

Block-Coordinate Frank-Wolfe for Structural SVMs

Laura Salvetti

Advisor: Prof. Francesco Rinaldi

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Abstract

Structural Support Vector Machines are a generalization of the classic binary SVMs, which are amongst the most popular classification tools in machine learning. Structural SVMs extend the SVM framework to problems where the output labels are structured objects, such as sequences, strings or graphs. Training structural SVMs results then in a more challenging optimization problem, since it can involve a very large number of variables or constraints. Lacoste-Julien et al. [1] introduced a randomized block coordinate version of the classic Frank-Wolfe algorithm for convex optimization problems with block separable constraints. In this seminar we review the theoretical properties of the algorithm and illustrate how it can be successfully applied to the structural SVM problem.

References

- [1] Simon Lacoste-Julien, Martin Jaggi, Mark Schmidt, and Patrick Pletscher. Block-coordinate frank-wolfe optimization for structural svms. In *International Conference on Machine Learning*, pages 53–61. PMLR, 2013.
- [2] Immanuel M Bomze, Francesco Rinaldi, and Damiano Zeffiro. Frank-wolfe and friends: a journey into projection-free first-order optimization methods. *4OR*, 19(3):313–345, 2021.
- [3] Thorsten Joachims, Thomas Finley, and Chun-Nam John Yu. Cutting-plane training of structural svms. *Machine learning*, 77(1):27–59, 2009.