ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Disney Research

Computer Graphics Laboratory ETH Zurich
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Master thesis

Composition, mixing, and overlay in stereo 3D

Introduction

Stereoscopic 3D is currently an important focus in various areas of the entertainment industry. Many parts of the production pipeline have to be adapted and modified to support stereo 3D content. This requires research in the fields of capturing, postproduction, storage, transmission, rendering and display of stereo 3D content among many others.
This master thesis shall investigate and research new methods for compositing, mixing and creating overlays for live action stereo 3D content. The work should consider difficulties and new opportunities arising from the fact that a scene is captured by multiple cameras. Additionally created information, such as depth or disparity data, has to be consistently adapted when mixing content. Further, such additional scene information shall also be used to design new tools, effects or optimized algorithms for video postproduction and editing.

Tasks

- Orientation, review of related work.
- Evaluation of standard postproduction and visual effects tools (Maya, After Effects, Nuke, etc.).
- Implementation and analysis of different depth/disparity estimation approaches (dense, sparse, etc.).
- Investigate:
    - How does the traditional compositing approach extend to stereo 3D content?
    - How can the estimated depth/disparity information be used to more accurately and efficiently create/render new virtual objects?
    - How can live action stereo 3D content from different sources with different capture settings (esp. interaxial and convergence) be adapted and matched for composition (e.g. virtual view synthesis, disparity mapping, gradient domain (depth) editing)?
    - How can depth/disparity information be used to create more advanced automatic effects (shadows, relighting)?
    - How can the algorithms be simplified for realtime applications (live broadcast)?
- Implementation of algorithms in C++ and/or Matlab.
- Creation of examples, demonstrations and illustrations of developed technology.
- Documentation of implemented software and experiments/ Master thesis/ Presentation.

Comments

A written report and a presentation are required to conclude this work. Prof. Markus Gross oversees this Master thesis. It is supervised by Manuel Lang and Aljoscha Smolic and it is carried out at the ETH Institute for Visual Computing.

Dates

Start Date: Monday, October 3, 2011 - Tuesday, April 3, 2012