Exploring the Impact of 360° Movie Cuts in Users' Attention

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Abstract

Virtual Reality (VR) has become more relevant since the first devices for personal use became available on the market. New content has emerged for this new medium with different purposes such as education, traning, entertainment, etc. However, the production workflow of cinematic VR content is still in an experimental phase. The main reason is that there is controversy between content creators on how to tell a story effectively. Unlike traditional filmmaking, which has been in development for more than 100 years, movie editing in VR has brought new challenges to be addressed. Now viewers have partial control of the camera and can watch every degree of the 360° that surrounds them, with the possibility of losing important aspects of the scene that are key to understand the narrative of the movie. Directors can decide how to edit the film by combining the different shots. Nevertheless, depending on the scene before and after the cut, viewers' behavior may be influenced. To address this issue, we analyze users' behavior through cuts in a professional movie, where the narrative plays an important role, and derive new insights that could potentially influence VR content creation, informing content creators about the impact of different cuts in viewers' behavior.

CCS Concepts

• *Human-centered computing → Virtual reality;*

Introduction. Movies are made up of many different camera shots, usually taken at very different times and locations, separated by cuts. However, little is known about user behavior and expectations in VR movies. To understand how viewers consume cinematic VR content, previous works have focused on analyzing users' behavior in 360° videos. In particular, Serrano et al. [SSRB*17] proposed the first systematic analysis of users' behavior across movie cuts. Although a valuable contribution, their stimuli consist of simple videos, lacking the complexity of real footage, and they were not designed for storytelling. We address this issue by proposing the first analysis based on a large-scale collection of user behavioral data watching professionally edited 360° video content.

Analyzing users' behavior. Telling a story in VR has one key difference with respect to traditional cinema: viewers control the camera and can explore every degree of the 360° that surrounds them. When editing a traditional movie, scenes are followed by scenes separated by cuts. However, when editing in VR, scenes have 360° and are followed by another 360° scene. Depending on the orientation of the scenes before and after the cut, viewers may miss the important parts of the scene that contribute to the narrative, not following the directors' intentions. Directing and retaining users' attention to ensure that all important parts of the narrative are being watched is a difficult task. A systematic analysis of this topic is challenging mainly because of the high dimensionality of the parameter space. We take into account more than 3000 users' head orientation data watching a professional movie produced by Felix & Paul Studios, and we quantitatively measure users' behavior by proposing a set of metrics that we compute after the cuts. Our insights reveal that user behavior is influenced by how the movie is edited. Directors could leverage this knowledge to encourage the desired behavior in a certain scene [MGS20].

Discussion. To our knowledge, our work is the first to attempt a systematic analysis of professionally edited, narrative 360° video content. Understanding how users behave in a VR movie makes one step forward towards building a cinematographic language for VR. How the different elements of the scene are placed and how the shots are edited are just some examples of variables that influence user behavior and should be understood to convey the film's narrative effectively. We believe that our findings can potentially help content creators in decision making. We also expect follow-up research to continue exploring this emerging field of cinematic VR.

References

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