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## ELC Activity – Handwritten Digit Recognition

Case1: K=2, and split=60:40

Accuracy=0.7693452380952381

& Confusion Matrix=

[[	1664	0	1	0	0	1	1	0	5	0]
[	40	1724	25	33	1	0	8	8	64	0]
[	264	0	1294	14	2	6	15	5	29	3]
[	267	3	57	1237	1	46	1	6	131	7]
[	420	3	15	0	1013	0	14	9	116	80]
[	321	5	11	69	3	899	43	5	182	5]
[	209	1	7	3	1	6	1419	0	3	0]
[	70	1	38	21	19	3	0	1438	84	42]
[	380	26	16	9	9	39	2	0	1148	0]
[	138	0	2	6	14	5	1	79	296	1089]]

Case2: K=2, and split=70:30

Accuracy= 0.7984126984126985

& Confusion Matrix=

[	[	1219	0	0	0	0	0	1	0	2	0]
[	38	1265	13	21	0	0	3	4	42	0]	
[	175	0	1041	9	0	2	4	3	17	2]	
[	173	2	31	969	0	23	0	5	73	3]	
[	286	4	17	1	774	0	5	5	80	45]	
[	209	0	7	49	2	772	19	1	101	3]	
[	131	3	5	1	0	5	1095	0	6	0]	
[	43	1	19	10	10	1	1	1148	68	30]	
[	246	15	10	10	2	15	3	1	922	0]	
[	105	1	1	3	8	5	0	57	244	855]]	

### Case3: K=2, and split=75:25

Accuracy= 0.9572380952380952

& Confusion Matrix=

```
[[1041 0 1 0 0 0 0 1 0 0]
 [ 0 1169 2 0 1 0 0 1 0 0]
 [ 3 13 990 1 0 0 1 14 1 0]
 [ 2 5 21 1056 1 3 0 2 5 1]
 [ 1 11 0 0 983 0 3 0 0 9]
 [ 1 0 0 44 3 887 11 1 1 1]
 [ 15 3 1 0 3 4 1007 0 0 0]
 [ 0 17 7 1 8 0 0 1108 0 4]
 [ 5 15 5 34 5 32 6 8 853 8]
 [ 6 4 2 12 37 5 1 35 1 957]]
```

### Case4: K=2, and split=80:20

Accuracy= 0.7008333333333333

& Confusion Matrix=

```
[[817 0 0 0 0 0 1 0 3 0]
 [ 28 793 8 13 2 0 4 1 43 0]
 [303 0 525 5 0 0 2 3 14 1]
 [247 3 21 552 0 6 0 5 50 2]
 [337 0 0 0 371 0 6 16 49 33]
 [225 1 0 24 2 421 15 3 64 2]
 [143 0 0 0 1 5 669 0 1 0]
 [ 43 0 14 13 0 0 0 761 31 18]
 [270 14 0 1 2 6 2 2 519 0]
 [113 0 2 2 8 1 0 124 155 459]]
```

### Case5: K=2, and split=90:10

Accuracy= 0.7111904761904762

& Confusion Matrix=

---

```

[[433  0  0  0  0  0  1  0  0  0]
 [ 13 436  6 10  0  0  2  1  7  0]
 [151  0 237  5  0  0  1  0  9  0]
 [119  1  9 259  0 12  0  0 14  2]
 [162  0  3  1 176  0  4  6 17 16]
 [118  0  3 20  0 218  8  1 19  1]
 [ 64  0  0  0  0  1 341  0  1  0]
 [ 28  0  4  4  3  0  0 412 17  6]
 [156  4  4  1  1  3  3  1 219  0]
 [ 48  0  0  0  3  1  0 51  67 256]]

```

### Case6: K=2, and split=95:5

Accuracy= 0.721

& Confusion Matrix=

```

[[2031  0  0  1  0  2  3  0  2  1]
 [ 93 2104 36 46  0  0  9  7 53  1]
 [ 445  2 1612 10  1  8  7  4 27  1]
 [ 434  6  62 1494  0 62  1 17 101  5]
 [ 867  4 18  2 861  4 13 77 127 80]
 [ 487  2 13 90  2 1111 15  3 124  5]
 [ 367  3  6  1  0  4 1659  0 14  0]
 [ 124  2 65 25  8  3  0 1840 45 63]
 [ 643 43 21 15  4 67  3  2 1252  0]
 [ 263  3  4  9 15 14  0 340 303 1177]]

```

### Case7: K=4, and split=60:40

Accuracy= 0.8164285714285714

& Confusion Matrix=

---

```

[[1659  0  0  0  0  0  1  0 12  0]
 [ 11 1731 20  5  1  0 14  4 117  0]
 [ 115  0 1387 11  2  1 24  4  84  4]
 [ 112  2  26 1341  0 30  1  4 232  8]
 [ 228  0  3  1 1028  0 44  7 211 148]
 [ 229  1  6 49  0 878 35  4 336  5]
 [ 102  0  0  0  1  4 1524  0 18  0]
 [ 49  1 27  7 12  1  0 1443 111 65]
 [ 71  3  3  4  6 13  4  0 1525  0]
 [ 87  0  0  8  4  6  1 37 287 1200]]

```

**Case8: K=4, and split=70:30**

Accuracy= 0.8211111111111111

& Confusion Matrix=

[	1212	0	0	0	0	0	1	0	8	1]
[	9	1290	19	10	0	0	8	2	45	3]
[	114	0	1064	9	0	0	6	2	55	3]
[	68	2	20	1014	0	24	3	4	139	5]
[	213	2	4	0	673	0	23	7	187	108]
[	155	0	6	51	1	710	20	2	212	6]
[	81	0	1	0	0	2	1139	0	23	0]
[	38	1	25	6	2	1	1	1124	69	64]
[	35	2	2	13	1	9	2	1	1159	0]
[	63	0	0	5	4	4	0	36	206	961]

**Case9: K=4, and split=75:25**

Accuracy= 0.7452380952380953

& Confusion Matrix=

[	10	39	0	0	0	0	0	1	0	2	1]
[	25	101	3	12	0	0	0	10	2	110	1]
[	17	3	0	78	5	8	0	0	12	6	38]
[	15	8	2	14	75	8	0	13	0	2	148]
[	33	0	0	0	48	1	0	5	6	104	81]
[	25	3	0	2	19	2	46	4	11	0	192]
[	16	5	0	0	0	0	1	85	9	0	8]
[	52	0	13	4	3	0	0	95	9	69	45]
[	20	6	0	2	1	1	3	4	1	75	3]
[	10	9	0	0	2	4	1	0	38	192	714]

**Case10: K=4, and split=80:20**

Accuracy= 0.7585714285714286

& Confusion Matrix=

```

[[816 0 0 0 0 0 1 0 4 0]
 [ 22 777 8 1 0 0 4 1 79 0]
 [163 0 645 9 0 0 4 5 27 0]
 [111 1 12 669 0 4 0 0 85 4]
 [265 0 1 0 386 0 11 9 85 55]
 [156 0 0 11 2 433 13 1 138 3]
 [114 0 0 0 1 3 695 0 6 0]
 [ 37 0 9 5 0 0 0 764 38 27]
 [180 0 0 3 0 1 3 1 627 1]
 [ 94 0 1 1 5 0 0 41 162 560]]

```

**Case11: K=4, and split=90:10**

Accuracy= 0.784047619047619

& Confusion Matrix=

```

[[432 0 0 0 0 0 1 0 1 0]
 [ 8 438 6 0 0 0 4 2 17 0]
 [ 71 0 305 8 0 0 3 0 16 0]
 [ 54 0 2 315 0 6 2 0 35 2]
 [119 1 0 0 205 0 5 0 21 34]
 [ 94 0 0 10 1 229 7 0 45 2]
 [ 49 0 0 0 0 0 353 0 5 0]
 [ 25 0 6 1 1 0 0 410 19 12]
 [ 86 0 0 1 0 1 1 1 302 0]
 [ 46 0 0 0 0 1 0 13 62 304]]

```

---

**Case12: K=4, and split=95:5**

Accuracy= 0.7965238095238095

& Confusion Matrix=

```

[[2022 0 0 1 0 0 4 0 12 1]
 [ 38 2129 26 7 0 0 10 3 133 3]
 [ 245 1 1772 18 1 4 8 3 63 2]
 [ 199 3 44 1701 1 32 1 6 185 10]
 [ 638 2 3 2 923 0 15 13 230 227]
 [ 287 0 3 66 1 1186 23 3 270 13]
 [ 205 1 0 1 1 3 1805 0 38 0]
 [ 104 2 44 7 3 3 0 1832 80 100]
 [ 168 6 6 13 1 30 1 2 1822 1]
 [ 195 0 1 3 3 6 1 91 293 1535]]

```



**Case13: K=5, and split=60:40**

Accuracy= 0.8211309523809524

& Confusion Matrix=

```
[[1660    0    0    0    0    0    1    0   11    0]
 [   5 1738   22   3   1   0   14   3  117   0]
 [ 113    1 1398   10   1   0   23   5   78   3]
 [ 103    3   28 1351    0   31   2   3  228   7]
 [ 183    1    3    0 1023    0   48   8  246  158]
 [ 206    0    2   58    0  866   43   3  360   5]
 [   86    0    0    0    1    5 1546    0   11   0]
 [   49    1   30    9   11    3    0 1414  117   82]
 [   56    4    5    6    6    9    3    0 1539    1]
 [   63    0    0    8    3    5    2   36  253 1260]]
```

**Case14: K=5, and split=70:30**

Accuracy= 0.8256349206349206

& Confusion Matrix=

```
[[1204    0    0    0    0    0    1    0   16    1]
 [   7 1288   20    6    0    0    8    3   53    1]
 [   97    0 1071    9    0    0   10    4   59    3]
 [   57    2   17 1015    0   26    3    4  150    5]
 [  190    1    3    0  686    1   18    6  189  123]
 [  152    0    3   58    1  686   21    2  236    4]
 [   58    0    1    0    0    2 1160    0   25    0]
 [   33    1   24    9    2    0    1 1109    80   72]
 [   31    1    2    9    0    5    0    0 1175    1]
 [   55    0    0    5    2    4    0   29  175 1009]]
```

**Case15: K=5, and split=75:25**

Accuracy= 0.7743809523809524

& Confusion Matrix=

```

[[1035  0  0  0  0  0  1  0  6  1]
 [ 30 1000 14  0  0  0  9  3 117  0]
 [ 145  1 814 11  0  0 12  6  33  1]
 [ 123  1  15 790  0 17  1  2 145  2]
 [ 280  0  2  0 517  0  9  4 112 83]
 [ 247  0  1 25  1 450 14  0 206  5]
 [ 115  0  0  0  0  1 908  0  9  0]
 [  42  0 20  5  3  0  0 959 62 54]
 [  56  0  2  2  1  1  4  1 904  0]
 [  94  0  0  2  3  1  0 31 175 754]]

```

**Case16: K=5, and split=80:20**

Accuracy= 0.7867857142857143

& Confusion Matrix=

```

[[817  0  0  0  0  0  0  0  4  0]
 [ 22 777 11  0  0  0  3  0 78  1]
 [131  0 675 10  0  0  4  4 29  0]
 [ 90  1 11 687  0  6  0  0 87  4]
 [245  0  0  0 398  1 13  9 91 55]
 [150  0  0 18  2 430 12  2 140  3]
 [ 75  0  0  0  0  2 733  0  9  0]
 [ 30  0  9  8  0  0  0 750 46 37]
 [ 59  0  0  4  0  1  2  0 749  1]
 [ 85  0  1  2  3  0  0 37 143 593]]

```

**Case17: K=5, and split=90:10**

Accuracy= 0.8095238095238095

& Confusion Matrix=

```

[[432  0  0  0  0  0  1  0  1  0]
 [ 10 434  4  0  0  0  5  2 20  0]
 [ 62  0 314  5  0  0  5  0 17  0]
 [ 47  1  2 323  0  7  2  0 33  1]
 [106  1  1  0 214  0  6  0 23 34]
 [ 82  0  0 13  1 229  9  0 52  2]
 [ 34  0  0  0  0  0 368  0  5  0]
 [ 23  0  6  1  0  0  0 408 21 15]
 [ 34  0  0  2  0  2  2  0 352  0]
 [ 28  0  0  0  0  0  0 13  59 326]]

```

**Case18: K=5, and split=95:5**

Accuracy= 0.815047619047619

& Confusion Matrix=

```
[[2021    1    0    1    0    0    4    0    13    0]
 [ 27 2135    24    3    0    0    12    7    139    2]
 [ 201    0 1818    14    1    0    10    3    67    3]
 [ 162    3    43 1746    0    31    2    11    173    11]
 [ 536    2    5    0 1003    1    20    13    259    214]
 [ 257    0    2    90    1 1174    24    3    293    8]
 [ 128    1    0    2    0    2 1890    0    31    0]
 [ 88    2    47    12    2    2    0 1836    80    106]
 [ 101    7    12    18    1    14    4    4 1886    3]
 [ 141    0    0    7    3    7    1    87    275 1607]]
```

**Case19: K=6, and split=60:40**

Accuracy= 0.8235119047619047

& Confusion Matrix=

```
[[1662    0    0    0    0    0    1    0    9    0]
 [ 5 1748    19    0    1    0    14    4    112    0]
 [ 113    1 1401    8    0    0    30    2    73    4]
 [ 107    3    30 1362    0    23    2    3    220    6]
 [ 169    0    3    1 1041    0    60    3    245    148]
 [ 199    0    2    70    0 876    38    2    350    6]
 [ 90    0    0    0    1    4 1536    0    18    0]
 [ 52    1    29    11    12    1    0 1416    121    73]
 [ 45    4    6    4    5    12    3    0 1550    0]
 [ 62    0    0    8    3    4    2    44    264 1243]]
```

**Case20: K=6, and split=70:30**

Accuracy= 0.8280952380952381

& Confusion Matrix=

```
[[1213    0    0    0    0    0    1    0    7    1]
 [ 9 1293    16    3    1    0    7    3    53    1]
 [ 94    0 1078    11    0    0    9    4    54    3]
 [ 60    2    16 1026    0    20    3    3    145    4]
 [ 184    1    6    0 691    1    18    8    189    119]
 [ 158    0    3    62    0 690    21    1    223    5]
 [ 71    0    1    0    0    2 1152    0    20    0]
 [ 31    1    26    7    2    0    1 1121    75    67]
 [ 32    2    2    8    0    4    0    1 1174    1]
 [ 53    0    0    4    2    3    0    36    185    996]]
```



**Case21: K=6, and split=75:25**

Accuracy= 0.7916666666666666

& Confusion Matrix=

```
[[818  0  0  0  0  0  0  0  3  0]
 [ 13 796  9  0  0  0  5  0 69  0]
 [125  0 679 11  0  0  3  6 29  0]
 [ 71  1  14 705  0  2  0  0 90  3]
 [234  0  1  0 398  0  9  7 102 61]
 [152  0  0 20  1 426  8  2 145  3]
 [ 79  0  0  0  0  2 729  0  9  0]
 [ 31  0 12  4  0  1  0 764 40 28]
 [ 55  0  0  5  0  1  2  0 752  1]
 [ 88  0  1  1  3  0  0 42 146 583]]
```

**Case22: K=6, and split=90:10**

Accuracy= 0.8192857142857143

& Confusion Matrix=

```
[[432  0  0  0  0  0  1  0  1  0]
 [  6 441  5  1  0  0  5  1 16  0]
 [ 57  0 319  6  0  0  5  0 16  0]
 [ 33  1  4 337  0  6  1  1 31  2]
 [ 95  1  1  0 220  0  5  0 28 35]
 [ 76  0  0 16  2 233  9  1 49  2]
 [ 38  0  0  0  0  0 363  0  6  0]
 [ 25  0  6  1  1  0  0 412 18 11]
 [ 30  0  0  1  0  1  1  0 359  0]
 [ 30  0  0  0  0  1  0 15  55 325]]
```

**Case23: K=6, and split=80:20**

Accuracy= 0.7916666666666666

& Confusion Matrix=

```

[[818 0 0 0 0 0 0 0 3 0]
 [ 13 796 9 0 0 0 5 0 69 0]
 [125 0 679 11 0 0 3 6 29 0]
 [ 71 1 14 705 0 2 0 0 90 3]
 [234 0 1 0 398 0 9 7 102 61]
 [152 0 0 20 1 426 8 2 145 3]
 [ 79 0 0 0 0 2 729 0 9 0]
 [ 31 0 12 4 0 1 0 764 40 28]
 [ 55 0 0 5 0 1 2 0 752 1]
 [ 88 0 1 1 3 0 0 42 146 583]]

```

---

**Case24: K=6, and split=95:5**

Accuracy= 0.8225238095238095

& Confusion Matrix=

```

[[2021 1 0 1 0 0 3 0 14 0]
 [ 21 2147 22 3 0 0 13 9 133 1]
 [ 173 0 1843 16 0 0 10 3 70 2]
 [ 146 3 45 1748 0 27 2 9 195 7]
 [ 471 2 4 0 1052 1 28 17 245 233]
 [ 257 0 3 77 0 1175 24 3 299 14]
 [ 114 1 0 1 0 3 1903 0 32 0]
 [ 86 3 51 11 5 2 0 1848 76 93]
 [ 79 5 9 19 0 15 3 4 1914 2]
 [ 134 0 0 9 1 4 1 94 263 1622]]

```

**Case25: K=7, and split=60:40**

Accuracy= 0.8245238095238095

& Confusion Matrix=

```

[[1659 0 0 0 0 0 1 0 12 0]
 [ 5 1753 21 0 1 0 13 5 105 0]
 [ 99 0 1408 11 1 0 26 2 82 3]
 [ 93 3 25 1381 0 17 5 3 222 7]
 [ 153 0 3 1 1029 0 55 5 267 157]
 [ 197 0 1 56 0 846 41 3 392 7]
 [ 74 0 0 1 1 5 1548 0 20 0]
 [ 52 1 28 10 9 1 1 1403 114 97]
 [ 47 3 3 3 5 10 3 0 1555 0]
 [ 59 0 0 8 4 5 2 41 241 1270]]

```

**Case26: K=7, and split=70:30**

Accuracy= 0.8288888888888889

&amp; Confusion Matrix=

```

[[1210  0  0  0  0  0  1  0 10  1]
 [  5 1290 15  4  1  0  9  2 59  1]
 [ 84  0 1081 11  1  0 10  5 58  3]
 [ 58  2  17 1020  0 18  3  2 153  6]
 [151  1  4  1 708  1 21  5 191 134]
 [151  0  3 61  0 664 21  1 255  7]
 [ 65  0  1  0  0  1 1156  0 23  0]
 [ 29  1 25  9  2  0  2 1115 78 70]
 [ 31  2  2  7  0  3  0  1 1177  1]
 [ 50  0  0  5  2  3  0 33 163 1023]]

```

**Case27: K=7, and split=75:25**

Accuracy= 0.7856190476190477

&amp; Confusion Matrix=

```

[[1035  0  0  0  0  0  1  0  6  1]
 [  7 1018 13  1  0  0  8  2 124  0]
 [ 97  1 845 11  0  0  9  6  53  1]
 [ 89  0 20 797  0 15  0  2 172  1]
 [230  0  3  0 539  0  9  7 126 93]
 [195  0  1 26  0 453 16  1 253  4]
 [ 91  0  0  0  0  1 925  0 16  0]
 [ 38  0 19  7  1  0  0 960 73 47]
 [ 37  0  4  3  1  3  3  1 918  1]
 [ 89  0  0  1  2  0  0 31 178 759]]

```

**Case28: K=7, and split=80:20**

Accuracy= 0.799404761904762

&amp; Confusion Matrix=

```

[[818 0 0 0 0 0 0 0 3 0]
 [ 7 796 9 0 0 0 5 0 75 0]
 [108 0 689 11 0 0 3 4 38 0]
 [ 61 1 13 716 0 3 0 0 88 4]
 [213 0 1 0 409 0 10 7 111 61]
 [137 0 0 17 0 425 9 2 164 3]
 [ 70 0 0 0 0 1 737 0 11 0]
 [ 29 0 14 7 0 0 0 751 45 34]
 [ 32 1 0 7 0 0 2 0 773 1]
 [ 79 0 0 1 2 0 0 34 147 601]]

```

**Case29: K=7, and split=90:10**

Accuracy= 0.8330952380952381

& Confusion Matrix=

```

[[432 0 0 0 0 0 1 0 1 0]
 [ 3 442 4 1 0 0 5 1 19 0]
 [ 48 0 330 4 0 0 5 0 16 0]
 [ 25 1 5 339 0 5 0 1 38 2]
 [ 85 1 0 0 226 0 7 0 30 36]
 [ 61 0 0 19 2 233 9 1 61 2]
 [ 29 0 0 0 0 0 374 0 4 0]
 [ 19 0 6 0 0 0 0 410 25 14]
 [ 18 1 0 2 0 2 0 0 369 0]
 [ 22 0 0 0 0 1 0 12 47 344]]

```

**Case30: K=7, and split=95:5**

Accuracy= 0.8266666666666667

& Confusion Matrix=

```

[[2022 0 0 0 0 0 3 0 15 0]
 [ 18 2155 21 5 0 0 14 3 132 1]
 [ 165 0 1848 15 0 0 13 5 67 4]
 [ 131 2 44 1764 0 21 2 7 203 8]
 [ 389 2 7 0 1067 0 41 12 270 265]
 [ 228 0 3 79 0 1157 29 3 338 15]
 [ 116 0 0 1 0 6 1914 0 17 0]
 [ 77 1 51 15 4 2 1 1844 74 106]
 [ 71 2 7 17 1 11 3 4 1931 3]
 [ 112 0 0 9 2 3 1 78 265 1658]]

```

**Case31: K=10, and split=60:40**

Accuracy= 0.8299404761904762

& Confusion Matrix=

```
[[1664    0    0    0    0    0    1    0    7    0]
 [   1 1754   18    1    1    0   12    2  114    0]
 [   98    1 1422   10    0    0   29    4   65    3]
 [  101    2   25 1372    0   17    4    3  224    8]
 [  114    0    2    0 1045    0   65    3  275  166]
 [  205    0    1   53    0  880   37    2  357    8]
 [   77    0    0    1    2    6 1545    0   18    0]
 [   53    0   25   11    5    1    1 1415  119   86]
 [   49    1    4    2    4   11    2    0 1556    0]
 [   57    0    0    5    1    3    4   33  237 1290]]
```

**Case32: K=10, and split=70:30**

Accuracy= 0.832936507936508

& Confusion Matrix=

```
[[1210    0    0    0    0    0    1    0   11    0]
 [   1 1302   13    3    0    0    8    2   56    1]
 [   86    0 1083   10    1    0   10    3   58    2]
 [   52    1   19 1036    0   12    2    3  149    5]
 [  131    1    6    0  719    0   17    4  208  131]
 [  155    0    4   60    0  666   22    2  250    4]
 [   76    0    1    0    0    3 1145    0   21    0]
 [   31    1   26    6    1    0    2 1117   73   74]
 [   25    1    2    9    0    1    0    1 1184    1]
 [   43    0    1    4    1    2    0   31  164 1033]]
```

**Case33: K=10, and split=75:25**

Accuracy= 0.7973333333333333

& Confusion Matrix=



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```

[[1038    0    0    0    0    0    0    0    5    0]
 [   3 1042   14    1    0    0    7    1 105    0]
 [   94    0 862    8    0    0    9    6   43    1]
 [   68    1   17 820    0    8    2    2 177    1]
 [  192    0    3    0 555    0   11    7 149   90]
 [  171    0    2   27    0 473   17    1 253    5]
 [   82    0    0    0    0    0 936    0   15    0]
 [   31    0   21    6    1    0    0 960   78   48]
 [   33    0    4    4    1    0    4    1 924    0]
 [   75    0    0    2    1    1    0   33 186  762]]

```

---

**Case34: K=10, and split=80:20**

Accuracy= 0.8082142857142857

& Confusion Matrix=

```

[[817    0    0    0    0    0    0    0    4    0]
 [   4 811   10    1    0    0    4    0 62    0]
 [   79    0 721    9    0    0    5    2 36    1]
 [   48    1   16 725    0    3    1    0 88    4]
 [  177    0    0    0 416    0   15    4 129   71]
 [  124    0    0   27    0 423   12    2 166    3]
 [   61    0    0    0    0    1 744    0   13    0]
 [   28    0   16    5    0    0    0 757   43   31]
 [   29    1    0    5    0    0    2    1 777    1]
 [   66    0    0    2    2    1    0   33 162  598]]

```

**Case35: K=10, and split=90:10**

Accuracy= 0.8452380952380952

& Confusion Matrix=

---

```

[[431    0    0    0    0    0    1    0    2    0]
 [   2 443    5    1    0    0    5    1 18    0]
 [   32    0 345    4    0    0    3    0 19    0]
 [   18    1    5 352    0    5    0    0 33    2]
 [   58    1    2    0 240    0    6    0 42   36]
 [   56    0    0   18    1 234   12    1 63    3]
 [   24    0    0    1    0    0 378    0    4    0]
 [   15    0    5    2    0    0    0 408   30   14]
 [   14    0    1    3    0    1    0    0 373    0]
 [   18    0    0    0    1    1    0   10   50  346]]

```

---

Case36: K=10, and split=95:5

Accuracy= 0.8346190476190476

& Confusion Matrix=

```
[[2023    0    0    0    0    0    3    0   14    0]
 [   3 2156   24    3    0    1   16    3  143    0]
 [ 152    0 1865   12    1    0   13    5   65    4]
 [ 114    1   49 1775    0   18    3    7  205   10]
 [ 259    0    7    0 1152    0   52   11  289  283]
 [ 242    0    2   71    0 1136   28    2  358   13]
 [ 102    1    0    0    0    3 1925    0   23    0]
 [   72    0   48   12    2    0    1 1847   92  101]
 [   52    1    6   14    2   10    3    5 1956    1]
 [   85    0    1    7    2    3    1   76  261 1692]]
```

---