

MASTER-SEMINAR, WINTER-SEMESTER 2019

“Signal Processing with Machine Learning”

Vorbesprechung u. Organisation: Freitag 11.10.2019, 14:00

THEMENBESCHREIBUNG: Signal processing used to build on rigorous models of noisy signals, e.g., linear distortion or additive white Gaussian noise. Optimal filtering is thus tailored to the respective model, while the implementation indeed requires the strong *a priori* information of the model at hand, e.g., in terms of target-signal and observation-noise covariances. Real systems of speech and audio communication, however, exhibit additional characteristics, such as nonlinearity and time-variance and, hence, the precise *a priori* models of the signals are not available. Artificial intelligence, machine learning, and adaptive systems offer frameworks for model compensation by introducing a data-driven perspective to optimum filtering. The following seminar topics (presented by academics, students, and industrial liaison) investigate the link between signal processing and machine learning in the applications of audio and acoustic signal processing:

- Intro & Demo of Audio and Acoustic Signal Processing (AIKA)
- Nuts and Bolts of Deep Learning (Video talk: Andrew Ng)
- Fundamentals of Machine Learning and Neural Networks
- Deep Neural Network Approach to Speech Spectral Enhancement
- Contrasting Intelligence and Artificial Intelligence
- Signal Processing over Acoustic Sensor Networks (Hardware, Software, Audio Equipment, Synchronization, Data Fusion)
- Beamforming on Ad-hoc Microphone Arrays

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