In this project we want to use the MagicLeap 2 to let the user build a virtual marble run course by simple drawing a line in space.

ETH zürich

Mixed Reality
263-5905-00L

mARble run

Build and play a simple and fun game in your environment, wherever you are

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1 Introduction

We aim to use the Magic Leap 2 to let users build virtual marble run courses in a real 3D environment easily and simulating the interaction of marbles with the course in real time.

2 Background

Mixed Reality is a relatively new field in the gaming industry and so is the Magic Leap 2. Our goal is to create a simple and intuitive game to get people from a wide age range familiar with Mixed Reality and augmented reality goggles.

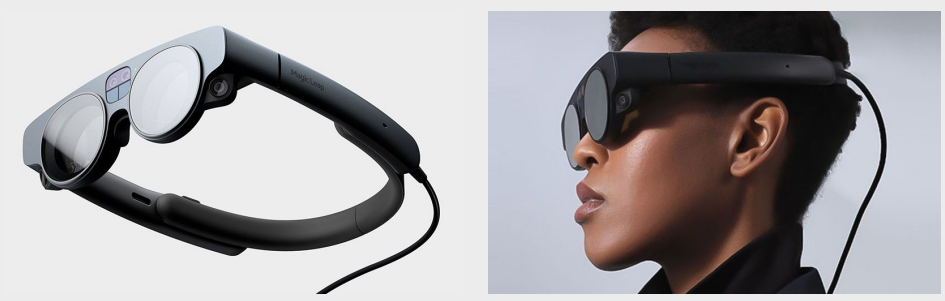

Fig. 1. The MagicLeap 2 Device, picture from www.insight.com

3 Method/Proposal

We use the Magic Leap controller to capture hand position. To draw the ramps, we follow these steps.

- User presses the Bumper button
- User draws the path for the track
- User releases the Bumper button
- A spline is fit over the points along the drawn path
- A half-pipe collision mesh is created around the spline in the scene. We call this final mesh a track.

We also include a feature where the user can add “special” pre-made blocks into the scene, e.g., a basket meant to catch the marble at the end of the track.
The user is also able to make several different tracks in the scene. Ideally, these tracks should automatically connect if the ends are close enough to each other. The user should also be able to move around the created parts and erase them.
The following pictures from our implementation in Unity showcase how we envisioned the result.

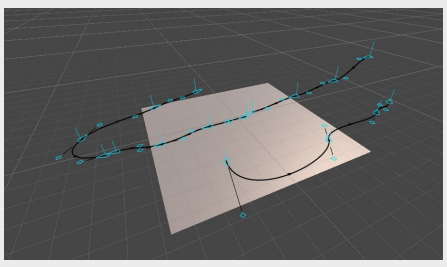

Fig. 2. bezier splines in a scene

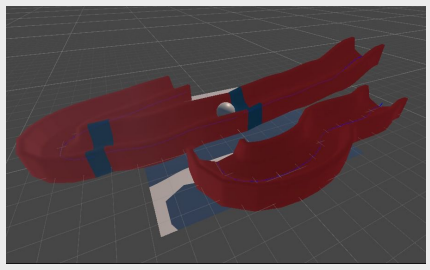

Fig. 3. several connected tracks in the scene

4 Results and Discussion

We have implemented the essentials of the game, including the ability to build the track, add special blocks from the store, erase the blocks, and running the marble through the track with realistic physical dynamics and interaction with the real environment. The automatic connection of the blocks is going to be implemented in the near future. The smoothing of the tracks can also be improved.

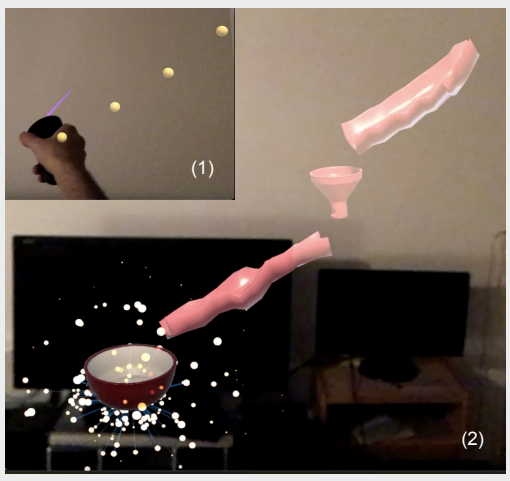

Fig. 4. (1) Drawing the path for the track. (2) A sample track with additional blocks (the funnel and the goal bowl), along with the celebration visuals.

5 Conclusion

We were able to implement most of the desired functionality. We initially had struggles with the device and unity, but we were able to gradually overcome these thanks to the guidance of our supervisor. While the basics are done now, there are details and features that we would like to improve and add to our game. We believe the game to be interesting enough to attract a wider audience for Mixed Reality devices, but this remains to be tested as we conduct our user study.

6 Improvements

- Automatic smooth connection of the tracks and blocks
- Better track smoothing and directions
- Improve performance, e.g., more efficient calculation of colliders on the fly to have a good user experience
- Add more special blocks

7 Survey

You are very welcome to test our game with our live demo.

We would appreciate it if you could kindly fill out this survey for our user study.

Partner: Magic Leap