

At the Chair of Logistics and Supply Chain Management of TUM School of Management, we are looking for an interested and qualified student to conduct his/her

Interdisciplinary project

on the topic

Decomposition algorithm for large-scale Markov Decision Processes

Markov decision process (MDP) has been one of the most attractive modeling methodologies for stochastic problems for many years. There are several methodologies for solving MDP models such as Linear Programming (LP), Value Iteration algorithm (VI), and Policy Iterations algorithm (PI). MDP is also the mathematical framework for describing an environment in reinforcement learning. One of the huge challenges of solving MDP models is that for problems with large state space finding the optimal solution becomes computationally expensive. However, decomposition algorithms have been introduced for solving these large-scale MDP models to a near-optimal solution and in some special cases, to an optimal solution. In this project, you would focus on developing the Dean-Lin algorithm for solving large-scale MDPs.

Key project tasks:

- Literature review relevant to MDP decomposition algorithms
- Implement the Dean-Lin algorithm to solve large-scale MDPs
- Evaluate the efficiency and effectiveness of the implemented algorithm

Requirements:

This project is open to students at TUM. Ideal candidates should have strong Python programming skills. Prior experience with commercial solvers such as Gurobi and an understanding of MDPs will be a plus. The final report should be written in English.

Earliest begin: as soon as possible

Supervisor: Mahsa Nakhost

Application: Email with curriculum vitae and transcript of records to logtheses.log@mgt.tum.de