

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

Master thesis

on the topic

Decomposition Algorithm for solving 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 thesis, you will review the relevant literature, develop an algorithm for finding the optimal solution for a large-scale MDP, and test the performance of your solution algorithm.

Key project tasks:

- Literature review relevant to MDP and decomposition methodologies
- Implementation of an exact algorithm for solving large-scale MDP
- Evaluate the algorithm you have developed and compare it with the well-known solution methodologies

Requirements:

The thesis is for students of the Master in Management and Technology with a focus on Operations and Supply Chain Management. Candidates should be familiar with mathematical programming and commercial solvers (e.g. Gurobi). Experience with programming in Python is a plus. The ability to work independently as well as analytical skills are required. The thesis should be written in English.

Begin: as soon as possible

Supervisor: Mahsa Abbaszadeh Nakhost

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