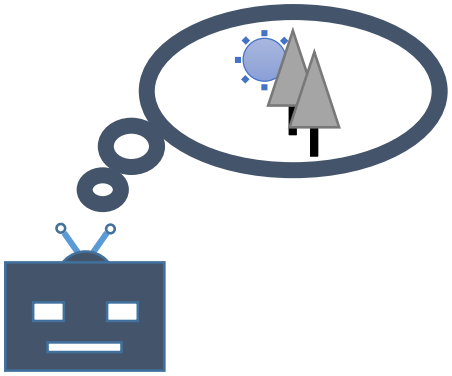
Curiosity-Driven Reinforcement Learning on the Job Shop Problem

Research Questions

Production planning and control requires quick decision making in dynamic environments with changing requirements and circumstances. Within the Cluster of Excellence „Internet of Production“, the IMA investigates the use of reinforcement learning for production planning and control and specifically the job shop problem. Reinforcement learning agents learn to solve a problem by receiving rewards in response to certain actions. While these rewards usually correspond to the objective function of the problem (“How can I best solve the given problem?”), a different kind of reward function has emerged recently which aims to mimic the human quality of curiosity (“What can I do to learn more about the environment I find myself in?”). The objective of the thesis will be to investigate the use of such curiosity-driven learning in the context of the job shop problem.



Research methodology

- Familiarization with the literature on (1) reinforcement learning for production planning / combinatorial optimization in general and (2) curiosity-driven reinforcement learning
- Implementation of curiosity driven reward function
- Evaluation of the feasibility of curiosity-based learning in the job shop problem
- Transfer of agents trained by curiosity to conventional objective functions

Requirements

- Interest in reinforcement learning
- Programming experience, preferably in Python

Contact

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