

Florent Teichtel-Koenigsbuch and H el ene Fargier - Solving scheduling problems with Constraint Programming and Graph Neural Networks

This presentation will give an overview of the research conducted in the knowledge compilation chair on solving scheduling problems applied to aircraft manufacturing optimisation. We will first present how local search strategies combined with Constraint Programming can solve complex and large multi-Skill Resource Constrained Project Scheduling problems with preemptive tasks and temporal precedence constraints. In order to further decrease the solving time and responsiveness of scheduling services, we show how we can learn the solution produced by Constraint Programming solvers on basic scheduling problems in the form of a Graph Neural Network (GNN) which is agnostic to the problem size and architecture to some extent. The resulting GNN can be seen as a heuristic that can be massively called on many potential scenarios in order to best react to probabilistic disruptions. Those research studies will build the foundations of ANITI 2's HEROIC chair on hybridizing machine learning, operation research and search methods to solve large combinatorial decision-making problems.

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