



THE UNIVERSITY OF CHICAGO

Department of Statistics

MASTER'S THESIS PRESENTATION

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Randomized Boosted Lasso

WEDNESDAY, February 14, 2018, at 3:45 PM
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ABSTRACT

Many statistical machine learning algorithms use a single regularization tuning parameter to control the trade-off between bias and variance. When the value of this tuning parameter changes, a regularization path of solutions to the minimization problem is generated, and the whole path is needed to select a tuning parameter or to interpret performance.

Algorithms such as Lasso are of great interest because of their resulted sparse models for interpretation in addition to prediction. BLasso was devised as a coordinate descent method with a fixed step size to minimize Lasso loss. In the case of a finite number of base learners and a bounded Hessian of the loss function, the BLasso path is shown to converge to the Lasso path when the step size goes to zero.

In this paper, we propose the Randomized BLasso algorithm as a modification of BLasso, for a large or infinite number of base learners. In each forward step, instead of greedily search from all base learners, we search from a partially random subset of all base learners. For an infinite number of base learners, Randomized BLasso shows to be sensitive to strong signal. For a large number of base learners, Randomized BLasso path is very close to BLasso path when the step size is small, thus could be a good approximation of Lasso solution.

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