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A ParaBoost Stereoscopic Image Quality Assessment (PBSIQA) System

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Abstract

The problem of stereoscopic image quality assessment, which finds applications in 3D visual content delivery such as 3DTV, is investigated in this work. Specifically, we propose a new ParaBoost (parallel-boosting) stereoscopic image quality assessment (PBSIQA) system. The system consists of two stages. In the first stage, various distortions are classified into a few types, and individual quality scorers targeting at a specific distortion type are developed. These scorers offer complementary performance in face of a database consisting of heterogeneous distortion types. In the second stage, scores from multiple quality scorers are fused to achieve the best overall performance, where the fuser is designed based on the parallel boosting idea borrowed from machine learning. Extensive experimental results are conducted to compare the performance of the proposed PBSIQA system with those of existing stereo image quality assessment (SIQA) metrics. The developed quality metric can serve as an objective function to optimize the performance of a 3D content delivery system.

Keywords: stereoscopic images, objective quality assessment, machine learning, decision fusion, feature extraction, image quality database

1. Introduction

With the rapid development of three-dimensional (3D) video technology, 3D visual content has become more popular nowadays. Standards for coding, transmitting and storing 3D visual data have been proposed such as stereoscopic 3D video [1], multiview video coding (MVC) [2], and multiview video plus depth map (MVD) format [3]. To optimize the performance of a 3D visual communication

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