VR/AR Ontology

Project Documentation

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This ontology was developed by Martin Letenay for the course Ontologies and Knowledge engineering course. The domain of the ontology was Virtual reality and Augmented reality. This document will describe the ontology itself in detail as well the process I used for creating it.

Sources of Domain Knowledge

The purpose of this project was to develop an ontology that would provide a high-level overview of VR/AR technologies and its aspects. During the research phase I have found several ontologies that describe or use virtual reality in some form but they were too complex and too specific for the scope of this project. Examples of such ontologies are:

Ontology for experimentation of human-building interactions using virtual reality

https://www.sciencedirect.com/science/article/pii/S1474034623000319

Using Ontologies for Modeling Virtual Reality Scenarios

https://link.springer.com/chapter/10.1007/978-3-319-18818-8_35

Virtual Reality Ontology Object Manipulation (VROOM)

https://www.scitepress.org/Papers/2022/107877/107877.pdf

Since I wanted a more high level overview ontology for my project I have used lecture slides from the course Virtual and Augmented Reality as well as various other internet sources

https://dai.fmph.uniba.sk/w/Course:VAR/sk

https://en.wikipedia.org/wiki/Virtual_reality

Ontology engineering process

I have used the Protégé editor and saved the ontology in Turtle syntax. The methodology I used was Ontology Engineering 101

1. Determine scope

2. Consider reuse

3. Enumerate terms

4. Define classes

5. Define properties

6. Define constraints

7. Create instances

I have created 47 classes, 29 object properties, with over 1000 individuals. Creating individuals was a difficult and time task and it involved finding and working with data. To streamline this process I wrote a python script to generate Turtle syntax for individuals.

Competency questions

Here are some examples competency questions for the ontology:

What types of output devices are supported in the virtual environment? (Displays, Audio devices, Controllers that can be used also as output devices)

How do haptic devices contribute to user interaction in VR? (they provide tangible feedback such as vibration and force feedback to create a more immersive experience when interacting with virtual objects)

What assets are part of the virtual environment? (Models, Textures, Audio. Images, Scripts)