Data, Predictions, and Decisions in Support of People and Society

Eric Horvitz
Microsoft Research
Redmond, WA 98052
+1 425-706-8080
horvitz@microsoft.com

ABSTRACT

Deep societal benefits will spring from advances in data availability and in computational procedures for mining insights and inferences from large data sets. I will describe efforts to harness data for making predictions and guiding decisions, touching on work in transportation, healthcare, online services, and interactive systems. I will start with efforts to learn and field predictive models that forecast flows of traffic in greater city regions. Moving from the ground to the air, I will discuss fusing data from aircraft to make inferences about atmospheric conditions and using these results to enhance air transport. I will then focus on experiences with building and fielding predictive models in clinical medicine. I will show how inferences about outcomes and interventions can provide insights and guide decision making. Moving beyond data captured by hospitals, I will discuss the promise of transforming anonymized behavioral data drawn from web services into large-scale sensor networks for public health, including efforts to identify adverse effects of medications and to understand illness in populations. I will conclude by describing how we can use machine learning to leverage the complementarity of human and machine intellect to solve challenging problems in science and society.

Categories and Subject Descriptors

I.2.6 [**Computing Methodologies**]: Learning—*Induction*

Keywords: Machine learning; probabilistic inference; decision analysis; probabilistic graphical models; transportation; healthcare

BIO

Eric Horvitz is distinguished scientist and director of Microsoft Research at Redmond. His interests span theoretical and practical challenges with machine learning, inference, and decision making. His efforts have helped to bring multiple systems and services into the world, including innovations in healthcare, ecommerce, aerospace, systems & networking, human-computer interaction, and privacy. He has been elected fellow of Association for the Advancement of Artificial Intelligence (AAAI), the American Association for the Advancement of Science (AAAS), the American Academy of Arts and Sciences, and the National Academy of Engineering, and has been inducted into the CHI Academy. He has served as president of AAAI, chair of the AAAS Section on Information, Computing, and Communications, and on the advisory committees for the National Science Foundation's (NSF) Directorate for Computer & Information Science & Engineering (CISE), the Computing Community Consortium (CCC), and the Information and Science Study Group (ISAT) of the Defense Advanced Research Projects Agency (DARPA). Information on publications, collaborations, and activities can be found at http://research.microsoft.com/~horvitz.

KDD'14, Aug 24–27, 2014, New York, NY, USA
ACM 978-1-4503-2956-9/14/08.
http://dx.doi.org/10.1145/2623330.2630817