FAU Neuroscientists Receive Patent for 5D Visualization Method to Understand Big Data

BOCA RATON, Fla. (October 3, 2013) – Florida Atlantic University received a U.S. patent for its “System and method for analysis of spatio-temporal data” five dimensional (5D) colorimetric technique that allows analysts to visualize large amounts of spatiotemporal data (variables in both space and time) in a simple, easy to read graph. Neuroscientists Emmanuelle Tognoli, Ph.D., and Scott Kelso, Ph.D., both researchers at the Center for Complex Systems and Brain Sciences at FAU, originally designed the technique to interpret large amounts of data and to better understand how the many parts of the human brain are coordinated in space and time.

The 5D colorimetric technique is able to portray variables that encompass both space and time, for instance, gas prices per county, foreclosure rates in different states, epidemiological data tracking a virus or temperature records. The technique has already been used to examine climatic records of sea surface temperature at 65,000 points around the world over a period of 28 years and provided scientists with a clear understanding of when and where temperature fluctuations occur.

“A considerable number of problems in our society are spatiotemporal ones,” said Jeffrey Anderson, Ph.D., associate vice president for research and director of technology development at FAU. “With this new tool, we are much better equipped to tackle big data, to see the big picture.”

Until now, spatiotemporal problems were analyzed either from a spatial perspective (for instance, a static map of gas prices in July 2013), or from a temporal one (evolution of gas prices in one county or the national average), but not simultaneously from both perspectives. Without both space and time, analysts are faced with a conundrum. Because important information is hidden in the interdependence between the two, neither view alone provides the full picture. For instance, gas prices may increase at different times in different regions of the U.S. (and for different reasons). Tognoli and Kelso note that such complexity is often crucial yet difficult to grasp.

Although this new visualization tool may shed light on many important societal issues, Tognoli and Kelso originally designed it to help them understand their research on brain coordination.

“As President Obama said when he announced the BRAIN initiative recently, we need to understand the dynamic brain in action. Combining this new method with conceptual and theoretical tools in real experiments will help elucidate the basic coordination dynamics of the brain,” said Kelso.
Many neurological disorders prove to be a matter not merely of one sick brain region, but a problem of coordination between brain regions. Sometimes the disruption involves too much cooperation between brain regions, other times brain regions function too independently of each other.

“In solving a problem facing their own research, Dr. Kelso and Dr. Tognoli have provided an answer for many other scientists trying to analyze large amounts of data,” said Dennis J. Crudele, interim university president. “I can see this method being adopted by scientists and analysts to help in diagnosing, remediating and improving some of society’s most pressing issues.”

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About Florida Atlantic University:
Florida Atlantic University, established in 1961, officially opened its doors in 1964 as the fifth public university in Florida. Today, the University, with an annual economic impact of $6.3 billion, serves more than 30,000 undergraduate and graduate students at sites throughout its six-county service region in southeast Florida. FAU’s world-class teaching and research faculty serves students through 10 colleges: the Dorothy F. Schmidt College of Arts and Letters, the College of Business, the College for Design and Social Inquiry, the College of Education, the College of Engineering and Computer Science, the Graduate College, the Harriet L. Wilkes Honors College, the Charles E. Schmidt College of Medicine, the Christine E. Lynn College of Nursing and the Charles E. Schmidt College of Science. FAU is ranked as a High Research Activity institution by the Carnegie Foundation for the Advancement of Teaching. The University is placing special focus on the rapid development of three signature themes – marine and coastal issues, biotechnology and contemporary societal challenges – which provide opportunities for faculty and students to build upon FAU’s existing strengths in research and scholarship. For more information, visit www.fau.edu.