MARATHA VIDYA PRASARAK SAMAJ'S

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Permanently Affiliated to Savitribai Phule Pune University Vide Letter No. : CA/1542 & Approved by AICTE New Delhi - Vide Letter No. : 740-89-32 (E) ET/98 AISHE Code - C-41622

Department of Instrumentation and Control
Innovative Teaching Method

Class:	BE Instrumentation and Control Academic Year 2023-24 Sem. 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:	27/9/2023, 10 am-12 pm.
No of students participated:	18

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	Student First Name Middle Name and last Name	roll number
kbtug20227@kbtcoe.org	9	3	3	0	0	3	Rupali Vijay Avhad	1
kbtug20427@kbtcoe.org	9	3	3	0	0	3	bajare Suraj Dattatray	2
kbtug21474@kbtcoe.org	12	3	3	0	3	3	Dabhade Rohit Sanjay	3
kbtug21244@kbtcoe.org	9	3	0	3	3	0	Khushi Dhananjay Datir	4
kbtug20212@kbtcoe.org	9	3	0	0	3	3	Davkar Samruddhi Shashank	5
kbtug21275@kbtcoe.org	9	3	3	0	3	0	Ujjwal Manoj Jadhav	6
kbtug21252@kbtcoe.org	5	2	0	0	3	0	pooja Hemant Jadhav	7
kbtug21481@kbtcoe.org	5	2	0	0	0	3	Tejal Shivaji Jagdale	8
kbtug21274@kbtcoe.org	12	3	3	0	3	3	Aditi Dattatray Jagtap	9
kbtug21469@kbtcoe.org	11	2	3	0	3	3	Sonali Gorakhnath Kasav	10
kbtug21303@kbtcoe.org	6	3	0	0	0	3	Poonam Sarjerao Pomnar	11
kbtug21305@kbtcoe.org	9	3	3	0	0	3	Kajal rajendra pomnar	12
kbtug20091@kbtcoe.org	9	3	0	0	3	3	Sajid Shaikh	13

kbtug21306@kbtcoe.org	11	2	3	0	3	3	Shinde Prashant Sanjay	14
kbtug20330@kbtcoe.org	8	2	3	0	0	3	Shinde Prajwal Sunil	15
kbtug21491@kbtcoe.org	6	3	3	0	0	0	Vedant Kiran Sonawane	16
kbtug20363@kbtcoe.org	11	2	3	0	3	3	Sonawane Saurabh Yadav	17
kbtug20046@kbtcoe.org	5	2	0	0	0	3	Harshad Anil Udamale	18
	Avg. on 3 scale	**2.61**	**1.83**	**0.17**	**1.67**	**2.33**		
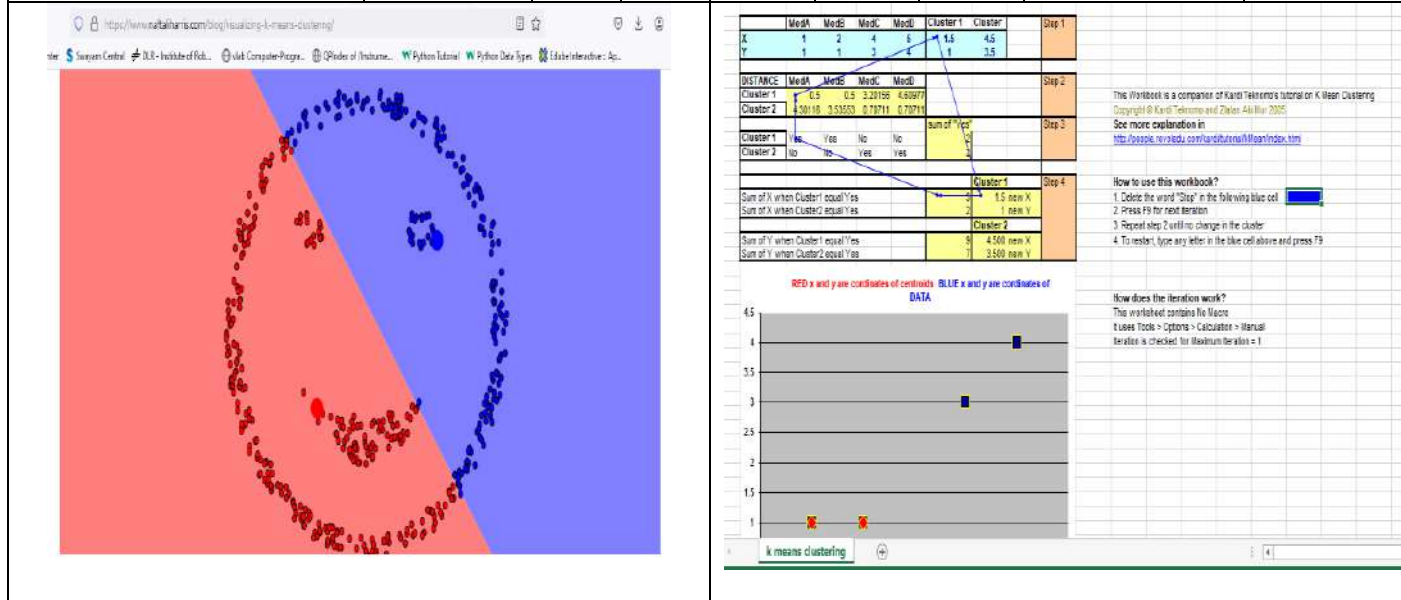
Dr. A. R. Kulkarni
Course Coordinator

Dr. B. J. Parvat
HoD.