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Keynote – Analysis and Visualization of Urban Data

Claudio T. Silva
Professor of Computer Science and Engineering and Data Science, New York University

Abstract

Today, 50% of the world's population lives in cities and the number will grow to 70% by 2050. Cities are the loci of economic activity and the source of innovative solutions to 21st century challenges. At the same time, cities are also the cause of looming sustainability problems in transportation, resource consumption, housing affordability, and inadequate or aging infrastructure. The large volumes of urban data, along with vastly increased computing power and improved user interfaces enable analysts to better understand cities. Encouraging success stories show better operations, more informed planning, improved policies, and a better quality of life for citizens. However, analyzing urban data often requires a staggering amount of work, from identifying relevant data sets, cleaning and integrating them, to performing exploratory analyses over complex, spatio-temporal data. Our long-term goal is to enable interdisciplinary teams to crack the code of cities by freely exploring the vast amounts of data cities generate. This talk describes challenges which have led us to fruitful research on data management, data analysis, and visualization techniques. I will present methods and systems we have developed to increase the level of interactivity, scalability, and usability for spatio-temporal analyses. This work was supported in part by the National Science Foundation, the Moore-Sloan Data Science Environment at NYU, IBM Faculty Awards, AT&T, NYU School of Engineering and Center for Urban Science and Progress.

Short Biography

Claudio Silva is a Professor of Computer Science and Engineering and Data Science at New York University. Claudio's research lies in the intersection of visualization, data analysis, and geometric computing, and recently he has been interested in the analysis of urban data. He coauthored more than 200 technical papers and 12 U.S. patents, primarily in visualization, geometry processing, computer graphics, scientific data management, HPC, and related areas. He has served on more than 100 program committees, and he is currently on the editorial board of the ACM Transactions on Spatial Algorithms and Systems, IEEE Transactions on Big Data, Computing in Science and Engineering, Computer and Graphics, The Visual Computer, and Graphical Models. He was general co-chair of IEEE VisWeek 2010, and papers co-chair of IEEE Visualization 2005 and 2006. He received four IBM Faculty Awards, and 12 best paper awards. He is an IEEE Fellow and received the 2014 IEEE VGTC Visualization Technical Achievement Award.

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Keynote – Whole Brain Optical Imaging

Francesco S. Pavone
Professor, Department of Physics and Astronomy, University of Florence
Director, European Laboratory for Non Linear Spectroscopy in Florence

Abstract

We are interested in the correlation between morphology of brain connections and functionality, which is one of the major neuroscience issues in the comprehension of many pathologies and mechanisms of behavior and computation. Elucidating the neural pathways that underlie brain function is also one of the greatest challenges in neuroscience. Nowadays, there are several imaging techniques offering a complementary approach to capture and visualize intact neural networks. Each of those offers a different strategy and furnish complementary information on the role of neural components. We will describe different approaches enabling to move from single neuron details to whole brain imaging both on functional and morphological point of views. Some examples of correlative microscopy, combining linear and non linear techniques will be described. Particular attention will be devoted to neural plasticity after damage as neurobiological application.

Short Biography

Francesco Saverio Pavone is directing a research group working in the field of biophotonics on single molecule biophysics, microscopy imaging-spectroscopy techniques, biomedical imaging, and laser manipulation of bio-samples. In particular, he is developing new microscopy techniques for high resolution and high sensitivity imaging, and for laser manipulation purposes. These techniques have been applied to single molecule biophysics, single cell imaging and optical manipulation. Tissue imaging is another research area developed, where non linear optical techniques have been applied to skin and neural tissue imaging. Also, In-Vivo imaging apparata have been developed and applied to animal and humans. Pavone is author of many international articles and editor of international books. He has given more than 70 invited talk and he is editor of major international journals. He coordinates several European projects and he has organized several international congresses; he is also director of the European Laboratory for Non Linear Spectroscopy in Florence.