

# Anticipatory Algorithms for Online Stochastic Combinatorial Optimization

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## Abstract:

In an increasingly dynamic and connected world, organizations often need to make operational decisions under time constraints and uncertainty.

Such decisions arise, for instance, when containing failures in power grids, when delivering quality of service in networks, when dispatching vehicles in transportation systems, and when replenishing inventories dynamically. Automating such decisions raises novel challenges and opportunities, moving decision-support systems from deterministic, a priori optimization to online stochastic combinatorial optimization (OSCO). This talk presents a class of anticipatory algorithms for OSCO applications, studies their theoretical properties, and demonstrates their performance on a variety of complex problems. The talk also illustrates the synergies between algorithmic, optimization, and machine-learning techniques for approaching these challenging applications and identifies promising research directions.