HW3 Report

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1.   Cost 和 Iteratoin
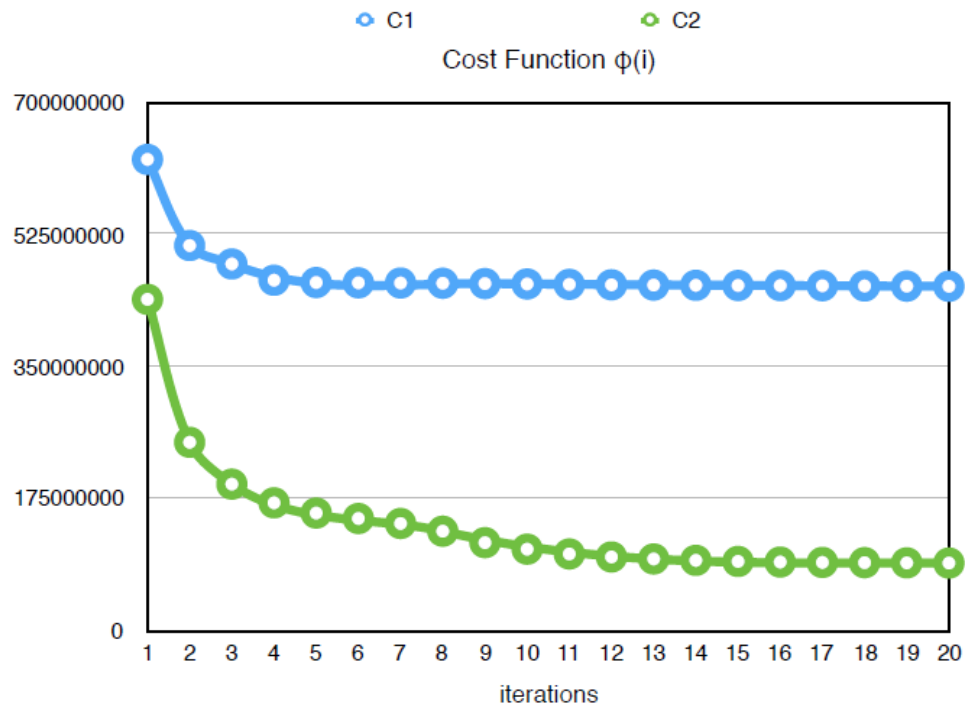
Euclidean:

Manhattan:
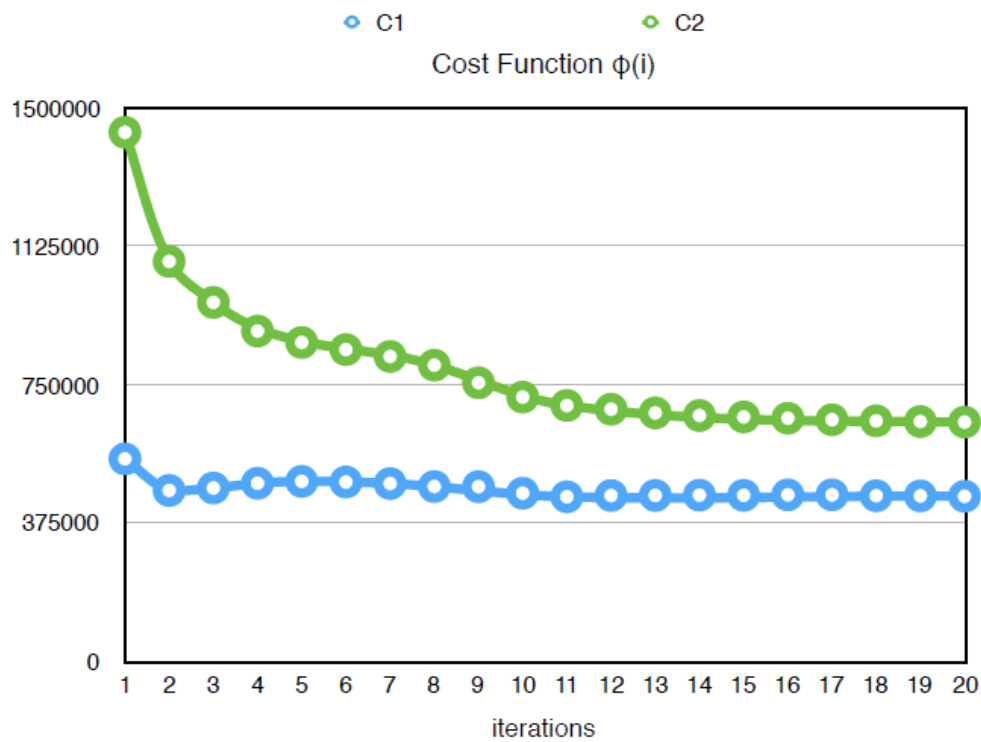
2.   After 10 iterations:

Percentage = (10 / 1)

Euclidean	C1	C2
Iteration 1	623660345.3064132	438747790.02791923
Iteration 10	459021103.34229076	108547377.17857023
Percentage	73.601%	24.740%

Discussion:

比起隨機選擇 10 個點(C1)，C2 表現比較好，因為起始的每個點去距離較遠，所以比較少機率會有 cluster 太過集中的情形，收斂和 improvement 也比較大。

Manhattan	C1	C2
Iteration 1	550117.1420000008	1433739.3099999963
Iteration 10	448929.4744988635	649689.0131843538
Percentage	81.606/5	45.314%

Discussion:

雖然 C2 收斂的比例較好，但是這次換 C1 表現較為出色。這有可能是因為 C1 選點就已經很優秀逼近正解(所以幾乎沒有改進)，也有可能是 cost function 造成的原因，可能 Manhattan 在處理高維度資料時更為出色。

3. Distance betweeb Clusters (20 次 iteration)

● **Euclidean (C1)**

cluster 1 2 692.157887

cluster 1 3 3490.25864

cluster 1 4 205.750279

cluster 1 5 346.718823

cluster 1 6 512.612247

cluster 1 7 444.731001

cluster 1 8 566.201992

cluster 1 9 1282.770845

cluster 1 10 307.669128

cluster 2 3 2798.801053

cluster 2 4 897.658986

cluster 2 5 1038.826888

cluster 2 6 1204.078199

cluster 2 7 1136.327344

cluster 2 8 1257.449528

cluster 2 9 669.890228

cluster 2 10 412.076077

cluster 3 4 3695.114191

cluster 3 5 3836.906638

cluster 3 6 4002.689083

cluster 3 7 3934.871559

cluster 3 8 4056.135573

cluster 3 9 2294.579642

cluster 3 10 3195.923901

cluster 4 5 142.438874

cluster 4 6 309.506324

cluster 4 7 241.730115

cluster 4 8 363.262895

cluster 4 9 1474.945421

cluster 4 10 504.634116

cluster 5 6 167.1498

cluster 5 7 99.545543

cluster 5 8 220.901784

cluster 5 9 1615.852353

cluster 5 10 646.930564

cluster 6 7 67.911861

cluster 6 8 53.789891

cluster 6 9 1782.203049

cluster 6 10 814.07615

cluster 7 8 121.63372

cluster 7 9 1715.2532

cluster 7 10 746.335559

cluster 8 9 1835.639672

cluster 8 10 867.823079

cluster 9 10 975.320423

- **Euclidean (C2)**

cluster 1 2 15760.122472

cluster 1 3 14110.834391

cluster 1 4 9045.320235

cluster 1 5 5567.684524

cluster 1 6 1924.624082

cluster 1 7 1100.85905

cluster 1 8 402.89055
cluster 1 9 2105.442576
cluster 1 10 3169.003773
cluster 2 3 11524.50565
cluster 2 4 6743.8841
cluster 2 5 10192.525007
cluster 2 6 14455.119372
cluster 2 7 14682.450993
cluster 2 8 15362.417961
cluster 2 9 13674.707531
cluster 2 10 12597.03956
cluster 3 4 9545.879403
cluster 3 5 10883.382188
cluster 3 6 12233.959805
cluster 3 7 13208.002934
cluster 3 8 13786.484183
cluster 3 9 12508.957381
cluster 3 10 11938.376127
cluster 4 5 3494.222416
cluster 4 6 7718.22201
cluster 4 7 7957.775949
cluster 4 8 8644.807041
cluster 4 9 6947.820636
cluster 4 10 5876.3302
cluster 5 6 4404.562591
cluster 5 7 4492.458214
cluster 5 8 5169.937291
cluster 5 9 3488.158519
cluster 5 10 2407.918794
cluster 6 7 1182.864189
cluster 6 8 1615.788236
cluster 6 9 1313.327493
cluster 6 10 2153.771472
cluster 7 8 698.488136
cluster 7 9 1010.197665
cluster 7 10 2085.460676
cluster 8 9 1702.792658
cluster 8 10 2768.607719

cluster 9 10 1080.534944

- **Mahattan (C1)**

cluster 1 2 2336.036682
cluster 1 3 11924.080118
cluster 1 4 652.125037
cluster 1 5 499.65336
cluster 1 6 952.467138
cluster 1 7 775.804709
cluster 1 8 1061.783411
cluster 1 9 1255.346668
cluster 1 10 732.704047
cluster 2 3 9597.441187
cluster 2 4 2777.741551
cluster 2 5 2828.26527
cluster 2 6 3279.854547
cluster 2 7 3104.116018
cluster 2 8 3388.744234
cluster 2 9 2380.460958
cluster 2 10 1605.270129
cluster 3 4 12322.897562
cluster 3 5 12419.434112
cluster 3 6 12870.995599
cluster 3 7 12695.389385
cluster 3 8 12978.890979
cluster 3 9 10775.939186
cluster 3 10 11196.786982
cluster 4 5 335.664013
cluster 4 6 558.1336
cluster 4 7 382.469332
cluster 4 8 667.483317
cluster 4 9 1653.44529
cluster 4 10 1376.94243
cluster 5 6 454.244004
cluster 5 7 278.003468
cluster 5 8 563.475096
cluster 5 9 1753.197598
cluster 5 10 1224.76378

cluster 6 7 177.254851
cluster 6 8 110.470081
cluster 6 9 2204.800069
cluster 6 10 1677.154902
cluster 7 8 287.351199
cluster 7 9 2028.739326
cluster 7 10 1500.840036
cluster 8 9 2314.427495
cluster 8 10 1786.571844
cluster 9 10 1006.367826

- **Mahattan (C2)**

cluster 1 2 15757.691264
cluster 1 3 20200.259436
cluster 1 4 9517.668233
cluster 1 5 5588.853635
cluster 1 6 3281.488247
cluster 1 7 1430.208678
cluster 1 8 602.954849
cluster 1 9 2102.553978
cluster 1 10 3211.455756
cluster 2 3 16003.499
cluster 2 4 7219.196667
cluster 2 5 10221.031
cluster 2 6 16325.2705
cluster 2 7 14506.48589
cluster 2 8 15335.957403
cluster 2 9 14980.056096
cluster 2 10 12922.931357
cluster 3 4 10690.484333
cluster 3 5 14613.552
cluster 3 6 17521.517667
cluster 3 7 18775.121461
cluster 3 8 19602.262815
cluster 3 9 18111.885425
cluster 3 10 16995.133536
cluster 4 5 3935.292667
cluster 4 6 9116.0245

cluster 4 7 8090.510188
cluster 4 8 8918.813117
cluster 4 9 7771.222078
cluster 4 10 6312.530012
cluster 5 6 6110.8325
cluster 5 7 4293.501903
cluster 5 8 5123.066808
cluster 5 9 4768.923
cluster 5 10 2710.0565
cluster 6 7 1855.579909
cluster 6 8 2682.569234
cluster 6 9 1358.795895
cluster 6 10 3413.036179
cluster 7 8 833.430282
cluster 7 9 674.82757
cluster 7 10 1784.512045
cluster 8 9 1500.824884
cluster 8 10 2613.997305
cluster 9 10 2062.251068