



Pursuing the Nature of Intelligence



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Abstract

In this talk, we will try to clarify different levels and mechanisms of intelligence from historical, scientific, mathematical, and computational perspective. From the evolution of intelligence in nature, from phylogenetic, to ontogenetic, to societal, and to artificial intelligence, we will try to shed light on how to understand the true nature of the seemingly dramatic advancements in the technologies of machine intelligence in the past decade. We achieve this goal by developing a principled mathematical framework to explain the practice of deep learning from the perspective of compressive data encoding and decoding. This framework not only reveals true nature hence limitations of the current practice and but also provides principled guidelines to develop more complete and more efficient learning architectures and systems. Eventually, we will clarify the difference and relationship between Knowledge and Intelligence, which may guide us to pursue the goal of developing systems with true intelligence.

Biography

Yi Ma is a Chair Professor in Artificial Intelligence, the inaugural director of the School of Computing and Data Science and the Institute of Data Science of the University of Hong Kong since 2023. His research interests include computer vision, high-dimensional data analysis, and integrated intelligent systems. Yi received his two bachelor's degrees in Automation and Applied Mathematics from Tsinghua University in 1995, two master's degrees in EECS and Mathematics in 1997, and a PhD degree in EECS from UC Berkeley in 2000. He served on the faculty of UIUC ECE from 2000 to 2011, the principal researcher and manager of the Visual Computing group of Microsoft Research Asia from 2009 to 2014, and the Executive Dean of the School of Information Science and Technology of ShanghaiTech University from 2014 to 2017. He was on the faculty of UC Berkeley EECS Department from 2018-2023, where he continues to be a visiting professor. He has published over 65 journal papers, 150 conference papers, and three textbooks on 3D vision, generalized PCA, and high-dimensional data analysis. He received the NSF Career award in 2004 and the ONR Young Investigator award in 2005. He also received the David Marr prize in computer vision from ICCV 1999 and best paper awards from ECCV 2004 and ACCV 2009. He has served as the Program Chair for ICCV 2013 and the General Chair for ICCV 2015. He is a Fellow of IEEE, ACM, and SIAM.