



清华大学
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Explainable AI for High-Dimensional Data

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**Venue: 10-316, East Main Building,
School of Software, Tsinghua University**

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Abstract :

Prediction and classification are core tasks in machine learning and artificial intelligence. There are a wide variety of methods available, such as random forests, deep neural networks, and others.

However, while convenient, all of these are largely black boxes, lacking accountability, trustworthiness, and effective means for debugging. There is hence a dire need for explainable ML and AI. A common problem in ML and AI is the high dimensionality of the data which makes it difficult for users to recognize and verify the various data relationships the machine is expected to learn. We have developed a few techniques that try to make these relationships easier to see, such as the contextual layout of data and variables in 2D, the isolation of data subspaces and their visualization, the balancing of multiple optimization objectives, and the organization of data into semantic hierarchies. We also extended these techniques to the spatial colorization of volumetric multi-spectral data which often occur in material science research. All of these platforms were conceived in tight collaborations with domain experts which give them relevance in practical applications.

Bio information:

Klaus Mueller holds a PhD in computer science. He is a professor in the Computer Science Department at Stony Brook University and he is also a senior scientist at the Computational Science Initiative at Brookhaven National Lab. His current research interests are visual analytics, explainable AI, data science, medical imaging, and high-performance computing. Klaus won multiple awards over the years, such as the US National Science Foundation Early Career award, the SUNY Chancellor Award for Excellence in Scholarship and Creative Activity, the IEEE CS Meritorious Service Certificate, and the IEEE CS Golden Core Award. He is also a member of the US National Academy of Inventors. To date, Klaus has authored around 200 papers which have been cited around 9,000 times. He was the elected chair of the IEEE Technical Committee on Visualization and Computer Graphics (VGTC) and now serves as the Editor-in-Chief of IEEE Transactions on Visualization and Computer Graphics. He is a senior member of the IEEE.