Effectivity and efficiency by problem-specific abstraction – a contribution to the research in machine learning of rules for managing series production networks

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Current academic and industry-oriented research in the area of business computing for Supply Chain Management focuses on the development of intelligent control methods for production networks. The combination of artificial intelligence and business computing methods enables the development of new approaches for an automated and fast eradication of infeasible plans in production networks. In order to fulfill this objective, this doctoral thesis presents a concept for a machine learning system that learns rules to manage change planning processes in series production networks. The developed system reduces the large state space of series production networks and deals with uncertainty of inter-company decisions during co-operative change planning processes. A plan-based distance function, integrated in k-means-clustering, reduces the state space of production networks in a scalable way. Q-Learning has been chosen for implementing the learning system. Q-Learning uses a cost-based reward function regarding planning restrictions and co-operation agreements in production networks.