

# Learning-Augmented Online Algorithms

Bertrand Simon

Centre de calcul de l'IN2P3 - Villeurbanne, France

`bertrand.simon@cnrs.fr`

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**Abstract** Guaranteed classical online algorithms are often designed in order to minimize the competitive ratio, i.e., the performance in the worst case, so usually do not perform well on easy inputs. An orthogonal approach has been developed in the last decade thanks to the progress in machine learning, which allows to predict key parameters of the instance. Its downside is that no guarantee can be given on the prediction quality, for instance if the training set does not represent the current instance. This statement is at the origin of the recently emerging field of learning-augmented algorithms. In this framework, an online algorithm has access to a predictor, which can give relevant information about the future instance, though without any guarantee on the quality. The objective is then to design an algorithm which performs well when the predictor turns out to be accurate, while being robust to imprecise predictions. This tutorial will introduce this new domain, present some recent works and discuss current research questions.