Stereoscopic display of lightfields information

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1 Abstract

In 1908, Lippmann has proved positively an important question: "Peut-on demander à la Photographie de nous rendre toute cette variété qu'ofre la vue directe des objets". In the last century, researchers from several areas have struggled to put in practice what Lippmann has proved in theory. A century after Lippman's work, micro and nanophotonics technologies allow new characteristics and capabilities on digital imaging devices towards a more faithful representation of the real world. Key examples are High Dynamic Range (HDR) cameras and displays, light-field sensing devices, and holographic microscopes that enable new capturing, manipulation and visualization modalities and perspectives. In summary, after a century, the static planar-like images are giving place to richer volume-like images, closer to the visual experience that human can have when interacting with real world objects.

This master thesis is related to the EmergIMG project that results from a Portuguese consortium that targets to design a common framework for the representation and quality assessment of emerging imaging modalities, including lightfields and holographic imaging. This consortium aims to boost an international impact in terms of research and standardization. The main goal of this dissertation is to study how lightfields information can be visualized for stereoscopic display. Different methods will be studied and objective and subjective quality analyzed.

2 Objectives

In this work is intended to study the different representations of lightfields information. The existent methods to use this information for 3D representation on a stereoscopic display should be studied. The objective and subjective quality assessment of the different methods will also be studied.

3 Task Description

Task 1 Study of the different representations of lighfields information.

Task 2 Study of the different methods of 3D representation.

Task 3 Implementation of the most performant methods.

Task 4 Objective quality assessment of stereoscopic representations.

Task 5 Subjective quality assessment of stereoscopic representations.

Task 6 Analysis of results.

Task 7 Writing.

4 Expected Results

1. Software for representation of lightfields information on a stereoscopic display;
2. Quality assessment of representation of lightfields information on a stereoscopic display.

5 Timeline

Task 1-2 Set-Oct

Task 3 Oct-Nov

Task 4 Nov-Dec

Task 5-6 Jan-Abril

Task 7 May-June

6 References

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