MACHINE LEARNING IN NEXTG NETWORKS VIA GENERATIVE ADVERSARIAL NETWORKS

The IEEE Long Island (LI) Chapter Communications Society in co-sponsor collaboration with IEEE LI Chapter Signal Processing Society (SPS) presents the following Distinguished Lecture:

Abstract:

Generative Adversarial Networks (GANs) implement Machine Learning (ML) algorithms that have the ability to address competitive resource allocation problems together with detection and mitigation of anomalous behavior. In this talk, we discuss their use in next-generation (NextG) communications within the context of cognitive networks to address i) spectrum sharing, ii) detecting anomalies, and iii) mitigating security attacks. GANs have the following advantages. First, they can learn and synthesize field data, which can be costly, time consuming, and nonrepeatable. Second, they enable pre-training classifiers by using semi supervised data. Third, they facilitate increased resolution. Fourth, they enable recovering corrupted bits in the spectrum. The talk will provide basics of GANs, a comparative discussion on different kinds of GANs, performance measures for GANs in computer vision and image processing as well as wireless applications, a number of datasets for wireless applications, performance measures for general classifiers, a survey of the literature on GANs for i)—iii) above, some simulation results, and future research directions. In the spectrum sharing problem, connections to cognitive wireless networks are established. Simulation results show that a particular GAN implementation is better than a convolutional autoencoder for an outlier detection problem in spectrum sensing.

Date and Time

Date: **21 May 2025**
Time: **07:00 PM EDT to 09:00 PM EDT**
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Registration

Starts **04 March 2025 12:00 AM EST**
Ends **21 May 2025 12:00 AM EDT**
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Speakers

Dr. Ender Ayanoglu

Topic: Machine Learning in NextG Networks via Generative Adversarial Networks