"Strange Bedfellows: Quantum Mechanics and Data Mining“

By
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Date: Friday, 16th April 2010
Time: 2.00pm to 3.00pm
Venue: MAS Executive Classroom 1 (MAS-03-06)
Host: Asst. Prof. Chew Lock Yue
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Abstract

Dynamic Quantum Clustering (DQC) is a highly visual and completely novel approach to finding clusters in arbitrary high-dimensional sets of data. As such it falls into the quickly evolving area referred to as visual-analytics. One reason it is interesting is that the basic algorithm is completely different from other algorithms used to cluster unstructured data, and so it can be expected to not share the failure modes of these other approaches. Another is that DQC works well with high-dimensional data and the visual interface makes it possible to develop an intuitive feeling for the structure of the data in a large number of dimensions.

What makes DQC unusual is that it maps the problem of clustering into a problem in quantum mechanics and then uses properties of quantum systems to cluster the data. In this talk I will review the basic problem of data clustering, review the basics of clustering approaches and then explain how DQC works. I will show a demonstration of the computation for a simple, small data set.

About the speaker

Dr. Weinstein has been a member of the theory group and the SLAC National Accelerator Laboratory (formerly the Stanford Linear Accelerator Laboratory) since June, 1972. He works in: particle physics, in the areas of PCAC, lattice field theories, non-perturbative methods in field theory and quantum mechanics; condensed matter physics, in particular the application of CORE (the Contractor Renormalization Group) approach to extracting the low-energy physics of complex systems, that he invented; application of computer algebra systems, such as Maple, to problems in theoretical and experimental physics; and now data-mining.

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