INVITATION TO THE LECTURE SERIES ARTIFICIAL INTELLIGENCE

Time: **Tuesday January 14, 2020, 14:00 h**
Place: **Lecture Hall 1 (HS 1)**

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Machine Learning for Signal Processing in Communications

The field of machine learning has seen tremendous advances in the past few years, largely due to the abundant processing power and the availability of vast amounts of data that enable effective training of deep neural networks. The main motivation for using machine learning comes from that fact that in some areas, such as image recognition, constructing models that are elegant, tractable, and practically useful is nearly impossible. The field of communications, however, is traditionally built on precise mathematical models that are well understood and have been shown to work exceptionally well for many practical applications. Unfortunately, the ever-increasing throughput and efficiency demands have forced communications systems designers to push the boundaries to such an extent that in many applications conventional mathematical models and signal processing techniques are no longer sufficient to accurately describe the encountered scenarios. This is where machine learning methods can come to the rescue as they do not require rigid pre-defined models and can extract meaningful structure from data in order to provide useful practical results. In this talk, I will describe several applications of machine learning techniques for communications. In particular, I will first talk about the suitability of neural networks for non-linear signal processing tasks in the context of self-interference cancellation for full-duplex communications as well as digital predistortion of power amplifier non-linearities. I will then explain the concept of deep unfolding and I will present its application to self-interference cancellation for full-duplex communications and to 1-bit precoding in massive MIMO systems.

Hosts: Johannes Kofler
Institute for Machine Learning and LIT AI Lab

Mario Huemer
Institute of Signal Processing

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