



Research School for Operations
Management and Logistics

DynaPlex - Deep Reinforcement Learning for Data-Driven Logistics

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This PhD research is part of the DynaPlex project, consisting of a collaboration between the University of Twente, the Eindhoven University of Technology, and a consortium of industry partners. The research revolves around (deep) reinforcement learning (DRL) applied to operations research challenges, with emphasis on data-driven logistics problems. DRL is a relatively new class of artificial intelligence algorithms that has been proven extremely powerful for complex dynamic decision-making challenges involving uncertainty. Although its value has been shown for various theoretical problems, adoption of DRL to real-life applications within the OR domain is lagging behind because of the complexity of quantifying benefits and the expert knowledge needed for implementation. The aim of this project is to overcome both of these challenges. The goals of the DynaPlex project are to (i) develop an algorithmic framework for (deep) reinforcement learning that can be applied to a wide variety of industry problems, (ii) developing a supporting modeling framework, and (iii) demonstrating, testing and improving the framework with case studies at industry partners. By conducting several case studies at different consortium partners, a generic DRL algorithmic framework can be developed that is valuable to the adoption of DRL for data-driven logistics challenges. The project contributes to research by offering new insights in DRL algorithms and enabling researchers to experiment with DRL more easily. Within this project, this PhD research particularly focusses on DRL for transportation applications.