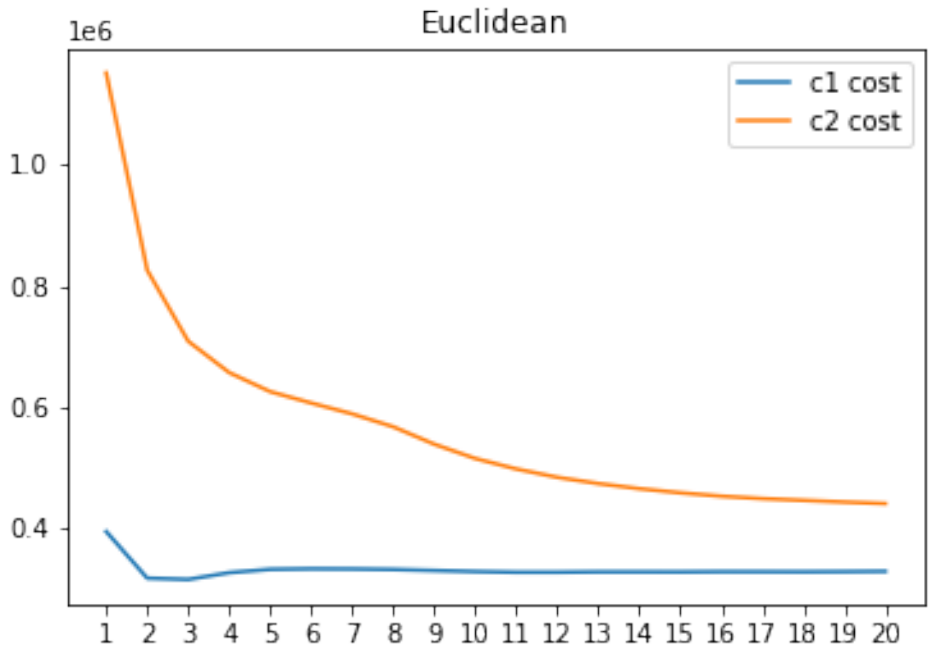
108062593 吳岱儒

a.

1. 用 Euclidean distance 來當作 distance measure

   使用 c1 當成 centroids 的 cost 就會很低，而且 improvement 同時也會很低，因會相較於 c2 的值，c1 已經夠好了，但是經過更多個 iterators 過後 c2 得到的 centroids 可能會比 c1 來得更好，



c1 Euclidean distance

c1_Euc	0	1	2	3	4	5	6	7	8	9
0	0	646.930564	1615.85235	167.1498	99.5455433	1038.82689	346.718823	220.901784	142.438874	3836.90664
1	0	0	975.320423	814.07615	746.335559	412.076077	307.669128	867.823079	504.634116	3195.9239
2	0	0	0	1782.20305	1715.2532	669.890228	1282.77084	1835.63967	1474.94542	2294.57964
3	0	0	0	0	67.9118611	1204.0782	512.612247	53.7898912	309.506324	4002.68908
4	0	0	0	0	0	1136.32734	444.731001	121.63372	241.730115	3934.87156
5	0	0	0	0	0	0	692.157887	1257.44953	897.658986	2798.80105
6	0	0	0	0	0	0	0	566.201992	205.750279	3490.25864
7	0	0	0	0	0	0	0	0	363.262895	4056.13557
8	0	0	0	0	0	0	0	0	0	3695.11419
9	0	0	0	0	0	0	0	0	0	0

c2 Euclidean distance

c2_Euc	0	1	2	3	4	5	6	7	8	9
0	0	1100.85905	2105.44258	402.89055	3169.00377	1924.62408	9045.32023	15760.1225	14110.8344	5567.68452
1	0	0	1010.19767	698.488136	2085.46068	1182.86419	7957.77595	14682.451	13208.0029	4492.45821
2	0	0	0	1702.79266	1080.53494	1313.32749	6947.82064	13674.7075	12508.9574	3488.15852
3	0	0	0	0	2768.60772	1615.78824	8644.80704	15362.418	13786.4842	5169.93729
4	0	0	0	0	0	2153.77147	5876.3302	12597.0396	11938.3761	2407.91879
5	0	0	0	0	0	0	7718.22201	14455.1194	12233.9598	4404.56259
6	0	0	0	0	0	0	0	6743.8841	9545.8794	3494.22242
7	0	0	0	0	0	0	0	0	11524.5057	10192.525
8	0	0	0	0	0	0	0	0	0	10883.3822
9	0	0	0	0	0	0	0	0	0	0

c1 Manhattan distance

	0	1	2	3	4	5	6	7	8	9
0	0	779.397227	2102.86492	204.522924	125.596786	1100.83309	374.890422	272.934913	171.365154	4170.30453
1	0	0	1327.58398	983.019681	904.37025	490.928058	406.701225	1050.91622	609.749322	3396.42
2	0	0	0	2306.38025	2227.55586	1005.29305	1731.06431	2374.54543	1934.08696	2513.42266
3	0	0	0	0	79.4016844	1303.89572	577.402076	69.5898763	375.247921	4372.78872
4	0	0	0	0	0	1225.35171	499.157894	147.865709	296.254724	4294.95283
5	0	0	0	0	0	0	728.924314	1372.09221	935.885338	3072.88869
6	0	0	0	0	0	0	0	645.769777	212.18109	3797.89908
7	0	0	0	0	0	0	0	0	443.498445	4440.71977
8	0	0	0	0	0	0	0	0	0	4001.03805
9	0	0	0	0	0	0	0	0	0	0

c2 Manhattan distance

	0	1	2	3	4	5	6	7	8	9
0	0	1311.03916	2369.41216	471.26572	3349.65709	3088.05432	9533.17085	15772.6149	20215.646	5604.20049
1	0	0	1068.93997	840.722524	2137.78826	1781.82267	8228.35508	14909.1695	18912.6054	4696.97538
2	0	0	0	1901.20876	1176.45043	2162.80215	7168.73296	13950.5759	17851.8068	3737.707
3	0	0	0	0	2883.73454	2619.81139	9065.40433	15434.46	19748.9357	5221.25281
4	0	0	0	0	0	3337.74626	6190.67931	12776.8831	16873.2437	2564.17054
5	0	0	0	0	0	0	8896.38921	16105.3475	17509.9028	5893.07013
6	0	0	0	0	0	0	0	7219.19667	10690.4843	3935.29267
7	0	0	0	0	0	0	0	0	16003.499	10221.031
8	0	0	0	0	0	0	0	0	0	14613.552
9	0	0	0	0	0	0	0	0	0	0

2. c1 得到的 improvement 為 16.56%

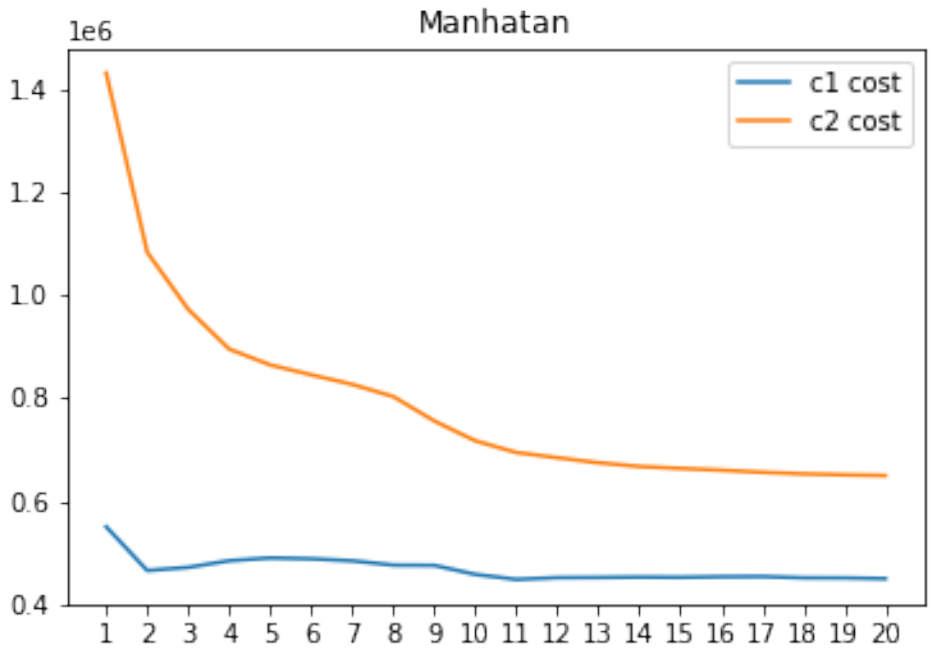
   c2 得到的 improvement 為 61.60%

   c1 得到的結果目前看起來是比 c2 來的好，可是經過更多的 iterators 後 c2 的結果有可能會比 c1 來的好，但是根據目前的情況 random init 的方法效果還不錯

b.

1. 用 Manhattan distance 來當作 distance measure

   使用 c1 當成 centroids 的 cost 就會很低，而且 improvement 同時也會很低，因會相較於 c2 的值，c1 已經夠好了，但是經過更多個 iterators 過後 c2 得到的 centroids 可能會比 c1 來得更好，



c1 Euclidean distance

	0	1	2	3	4	5	6	7	8	9
0	0	681.03499	1407.4044	236.514622	147.046974	270.748792	2898.71289	249.379188	1391.55042	10626.4886
1	0	0	729.056349	917.127383	827.718886	413.365061	2219.17728	528.699758	832.147434	9948.04408
2	0	0	0	1642.12869	1553.12381	1137.13527	1491.35735	1251.15835	709.407786	9236.84002
3	0	0	0	0	89.4909166	505.071067	3133.46013	457.259653	1613.55579	10862.9658
4	0	0	0	0	0	415.989985	3044.47787	375.156188	1529.46401	10773.5308
5	0	0	0	0	0	0	2628.49081	221.372794	1171.96421	10361.3675
6	0	0	0	0	0	0	0	2734.04985	1812.45457	7767.9456
7	0	0	0	0	0	0	0	0	1156.58338	10433.0614
8	0	0	0	0	0	0	0	0	0	9340.27523
9	0	0	0	0	0	0	0	0	0	0

c2 Euclidean distance

	0	1	2	3	4	5	6	7	8	9
0	0	514.627038	1571.24342	1338.16113	3022.66088	2006.70267	9032.33302	15747.2342	14100.1447	5554.78669
1	0	0	1081.37933	827.840658	2511.45886	1637.72944	8521.19786	15239.8771	13684.6068	5047.51626
2	0	0	0	566.551017	1649.38917	910.994388	7588.40454	14328.2262	12643.9856	4167.63653
3	0	0	0	0	1684.51601	1405.10908	7694.2767	14412.0566	13125.351	4219.76057
4	0	0	0	0	0	2124.26336	6009.82022	12731.3976	12006.3946	2542.56935
5	0	0	0	0	0	0	7742.62812	14474.5541	12167.7939	4452.97168
6	0	0	0	0	0	0	0	6743.8841	9545.8794	3494.22242
7	0	0	0	0	0	0	0	0	11524.5057	10192.525
8	0	0	0	0	0	0	0	0	0	10883.3822
9	0	0	0	0	0	0	0	0	0	0

c1 Manhattan distance

	0	1	2	3	4	5	6	7	8	9
0	0	770.737383	1500.99341	287.429708	177.593162	276.326491	3104.28577	382.46333	2028.90162	12695.5542
1	0	0	737.713573	1056.7995	947.743236	496.331521	2341.01722	651.187488	1260.51056	11929.3002
2	0	0	0	1786.81132	1677.66686	1226.66035	1605.27013	1379.16517	1006.36783	11196.787
3	0	0	0	0	110.217624	561.849249	3388.98265	667.53323	2314.66745	12979.1332
4	0	0	0	0	0	452.861331	3280.35917	558.469258	2205.30738	12871.4834
5	0	0	0	0	0	0	2830.14453	335.951213	1755.10553	12421.2631
6	0	0	0	0	0	0	0	2778.94576	2380.46096	9597.44119
7	0	0	0	0	0	0	0	0	1653.82589	12323.2876
8	0	0	0	0	0	0	0	0	0	10775.9392
9	0	0	0	0	0	0	0	0	0	0

c2 Manhanttan distance

	0	1	2	3	4	5	6	7	8	9
0	0	602.954849	2102.55398	1430.20868	3211.45576	3281.48825	9517.66823	15757.6913	20200.2594	5588.85363
1	0	0	1500.82488	833.430282	2613.99731	2682.56923	8918.81312	15335.9574	19602.2628	5123.06681
2	0	0	0	674.82757	2062.25107	1358.79589	7771.22208	14980.0561	18111.8854	4768.923
3	0	0	0	0	1784.51205	1855.57991	8090.51019	14506.4859	18775.1215	4293.5019
4	0	0	0	0	0	3413.03618	6312.53001	12922.9314	16995.1335	2710.0565
5	0	0	0	0	0	0	9116.0245	16325.2705	17521.5177	6110.8325
6	0	0	0	0	0	0	0	7219.19667	10690.4843	3935.29267
7	0	0	0	0	0	0	0	0	16003.499	10221.031
8	0	0	0	0	0	0	0	0	0	14613.552
9	0	0	0	0	0	0	0	0	0	0

2. 用 Euclidean distance 來當作 distance measure

使用 c1 當成 centroids 的 cost 就會很低，而且 improvement 同時也會很低，因會相較於 c2 的值，c1 已經夠好了．但是經過更多個 iterators 過後 c2 得到的 centroids 可能會比 c1 來得更好．