

Scientific Talk



Title: Involution-Based Graph Signal Processing

Speaker: Univ.-Prof. Dr. Gerald Matz, Institute of Telecommunications, Vienna University of Technology

Time: 20.09.2024, 10:30 – 11:30

Location: S3 512



Abstract:

Graph signal processing (GSP) has provided a wide range of powerful methodologies for diverse learning tasks. The data domain in graph signal processing (GSP) is fundamentally non-Euclidean. However, the similarity between data points (graph signal samples) has predominantly been measured using Euclidean metrics. In this talk, we discuss a generalized GSP framework that builds on so-called generalized signature graphs (multilayer signed graphs). The framework encompasses models and tools that build on generalized similarity/dissimilarity metrics and on different types of involutions (self-inverse mappings) to capture domain-specific data symmetries. We specifically discuss efficient algorithms for learning the graph topology and for multi class clustering.

Biography:

Univ.Prof. Dipl.-Ing. Dr.techn. Gerald Matz, was appointed as University Professor for Machine learning in Telecommunications at TU Wien with effect from August 1, 2023. He is assigned to the Institute of Telecommunications at the Faculty of Electrical Engineering and Information Technology.

Gerald Matz studied electrical engineering at TU Wien. In 2000 he received his doctorate - also from TU Wien - with a dissertation on the topic "A time-frequency calculus for time-varying systems and nonstationary processes with applications". He obtained his Venia Docendi for the subject "Communication Systems" in 2004 with a habilitation on "Time-varying linear systems in wireless communications". An Erwin Schrödinger scholarship from the FWF then enabled him to carry out a research stay at the École supérieure d'électricité in Paris (Supélec) until 2005. Back in Austria, Gerald Matz continued to work at TU Wien as an a.o. Professor and was able to establish himself scientifically here. Over the next few years, several stays abroad took him to ETH Zurich (Switzerland, 2007) and ENSEEIHT (Toulouse, France, 2011). He is also Deputy Editor-in-Chief of the IEEE Journal "Transactions on Signal Processing" and co-author of the book *Wireless Communications over Rapidly Time-Varying Channels* (New York: Academic, 2011). In January 2023, Gerald Matz was appointed IEEE Fellow for his contributions to signal processing for radio transmission in non-stationary environments.

Gerald Matz's scientific home is the Research Unit of Signal Processing, which he has headed since 2020. There he deals with questions about signal and information processing, information and communication theory and machine learning.