

Abstract

In the first half of the twentieth century, the Dutchman Huizinga coined the term *Homo Ludens*, Man the Player; a person who develops his or her individual abilities and skills through play or the activity of playing. With the advent of modern technology, this idea has by no means been forgotten, but, quite the contrary, has returned to the center of scientific research – in the form of so-called *Serious Games*. Games that do not just entertain, but, as a rule, above all, should impart knowledge.

The starting point of the present thesis was the question of how to make outdoor archaeological sites or the knowledge hidden in them more accessible to the public. Knowledge that is all too often inaccessible, first of all because it is hidden in the ground. With augmented reality, a tool is available to make those hidden contents visible again – in the form of virtual copies. And thanks to portable and ever more powerful devices, especially smartphones, an augmented reality can nowadays be established almost everywhere.

The idea of using augmented reality as a tool to explore outdoor archaeological sites is examined in the present thesis and developed into a concept that can be used to describe archaeological scenes that are always conducive to the playful transmission of knowledge. In particular, these scenes not only consider technical aspects, but above all also consider questions of context-sensitive visualization and tool-based interaction, so that users can interact in or with the augmented reality.

The concept of archaeological scenes is then transformed into a technical concept by transforming the layers of archaeological scenes into a scene graph. The scene graph consists of a total of three layers, in which the objects of the scene are to be placed: environment objects that describe the scenery, archaeological objects, such as artifacts, with which the user will mainly interact, and context objects with which the context of the scene, for example, the position of the user, is captured passively and influenced actively. However, tools are not nodes of the scene graph, but rather operate on it. Tools are also distinguished between visualization and interaction tools. The former influence the presentation of content, showing, for example, hidden artifacts. The latter make it possible to interact with them, allowing, for example, the excavation of artifacts.

As part of the present thesis, the technical concept was finally implemented as a prototype and the corresponding classes and interfaces as well as their interplay were documented in detail. The prototypical implementation was meant to identify any strengths and weaknesses of the (technical) concept and create a foundation or starting point for future developments.