```
C:\Users\ajdse\Anaconda3\python.exe "D:/EEE Year4/Representation-and-
Distance-Metrics-Learning/k_mean_main.py"
C:\Users\ajdse\Anaconda3\lib\site-packages\sklearn\externals\joblib\
externals\cloudpickle\cloudpickle.py:47: DeprecationWarning: the imp
module is deprecated in favour of importlib; see the module's
documentation for alternative uses
  import imp
Processing K-means clustering...
Processing ranklists
  [==================================================] 100%
Accuracy for K-Mean @rank 1 :   66.9286% K = 700
Accuracy for K-Mean @rank 5 :   80.8571% K = 700
Accuracy for K-Mean @rank 10 :   84.1429% K = 700
-----PCA------
Processing K-means clustering...
Processing ranklists
  [==================================================] 100%

Accuracy for K-Mean @rank 1 :   67.9286% K = 700
Accuracy for K-Mean @rank 5 :   82.0714% K = 700
Accuracy for K-Mean @rank 10 :   85.1429% K = 700

-----LMNN------
2 1492201.5912604597 -130063.18915840983 71 1.0099999999999999e-06
3 1376092.838951887 -116108.75230857264 33 1.0200999999999998e-06
4 1268252.2866570964 -107840.55229479074 16 1.0303009999999997e-06
5 1168397.491284551 -99854.79537254525 12 1.0406040099999998e-06
6 1076588.9907548057 -91808.50052974536 8 1.0510100500999999e-06
7 993050.8719144454 -83538.11884036032 7 1.061520150601e-06
8 918026.754533605 -75024.11738084047 6 1.07213535210701e-06
9 851786.9652249853 -66239.78930861969 6 1.08285670562808e-06
10 794607.5256242474 -57179.43960073788 4 1.0936852726843608e-06
11 746778.9884292632 -47828.53719498415 4 1.1046221254112045e-06
12 708586.3985757977 -38192.58985346556 4 1.1156683466653166e-06
13 680329.4116148072 -28256.98696099047 4 1.1268250301319698e-06
14 662319.8311683331 -18009.580446474138 6 1.1380932804332895e-06
15 654904.3146950984 -7415.516473234631 14 1.1494742132376223e-06
16 654765.155476759 -139.15921833948232 20 2.9024223884249963e-07
LMNN didn't converge in 17 steps.
Processing K-means clustering...
Processing ranklists
  [================================================ ]  98%
Accuracy for K-Mean @rank 1 :   66.2857% K = 700
Accuracy for K-Mean @rank 5 :   80.0714% K = 700
Accuracy for K-Mean @rank 10 :   82.7143% K = 700
Processing ranklists
  [==================================================] 100%
-----PCA_LMNN-----
2 1366326.7803372412 -129297.92900720262 74 1.0099999999999999e-06
3 1250788.0181446248 -115538.76219261647 35 1.0200999999999998e-06
4 1143517.6086976859 -107270.4094469389 16 1.0303009999999997e-06
5 1044207.5323006443 -99310.07639704156 12 1.0406040099999998e-06
6 952895.5226102856 -91312.00969035877 9 1.0510100500999999e-06
7 869800.3721074313 -83095.15050285426 8 1.061520150601e-06
```

```
8  795163.163912978 -74637.20819445327 6 1.07213535210701e-06
9  729255.4172316609 -65907.7466813171 6 1.08285670562808e-06
10 672348.8329520328 -56906.58427962812 6 1.0936852726843608e-06
11 624729.6655412633 -47619.1674107695 4 1.1046221254112045e-06
12 586687.5690575377 -38042.09648372559 4 1.1156683466653166e-06
13 558517.2193290149 -28170.349728522822 5 1.1268250301319698e-06
14 540531.4998157484 -17985.719513266464 8 1.1380932804332895e-06
15 533080.883667701 -7450.616148047382 17 1.1494742132376223e-06
16 532935.4581719857 -145.4254957153462 20 2.9024223884249963e-07
LMNN didn't converge in 17 steps.
Processing ranklists
 [                                              ] N/A%Processing K-
means clustering...
Processing ranklists
 [============================================= ]  98%
Accuracy for K-Mean @rank 1 :  65.9286% K = 700
Accuracy for K-Mean @rank 5 :  80.1429% K = 700
Accuracy for K-Mean @rank 10 :  83.4286% K = 700


-----NCA-----
Processing ranklists
 [==============================================] 100%[NCA]
[NCA]   Iteration       Objective Value     Time(s)
[NCA]   ------------------------------------------
[NCA]           0           7.366959e+03        7.86
[NCA]           1           7.367001e+03        7.83
[NCA]           2           7.367999e+03        7.90
[NCA]           3           7.368000e+03        7.86
[NCA]           4           7.368000e+03        8.06
[NCA] Training took    43.47s.
Processing K-means clustering...
Processing ranklists
 [==============================================] 100%
Accuracy for K-Mean @rank 1 :  65.0000% K = 700
Accuracy for K-Mean @rank 5 :  80.0714% K = 700
Accuracy for K-Mean @rank 10 :  83.4286% K = 700


-----PCA_NCA-----
Processing ranklists
 [==============================================] 100%[NCA]
[NCA]   Iteration       Objective Value     Time(s)
[NCA]   ------------------------------------------
[NCA]           0           7.316730e+03        4.82
[NCA]           1           7.367804e+03        4.84
[NCA]           2           7.367995e+03        4.80
[NCA]           3           7.367995e+03        4.89
[NCA]           4           7.367997e+03        4.82
[NCA]           5           7.367998e+03        4.83
[NCA]           6           7.367999e+03        4.79
[NCA]           7           7.367999e+03        4.79
[NCA]           8           7.367999e+03        4.79
[NCA]           9           7.368000e+03        4.85
[NCA]          10           7.368000e+03        4.81
[NCA]          11           7.368000e+03        4.77
```

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[NCA]            12            7.368000e+03          4.84
[NCA]            13            7.368000e+03          4.80
[NCA]            14            7.368000e+03          4.83
[NCA]            15            7.368000e+03          5.08
[NCA] Training took     80.67s.
Processing ranklists
 [                                                    ] N/A%Processing K-
means clustering...
Processing ranklists
 [=================================================== ]  98%
Accuracy for K-Mean @rank 1 :   67.9286% K = 700
Accuracy for K-Mean @rank 5 :   82.6429% K = 700
Accuracy for K-Mean @rank 10 :   85.8571% K = 700


 -----ITML-----
Processing ranklists
 [====================================================] 100%itml iter: 0,
conv = 19.099085
itml iter: 1, conv = 2.987392
itml iter: 2, conv = 0.221271
itml iter: 3, conv = 0.013727
itml iter: 4, conv = 0.001679
itml iter: 5, conv = 0.000228
itml iter: 6, conv = 0.000040
itml converged at iter: 7, conv = 0.000009
Processing K-means clustering...
Processing ranklists
 [====================================================] 100%
Accuracy for K-Mean @rank 1 :   67.9286% K = 700
Accuracy for K-Mean @rank 5 :   81.3571% K = 700
Accuracy for K-Mean @rank 10 :   85.2143% K = 700


 -----PCA_ITML-----
itml iter: 0, conv = 17.815975
itml iter: 1, conv = 3.404314
itml iter: 2, conv = 0.349734
itml iter: 3, conv = 0.033983
itml iter: 4, conv = 0.005978
itml iter: 5, conv = 0.000603
itml iter: 6, conv = 0.000104
itml iter: 7, conv = 0.000015
itml converged at iter: 8, conv = 0.000002
Processing ranklists
 [                                                    ] N/A%Processing K-
means clustering...
Processing ranklists
 [=================================================== ]  98%
Accuracy for K-Mean @rank 1 :   67.7857% K = 700
Accuracy for K-Mean @rank 5 :   81.9286% K = 700
Accuracy for K-Mean @rank 10 :   84.9286% K = 700


 -----PCA_MMC-----
Processing ranklists
 [====================================================] 100%mmc iter: 0,
```

```
conv = 0.022361, projections = 10000
mmc iter: 1, conv = 0.011180, projections = 10000
mmc iter: 2, conv = 0.005590, projections = 10000
mmc iter: 3, conv = 0.002795, projections = 10000
mmc iter: 4, conv = 0.001398, projections = 10000
mmc iter: 5, conv = 0.000699, projections = 10000
mmc iter: 6, conv = 0.000349, projections = 10000
mmc iter: 7, conv = 0.000175, projections = 10000
mmc iter: 8, conv = 0.000087, projections = 10000
mmc iter: 9, conv = 0.000044, projections = 10000
mmc iter: 10, conv = 0.000022, projections = 10000
mmc iter: 11, conv = 0.000011, projections = 10000
mmc converged at iter 12, conv = 0.000005
Processing ranklists
 [                                            ] N/A%Processing K-
means clustering...
Processing ranklists
 [============================================ ]  98%
Accuracy for K-Mean @rank 1 :  67.6429% K = 700
Accuracy for K-Mean @rank 5 :  82.4286% K = 700
Accuracy for K-Mean @rank 10 :  85.3571% K = 700
Processing ranklists
 [=============================================] 100%
Process finished with exit code 0
```