

Feature Extraction and Selection using Topological Data Analysis

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Abstract: Topological data analysis (TDA) is rapidly emerging as one of the most general-purpose methods for feature extraction and selection in any supervised or unsupervised learning application. Based on the core idea of characterizing topological features in noisy and high-dimensional data sets based on their *persistence information*, TDA provides a robust framework to yield suitable features. In this talk, I will discuss two successful demonstrations of this idea, one for manufacturing system outputs prediction and the other for multi-way classification of 3D meshes and textured images. I will conclude by pointing out several future research directions.

Bio: *Ashis G. Banerjee* is an Assistant Professor with joint appointment in the Department of Industrial & Systems Engineering and the Department of Mechanical Engineering at the University of Washington, Seattle. Prior to his current appointment, he was a Research Scientist in the Complex Systems Engineering Laboratory at General Electric Global Research (GEGR). Before joining GEGR, he was a Research Scientist and Postdoctoral Associate at Massachusetts Institute of Technology. He obtained his Ph.D. and M.S. in Mechanical Engineering from the University of Maryland, College Park, and B.Tech. in Manufacturing Science and Engineering from the Indian Institute of Technology, Kharagpur. Dr. Banerjee has received several honors including the 2018 Marquis Who's Who in America, 2012 Most Cited Paper Award from the Computer-Aided Design journal, the 2009 Best Dissertation Award from the Department of Mechanical Engineering, and the 2009 George Harhalakis Outstanding Systems Engineering Graduate Student Award from the Institute for Systems Research at the University of Maryland. His research interests include digital manufacturing, predictive and prescriptive analytics, and planning and control of multi-robot systems.

Tuesday, October 24, 2017
1:30 - 2:20 p.m.
MEB 235