Karlsruhe Institute of Technology

FAKULTÄT FÜR ELEKTROTECHNIK UND
INFORMATIONSTECHNIK

A Guide for future VR development at the IPE with the unreal engines

Internship report
of

Jonas Teufel

am Institut für Prozessdatenverarbeitung
und Elektronik

Supervisor: Andreas Kopmann

Bearbeitungszeit: 01.04.2015 – 30.09.2015

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Karlsruhe, den 30.09.2015, _____

Jonas Teufel

Als Ansichtsexemplar genehmigt von

Karlsruhe, den 30.09.2015, _____

Andreas Kopmann

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1. Introduction

1.1. The premise

This document aims to create an entry point to unreal engine VR development. Hereby the focus is not necessarily on creating a full blown game mechanic, but rather on projects, which would be both achievable and beneficial in a scientific context.
Although this document aims to create sort of a general overview, it is being written specifically for the *Institute of data processing*(IPE) at the KIT. The IPE has already conducted multiple VR projects. I will use them as an example to explain, what purpose a VR project could have in the scientific context:

- One project used the CAD models for the *KATRIN* [CITATION] experiment and imported those as models into a VR setting, which can be used present the experiment to a broader public, which is not able to visit the restricted area for example.
- Part of the research at the KIT campus north is the recording of x ray tomographies. Using this method researchers were able to create detailed 3D models of insects within fossils. There has been an effort to import these insect models into a VR setting. The capabilities of the unreal engine could help to animate the movement and behaviour of these long extinct species for example. An audience would be able to experience these animals first hand.

1.2. document overview

This document aims to achieve several things:

entry point This document should provide a basic overview of the first steps to be taken, when starting VR development with the unreal engine, such as the installation of required programs and the setup of the needed hardware.

choices The success of a VR project is significantly determined, by the planning process or the general "vision" for the final project. There are some game-specific and also VR-specific design choices, that have to be well thought about when determining the initial goal of the project.

tutorial I will attempt to provide tutorial-like sections for chosen topics, which will be helpful for developing a first application scaffold.

literature The unreal engine is too big of a topic to be explained well in a single document. Thus, this document will not provide a "real" tutorial. Instead I will reference some literature and other resources, that have done a good job of explaining certain aspects of the topic.

2. First steps

2.1. Installing the development environment

2.1.1. Unreal engine requirements

The *minimal requirements*[1] for installing the unreal engine are quite low, as can be seen in figure 2.1 [Unr]. These requirements make it seem as if development with the unreal engine was actually possible on such a machine.
I have tried to install the development environment on a computer, which just barely satisfied these requirements. From the experience I can say, that while the program actually starts, it is completely unusable. The graphics card and the CPU will be absolutely overwhelmed.

Recommended Hardware

Operating System	Windows 10 64-bit
Processor	Quad-core Intel or AMD, 2.5 GHz or faster
Memory	8 GB RAM
Video Card/DirectX Version	DirectX 11 or DirectX 12 compatible graphics card

Figure 2.1.: Minimal system requirements for the unreal engine

On the far bottom of the same requirements page, epic games lists the specs of the PC's, which themselves use for their game development, as shown in figure 2.2.
These should be considered as the *actual* minimal requirements for a smooth development experience.

- Windows 10 64-bit
- 64 GB RAM
- 256 GB SSD (OS Drive)
- 2 TB SSD (Data Drive)
- NVIDIA GeForce GTX 970
- Xoreax Incredibuild (Dev Tools Package)
- Six-Core Xeon E5-2643 @ 3.4GHz

Figure 2.2.: Reasonable system requirements for the unreal engine

[1] `https://docs.unrealengine.com/en-US/GettingStarted/RecommendedSpecifications/index.html`

Changelog

Version 0

0.0.0 - 18.11.2019

- Created the git repository
- Copied the template for the KIT bachelors degree to be used as the basis of this document
- wrote a first version of the "premise" chapter and "document overview"

Appendix

A. First Appendix Section

Wonderful Appendix!

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[Unr] *Hardware and Software Specifications*. https://docs.unrealengine.com/en-US/GettingStarted/RecommendedSpecifications/index.html.