Prem Kalra
Shmuel Peleg (Eds.)

Computer Vision, Graphics and Image Processing

5th Indian Conference, ICVGIP 2006
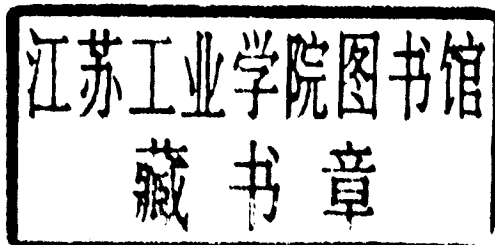**Madurai, India, December 2006**
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Preface

The Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP) is a forum bringing together researchers and practitioners in these related areas, coming from national and international academic institutes, from government research and development laboratories, and from industry. ICVGIP has been held biannually since its inception in 1998, attracting more participants every year, including international participants.

The proceedings of ICVGIP 2006, published in Springer's series *Lecture Notes in Computer Science*, comprise 85 papers that were selected for presentation from 284 papers, which were submitted from all over the world. Twenty-nine papers were oral presentations, and 56 papers were presented as posters. For the first time in ICVGIP, the review process was double-blind as common in the major international conferences. Each submitted paper was assigned at least three reviewers who are experts in the relevant area. It was difficult to select such a few papers, as there were many other deserving, but those could not be accommodated.

The support of the reviewers has been crucial, and we thank them for their valuable efforts and the time devoted for the conference. We would like to thank the team of IIIT Hyderabad, who developed and provided the online conference management software, which was used for ICVGIP 2006. Parag Kumar Chaudhuri of IIT Delhi helped greatly in the entire process and logistics, from the Call for Papers to the preparation of the proceedings. Siddharth Srinivasan, a MTech student at IIT Delhi, also contributed in the logistics. We would also like to thank the support of our sponsors, especially M/S Adobe India, M/S IBM India Research Lab, M/S Google India, M/S Yahoo! India Research and Development, M/S Tata Consultancy Services Ltd, and M/S HPL India.

We have no doubt that ICVGIP 2006 was another step towards making ICVGIP an important worldwide event to showcase research and development in the areas of computer vision, graphics and image processing.

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Malay Kumar Nema[1], Subrata Rakshit[1], and Subhasis Chaudhuri[2]

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Abstract. The present paper proposes a new method for high resolution image generation from a single image. Generation of high resolution (HR) images from lower resolution image(s) is achieved by either reconstruction-based methods or by learning-based methods. Reconstruction based methods use multiple images of the same scene to gather the extra information needed for the HR. The learning-based methods rely on the learning of characteristics of a specific image set to inject the extra information for HR generation. The proposed method is a variation of this strategy. It uses a generative model for sharp edges in images as well as descriptive models for edge representation. This prior information is injected using the Symmetric Residue Pyramid scheme. The advantages of this scheme are that it generates sharp edges with no ringing artefacts in the HR and that the models are universal enough to allow usage on wide variety of images without requirement of training and/or adaptation. Results have been generated and compared to actual high resolution images.

Index terms: Super-Resolution, edge modelling, Laplacian pyramids.

1 Introduction

Generation of high resolution (HR) images from low resolution (LR) images have been attempted through reconstruction based approaches and learning based approaches. Reconstruction based approaches require multiple images. They make use of subpixel shifts between images to pool in the extra information needed to create the HR image. Methods employed include sub-pixel registration, nonuniform interpolation [1][2] and frequency domain approaches [3][4]. An exhaustive list of methods can be found in [5], [6]. Learning based approaches build a relation between LR and HR images, based on the imaging process and/or description of corresponding edges between LR and HR. Multiresolution based mehods are a natural choice for this problem. The multiresolution representations seperate the information in images by frequency. The generation of HR is essentially the problem of generating the missing (hypothetical) level(-1) subband. Solutions have been proposed based on zoom [7][8], wavelet [9] and contourlet [10] coefficients. A detailed discussion can be obtained from [11]. The problem may be

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