Angle-Based Model for Interactive Dimensionality Reduction and Data Visualization

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Abstract

In recent times, an undeniable fact is that the amount of data available has increased dramatically due mainly to the advance of new technologies allowing for storage and communication of enormous volumes of information. In consequence, there is an important need for finding the relevant information within the raw data through the application of novel data visualization techniques that permit the correct manipulation of data. This issue has motivated the development of graphic forms for visually representing and analyzing high-dimensional data. Particularly, in this work, we propose a graphical approach, which, allows the combination of dimensionality reduction (DR) methods using an anglebased model, making the data visualization more intelligible. Such approach is designed for a readily use, so that the input parameters are interactively given by the user within a user-friendly environment. The proposed approach enables users (even those being non-experts) to intuitively select a particular DR method or perform a mixture of methods. The experimental results prove that the interactive manipulation enabled by the here-proposed model-due to its ability of displaying a variety of embedded spaces-makes the task of selecting a embedded space simpler and more adequately fitted for a specific need.

Keywords: *Dimensionality reduction, Data visualization Kernel PCA, Pairwise similarity*

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