**Assignment 5, Introduction to Machine Learning**

In this assignment, you will handle hierarchical clustering and find out the optimal k (number of clusters). Refer to the Python notebook used to illustrate unsupervised clustering in class. In the notebook, we illustrated different methods to identify the optimal k in K-means clustering model.

In this assignment, you can refer to the same notebook and use the same data set. Below are the tasks you need to complete.

1. Perform Agglomerative Hierarchical clustering using “Euclidean distance” as distance metric and linkage method = ‘average’ for k = 2, 3, 4, …. 9. [25 points]
2. Using the methods provided in the notebook identify the optimal k. [25 points]
3. Perform Steps 1 – 2 but using linkage method = ‘ward’. [50 points]