VR ROLLER COASTER:

FROM FEAR TO THRILL – WITHOUT LEAVING THE ROOM

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INTRODUCTION

Roller coaster is the king of gravity defying thrills. With gut-wrenching twists, loops, turns, supernatural speeds — what's not to love?

Roller coaster proved to be the most popular application of Virtual Reality, since 2016.

METHOD

- **User interaction-based roller coaster:** collect or dodge objects along the track of the roller coaster, while enjoying the ride.

- **Two types of tracks:** Journey and Adventure.

Exploration

Thrill

IMPLEMENTATION: Roller Coaster Tracks

- **The roller coaster tracks used in the application were developed using two plug-ins: Tracks and Rails, and Animated Steel Coaster Plus [1,2].**

[1] Zen Fulcrum LLC. Tracks and Rails   [2] Laxer. Animated Steel Coaster Plus

IMPLEMENTATION: Object Interaction

- In the main scene, eye tracker Tobii is used for selecting the roller coaster track, i.e. **gaze-based selection** is implemented.

IMPLEMENTATION: Object Interaction

- In the Journey scene, **statues are shooting arrows** at the moving cart.

- **Monkey statues get activated**, producing a sound, with the purpose of slightly disorienting a user.

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IMPLEMENTATION: Object Interaction

- In the Adventure scene, a number of Olaf statues are not stationary: one of them greets the user, some other ones throw snowballs at one another and at the user.

- Interactive Santas pop up along the way, holding a present.

IMPLEMENTATION: Play modes

- **Three speed levels:** standard, 1.5x and 2x faster.

- **Day and night modes**
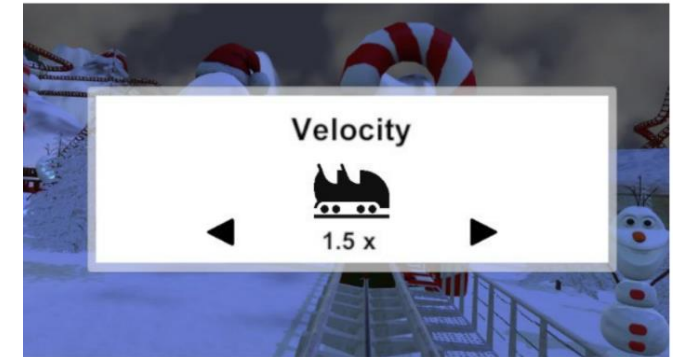
IMPLEMENTATION: User Feedback

- **Automatic user discomfort recorder:** automatic logging of the user's position and rotation at each frame.

```
…
2019/04/27_09:38:58|(158.8, 1.7, 116.5)|(0.0, 0.9, 0.0, -0.4)|(-0.1, -0.4, 0.0, -0.9)
2019/04/27_09:38:58|(159.4, 1.7, 117.0)|(0.0, 0.9, 0.0, -0.4)|(-0.1, -0.4, 0.0, -0.9)
2019/04/27_09:38:59|(159.9, 1.7, 117.4)|(0.0, 0.9, 0.0, -0.4)|(-0.1, -0.4, 0.0, -0.9)
2019/04/27_09:38:59|(160.4, 1.7, 117.9)|(0.0, 0.9, 0.0, -0.4)|(-0.1, -0.4, 0.0, -0.9)
…
```

- **Manual recorder:** pressing the touchpad during the ride + going through the positions afterwards

IMPLEMENTATION: User Feedback

- **"Happy Place" Feature:** a safe space, which user can evacuate to at any point of their ride, e.g. in case they are not feeling well and would like to end the ride.

RESULTS

• At least **two shapes of tracks**, including **rotations in three degrees of freedom** (roll, yaw, and pitch)
• A user interface to choose different tracks immersively, **play modes**
• **User discomfort recorder**, logging real-time user feedback during the game

High-quality immersive VR experience, while taking care of user's well-being and incorporating interactive gameplay.

AUTHORSHIP

Yoonsang Kim

- **Roller coaster tracks**

- **Main scene**

- Controller interaction

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- **Gaze-based interaction**

- **Object interaction**

- **User feedback logging**