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*Comparison of Three Clustering Algorithms, K-Means, Self-Organizing Maps, and Relational Self-Organizing Maps, on Porcine Atherosclerotic Tissues.* Preliminary report.

Atherosclerosis is a cardiovascular disease in which plaque accumulates along the wall of an artery, increasing the risk for heart attack or stroke. Acoustic Radiation Force Impulse (ARFI) is an ultrasound imaging technique in which acoustic waves are focused at a point, causing displacement of the tissue that is then tracked over time to measure elastic and viscoelastic material properties from the imaging data. We investigate the results of three data clustering algorithms, K-Means, Self-Organizing Maps (SOMs), and Relational SOMs to ARFI imaging of porcine atherosclerotic plaques. In this context, we hope to cluster images based on similar patterns in the data set. Based on the dimension, size and scope of image patterns considered in this work, the clustering configuration used for each clustering algorithm considered was a 3x3 lattice of nine neurons. We will discuss metrics that were used to compare the performance of these three clustering methods on the data set. (Received September 20, 2016)