

# Learning from User Interactions

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## ABSTRACT

The ability to learn from user interactions can give systems access to unprecedented amounts of world knowledge. This is already evident in search engines, recommender systems, and electronic commerce, and other applications are likely to follow in the near future (e.g., education, smart homes). More generally, the ability to learn from user interactions promises pathways for solving knowledge-intensive tasks ranging from natural language understanding to autonomous robotics.

Learning from user interactions, however, means learning from data that does not necessarily fit the assumptions of the standard machine learning models. Since interaction data consists of the choices that humans make, it has to be interpreted with respect to how humans make decisions, which is influenced by the decision context and constraints like human motivation and human abilities.

In this talk, I argue that we need learning approaches that explicitly model user-interaction data as the result of human decision making. To this effect, the talk explores how integrating micro-economic models of human behavior into the learning process leads to new learning algorithms that have provable guarantees under verifiable assumptions and to learning systems that perform robustly in practice. These findings imply that the design space of such human-interactive learning systems encompasses not only the machine learning algorithm itself, but also the design of the interaction under an appropriate model of user behavior.

## Categories and Subject Descriptors

I.2.6 [Learning]; H.1.2 [User/Machine Systems]; H.3.5 [Online Information Services]

## General Terms

Algorithms, Experimentation, Theory

## Keyword

Machine Learning, Implicit Feedback, Explicit Feedback, User Models

## BIO

Thorsten Joachims is a Professor in the Department of Computer Science and in the Department of Information Science at Cornell University. His research interests center on a synthesis of theory and system building in machine learning, with applications in information access, language technology, and recommendation. His past research focused on support vector machines, text classification, structured output prediction, convex optimization, learning to rank, learning with preferences, and learning from implicit feedback. In 2001, he finished his dissertation advised by Prof. Katharina Morik at the University of Dortmund. From there he also received his Diplom in Computer Science in 1997. Between 2000 and 2001 he worked as a PostDoc at the GMD Institute for Autonomous Intelligent Systems. From 1994 to 1996 he was a visiting scholar with Prof. Tom Mitchell at Carnegie Mellon University.



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