Creating a **Rollercoaster Simulation** for **Autistic subjects** using **Virtual Reality** technologies

Supervisor: Dr Gary Ushaw

Newcastle University

Student: Jonathan Mulligan
Student Number: 120196948
Email: j.mulligan@newcastle.ac.uk

unity

Oculus

School of **Computing Science**

Aims:

- **To create a rollercoaster simulation for Autistic subjects**
- **To utilise Virtual Reality technology when creating it**

Introduction:

The University's Games Lab was contacted by the North East Autism Society about working on applying modern video game technology research to helping the behaviour of severely autistic patients.

It was recently observed that riding on a rollercoaster can have strong positive effects on the communication ability of these patients, allowing them to become much more communicative. However these effects were mostly short-term.

As to why this happens was not clear, but by creating a virtual simulation of a rollercoaster, we hoped to recreate this experience for the subject, to see if the effects were similar.

Video game technology is ideally suitable to create this simulation, especially with the recent developments in accessible Virtual Reality devices.

Simulating a rollercoaster

The simulation was to be made up of various twists, turns and drops, that were all dynamically lead by data.

The initial idea I had for the rollercoaster was for it to be randomly generated. This meant that the experience is different each time the user runs the simulation.

However, asking a focus group revealed it to also be a good idea to have a more predictable style of play, as some people prefer to know exactly which turns and drops will be on a rollercoaster ride (as with a real life rollercoaster). Due to this helpful feedback, I created an option to change to pre-made tracks.

The theme that I ran with for the simulation was a canyon/cave one (as can be seen in the below screenshots).

The third image below also shows a simple puzzle mini-game I designed for the simulation that was completely optional.

Using Virtual Reality

Oculus Rift is a new technology that uses a head-mounted display to immerse the player into the game world. This means that if the player turns their head left or right, the protagonist of the video game will turn their head accordingly. It also offers a full 3D-effect, giving the perception of depth to the player.

I felt like this would be perfect for immersing those with autism into the simulation, especially as the Oculus Rift uses a first-person perspective, and it allowed the player to view their surroundings freely, as they moved forwards through the track.

Oculus Rift Development Kit 2
https://www.oculus.com/order/

Other uses for finished product

I was approached by some participants of the University's 'ACTION 2014: Changing Age' programme, who expressed interest in also using a version of the final product for their team's commercial product.

As a result of this, I created an altered version of the simulation that would play like a video game. This altered version was designed with the aim of appealing to all ages and members of a family. As such it became a family entertainment game, that tasks the player with collecting as many coins as possible on their ride through levels.

Conclusions

The finished product was sent to the North East Autism Society, including an Oculus Rift development kit, and documentation on how to set the simulation up with it.

The Society are currently still testing the effects of this simulation on their autistic patients and are yet to come up with a proper conclusion as to the benefits of the simulation.

For any further information, please do not hesitate to contact Jonathan.

Scenario Mode
Random Mode
Track Creator
Scoreboards
Options
Quit Game

Change Account

Signed in as: Jonathan