TETAM PhD Seminars – 28.12.2018, 10:00-11:35
TETAM Roof Conference Hall

Mobile Network Planning Using Signal Measurements Of Existing Networks, 3D Structures, And Geographical Grids
Murat Özyurt

Abstract: The research proposes a new method for estimating signal propagation characteristics and planning cellular network base station locations at new sites having 3D city maps, with respect to signal propagation training results of other areas with wireless signal measurements and 3D city maps. The training areas can be divided into geographical grids of 3D tiles, each one having distinct propagation parameters according to actual signal measurements. The 3D likeliness between training area tiles and target area tiles can be used to estimate the potential propagation characteristics on the target area. Base stations can then be located according to calculated propagation parameters for obtaining better coverage.

Bio: Having completed Computer Engineering B.S. and Software Engineering M.S. programs of Boğaziçi University in 2005 and 2008 respectively, Murat Özyurt has been pursuing his studies in PhD in Computer Engineering at Boğaziçi University, working on computer networks. Since 2005, he worked on software research and development for mobile games, web applications, defence technologies, education and telecommunication infrastructure projects at his own companies as well as companies like Turkish Telecom, Turkcell Technology, and Ericsson. He is currently pursuing his PhD research at Telecommunications and Informatics Technologies Research Center in Boğaziçi University Computer Center.

Unsupervised Morpheme Segmentation with Application to Automatic Speech Recognition
Gözde Çetinkaya

Abstract: Search and retrieval of information has become an inevitable demand as a result of ever increasing multimedia content and ability of cheaper storage. With this perspective, speech retrieval (SR) which combines automatic speech recognition (ASR) and information retrieval (IR) is an important key to easier browsing and retrieving of multimedia content. In the basic scenario for speech retrieval, the spoken content is transcribed into text or lattice format, then a text retrieval method searches over the ASR output to find requested information. However, the agglutinative nature of some languages lead to a high number of out-of-vocabulary (OOV) words which in turn lower ASR accuracy. Morphological segmentation is a way to deal with OOV problem by introducing the common segments within the words. In our study, the segmentation method is based on semantic similarity which is computed using the neural word embeddings. For morpheme transitions, maximum likelihood estimation is used to build a bigram language model. After morphemes are obtained, they are used to generate the language model. The proposed method is tested with Turkish Broadcast News and the results are promising.

Bio: Gözde Çetinkaya graduated from Electrical and Electronics Engineering at Istanbul Kültür University and completed her M. Sc. degree on signal processing and telecommunication option in Electrical and Electronics Engineering at Boğaziçi University. Currently, she is a Ph. D. candidate in the same department at Boğaziçi University. She is working on Automatic Speech Recognition with Prof. Murat Saraçlar. Her research interests include speech and language processing, spoken information retrieval and language modeling.

Multi-Modal Tensor Representations in Brain Networks
Göktekin Durusoy

Abstract: Brain network models are promising tools for understanding neurodegenerative diseases. However, global network parameters, despite their high sensitivity, suffer from low specificity. Further, they do not provide an insight into the diseases causes and progress mechanisms. Local network analysis offers an alternative. Local analysis ranges from individual edge and node analysis of networks to sub-network analysis. Further, the variability in connectivity definitions poses a challenge. We propose to represent structural brain networks with multiple connectivity definitions over a population with a single 4D brain tensor (B) and employ tensor factorization of B to get a lower dimensional representation for each subject. B is factorized over the domain of 7 known functional networks, thus we get a 7D feature vector (F) for each subject and each connectivity definition all at once. In a preliminary study, the discriminant power of F is assessed over a group of 20 cases with 7 Alzeimer's Disease patients and 13 controls. We used 6 different connectivity definitions. Linear discriminant analysis results in 90-95\% accuracy in binary classification. The assessment of the canonical coordinates reveals Salience subnet to be the most powerful in classification, consistently over all connectivity definitions. The method can be extended to cover multi-modal networks, including functional networks and be used to search for discriminating subnetworks. In addition to upper subject, all individuals are unique, and the question is whether it is sufficiently observable or not. In order to assess this observability, functional and structural connectomes are investigated to distinguish individuals.

Bio: Goktekin Durusoy graduated from Uludag University Department of Electronics Engineering in 2010. He got his M.Sc. degree from New York University in Electrical Engineering in 2013. He is pursuing his education as a Ph.D. student under the supervisor of Burak Acar in the Department of Electrical \& Electronics Engineering in Bogazici University. He worked as a research assistant at Namik Kemal University between the years of 2013-2017, and is working as a scholarship/researcher at DPT/TAM project. His research interests include image processing, signal processing and analysis towards computer-aided diagnosis.