



Department of Instrumentation and Control

Innovative Teaching Method

Class:	BE Instrumentation and Control Academic Year 2024-25Sem. VII
Name of Method:	Participative learning (Use of visualization tool and Excel Sheet Tool for K-means clustering algorithm for classification)
Course:	Data Analytics (Elective)
Name of Staff	Dr. A. R. Kulkarni
Date and Time:	9/7/2024, 16/7/2024 10 am-12 pm.
No of students participated:	12. Total students 12. Appeared 12. Submitted feedback 12 (100%).

Learning Objective: After this method students will be able to

1. use of Visualizing K-Means Clustering (<https://www.naftaliharris.com/blog/visualizing-k-means-clustering/>). .
2. use Excel sheet K-means clustering (<https://people.revoledu.com/kardi/tutorial/kMean/NumericalExample.htm>)
3. explore different ways of choosing centroids in K-means clustering
4. check the algorithm performance by observing whether the algorithm is to capture the four different clusters of points in the "Smiley" and "Pimpled Smiley" datasets?
5. Identify that the computation of k-means clustering stability is reached in spreadsheet

Outcomes: Students experiences the visualization of K means clustering, different datasets, and also are able to use Excel Sheet as an excellent tool equally for the same algorithm.

Description:

Two methods are used to explore K-means clustering algorithm. First method is online visualization. Second method is use of excel sheet tool. Both methods have their advantages and limitations. One is online, other is offline. Students exactly come to know the steps, and its visual result of data classification. In excel sheet students can verify hand calculations-which is a bit lengthy.

Impact of Innovative Method: Interactive visualization is achieved. Students explored novel tool which is available globally.

COs, POs and PSOs explored: CO4,PO5 (3),PSO2(3) PSO2: Apply instrumentation & control in multidisciplinary domains related to research & entrepreneurship development.

Rubrics used:

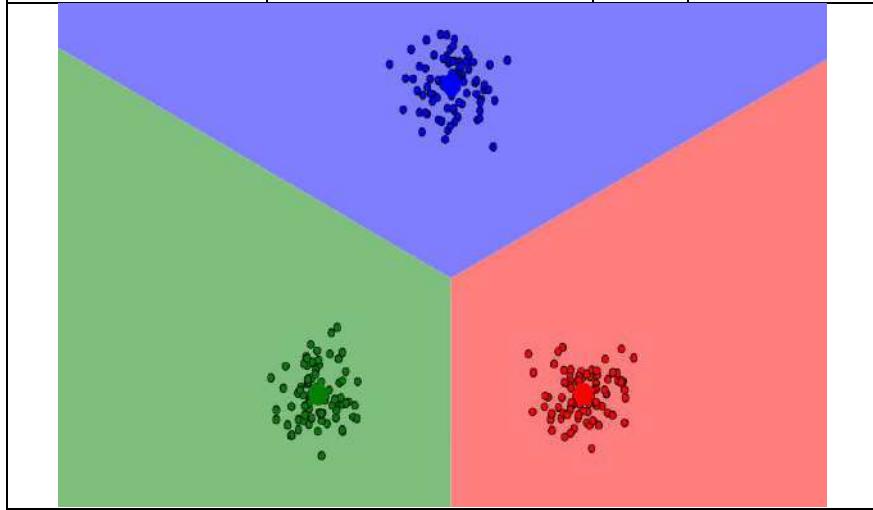
Skills/Criterion/Category	3 Points	2 Points	0 Points
User chose the centroid by different methods.	All methods	User can choose it by clicking mouse , Randomly	NA

Analytical Skill: Is the algorithm here able to capture the four different clusters of points in the "Smiley" and "Pimpled Smiley" datasets?	No	-	Yes
User answers question based on visual skill (by observing graph parameters on X and Y axis)	Weight and pH	-	weight and pressure , weight and level weight and flow
Observation skill- user comes to know that computation of k-means clustering stability is reached	group matrix elements does not move anymore	-	group matrix elements does move continuously

Assessment based on Rubrics

Username	Total score(Max 15)	Q1	Q2	Q3	Q4	Q5
Timestamp	Username	Total score	Which options are provided to proceed with visualization? [Score]	K-Means Performance related: is the algorithm here able to capture the four different clusters of points in the "Smiley" and "Pimpled Smiley" datasets? (Try it !) [Score]	Excel sheet Question: Medicines A, B And D are expressed in the graph on the basis of ---- [Score]	Excel sheet question: computation of k-means clustering stability is reached is identified by observing that ---- [Score]
2024/10/19 4:57:01 PM GMT+5:30	kbtug22579@kbtcoe.org	1	1	0	0	0
2024/10/19 5:38:30 PM GMT+5:30	kbtug21105@kbtcoe.org	2	0	0	1	1
2024/10/19 5:41:18 PM GMT+5:30	kbtug21341@kbtcoe.org	2	0	0	1	1
2024/10/19 5:43:03 PM GMT+5:30	kbtug21341@kbtcoe.org	3	0	1	1	1

2024/10/20 9:49:20 AM GMT+5:30	kbtug21168@kbtcoe.org	3	1	0	1	1
2024/10/20 10:03:21 AM GMT+5:30	kbtug21074@kbtcoe.org	2	0	0	1	1
2024/10/20 10:05:47 AM GMT+5:30	kbtug22573@kbtcoe.org	3	1	0	1	1
2024/10/20 3:12:13 PM GMT+5:30	kbtug21390@kbtcoe.org	2	1	0	0	1
2024/10/21 12:21:51 PM GMT+5:30	kbtug21342@kbtcoe.org	2	0	0	1	1
2024/10/22 10:30:03 AM GMT+5:30	kbtug22593@kbtcoe.org	3	1	0	1	1
2024/10/23 1:39:19 PM GMT+5:30	kbtug21472@kbtcoe.org	2	0	0	1	1
2024/10/25 2:12:38 PM GMT+5:30	kbtug21237@kbtcoe.org	1	0	0	0	1
	Avg	2.17	0.42	0.08	0.75	0.92
	Max marks	4				
	On 3 scale	1.625				



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