### **Accepted Manuscript**

A novel framework for compressed sensing based scalable video coding

B.K.N. Srinivasarao, Vinay Chakravarthi Gogineni, Subrahmanyam Mula, Indrajit Chakrabarti

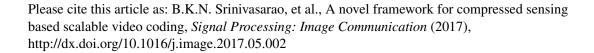
PII: S0923-5965(17)30086-3

DOI: http://dx.doi.org/10.1016/j.image.2017.05.002

Reference: IMAGE 15221

To appear in: Signal Processing: Image Communication

Received date: 25 October 2016 Revised date: 3 May 2017 Accepted date: 3 May 2017



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.



#### **ACCEPTED MANUSCRIPT**

# A Novel Framework for Compressed Sensing based Scalable Video Coding

B.K.N.Srinivasarao\*, Vinay Chakravarthi Gogineni, Subrahmanyam Mula and Indrajit Chakrabarti

Department of Electronics and Electrical Communication Engineering Indian Institute of Technology, Kharagpur, INDIA

#### Abstract

Considering high throughput values as specified by modern video processing standards, Scalable Video Coding (SVC) systems intended for such standards are generally implemented by means of dedicated hardware. However, the high computational complexity associated with the current Compressed Sensing (CS) based video coding schemes makes their hardware realization considerably challenging. In this paper, we present a novel CS based SVC framework that is amenable to real-time VLSI implementation. At the encoder, after applying the Three-Dimensional Discrete Wavelet Transform (3-D DWT) on the input video frames, a novel Adaptive Measurement Scheme (AMS) in CS is introduced, which is applied on the high frequency sub-bands of the 3-D DWT frames. The proposed AMS along with 3-D DWT not only achieves scalability and better compression ratio, but also reduces the overall computational complexity of the system. We have also proposed an Enhanced Approximate Message Passing (EAMP) algorithm to reconstruct the high frequency sub-bands from the CS measurements at the decoder. The proposed EAMP procedure combines the benefits of Approximate Message Passing (AMP) and Iterative Hard Thresholding (IHT) algorithms thereby simultaneously achieving sparsity measurement tradeoff and good reconstruction quality. We have carried out the detailed complexity analysis and simulations to demonstrate the superiority of the proposed framework over the existing schemes. Keywords: Scalable Video Coding (SVC), Compressed Sensing (CS), 3-D wavelets, Approximate Message Passing (AMP).

\*Corresponding Author

Email addresses: srinu.bkn@iitkgp.ac.in (B.K.N.Srinivasarao), vinaychakravarthi@ece.iitkgp.ernet.in, svmula@iitkgp.ac.in, indrajit@ece.iitkgp.ernet.in (Vinay Chakravarthi Gogineni, Subrahmanyam Mula and Indrajit Chakrabarti)

#### Download English Version:

## https://daneshyari.com/en/article/4970440

Download Persian Version:

https://daneshyari.com/article/4970440

<u>Daneshyari.com</u>