Interactive Selection of Multivariate Features in Large Spatiotemporal Data

2:00 p.m. Friday, Jun.14, 2013

Room 2736, Science Building No. 2

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Selecting meaningful features is central in the analysis of scientific data. Today's multivariate scientific datasets are often large and complex making it difficult to define general features of interest significant to scientific applications. To address this problem, we propose three general, spatiotemporal metrics to quantify the significant properties of data features--concentration, continuity and co-occurrence, named collectively as CO3. We implemented an interactive visualization system to investigate complex multivariate time-varying data from satellite remote sensing with great spatial resolutions, as well as from real-time continental-scale power grid monitoring with great temporal resolutions. The system integrates CO3 metrics with an elegant multi-space user interaction tool to provide various forms of quantitative user feedback. Through these, the system supports an iterative user-driven analysis process. Our findings demonstrate that the CO3 metrics are useful for simplifying the problem space and revealing potential unknown possibilities of scientific discoveries by assisting users to effectively select significant features and groups of features for visualization and analysis. Users can then comprehend the problem better and design future studies using newly discovered scientific hypotheses.
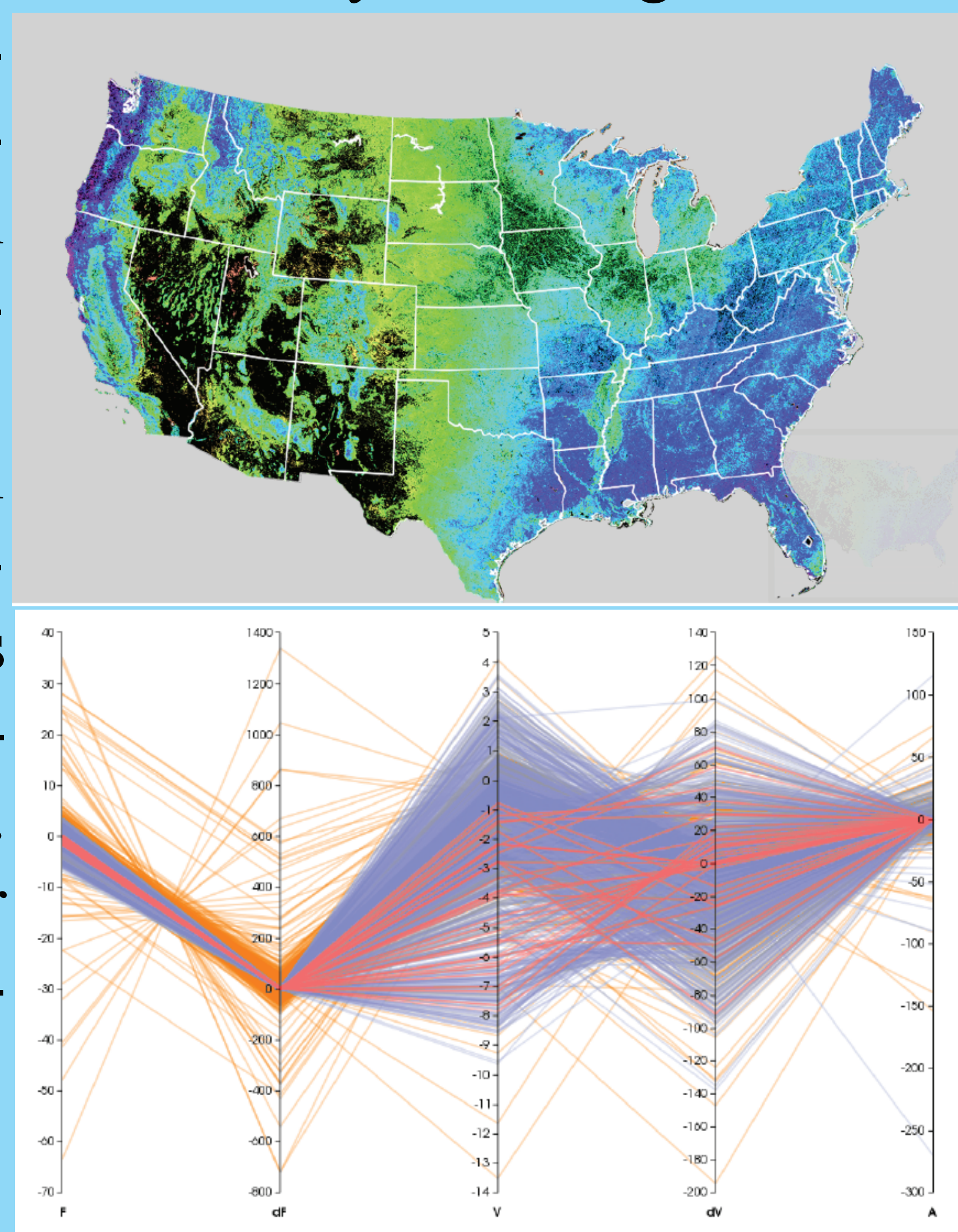
Jian Huang is an associate professor of computer science at the University of Tennessee, Knoxville. His research in large data visualization has received funding from National Science Foundation, Department of Energy, UT-Battelle and NASA. He earned his PhD from the Ohio State University, Columbus, in 2001.

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地点：北京大学理科2号楼 2736