

Rapture of the Deep

Enzio Probst

Filmakademie Baden-Wuerttemberg, Animationsinstitut
Akademiefhof 10, Ludwigsburg 71638
enzio.probst@filmakademie.de

Monja Dietrich

Filmakademie Baden-Wuerttemberg, Animationsinstitut
Akademiefhof 10, Ludwigsburg 71638
monja.dietrich@filmakademie.de

Vincent Suttner

Filmakademie Baden-Wuerttemberg, Animationsinstitut
Akademiefhof 10, Ludwigsburg 71638
vincent.suttner@filmakademie.de

Theres Buehler

Hochschule der Medien
Nobelstrasse 10, Stuttgart 70569
tb.buehler@gmail.com



Figure 1: HTC Vive with Tobii Eye Tracker (middle); jellyfish (left) and deep sea creature (right) that the player can encounter in the experience

ABSTRACT

Rapture of the Deep is an interactive Virtual Reality experience with eye tracking. The Experience is set in an underwater scenario using eye tracking as the main mechanism which allows the environment to react to the player's gaze and attention. In this project we worked with a retrofitted version of the HTC Vive headset with a complete Eye Tracking integration by Tobii¹ Pro and the Tobii Pro SDK for the Unity3D² Engine. Rapture of the Deep seeks to test how eye tracking technology can be employed as an attentive and invisible user interface allowing people to use reflexive and emotional behavior as a game controller.

¹Tobii; World leader in Eye Tracking research technology; <https://www.tobiipro.com>

²Unity3D; Real time engine for interactive applications; <https://unity3d.com>

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

SA '18 Virtual and Augmented Reality, December 04-07, 2018, Tokyo, Japan

© 2018 Copyright held by the owner/author(s).

ACM ISBN 978-1-4503-6028-9/18/12.

<https://doi.org/10.1145/3275495.3275499>

CCS CONCEPTS

• **Computing methodologies** → *Virtual reality*;

KEYWORDS

Virtual Reality, Eye Tracking, User Experience, contact-less interaction, immersion

ACM Reference Format:

Enzio Probst, Vincent Suttner, Monja Dietrich, and Theres Buehler. 2018. Rapture of the Deep. In *Proceedings of SA '18 Virtual and Augmented Reality*. ACM, Tokyo, Japan, 2 pages. <https://doi.org/10.1145/3275495.3275499>

1 EYE TRACKING

People are instinctively driven to look at things, in order to find out what they are, even if it is potentially dangerous for them. We gaze at objects before even thinking about them. By using Eye Tracking information, we designed a game controller which makes an intuitive player reaction and immersive experience possible while eliminating the need for less intuitive interaction interfaces in VR (e.g. physical buttons). This also meant that the player never has complete conscious control over their actions in the game since we can never completely control where and how our eyes move, or what our gaze might provoke. If we notice something

approaching quickly out of the corner of our eyes, we will look at it, it is necessary for our survival. If we are being looked at, we respond, it's a conversation. The natural movement of the eyes can be categorized into voluntary and involuntary movements [Rayner 1998]. With Rapture Of the Deep our goal was to combine these movements in order to increase the entertainment value for the user.

One of the perks of eye tracking is also that it is accessible to people of all ages and no prior knowledge of games is needed to work your way through the Experience.

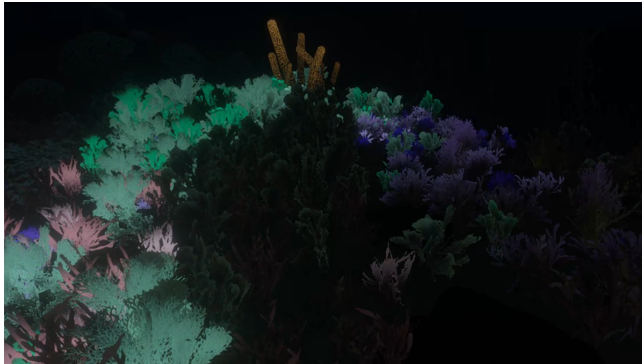


Figure 2: Screenshot of the experience; Bottom of the ocean filled with plants that light up when looked at, creating a glowing trail following the movement of the eye

2 CURIOSITY AND FEAR

We decided to set our experience in a realistically rendered underwater world where the player would be faced with two conflicting emotions: curiosity and fear. These two very basic emotions are rooted in our instinctive survival behavior and go deep into our subconscious. By evoking the kind of emotions humans cannot consciously control, we wanted to provoke subconscious eye movement of the player. This way the player is guided deeper into the ocean by his/her own need to explore. In the experience the player can work their way down to the bottom of the ocean if they dare. The world forms around the player, creating relaxing and also unsettling moods, triggered by the player's gaze and attention to different deep sea creatures around them.

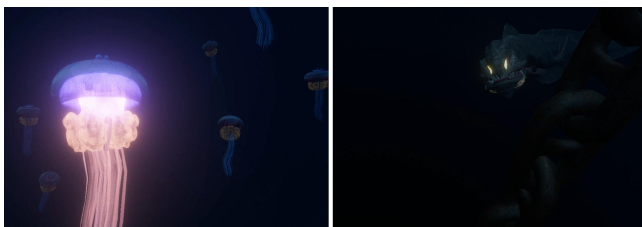


Figure 3: Screenshots of the experience; Relaxing encounter with Jellyfish (left); Unsettling encounter with deep sea creature (right)

3 TECHNOLOGY

3.1 Spatial Audio

Sound was a key factor for creating a believable atmosphere for the player to react on, in order to minimize irritation in the game world. This way, natural player reactions are possible. We used ambisonic sound to steer the players gaze where it was needed for the experience to advance and reinforce the players decision to look in a certain direction through audible feedback. For example: If the player looks at a specific jellyfish, it results in a reaction sound followed by the jellyfish starting to glowing more brightly as long as it is being looked at. If the player holds eye contact with the jellyfish for 1 second it is activated and lets the player know so, by playing a melody and emitting bright, colorful light.

3.2 Procedural Animation

To make the underwater world and its inhabitants feel untamed and realistic we used procedural animation with keyframe animated sequences added on top, so that smooth and seamless motions in every direction would be possible. Our goal was to give the player a strong sensation of the scale of the creatures and also the impression that all of the player's adversaries have their own spirit.

4 EVALUATION

The Experience was previously showcased at the FMX³ 2018 Conference for Animation and VFX in Stuttgart. This was a very interesting opportunity for us to gather feedback. Each play through ranged from 4-8 minutes, depending on the person playing. The time spent in the Experience did not correlate with the person's age or technological knowledge. In fact the person to complete the fastest was 63 years old at the time and had never worn an HMD before. It was interesting to see how different people reacted to the unsettling parts of the experience. The majority of players completed the game and recalled feeling flustered when looking down into the dark ocean and upon the appearance of the big deep sea creature. Said moments did not pose any symptoms of fear to others, while very few quit the Experience due to fear. We were able to evaluate the different stages of the Experience on how well they made use of the eye tracker and encouraged people to only use eye movement and not head/neck movement. One problem that we were faced with was that due to the curvature of the lenses in the HMD, the field of view gets blurry around the edges of the screen, which significantly narrows down the play area.

ACKNOWLEDGMENTS

This project has been realized as part of the AniTrailer/AniPlay program 2018 at the Filmakademie Baden-Wuerttemberg, Animationsinstitut.⁴

REFERENCES

Keith Rayner. 1998. Eye Movements in reading and Information Preprocessing: 20 Years of Research. *United States: Psychological Bulletin* (Jan. 1998).

³FMX 2018; International Conference on Animation, Effects, VR, Games and Transmedia

⁴Animationsinstitut 2018. AniPlay / AniTrailer . Animationsinstitut. <https://animationsinstitut.de>.