

Superresolution imaging: Theory, Algorithms and Applications

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The International Conference on Superresolution Imaging was held from 29 August to 31 August, 2005 at the University of Hong Kong. The conference had two major objectives: (1) to improve the dialogue and collaboration between mathematicians, engineers and computer scientists working in superresolution imaging, and (2) to stimulate new theoretical research and emerging applications in superresolution imaging.

This proceeding contain six papers from invited speakers of the conference. The contributions cover different aspects in the superresolution imaging research. The first article, “Region-based Super-resolution for Compression”, addresses the problem of synthesizing a high-resolution image from a compressed low-resolution video sequence using region-based information. The second article, “Super-resolution Reconstruction in a Computational Compound-eye Imaging System”, discusses a novel and effective multiple-design parameter approach for high-resolution image reconstruction. The third article, “Example-based Single Image Super-resolution: A Global MAP Approach with Outlier Rejection” proposes an efficient scheme for using image examples as driving a powerful regularization scheme for superresolution imaging. The fourth article, “Super-resolution: Should We Process Locally or Globally?” studies the usefulness of different local and global learning-based, single-frame image super-resolution reconstruction techniques in handling deblurring, denoising and alias removal. The fifth article, “Super Resolution Reconstruction based on Wavelet Estimation”, uses linear interpolation to build up an image reconstruction algorithm to obtain the relationship between the detail coefficients in wavelet subbands and the set of low-resolution images. The sixth article, “An Efficient Algorithm for Superresolution in Medium Field Imaging”, applies the preconditioned conjugate

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gradient method to restore high-resolution images from several blurred low-resolution frames in medium field imaging.

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