

## Accepted Manuscript

Image Super-Resolution using Sparse Coding over Redundant Dictionary based on Effective Image Representations

Muhammad Sajjad, Irfan Mehmood, Sung Wook Baik

PII: S1047-3203(14)00181-3  
DOI: <http://dx.doi.org/10.1016/j.jvcir.2014.10.012>  
Reference: YJVC 1437

To appear in: *J. Vis. Commun. Image R.*

Received Date: 18 September 2013  
Accepted Date: 20 October 2014



Please cite this article as: M. Sajjad, I. Mehmood, S.W. Baik, Image Super-Resolution using Sparse Coding over Redundant Dictionary based on Effective Image Representations, *J. Vis. Commun. Image R.* (2014), doi: <http://dx.doi.org/10.1016/j.jvcir.2014.10.012>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Image Super-Resolution using Sparse Coding over Redundant Dictionary based on Effective Image Representations

Muhammad Sajjad, Irfan Mehmood, Sung Wook Baik\*

Tel: +82-02-3408-3797, Fax: +82-02-3408-4339

[sajjad@sju.ac.kr](mailto:sajjad@sju.ac.kr) , [irfanmehmood@sju.ac.kr](mailto:irfanmehmood@sju.ac.kr) , [sbaik@sejong.ac.kr](mailto:sbaik@sejong.ac.kr)

College of Electronics and Information Engineering, Sejong University, Seoul, Korea

**Abstract:** Recent years have shown a growing research interest in the sparse-representation of signals. Signals are described through sparse linear combinations of signal-atoms over a redundant-dictionary. Therefore, we propose a novel super-resolution framework using an overcomplete-dictionary based on effective image-representations such as edges, contours and high-order structures. This scheme recovers the vector of common sparse-representations between low-resolution and corresponding high-resolution image-patches by solving the  $l_1$ -regularized least-squared problem; subsequently, it reconstructs the HR output by multiplying it with the learned dictionary. The dictionary used in the proposed-technique contains more effective image-representations than those in previous approaches because it contains feature-descriptors such as edges, contours and motion-selective features. Therefore, the proposed-technique is more robust to various types of distortion. A saliency-map quickens this technique by confining the optimization-process to visually salient regions. Experimental analyses confirm the effectiveness of the proposed-scheme, and its quantitative and qualitative performance as compared with other state-of-the-art super-resolution algorithms.

**Keywords:** Super-resolution, reconstruction, denoising, representation-coefficients, sparse-coding, overcomplete-dictionary.

## 1. Introduction

Image super resolution (SR) is an enthusiastic area of research and desirable for many applications. Image SR increases the pixel density of a low-resolution (LR) image to obtain a high-resolution (HR) image. Image SR promises to overcome some of the inherent resolution limitations of low-cost imaging sensors, e.g. surveillance cameras and cell phones. LR images obtained from LR digital devices are reconstructed to an acceptable resolution

Download English Version:

<https://daneshyari.com/en/article/6938541>

Download Persian Version:

<https://daneshyari.com/article/6938541>

[Daneshyari.com](https://daneshyari.com)