Assignment_08

Homework Assignment 8 [30 points]

STAT430 Unsupervised Learning - Fall 2021

Due: *Friday, October 22 on Compass at 11:59pm CST.*

Problems	Points
1.1	0.25
1.2.1	0.25
1.2.2.	0.5
1.2.3	0.5
1.3	0.5
2.1	1
2.2	1
2.3	1
3.1.1	0.5
3.1.2	0.5
3.2.1	0.5
3.2.2	0.5
3.3.1	0.5
3.3.2	0.5
3.4.1	0.5
3.4.2	0.5
3.4.3	0.5
3.4.4	0.5
3.5.1	0.5
3.5.2	1
3.5.3	0.25
4.1.1	0.5
4.1.2	0.5
4.2.1	0.5
4.2.2	0.5
4.3.1	0.5
4.3.2	0.5
4.4	0.75
5.1.1	1.5
5.2.1	0.5
5.2.2	1.5
6.1	0.5
6.2	0.75
7.1	0.5
7.2	0.75
7.3	0.5
7.4	0.25
8.1	0.5
8.2	0.5
8.3	0.75
9.1.1.	0.5
9.1.2	0.5
9.2.1	0.5
9.2.2	0.5
9.3.1	0.5
9.3.2	0.5
10	3

Questions #1-#9: Answer the questions in the jupyter notebook.

Question #10:

We would like to cluster the dataset below using k-prototypes using $k = 2$ clusters and $\gamma = 2$. The prototypes for the *current* iteration of the k-prototypes algorithm are given below. Determine what the *new* prototypes will be in the next iteration of the algorithm. Show your work.

		Dataset			
	GPA	Number of UIUC Football Games Attend		Major	Team Edward or Team Jacob?
Object 1	4	0		Math	Neither
Object 2	3.5	1		Stats	Edward
Object 3	2.5	1		CS	Neither
Object 4	3.3	2		Stats	Jacob
Object 5	3.8	2		Math	Jacob
Object 6	3	10		CS	Edward

		Current Prototypes			
	GPA	Number of UIUC Football Games Attend		Major	Team Edward or Team Jacob?
Prototype 1	3	3		Math	Neither
Prototype 2	3.7	1		Stats	Edward

Objects		Numerical Component	Categorical Component	Dist to prototype 1 (Gamma = 2)		Numerical Component	Categorical Component	Dist to Prototype 2 (Gamma = 2)		Assign to
Object 1		10	0	10		1.09	4	5.09		Prototype 2
Object 2		4.25	4	8.25		0.04	0	0.04		Prototype 2
Object 3		4.25	2	6.25		1.44	4	5.44		Prototype 2
Object 4		1.09	4	5.09		1.16	2	3.16		Prototype 2
Object 5		1.64	2	3.64		1.01	4	5.01		Prototype 1
Object 6		49	4	53		81.49	2	83.49		Prototype 1

New Prototypes	GPA	Number of Football Games attend	Major	Team Edward or Team Jacob?
Prototype 1	3.4	6	Math	Jacob
Prototype 2	3.325	1	Stats	Neither