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Department of Medicine
Channing Division of Network Medicine

Channing Methods Seminar

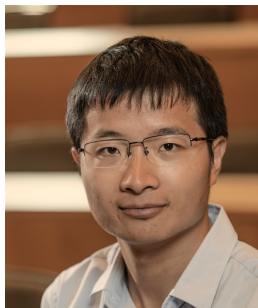
December 5 (Tuesday), 2023, 11AM (ET)

MCP 5th-floor large conference room

<https://us02web.zoom.us/j/579497999?pwd=cHNIWHMzWUJFUUVJTG1EeVJmY05aQT09>

Meeting ID: 579 497 999

Passcode: 844168



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A Law of Data Separation in Deep Learning

Abstract: The law of equi-separation is a pervasive empirical phenomenon that describes how data are separated according to their class membership from the bottom to the top layer in a well-trained neural network. We will show that, through extensive computational experiments, neural networks improve data separation through layers in a simple exponential manner. This law leads to roughly equal ratios of separation that a single layer is able to improve, thereby showing that all layers are created equal. We will conclude the talk by discussing the implications of this law on the interpretation, robustness, and generalization of deep learning, as well as on the inadequacy of some existing approaches toward demystifying deep learning. This is based on joint work with Hangfeng He (arXiv:2210.17020).

Bio: Weijie Su is an Associate Professor at the University of Pennsylvania, with an appointment in the Wharton Statistics and Data Science Department, where he is a co-director of the Penn Research in Machine Learning Center. Prior to joining Penn, he received his Ph.D. from Stanford University in 2016 under the supervision of Emmanuel Candes and his bachelor's degree from Peking University in 2011. His research interests span deep learning theory, mathematical optimization, privacy-preserving data analysis, and high-dimensional statistics. He is a recipient of the Stanford Theodore Anderson Dissertation Award in 2016, an NSF CAREER Award in 2019, a Sloan Research Fellowship in 2020, the IMS Peter Gavin Hall Prize in 2022, and the SIAM Early Career Prize in Data Science in 2022.

Hosted by Yang-Yu Liu