Improving Predictive Models Using Non-Spherical Gaussian Priors

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Presentation Abstract Summary Predictive models for neural or fMRI data are often fit using regression methods that employ priors on the model parameters. One widely used method is ridge regression, which employs a Gaussian prior that has equal and independent variance for all parameters (i.e. a spherical multivariate Gaussian). However, a spherical prior is not always appropriate: there are many cases where expert knowledge or hypotheses about the structure of the model parameters could be used to construct a better prior. Here we show that Tikhonov regression with non-spherical Gaussian priors can improve several predictive models for fMRI data. This is particularly important when combining feature spaces into a single predictive model. Finally, we demonstrate a computationally efficient method for incorporating non-spherical priors into regression models.

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