



Multi-task Regression using Minimal Penalties

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In this paper we study the kernel multiple ridge regression framework, which we refer to as multi-task regression, using penalization techniques. The theoretical analysis of this problem shows that the key element appearing for an optimal calibration is the covariance matrix of the noise between the different tasks. We present a new algorithm to estimate this covariance matrix, based on the concept of minimal penalty, which was previously used in the single-task regression framework to estimate the variance of the noise. We show, in a non-asymptotic setting and under mild assumptions on the target function, that this estimator converges towards the covariance matrix. Then plugging this estimator into the corresponding ideal penalty leads to an oracle inequality. We illustrate the behavior of our algorithm on synthetic examples.

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