

Development of high-definition Virtual Reality for historical architectural and urban digital reconstruction

A case study of Azuchi Castle and Old Castle Town in 1581

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Abstract. This study shows fundamental data for constructing a high-definition VR application under the theme of a three-dimensional visualization to restore past architecture and cities. It is difficult for widespread architectural and urban objects to be rendered in real-time. Thus, in this study, techniques for improving the level of detail (LOD) and representation of natural objects were studied. A digital reconstruction project of Azuchi Castle and old castle town was targeted as a case study. Finally, a VR application with specifications of seven million polygons, texture of 1.87 billion pixels, and 1920 × 1080 screen resolution, was successfully developed that could run on a PC. For the developed VR applications, both qualitative evaluation by experts and quantitative evaluation by end users was performed.

Keywords: Cultural heritage, digital reconstruction, Virtual Reality, visualization, 3D modeling, presentation.