.0, 0.0, 0.0, 779.0, 0.0]
 97 [0.0, 0.0, 0.0, 2.0, 22.0, 7.0, 0.0, 11.0, 15.0, 745.0]
 98 When k = 15, the Confusion matrix is:
 99 [771.0, 0.0, 11.0, 3.0, 2.0, 3.0, 2.0, 1.0, 3.0, 8.0]
100 [1.0, 900.0, 24.0, 12.0, 11.0, 7.0, 5.0, 19.0, 27.0, 4.0]
101 [0.0, 3.0, 759.0, 4.0, 0.0, 0.0, 0.0, 0.0, 5.0, 1.0]
102 [0.0, 1.0, 5.0, 827.0, 0.0, 7.0, 0.0, 0.0, 27.0, 12.0]
103 [0.0, 2.0, 1.0, 0.0, 740.0, 2.0, 0.0, 1.0, 5.0, 3.0]
104 [2.0, 0.0, 0.0, 12.0, 0.0, 749.0, 4.0, 0.0, 20.0, 2.0]
105 [4.0, 0.0, 1.0, 0.0, 4.0, 11.0, 825.0, 0.0, 6.0, 0.0]
106 [0.0, 2.0, 20.0, 10.0, 4.0, 0.0, 0.0, 856.0, 3.0, 20.0]
107 [0.0, 0.0, 3.0, 5.0, 0.0, 0.0, 0.0, 0.0, 772.0, 0.0]
108 [0.0, 0.0, 0.0, 4.0, 20.0, 8.0, 0.0, 12.0, 17.0, 745.0]
109 When k = 17, the Confusion matrix is:
110 [771.0, 0.0, 10.0, 2.0, 2.0, 3.0, 3.0, 1.0, 2.0, 8.0]
111 [1.0, 900.0, 29.0, 13.0, 15.0, 7.0, 5.0, 22.0, 29.0, 4.0]
112 [0.0, 3.0, 751.0, 4.0, 0.0, 0.0, 0.0, 0.0, 6.0, 1.0]
113 [0.0, 1.0, 6.0, 828.0, 0.0, 9.0, 0.0, 0.0, 26.0, 11.0]
114 [0.0, 2.0, 2.0, 0.0, 734.0, 3.0, 0.0, 1.0, 6.0, 4.0]
115 [2.0, 0.0, 0.0, 13.0, 0.0, 748.0, 4.0, 0.0, 21.0, 2.0]
116 [4.0, 0.0, 1.0, 0.0, 4.0, 10.0, 824.0, 0.0, 5.0, 0.0]
117 [0.0, 2.0, 22.0, 9.0, 4.0, 1.0, 0.0, 853.0, 3.0, 19.0]
118 [0.0, 0.0, 3.0, 5.0, 0.0, 0.0, 0.0, 0.0, 772.0, 1.0]
119 [0.0, 0.0, 0.0, 3.0, 22.0, 6.0, 0.0, 12.0, 15.0, 745.0]
120 When k = 19, the Confusion matrix is:
121 [771.0, 0.0, 11.0, 2.0, 2.0, 2.0, 3.0, 1.0, 1.0, 8.0]
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122 [1.0, 900.0, 33.0, 14.0, 15.0, 10.0, 5.0, 25.0, 28.0, 4.0]
123 [0.0, 3.0, 743.0, 3.0, 0.0, 0.0, 0.0, 0.0, 6.0, 1.0]
124 [0.0, 1.0, 5.0, 826.0, 0.0, 8.0, 0.0, 0.0, 27.0, 13.0]
125 [0.0, 2.0, 2.0, 0.0, 733.0, 2.0, 0.0, 1.0, 6.0, 6.0]
126 [2.0, 0.0, 1.0, 12.0, 0.0, 748.0, 4.0, 0.0, 22.0, 2.0]
127 [4.0, 0.0, 2.0, 0.0, 5.0, 10.0, 824.0, 0.0, 7.0, 0.0]
128 [0.0, 2.0, 24.0, 10.0, 4.0, 0.0, 0.0, 851.0, 3.0, 19.0]
129 [0.0, 0.0, 3.0, 5.0, 0.0, 0.0, 0.0, 0.0, 769.0, 1.0]
130 [0.0, 0.0, 0.0, 5.0, 22.0, 7.0, 0.0, 11.0, 16.0, 741.0]
131 When k = 21, the Confusion matrix is:
132 [771.0, 0.0, 11.0, 2.0, 2.0, 3.0, 3.0, 1.0, 2.0, 8.0]
133 [1.0, 900.0, 35.0, 15.0, 17.0, 11.0, 5.0, 23.0, 29.0, 5.0]
134 [0.0, 3.0, 739.0, 3.0, 0.0, 0.0, 0.0, 0.0, 6.0, 1.0]
135 [0.0, 1.0, 5.0, 825.0, 0.0, 8.0, 0.0, 0.0, 28.0, 12.0]
136 [1.0, 2.0, 4.0, 0.0, 730.0, 2.0, 0.0, 1.0, 5.0, 5.0]
137 [2.0, 0.0, 1.0, 12.0, 0.0, 746.0, 4.0, 0.0, 22.0, 2.0]
138 [3.0, 0.0, 1.0, 0.0, 5.0, 10.0, 824.0, 0.0, 7.0, 0.0]
139 [0.0, 2.0, 25.0, 11.0, 4.0, 0.0, 0.0, 853.0, 3.0, 20.0]
140 [0.0, 0.0, 3.0, 5.0, 0.0, 0.0, 0.0, 0.0, 766.0, 1.0]
141 [0.0, 0.0, 0.0, 4.0, 23.0, 7.0, 0.0, 11.0, 17.0, 741.0]
142
143 Process finished with exit code 0
144
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