

02561 - Computer Graphics



DTU - Technical University of Denmark

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Virtualizing physical object movements

Daniel F. Hauge (s201186)

Abstract

This project aims to virtualize and display a physical object with it's physical movements on screen. The project consists of an implementation which succesfully captures 3 degrees of freedom and uses the movements to display on screen.

The implementation is hosted on: grafik.feveile-hauge.dk.

1 Introduction

- Project introduction, what is it about and more.

1.1 Problem statement

- How to capture and display object movements and display it on screen.

1.2 Motivation & Usages

- Virtual / Augmented reality applications, Multi-faceted interface for example 3D modelling work, 3D animation acting (Motion capture)

2 Method

There are challenges the problem at hand etc.

2.1 Capture physical movements

Sensors. Magnetic & Accelerometers Light? etc. Choosing Magnetic and accelerometers, as it can be self contained etc.

The phone has these sensors and can be used as a sort of controller for capturing movements.

2.2 Data transfer

Wireless transfer to allow for 100% freedom in movements. Bluetooth, wifi. Requirement: 100% freedom in movements. The object should only be under constraints as in the real world. A phone is still a good candidat for this requirement, as it is wireless.

Wifi is used picked, as it is adequately fast and reliable.

2.3 Display

Using a triangle mesh to instantiate vertex. We can use affine transformation with a rotation and translation matrix to move the object in virtual space.

3 Implementation

3.1 Capturing physical movements

3.1.1 Orientation

- Javascript AbsoluteOrientationSensor etc.

3.1.2 Displacement

- Javascript LinearAccelerationSensor

3.2 Data transfer

- Power of websockets

3.3 Display

- Implementation of stuff.

4 Solution

- The solution is this and that. With video.

4.1 Trying the solution

- Instructions.

5 Conclusion

- Sensors from a phone can be used to capture and virtualize movements.
- The resulting solution is not super usefull but demonstrates potential for other applications.
- Unfortunately the solutions does not support displacement, which would have been cool.