

Hidden in a Combinatorial Web: Using Statistical & Information-Theoretic Tools to Find Connections



Pradeep Ravikumar
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CURRENT RESEARCH

Inferring dependencies and associations to create algorithms that learn from experience

Human intelligence is often defined by our ability to identify and build upon associations and connections between concepts based on past experience. In order to replicate this "intelligence," it is thus vital to characterize the ability to infer such connections and associations between variables and entities. Such a characterization thus has implications for the very underpinnings of "machine learning" which at its core asks: what are the principles machines use to learn from experience and data?

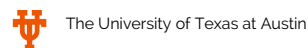
Dr. Pradeep Ravikumar of the University of Texas, is working to elucidate the underlying mathematical and information-theoretic mechanisms by which we can learn such dependencies, associations, and connections among not just a few variables, but on a "big data" scale. He and his team, with a grounding in both statistics and computer science, are working to use multiple technologies to look at the many connections and associations that exist between variables (which could be genes, neurons, and other parts of varied systems) reliably with limited computation and limited data. His research has the potential to have an enormously great impact not only in applications and commercial endeavors, but also in understanding the nature of Artificial Intelligence itself.

Current projects include:

- Cancer Genomics: Dr. Ravikumar is using multiple technologies to infer dependencies among mutation status and expression or activity levels of thousands of genes simultaneously. This would illuminate how mutations of one gene affects activity levels of various genes, and therefore would help to form a "global" picture of mutations and activity across the genome. This picture could be further...

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AFFILIATION



EDUCATION

- Ph.D., in Computer Science, 2007, Carnegie Mellon University
- B.Tech., in Computer Science and Engineering, 2002, Indian Institute of Technology, Bombay

AWARDS

- The Sloan Fellowship, 2014
- The National Science Foundation's CAREER Award, 2013
- The Siebel Scholarship, 2007

RESEARCH AREAS

Life Science, Health IT, IOT, Devices, Data

FUNDING REQUEST

Your contributions will support the research of Dr. Ravikumar as he infers connections among tens of even hundreds of thousands of variables, as efficiently from data as possible. Your donations will fund the necessary \$175K per year required for personnel. With your help, Dr. Ravikumar expects to obtain a mechanism for inferring dependencies from data that is transferable across domains in the next five years thereby having applications within cancer research, mental health treatments, and neurobiology.