Robust Fisher Discriminant Analysis

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Fisher linear discriminant analysis (LDA) can be sensitive to the problem data. Robust Fisher LDA can systematically alleviate the sensitivity problem by explicitly incorporating a model of data uncertainty in a classification problem and optimizing for the worst-case scenario under this model. The main contribution of this paper is show that with general convex uncertainty models on the problem data, robust Fisher LDA can be carried out using convex optimization. For a certain type of product form uncertainty model, robust Fisher LDA can be carried out at a cost comparable to standard Fisher LDA. The method is demonstrated with some numerical examples. Finally, we show how to extend these results to robust kernel Fisher discriminant analysis, *i.e.*, robust Fisher LDA in a high dimensional feature space.