CCT Colloquium Series

Multiscale and Multispectral Geometry for Visual Computing

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Johnston Hall 338
April 23, 2010 - 01:00 pm

Abstract:
Visual data, such as medical images, are typically collected from individual subjects, and many consist of sophisticated three-dimensional (3D) shapes. Assessing of similarity and disparity from the multimodality 3D imaging data across subjects plays a central role in many visual computing applications. Apparently, intrinsic geometric structures and shapes extracted from 3D imaging of real-world objects are very important in linking individual objects for interpretation. However, global modeling of geometric shape data and assessment of patterns and relationships of related information within and across large individual datasets are under-explored. Comparative analysis of a large number of cross-subject dynamic shapes is even more complicated. In this talk, I will present novel, intrinsic geometric scale space and multispectral geometry theory as well as their processing tools for handling 3D shapes. The rigorous mathematic and computational framework that tightly unifies geometric computing and multiscale/multispectral theory provides a viable framework for many critical tasks in visual computing applications, such as shape matching, registration, and data integration. We proved that the approach rigorously satisfies the space axioms. Based on the framework, I will further demonstrate the capabilities of our framework through many real visual computing applications, such as animation/motion transfer, clinical diagnosis of brain disorder, endoscopic visualization, etc.

Speaker's Bio:
Dr. Jing Hua is an Associate Professor of Computer Science at Wayne State University (WSU) and the founding director of Graphics, Imaging and Visualization Lab (GIV). He joined Wayne State University in the Fall of 2004 and received early promotion and tenure in 2009. Dr. Hua received his Ph.D. degree (2004) and M.S. degree (2002) in Computer Science from the State University of New York at Stony Brook. He also received his M.S. degree (1999) in Pattern Recognition and Artificial Intelligence from the Institute of Automation, Chinese Academy of Sciences in Beijing, P. R. China and his B.S. degree (1996) in Electrical Engineering from the Huazhong University of Science & Technology in Wuhan, P. R. China. His research interests include Computer Graphics, Visualization, Geometric Analysis, 3D Image Analysis and Informatics. He received the Best Paper Award at ACM Solid Modeling 2004, the Faculty Research Award from WSU in 2005, and the WSU Excellence in Teaching Award in 2008. He is a Principal Investigator of many research projects funded by the National Science Foundation, National Institutes of Health, Michigan Technology Tri-Corridor and Ford Motor Company.

Refreshments will be served.
This lecture has a reception.

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