

Danny Tan

AI Fall 2018

HW # 10

Problem 1:

First iteration

Point	x	y	cluster	distance to 1st	distance to 2nd	distance to 3rd	Closest Cluster	Cost
A	1	6	1	545.5155564	402.9858868	871.7360712	2	297587.2222
B	1002	20	1	542.1883642	803.6430333	277.642656	3	293968.2222
C	498	651	1	425.3397335	411.5915755	530.4191215	2	180913.8889
D	6	10	2	539.3306551	396.728024	865.8345364	2	157393.125
E	510	622	2	396.451202	396.1150401	500.5890974	2	156907.125
F	503	632	2	406.3420836	399.4641724	512.7271312	2	159571.625
G	4	9	2	541.5636825	398.7651251	868.0309774	2	159013.625
H	1010	25	3	547.7474073	809.2518922	278.4369069	3	77527.11111
I	1006	30	3	542.203119	803.718312	272.0345158	3	74002.77778
J	502	680	3	454.3363903	437.6095577	550.4714141	2	303018.7778
							Total Cost	1859903.5

	x	y
Cluster 1 Centroid	500.3333333	225.6666667
Cluster 2 Centroid	255.75	318.25
Cluster 3 Centroid	839.3333333	245

Second iteration

Point	x	y	cluster	distance to 2nd	distance to 3rd	Closest Cluster	Cost
A	1	6	2	466.4873732	1005.179586	2	217610.4694
B	1002	20	3	795.4077378	6.403124237	3	41
C	498	651	2	347.8286289	806.1885636	2	120984.7551
D	6	10	2	460.2555634	1000.112494	2	211835.1837
E	510	622	2	332.9414976	776.1604216	2	110850.0408
F	503	632	2	335.9909195	788.3260747	2	112889.898
G	4	9	2	462.2753177	1002.127736	2	213698.4694
H	1010	25	3	800.3996578	4	3	16
I	1006	30	3	794.6289598	5	3	25
J	502	680	2	373.6909123	826.4629453	2	139644.898
						Total Cost	1127595.714

	x	y
Cluster 2 Centroid	289.1428571	372.8571429
Cluster 3 Centroid	1006	25

Problem 2:

A)

Points	x	y	total
A	2	4	6
B	11	6	17
C	10	11	21
D	4	5	9
E	10	11	21
F	10	11	21
G	4	5	9
H	11	6	17
I	11	6	17
J	10	11	21
Total bits			159

B)

Cluster	x	y	total
P1	4	5	9
P2	11	6	17
P3	10	11	21
		total bits	47

Points	delta x	delta y	x bit	y bit	cluster bit	total
A	-3	-2	3	3	2	8
B	-4	-5	4	4	2	10
C	-5	5	4	4	2	10
D	2	2	3	3	2	8
E	7	-24	4	6	2	12
F	0	-14	1	5	2	8
G	0	1	1	2	2	5
H	4	0	4	1	2	7
I	0	5	1	4	2	7
J	-1	34	2	7	2	11
					Total bit	86

To represent whole data, $47+86 = 133$