ENDER AYANOGLU

GENERATIVE ADVERSARIAL NETWORKS FOR SPECTRUM SHARING

ABSTRACT

Due to the explosive growth of new users and new applications, it is expected that the wireless spectrum will need to be used in a dynamic fashion starting in the near future. This can be achieved by using the concept of cognitive radio, giving users access to the unused spectrum under dynamic spectrum access. It is generally accepted that conventional methods of cognitive radio will fall short of being able to handle the enormous demand for spectral resources, and therefore it is expected that techniques from artificial intelligence or machine learning will help provide dynamic control for spectrum sharing. The process of spectrum sharing begins with sensing the spectrum. Recently, a number of techniques for spectrum sensing employing machine learning have been introduced. In this talk, we employ a machine learning approach known as generative adversarial networks towards this purpose. This particular approach is known to be very successful for anomaly detection in image processing. We alter performance criteria used in this set of networks from image processing applications to wireless and employ such networks for spectrum sensing, both in conventional and cooperative spectrum sensing. Initial results show the efficacy of this approach.

BIOGRAPHY

Ender Ayanoglu received his Ph.D. degree from Stanford University, Stanford, CA in 1986 in electrical engineering. He worked at Bell Laboratories Research and Cisco Systems. Since 2002, he has been a Professor in the Department of Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA. He served as the Chair of the IEEE Communication Theory Technical Committee, as the Editor-in-Chief of the IEEE Transactions on Communications and as the founding Editor-in-Chief of the IEEE Transactions on Green Communications and Networking. He is the reciepient of two best paper awards from the IEEE Communications Society. He is an IEEE Communications Society Distinguished Lecturer in 2022 and 2023.

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