a tensor of size N×N×N is represented as an outer product of 3 mutually orthogonal N-dimensional vectors, while for the 3DHSVD the component is defined by the kernels of size 2×2×2, contained by it. The basic advantages of the new decomposition for multi-dimensional images are the low computational complexity and the tree-like structure, which permits cutting-off the low-energy branches through threshold selection. This makes the algorithm suitable for parallel processing with multi-processor systems, where the basic processor executes the kernel decomposition algorithm for a tensor of size 2×2×2. The 3DHSVD algorithm opens new possibilities for fast image processing in various application areas, such as: image filtration, segmentation, merging, digital watermarking, extraction reduced number of features for pattern recognition, etc.

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