

Adaptability in data-driven optimization

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Keywords: combinatorial optimization, machine learning, routing problems.

Abstract: Data-driven optimization has shown great success in dealing with the uncertainty of real-world problems. In this talk, we focus on situations where the available data does not accurately represent the target optimization problem. In the first part, we present the problem of generating the most pleasant personalized itineraries. In addition to the unexpected variations of the environment, this problem depends on user preferences which are hard to automatically translate into accurate optimization criteria. We propose a heuristic that accounts for these uncertainties by designing flexible itineraries. In the second part, we discuss neural combinatorial optimization approaches, where deep neural networks are trained to directly learn a heuristic from a dataset of instances. In this context the produced heuristic is effective for instances that are close to the training ones, ie drawn from the same underlying distribution. In many cases however the true target distribution is unknown at training time. We present an approach, based on meta-learning, to produce heuristics that can efficiently adapt to unseen target distributions. Our contribution is illustrated on standard routing problems.