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Amanda J. Mangum* (amangum@niagara.edu) and **Mansoor Haider**. *Self-Organizing Maps for Data Clustering in Acoustic Radiation Force Ultrasound Imaging of Cardiovascular Tissues*. Preliminary report.

Atherosclerosis is a cardiovascular disease in which plaque accumulates along the wall of an artery, altering blood flow and 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 application of data clustering algorithms, based on Self-Organizing Maps (SOMs), to ARFI imaging for early detection and characterization of atherosclerotic plaques. In this context, SOMs cluster images based on similar patterns in the data set that are identified via a projection of the data vector space onto a lower dimensional map. This map is obtained in a training phase that utilizes a neighborhood function (which distinguishes SOMs from K-Means) to ensure that neighboring data clusters are more similar than clusters far away from each other (in terms of the map topology). Data was examined from an ex vivo ARFI imaging study on porcine iliac arteries performed at the Gallippi Ultrasound Lab at UNC-Chapel Hill. Extensive analysis of SOM performance was carried out by training SOMs on combinations of expanded training sets. (Received September 15, 2014)