

STORYTELLING FOR VOLUMETRIC VR

Extended Abstract

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ABSTRACT

This abstract summarizes the considerations and measures made within the research project VVOW in relation to storytelling. Our research colloquium is convinced that research on a new technology such as volumetric video also means rethinking its content. The technical achievements need a rethinking of the learned narrative methods. In addition, the technology is still at a stage of development in which the strengths must be worked out with the help of storytelling and the algorithmic capacities must always be taken into account.¹

CCS CONCEPTS

• **Human-centered computing** → **Mixed / augmented reality**; **Virtual reality**; **Interaction design theory, concepts and paradigms**; Collaborative interaction; Haptic devices; • **Applied computing** → Media arts;

KEYWORDS

Volumetric Video, Virtual Reality, Storytelling

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1 INTRODUCTION

Up to now, as a user of interactive VR experiences, one generally encounters animated figures in an artificial environment resembling a computer game. The next upcoming thing is the integration of Volumetric VR. With their new R&D project VVOW - Volumetric Video Workflow - the Fraunhofer HHI department "Vision & Imaging Technologies", Troitzkind GmbH and reallifefilm international GmbH are aiming a novel 3D reconstruction and modelling method for real people based on a multi-camera recording system. The new system will be used for future film productions, walk-in entertainment and infotainment experiences.

¹The latest news of the project can be followed here: <http://vvow.eu>

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2 STORYTELLING FOR VOLUMETRIC VR

2.1 Volumetric Video Workflow

General technical information on the project: The cooperation on the project started in summer 2017. The core of the work is the evaluation and further development of the production process based on test productions. The project focuses on a multitude of problems and requirements of the current state of technology:

- The integration of real content into virtual and augmented reality applications is only possible to a limited extent with classic technologies today.
- Use of billboards does not allow any navigation around the person.
- Virtual characters have limited realism with regard to the realistic reproduction of facial expressions and movement details in clothing.
- Innovative 3D reconstruction and modelling method for real people based on a multi-camera imaging system allows a lifelike 3D representation of people.

The project focuses on the following aspects of implementation:

- Set-up of a multi-camera recording system with up to 32 cameras (see illustration of a first prototype).
- Development of methods for temporal stabilization of dynamic 3D models.
- Development of mesh reduction and smoothing techniques.
- Development of plug-ins for commercial 3D post-production tools for efficient post-processing of 3D meshes.

2.2 Opportunities and limits

With the technique of volumetric video we are on the way to a new recording system of for realistic 3D images of individuals. There are still a lot of efforts to be made, but there is a chance that the production could even happen in real time in the future. Aside from all the euphoria about the new technical possibilities, there are still some constraints in the current state of technology that have to be taken into account in production: First, there are challenges for the actors. They have to reduce their movements considerably, as the setup with 32 cameras can only capture an area of approximately 2x2 meters without gaps. During shooting, they are exposed to strong light sources all around to guarantee optimal illumination of every detail. Furthermore, the recording with a complex camera system has further technical limitations, which have to be considered during the creative process: At the moment only one person can be recorded at a time to avoid occlusions, reflective materials can lead to errors in the texture, and it is not allowed to move too fast to avoid motion blur. In order to guarantee the best possible result of the recordings, material and movement

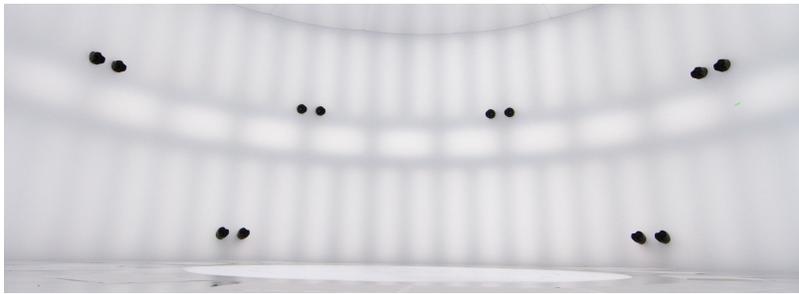


Figure 1: Picture of the Volumetric Studio by Fraunhofer HHI.

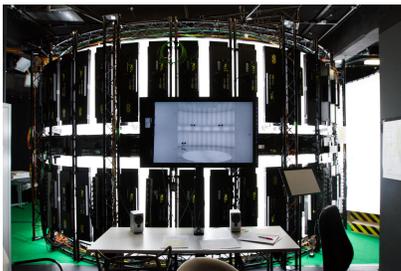


Figure 2: Picture of the Volumetric Studio by Fraunhofer HHI.

tests are necessary before the actual recording. Within our research team we are working on reducing the technical limitations and at the same time we are looking for creative solutions to create unique experiences with the current state of the art.

3 EXAMPLE "SORCERER'S APPRENTICE"

In the beginning of the year, our research group started working on a larger case presenting the new technology, exploring the potential for interaction and developing a complex narration in combination with volumetric video. The challenge in selecting the material was to choose an easily understandable basic situation in order to create a short, yet intensive experience that also took into account the time for rendering.

The history of the sorcerer's apprentice is internationally known due to the adaptation of Disney and, along with the author Goethe, it stands for a part of German cultural history.

While the technical task is complex, it should not be neglected that the content must also evolve. The team of *reallifefilm international* combines the technical expertise and many years of experience in developing 360-degree films and VR experiences to take storytelling within the technical requirements to a new level.

3.1 Storytelling and interaction

Especially when working with a completely new technology, which is still in development, it is the task of storytelling to work out the strengths of the current step of technology and at the same time to present a calculated challenge for further development within the project. The opportunities of volumetric VR have to be tested anew with every new project. The entire team must be familiar with



Figure 3: Shooting of "sorcerer's apprentice".

the technical conditions within their department. In our case these include requirements such as a small radius of action, a limited absorption capacity, special specifications for the use of materials, etc. In addition to the basic tasks of volumetric VR production, our R&D group is working on the development of algorithms that allow the recorded figure to react to the user. For this the character is rigged and the position of the user is tracked. We are also working on merging the individual meshes into mesh sequences to make the post-production process significantly easier.

4 CONCLUSIONS

Working on volumetric video is working on an unfinished technical process. Although the technical challenges are so complex, it is important to remember that we are facing new worlds not only in terms of technology but also in terms of content and storytelling. Close cooperation between the developers and the storytellers can create experiences that take full advantage of the new technology and at the same time find creative solutions to skilfully avoid the current technical obstacles.

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²Trotzkind GmbH: Sven Haeberlein, Nico Nonne, Eduard Zell, Thilo Borgmann; Fraunhofer Heinrich Hertz Insitute: Oliver Schreer, Ingo Feldmann, Thomas Ebner, Sylvain Renault, Thomas Koch; reallifefilm international GmbH: Soenke Kirchof, Martje Friedrich, Philipp Wenning, Jessica Zippel; and many more who did help within the shootings or postproduction