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PROTON LAB 1

ASU STUDENT BRANCH CHAPTER

Machine Learning in NextG Networs via Generative Adversarial Networks

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Ender Ayanoglu received the Ph.D. degree from Stanford University,Stanford, CA in 1986, in electrical engineering. He was with the Communications Systems Research Laboratory, Bell Laboratories until 1999.

From 1999 until 2002, he was a Systems Architect at Cisco Systems, Inc., San Jose, CA. Since 2002, he has been a Professor in the Department of Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA, where he served as the Director of the Center for Pervasive Communications and Computing and held the Conexant–Broadcom Endowed Chair during 2002–2010. During 2000–2001, he served as the founding chair of the IEEE–ISTO Broadband Wireless Internet Forum (BWIF). From 1993 until 2016, he served as the Editor and then the Editor-in-Chief of the IEEE Transactions on Communications. From 2016 to 2020 he served as the Founding Editor-in-Chief of the IEEE Transactions on Green Communications and Networking. From 1990 to 2002, he served on the Executive Committee of the IEEE Communications Society Communication Theory Committee, and from 1999 to 2002, was its Chair. Dr. Ayanoglu is the recipient of the IEEE Communications Society Stephen O. Rice Prize Paper Award in 1995, the IEEE Communications Society Best Tutorial Paper Award in 1997, the IEEE Communications Society Communication Theory Technical Committee Outstanding Service Award in 2014, and the IEEE Communications Society Joseph LoCicero Award in 2023. He is an IEEE Communications Society Distinguished Lecturer 2022–2027. He has been an IEEE Fellow since 1998.

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. We will present simulation results that show the efficacy of this approach.

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On Zoom

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