IEEE Signal Processing WA Chapter

Seminar Notice

Title: ***Data fusion through matrix and tensor factorizations: on current solutions and challenges***

Presenter: Tulay Adali, IEEE Distinguished Lecturer

Time: 4pm – 6pm

Date: Wed 21 Nov 2018

Venue: Room 312.222 Geology Building
Curtin University, Bentley Campus

Cost: Free to all IEEE members as well as non-members

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Abstract:

In many fields today, multiple sets of data are readily available. These might either be multimodal data where information about a given phenomenon is obtained through different types of acquisition techniques resulting in datasets with complementary information but essentially of different types, or multiset data where the datasets are all of the same type but acquired from different subjects, at different time points, or under different conditions. Joint analysis of such data—its fusion—promises a more comprehensive and informative view of the task at hand, and, is at the heart of numerous problems across disciplines including neuroscience, remote sensing, video analysis, atmospheric and physical sciences to name a few. Since most often, very little prior information is available about the relationship among the datasets, data-driven methods have proven especially useful for data fusion.

Solutions based on matrix and tensor decompositions for data fusion minimize the assumptions, and at the same time, can maximally exploit the interactions within and across the datasets. This talk presents an overview of main models that have been successfully used for fusion of multiple datasets. An important focus is on the interrelated concepts of uniqueness, interpretability, and diversity. Diversity refers to any structural, numerical, or statistical property or assumption on the data that enables uniqueness, which is key for interpretability, the ability to attach a physical meaning to the final decomposition. The relevance of these concepts as well as the challenges that remain are highlighted through examples in medical image fusion.

About the Speaker:

Tülay Adali received the Ph.D. degree in Electrical Engineering from North Carolina State University, Raleigh, NC, USA, in 1992 and joined the faculty at the University of Maryland Baltimore County (UMBC), Baltimore, MD, the same year. She is currently a Distinguished University Professor in the Department of Computer Science and Electrical Engineering at UMBC.

She has been active in conference and workshop organizations. She was the general or technical co-chair of the IEEE Machine Learning for Signal Processing (MLSP) and Neural Networks for Signal Processing Workshops 2001−2008, and helped organize a number of conferences including the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP). She has served or currently serving on numerous editorial boards and technical committees of the IEEE Signal Processing Society. She was the chair of the technical committee on MLSP, 2003−2005 and 2011−2013, the Technical Program Co-Chair for ICASSP 2017, Special Sessions Chair for ICASSP 2018. She is the Vice President-elect Technical Directions of the IEEE Signal Processing Society.

Prof. Adali is a Fellow of the IEEE and the AIMBE, a Fulbright Scholar, and an IEEE Signal Processing Society Distinguished Lecturer. She was the recipient of a 2010 IEEE Signal Processing Society Best Paper Award, 2013 University System of Maryland Regents' Award for Research, and an NSF CAREER Award. Her current research interests are in the areas of statistical signal processing, machine learning, and applications in medical image analysis and fusion.