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Reinforcement Learning to Rank

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ABSTRACT:

Interactive systems such as search engines or recommender systems are increasingly moving away from single-turn exchanges with users. Instead, series of exchanges between the user and the system are becoming mainstream, especially when users have complex needs or when the system struggles to understand the user's intent. Standard machine learning has helped us a lot in the single-turn paradigm, where we use it to *predict*: intent, relevance, user satisfaction, etc. When we think of search or recommendation as a series of exchanges, we need to turn to bandit algorithms to determine which *action* the system should take next, or to reinforcement learning to determine not just the next action but also to *plan* future actions and estimate their potential pay-off. The use of reinforcement learning for search and recommendations comes with a number of challenges, because of the very large action spaces, the large number of potential contexts, and noisy feedback signals characteristic for this domain. This presentation will survey some recent success stories of reinforcement learning for search, recommendation, and conversations; and will identify promising future research directions for reinforcement learning for search and recommendation.

SPEAKER:

Maarten de Rijke is University Professor of Artificial Intelligence and Information Retrieval at the University of Amsterdam. He holds MSc degrees in Philosophy and Mathematics (both cum laude), and a PhD in Theoretical Computer Science. He worked as a postdoc at CWI, before becoming a Warwick Research Fellow at the University of Warwick, UK. He joined the University of Amsterdam in 1998, and was appointed full professor in 2004. He is a member of the Royal Netherlands Academy of Arts and Sciences (KNAW) and a recipient of a Pioneer Personal Innovation grant, the Tony Kent Strix Award, the Bloomberg Data Science Research Award, the Criteo Faculty Research Award, the Google Faculty Research Award, the Microsoft PhD Research Fellowship Award, and the Yahoo Faculty and Research Engagement Program Award as well as a large number of NWO grants. He is the director of the newly established Innovation Center for Artificial Intelligence and a former director of Amsterdam Data Science. His research focus is at the interface of information retrieval and artificial intelligence, with projects on online and offline learning to rank, on recommender systems, and on conversational search.

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