

Author's Accepted Manuscript

Utilizing Binocular Vision to Facilitate Completely
Blind 3D Image Quality Measurement

Wujie Zhou, Lu Yu, Weiwei Qiu, Ting Luo,
Zhongpeng Wang, Ming-Wei Wu



PII: S0165-1684(16)30105-0
DOI: <http://dx.doi.org/10.1016/j.sigpro.2016.06.005>
Reference: SIGPRO6165

To appear in: *Signal Processing*

Received date: 20 October 2015
Revised date: 31 May 2016
Accepted date: 6 June 2016

Cite this article as: Wujie Zhou, Lu Yu, Weiwei Qiu, Ting Luo, Zhongpeng Wang and Ming-Wei Wu, Utilizing Binocular Vision to Facilitate Completely Blind 3D Image Quality Measurement, *Signal Processing* <http://dx.doi.org/10.1016/j.sigpro.2016.06.005>

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 galley proof before it is published in its final citable 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.

Utilizing Binocular Vision to Facilitate Completely Blind 3D Image Quality Measurement

Wujie Zhou^{a,b*}, Lu Yu^a, Weiwei Qiu^b, Ting Luo^c, Zhongpeng Wang^b, Ming-Wei Wu^b

^a College of Information and Electronic Engineering, Zhejiang University, Hangzhou 310027, China

^b School of Information and Electronic Engineering, Zhejiang University of Science and Technology, Hangzhou 310023, China

^c College of Science and Technology, Ningbo University, Ningbo, 315211, China

Abstract: In the field of practical three-dimensional (3D) applications, blind measurement of the perceptual quality of distorted 3D images remains a challenging research topic. In this paper, we propose a completely blind 3D image quality measurement (IQM) metric that utilizes a binocular vision mechanism to better align with human perception. As its primary focus, this study is inspired by the visual processing in the primary visual cortex (V1) and the higher visual areas (V2) of binocular vision to facilitate blind 3D-IQM. Furthermore, the proposed metric does not require distorted samples or human subjective opinion scores for training. More specifically, the binocular quality-predictive features of areas V1 and V2 are first extracted from a corpus of pristine natural 3D images. Subsequently, a pristine multivariate Gaussian (MVG) model is trained from the extracted features. Finally, with the trained MVG model, the quality of distorted 3D images is measured using a Mahalanobis distance. Experimental results using two public benchmark 3D databases show that in comparison with current state-of-the-art IQM metrics, the proposed metric achieves excellent prediction performance.

Keywords—3D image quality measurement, binocular vision, completely blind, pristine multivariate Gaussian model.

*Corresponding author.

E-mail addresses: wujiezhou@163.com

Postal address: 310023

Tel.: +86-571-85070303.

Download English Version:

<https://daneshyari.com/en/article/6958223>

Download Persian Version:

<https://daneshyari.com/article/6958223>

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