

Robust Localized Learning

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Machine learning and big data are of still increasing importance. Kernel methods are one important class of machine learning methods. Although their theoretical properties have been intensively investigated, many kernel methods can not directly be applied to large data sets due to numerical problems. There exist different approaches to overcome numerical problems of kernel methods, e.g. distributed learning and other divide-and-conquer strategies. In this talk we consider a special divide-and-conquer strategy called localized learning. In the first step, a regionalization method, e.g. a regression tree or a cluster method, is used to separate the input space into much smaller regions, which are not necessarily disjoint. In the second step, a standard kernel method is applied to each region. In the last step, the predictions of all kernel methods are aggregated in an appropriate manner. We will give results on the statistical robustness of localized learning and will demonstrate that this approach can be applied even for large and high dimensional data sets.