

Virtual Reality

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Chapter 1

Introduction

Virtual Reality is the attempt to use technology, such as head mounted display devices, and computer generated graphics, to allow the user to experience a sense of presence in a virtual environment. This is used in a wide variety of cases, including but not limited to, entertainment, education, medical therapy, research, and visualization.

Chapter 2

Related Work

2.1 Headmounted Display Technology

The concept of Virtual Reality dates back to the 1980s (Citation Needed), and unlike some depiction of it in pop culture at the time, never archived the level of immersion and presence that recent technological advances enable us to. Due to a jump in interest hardware such as the Oculus Rift found funding in recent years. In the case of Oculus, it was via Crowdfunding. But as a result, commercial products from Google, Valve/HTC or Sony have been announced. At the time of writing, none of the mentioned companies have released a commercially available end user product. Oculus Rift has released and sold Developer Kits, which are most frequently used in modern Virtual Reality endeavours.



2.2 Software

Programming software for virtual reality does not differ much from regular computer graphics programming. Most commercial vendors offer their own API that helps translating a virtual camera to a two camera 3D setup. It was

found however, that how the camera is used is imperative to not give the user of the virtual reality headset motion sickness. For example, moving the camera without the user moving their head was resulted in severely negative feedback from the test subjects.

2.3 Additional Hardware

With headmounted displays, vision, the groundwork for a feeling of presence in virtual reality, is laid out. Headsets or surround sound systems have been shown to suffice for the audio representation of the virtual environment. Moving around naturally has proven difficult, however. While video game demos often use a gamepad, it is less than ideal for upholding a sense of presence. Products, such as the XYZ try to enable free movement in virtual reality.

Chapter 3

Discussion

$$x - x_i = \sqrt{\frac{k^2}{2}} \int_0^1 \frac{1}{\sqrt{1 - \sin^2 \phi}} d\phi \quad (3.1)$$

Chapter 4

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