



The Institute of Electrical and Electronics Engineers
(IEEE)



Galveston Bay Section Monthly Meeting

February 16th, 2017 (Thursday) Luncheon Meeting

TOPIC: “Using Dynamic Functional Connectivity Features to Classify Subjects Based on Functional MRI Data”

SPEAKER: Dr. Unal Sakoglu, University of Houston, Clear Lake

PRESENTATION: A dynamic sliding window-based method, namely dynamic functional connectivity (DFC), which assesses temporal dynamics of functional connectivity among different brain networks based on fMRI data, was recently developed by Sakoglu et al. and it has gained much attention. DFC method provides much more information about the dynamics of interaction among the brain regions than the static FC method does.

The DFC method can be applied to predefined brain regions of interest, as well as to brain regions determined by data-driven methods such as independent component analysis (ICA). Also, DFC can be applied to both resting-state fMRI data, and also to task-based fMRI data in order to study task-modulation of functional connectivity, since DFC can quantify the temporal evolution of functional connectivity. In addition, DFC-based features can be used as input to pattern classification / machine learning algorithms for classification of "brain states" and for classification of participants with different brain diseases or conditions; DFC-based classification can lead to better classification accuracy when compared with just using static functional connectivity based features.

In this talk, DFC-based analysis and classification results from an fMRI dataset, which was obtained from cocaine addicted patients and healthy control participants, will be presented. When combined with a powerful data-driven brain activation analysis method ICA, it will be shown that DFC-based classification method can lead to better overall classification accuracy results for classifying cocaine addicted patients vs healthy control participants, reaching over 90% sensitivity and specificity.

SPEAKER: Bio: Dr. Unal "Zak" Sakoglu is currently an Assistant Professor of Computer Engineering at University of Houston - Clear Lake. He had his BS in Electrical-Electronics Engineering from Bilkent University, Turkey, and MS & PhD degrees in Electrical and Computer Engineering from University of New Mexico in Albuquerque, NM. His graduate

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research involved developing signal/image processing and nonuniformity correction algorithms for better multispectral classification with infrared array sensors developed at UNM Center for High Technology Materials. He did his post-doctoral training at UNM Neurology Department BRAIN Imaging Center and Mind Research Network in Albuquerque, where he developed and applied data analysis & classification techniques to functional magnetic resonance imaging data. He worked as a Research Scientist at UT Southwestern Medical Center Neuroradiology Department, at Abbott Laboratories Translational Neuroimaging Group, and at UT Dallas School of Behavioral and Brain Sciences, where he analyzed different modalities of medical imaging data such as EEG, PET/CT, SPECT/CT, MRI and fMRI, during these positions. Prior to joining UHCL, he was a faculty of Computer Science at Texas A&M University-Commerce. He is currently working on development and application of dynamic multivariate pattern classification, data-mining and machine-learning methods to functional neuroimaging data in order to advance the understanding of how the human brain is functioning and how it is effected by different brain conditions (different stimuli, disease, etc.).

Gilruth Recreation Center NASA-JSC, Discovery Room (downstairs)

Free parking. No security processing required. Easy drive in off Space Center Blvd. See website below for map. Interested non-IEEE engineers, technicians, scientists, IEEE Members and guests alike are welcome!

11:30 AM - Light Lunch with reservation (\$10.00 donation)

12:00 PM – 1:00 PM - Program and Q&A

Please RSVP Before Noon on Monday, February 13th, 2017

Number of lunches is limited. Please reserve early

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