Full Name (English):	Linqiang Ge	Recent Photo 
Affiliated Institution and Title (English):	Associated Professor, Columbus State University, USA	

Biography
(Please provide in paragraph form within 500 words.)

Dr. Linqiang Ge holds the position of associate professor within the TSYS School of Computer Science at Columbus State University, GA, USA. His primary research areas encompass Cyber Security, Computer Networks, Cyber-Physical Systems and digital signal processing, reflecting his deep commitment to understanding and fortifying the digital world against emerging threats. Within the broad domain of Cyber Security, Dr. Ge specializes in wireless and sensor networks, delving into the intricate intricacies of safeguarding these vital communication channels. He has authored 40 papers in renowned security and system conferences, respected journals such as the International Journal of Security and Communication Networks (SCN), the IEEE Internet of Things Journal, IEEE Transactions on Intelligent Transportation Systems, Journal of Biomedical and Health Informatics (JBHI), IEEE the IEEE International Conference on Computer Communication and Networks (ICCCN), and so on.

Speech Title (English):

Topological Data Analysis for Scalp EEG Signal Processing

Speech Abstract
(Please provide in paragraph form within 500 words.)

Topological data analysis (TDA) has proven to be a potent approach for extracting intricate topological structures from complex and high-dimensional data. In this paper, we propose a TDA-based processing pipeline for analyzing multi-channel scalp EEG data. The pipeline starts with extracting both frequency and temporal information from the signals via Hilbert-Huang Transform. The sequences of instantaneous frequency and instantaneous amplitude across all electrode channels are treated as approximations of curves in the high dimensional space. TDA features, which represent the local topological structure of the curves, are further extracted and used in the classification models. Three sets of scalp EEG data, including one collected in a lab and two Brain-computer Interface (BCI) competition data, are used to validate the proposed methods, and compare with other state-of-art TDA methods. The proposed TDA-based approach shows superior performance and outperform the winner of the BCI competition. Besides BCI, the proposed method can also be applied to spatial and temporal data in other domains such as computer vision, remote sensing, and medical imaging.