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Bi-level Optimisation for Machine Learning

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In recent years, bi-level optimization – solving an optimization problem that depends on the results of another optimization problem – has raised much interest in the machine learning community. This type of problem arises in many different fields, ranging from hyper-parameter optimization and data-augmentation to dictionary learning. A core question for such a problem is the estimation of the gradient when the inner problem is not solved exactly. While some fundamental results exist, there is still a gap between what is used in practice and our understanding of the theoretical behavior of such problems. In this talk, I will review different use cases where this type of problem arises as well as recent advances on how to solve them efficiently.

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