SVD Transforms in Computer Vision

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Using the singular value decomposition (SVD) of a matrix a class of transforms of an image, which we generically call SVD transforms, are introduced. SVD transforms are applied to a number of basic problems in computer vision such as

1. Texture differentiation

2. Detection of an extraneous object in a texture environment

3. Segmentation of images

4. Locating eyes in a facial images

SVD has been used extensively in statistics, however the way it is used in this context is quite different, and as yet, there is no satisfactory theoretical framework for understanding why it works to the extend that it does. Some computer experiments designed to gain some insight into the scope and limitations of SVD are explained.