DESIGN, IMPLEMENTATION & COMPARISON OF WEIGHTED GRAPH AND CLASS-SPECIFIC KERNELS

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ABSTRACT

Most of the real-world data are represented via structural objects and the structural classification is one of the recent challenges in computational sciences. Graphs, a class of the most used structural organization models, can be classified accurately with kernel machines. We propose extensions to the graphlet and random walk kernels. We propose a weighted graphlet kernel, which give weights to the graphlets with respect to their vertex similarities. We extend the random walk kernel to work on any given unlabeled graph by extracting local features for nodes and edges and giving weights to the walks using these local features. We experiment our proposed methods on some graph datasets and compare them with other classification algorithms.

In classification with kernel machines, the same kernel function is applied to all instances in the dataset although all the classes might have different distributions that can be exploited in kernel function evaluations. Designing kernel functions specific to classes can improve the performance of the classifier. We propose class specific kernels and design kernel functions using data distributions. We use regression and principal component analysis to find coefficients that are specific to the classes in the dataset. We experiment our methods on some workbench datasets.