Tutorial 2

Title: Unsupervised machine learning

Questions

1. Write a code to calculate the volume fraction of the white phase for all 6 representative microstructures. Also calculate the average class-wise volume fraction of white phase from the autocorrelations data. Compare the volume fractions.
2. Perform Principal Component Analysis (PCA) on the autocorrelations data (components = 3). First take only 65025 features and then repeat for 130050 features. Comment on the results.
3. Perform Multi-Dimensional Scaling (MDS) on the autocorrelations data (components = 3). First take only 65025 features and then repeat for 130050 features. Comment on the results.
4. Calculate the preserved distances in reduced dimensions after PCA and MDS. Plot actual vs preserved distances.

****

Additional references:

PCA

https://scikit-learn.org/stable/modules/generated/sklearn.decomposition.PCA.html

MDS

https://scikit-learn.org/stable/modules/generated/sklearn.manifold.MDS.html

Euclidean distance

https://scikit-learn.org/stable/modules/generated/sklearn.metrics.pairwise.euclidean_distances.html