数学与系统科学研究院

计算数学所学术报告

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报告题目：

The 1-d manifold embedding of high-dimensional data and its application in data classification and image inpainting

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报告时间：**2014** 年 **6** 月 **9** 日（周一）

上午 **11:00-12:00**

报告地点：　　科技综合楼三层 **311**

计算数学所报告厅

Abstract:

Recently, the image-patch ordering method has been introduced in image processing and becomes an active research topic. The method sorts patches of an image into a sequence, on which we may apply 1-d signal processing techniques. However, the sorting method does not count the metric on the data set: All points on the sequence are uniformly arranged. In this talk, we introduce a 1-d manifold embedding model for the high-dimensional data. In this new model, we assume that the data set resides on a low-dimensional manifold. Then we construct a shortest path (a smooth curve) on the manifold that passes through all points. Finally, we isometrically map the curve onto a straight line so that a 1-d metric is defined on the data. Since the metric more precisely describes the similarity of the data, when we apply interpolation, filtering, and other operators on the data, we will obtain more accurate results. We also introduce a heuristic interpolation technique for the semi-supervised classification. The technique dynamically updates the labeled data set to produce a more accurate classifier in the interpolation scheme. The experiments show that the new model gives much better results in handwritten digits classification and image inpainting than other existent methods.

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