BIOSTATISTICS SEMINAR

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Representational Learning and Grid Cells

Abstract:

A key perspective of deep learning is representation learning, where concepts or entities are embedded in latent spaces and are represented by latent vectors whose elements can be interpreted as activities of neurons. In this talk, I will discuss our recent work on representational models of grid cells. The grid cells in the mammalian entorhinal cortex exhibit striking hexagon firing patterns when the agent (e.g., a rat or a human) navigates in the 2D open field. I will explain that the grid cells collectively form a vector representation of the 2D self-position, and the 2D self-motion is represented by the transformation of the vector. We identify a group representation condition and an isotropic scaling condition for the transformation, and show that these two conditions lead to locally conformal embedding and the hexagon grid patterns. Joint work with Ruiqi Gao, Jianwen Xie, Xue-Xin Wei and Song-Chun Zhu.

September 9, 2021   1301 McGavran-Greenberg Hall   3:30-4:30 PM

Zoom Link:
https://unc.zoom.us/j/93545206596?pwd=N1IKeVZjSFhuM2IhSDJCWjN3c21BUT09
Meeting ID: 935 4520 6596   Passcode: 823321

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