ME 793 - Assignment 5

Department of Mechanical Engineering, IIT Bombay

Spring 2021

Due Date: 10:30 AM, March 27, 2022, Marks 20

Assignment Date: 11:30 AM, Thursday, March 18, 2022

Objective and Instructions

1. The objective is to understand the application of Clustering to data present in form of scalars and in form of images.

2. You will use the data that you created and used for Assignment 3 or 4 and an additional image dataset that is given below.

3. This assignment needs to be performed using Jupyter Notebook or Google Colab Notebook or only.

4. Submit Jupyter Notebook and your data file to Moodle.

Q 1. Make sure that you are using the data that you created for Assignment 3 or 4. This table must have 7 columns. Sort the table according to the increasing order of thermal conductivity. Now divide the complete data into 7 subgroups of thermal conductivity. Suppress the groups 2, 4 and 6. Now you have only 4 groups of elements based on certain range of thermal conductivity. Now shuffle this data table based on the thermal conductivity. Apply *k-Means* method and show that there are 4 groups of elements. Other properties can be removed from this table since we will perform *k*-means analysis only for thermal conductivity.

Q 2. Apply *k-Means* method on this data and reveal how many groups it has. Dataset - Micrographs of Metals. The final results should include (a) elbow plot and (b) graphics of clusters or 'blobs' in PC space.

Your Jupyter Notebook must show various decorated plots as appropriate for clearly understanding the problem setup, methodology and model outcome. Definitely show the elbow plot for k-Means method.

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