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"Data-Driven Decision Support for Enterprise Applications"

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Lehrstuhl Enterprise Platform and Integration Concepts

Abstract

The need for automated decision-making is steadily increasing. The goal is to derive and to implement methods for data-driven decision support for practical applications in constantly changing environments. Solving such problems requires combining data management, data science, and optimization. In general, decision problems can be described by given performance criteria, admissible decisions, constraints, and data-driven estimations of the interplay of decisions on performance. Further, every application has its own specifics, which can be exploited to solve a problem effectively. In this talk, we consider different use-cases and explore suitable optimization techniques. These research projects fall into the areas of (i) database configuration management and (ii) operations management. In the area of optimizing database configurations, we consider specific workload-driven resource allocation problems such as data placement or index selection. The talk illustrates efficient solution concepts and shows their performance compared to state-of-the-art solutions. In addition, we discuss how the consideration of multiple potential future workload scenarios can be used to identify more robust solutions. In operations management, decision support is used to optimize sales processes by balancing revenues and costs. Particularly, we explore solution approaches for e-commerce applications such as dynamic pricing competition and inventory management. The presented approaches rely on stochastic (Markov) models, which can be efficiently solved using dynamic programming techniques. The models' dynamics (e.g., demand probabilities) are estimated from partially observable market data using machine learning techniques. We evaluate performance results of data-driven pricing strategies applied in practice and discuss the long-term interaction of self-adapting strategies.

Short CV

Rainer Schlosser studied mathematics and business administration at Humboldt University of Berlin with a focus on optimization, stochastics, and quantitative methods. He worked as a research assistant at the Institute of Operations Research at HU Berlin. In 2014, he received his Ph.D. in operations research where he focused on dynamic optimization problems. In 2015, he joined the Hasso Plattner Institute working at the EPIC research group of Prof. Plattner where he specialized on optimization problems in enterprise data management. He has taught methods of operations research at HU Berlin and data-driven decision-making at HPI. Dr. Schlosser has 30 peer-reviewed publications in international journals and conferences of different fields, such as operations research, economics, computer science, and data science (e.g., EJOR, JEDC, ICDE, KDD) and is a peer reviewer for various journals including Management Science, Omega, and IEEE Transactions on Knowledge and Data Engineering.

Host: Dr. Matthias Uflacker