Welcome to the SPS Seasonal School on Signal Processing and Communication Systems for 5G. The jointly, internationally, organized by IEEE Vizag Bay Section Communications Society & SPS Joint Chapter, Vizag, India, IEEE Long Island Section SPS Chapter, New York, USA, and IEEE Finland SP/CAS Chapter, Finland presents the following Technical Lecture:

Machine Learning for Next Generation Wireless Communication Systems 5G/6G
Friday September 17th 2021 at 8AM-12PM Pacific

Abstract:

With the emergence of fifth-generation (5G) networks, there has been a shift in the research focus towards exploring new technologies for the next-generation communication systems, sixth-generation (6G). The potential target expectations from 6G are to achieve even higher data rates, further reduction in latency and ultra massive machine type connection density compared to 5G. In this search for new technologies, there has been a significant interest in applying machine learning and artificial intelligence to communication systems.

In this lecture, we motivate the AI/ML for wireless communications by starting with simple machine learning applications and similarities to communication use cases. During the course, you will learn about various wireless communication system blocks and the application of ML to them. We cover the applications at the physical and higher layers at both base station and user equipment of the wireless communication system. Later we briefly discuss the possibility of end-to-end conventional communication system replaced by an ML trained communication system. We will observe that ML/AI does not give benefits all the time.

In the later part of this lecture, we cover model-based and model-free systems and how they evolve with continuous improvements. We will further discuss and exercise a step-by-step procedure on designing an ML application for a wireless communication system with the constraints of complexity, timing, performance, and training requirements.

By the end of this lecture, you will have learned about various blocks of communication systems that ML trained systems can replace and where to apply and where not to apply ML/AI in wireless communication systems.

Technical Lecturer:

Mr. Ashok Kumar Reddy Chavva (M'05–SM'14) received M.E degree in telecommunication engineering from the Indian Institute of Science, Bangalore, India, in 2005. In June 2005, he joined a wireless startup Beceem Communications which developed the first 4G system based on WiMAX. Here, he was involved in developing physical layer algorithms for broadband wireless systems. Broadcom later acquired this team. He worked with Broadcom till November 2013. Since November 2013, he has been with Samsung R&D Institute India Bangalore, India, currently leads an R&D team that works on differentiating mobile devices. His research interests include algorithm design for the physical layer, performance evaluation of wireless communication systems for Beyond-5G and 6G systems, and machine learning for communications. He received the best paper award at IEEE CCNC, Las Vegas, USA, 2016 and the best paper (third) at IEEE World 5G Forum, 2020.

Logistics:
Where: Virtual Meeting
When: The 17th of September 2021 @ 8am—12pm PST

Registration Fees:

Free for all registered participants

Registration: https://attend.ieee.org/sps-ss/

Technical Lecture Coordinators:

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