

Abstract

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Nonlinearity Reduction of Manifolds using Gaussian Blur for Handshape Recognition based on Multi-Dimensional Grids

This paper presents a hand-shape recognition algorithm based on using multi-dimensional grids (MDGs) to divide the feature space of a set of hand images. Principal Component Analysis (PCA) is used as a feature extraction and dimensionality reduction method to generate eigenspaces from example images. Images are blurred by convolving with a Gaussian kernel as a low pass filter. Image blurring is used to reduce the non-linearity in the manifolds within the eigenspaces where MDG structure can be used to divide the spaces linearly. The algorithm is invariant to linear transformations like rotation and translation. Computer generated images for different hand-shapes in Irish Sign Language are used in testing. Experimental results show accuracy and performance of the proposed algorithm in terms of blurring level and MDG size.