Introduction to Computational Intelligence

3 ECTS

Lecturer

Prof. Dr. Oliver Wendt
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Curriculum Vitae

Prof. Dr. Oliver Wendt studied Business Administration at the Koblenz School of Corporate Management, at HEC Montréal and at USC Los Angeles.

After working as management consultant in the area of Airline and Hotel Yield Management, he joined Prof. Dr. Wolfgang König at the Chair of Business Information Systems Goethe Universität Frankfurt/Main. There he received his PhD in 1994 for combining Simulated Annealing and Genetic Algorithms into a hybrid heuristic yielding superior solutions for vehicle routing problems. Interrupted by an interim professorship at Ruprecht-Karls-Universität, Heidelberg (1999), Oliver Wendt stayed at Frankfurt University as a Post-Doc Researcher and Assistant Professor until his habilitation (2003) for his work on economic foundations of business informatics. After half a year as a visiting researcher at the International Computer Science Institute in Berkeley Oliver Wendt accepted the call to a to a full professorship at the TU Kaiserslautern in October 2004.

Research specializations

- Complex (and often stochastic) search and optimization problems in business
- Yield management
- Metaheuristics
- Distributed problems

Selected publications

Schneider, M.; Stenger, A.; Goeke, D.: The Electric Vehicle Routing Problem with Time Windows and Recharging Stations. In: Transportation Science, 48 (4) 500 - 520.

Yike Hu, Oliver Wendt, Alexander Keßler: Agent-based Cooperative Optimization of Integrated Production and Distribution Planning. In: Hu, B.; Morasch, K.; Pickl, S.; Siegle, M. (Ed.): Operations Research Proceedings 2010; Springer Verlag, Berlin, Heidelberg, 2011, S.213-218.

Course description

For many assignment and permutation problems an exponential growth of the number of solutions prohibits the application of optimization algorithms known from Operations Research. Rather, literature and practitioners resort to the application of heuristics. Heuristics come with much lower computational effort but as a downside cannot provide a guarantee for the optimality of the solutions found. First, the course focuses on local search heuristics inspired by analogies to nature (Genetic Algorithms and Simulated Annealing) and Tabu Search and compares their applicability for different classes of planning problems. Furthermore, most decision processes do not only confront us with a high number of alternatives but also with uncertainty. We show how Machine Learning (Reinforcement Learning and Artificial Neural Networks) can address this uncertainty in complex decision processes.