Bonn – Cologne Computational Neuroscience Seminar

Exploring the Visual System with Functional Digital Twins and Inception Loops

Prof. Fabian Sinz
University of Göttingen, Institute of Computer Science

Talk Abstract

Deep nonlinear system identification models have set new standards in modeling the responses of large-scale populations of neurons to natural stimuli, yielding models that can accurately predict the response of thousands of neurons to arbitrary stimuli and can account for how behavior modulates responses of visual neuron. This allows us to treat the model as a functional digital twin of the neural population and probe neurons in ways that would not be feasible experimentally. With that, we can derive new hypotheses about the neural populations in silico and consequently verify them in vivo, in a paradigm we call inception loops. In this talk, I will give an overview over the models, and showcase several examples how they can be used to derive novel insights for the visual system in mice and monkeys. We believe that the combination of large-scale recordings under natural stimulation and deep data-driven modeling is a paradigm shift in systems neuroscience towards understanding computations in sensory system on complex ecological stimuli.

Prof. Fabian Sinz

Prof. Fabias Sinz is a renowned scientist specializing in machine learning, with a specific emphasis on neuroscience data. His research group focuses on developing deep learning algorithms to gain insights into the visual cortex and generate experimentally testable predictions. They aim to understand why biological systems exhibit superior generalization compared to computer vision systems and transfer these properties to artificial systems. Since 2021, he has served as a Professor for Machine Learning at the Institute of Computer Science, Campus Institute Data Science, University of Göttingen. Prior to this, Sinz held several key positions, including Independent CyberValley Research Group Leader at the Wilhelm-Schickard-Institute for Computer Science, University of Tübingen. He also worked as an Adjunct Assistant Professor at the Center for Neuroscience and Artificial Intelligence, Baylor College of Medicine in Houston. Sinz has made significant contributions to academia, evident from his research roles as a Research Assistant Professor and Machine Learning Coordinator at Baylor College of Medicine's Department for Neuroscience.

Friday, 23rd June 2023, 12 pm

In-Person:
University of Bonn Medical Center
Venusberg-Campus 1
Epileptology/ Building 83
Seminar room (room 266), Ground Floor
Directions

Online:
https://uni-bonn.zoom.us/j/62321512510?pwd=ZC9SMDdBRGoxQ1ZLamwvYjZBc0pXUT09

Meeting-ID: 623 2151 2510
Code: 355800

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