



# Image Super-Resolution and Applications

*Fathi E. Abd El-Samie, Mohiy M. Hadhoud, Said E. El-Khamy*

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**Image Super-Resolution and Applications** Fathi E. Abd El-Samie, Mohiy M. Hadhoud, Said E. El-Khamy

This book is devoted to the issue of image super-resolution—obtaining high-resolution images from single or multiple low-resolution images. Although there are numerous algorithms available for image interpolation and super-resolution, there's been a need for a book that establishes a common thread between the two processes. Filling this need, **Image Super-Resolution and Applications** presents image interpolation as a building block in the super-resolution reconstruction process.

Instead of approaching image interpolation as either a polynomial-based problem or an inverse problem, this book breaks the mold and compares and contrasts the two approaches. It presents two directions for image super-resolution: super-resolution with *a priori* information and blind super-resolution reconstruction of images. It also devotes chapters to the two complementary steps used to obtain high-resolution images: image registration and image fusion.

- Details techniques for color image interpolation and interpolation for pattern recognition
- Analyzes image interpolation as an inverse problem
- Presents image registration methodologies
- Considers image fusion and its application in image super resolution
- Includes simulation experiments along with the required MATLAB® code

Supplying complete coverage of image-super resolution and its applications, the book illustrates applications for image interpolation and super-resolution in medical and satellite image processing. It uses MATLAB® programs to present various techniques, including polynomial image interpolation and adaptive polynomial image interpolation. MATLAB codes for most of the simulation experiments supplied in the book are included in the appendix.

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