Conference Poster

Location Based Services for the Underground – Showcasing a multimodal visualization approach for underground infrastructure

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Location Based Services for the Underground – Showcasing a multimodal visualization approach for underground infrastructure

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Showcase abstract. This research focuses on a holistic approach to implement a seamless transition from traditional virtual map visualization to virtual reality (VR) and augmented reality (AR) modes: The approach integrates our work in a single mobile application for the visualization of semantic 3D city data available for multiple mobile operating systems (OS). The developed application, previously presented by Santana et al. 2017 has been extended to include information from underground structures such as water and electricity networks. The focus of this research lies on the visualization and interaction aspect of underground infrastructure objects on-site trough AR and VR modes. Multiple visualization techniques have been applied and evaluated such as adaptive visibility and transparency, virtual hole creation, and scale dependent coloring of objects.

A major requirement of the application is its connectivity to a PostgreSQL database using the simplified CityGML data structure (3DCityDB) in which the building and underground structures are stored. A benefit of using the CityGML standard instead of other geospatial data formats is that semantic information can be stored directly in the model at different levels of detail (LoDs), which can be used for cartographic visualization proposes (Döllner et al., 2006). The developed mobile application is using the Glob3 Mobile framework. This software development kit (SDK) is a mobile-oriented framework for the development of map and 3D globe applications, being easily configurable on the user-navigation and level-of-detail strategies (Figure 1). Thus, the framework is suitable for the present research, having recently demonstrated the capabilities that mobile devices offer for the planning of complex infrastructures and large datasets.

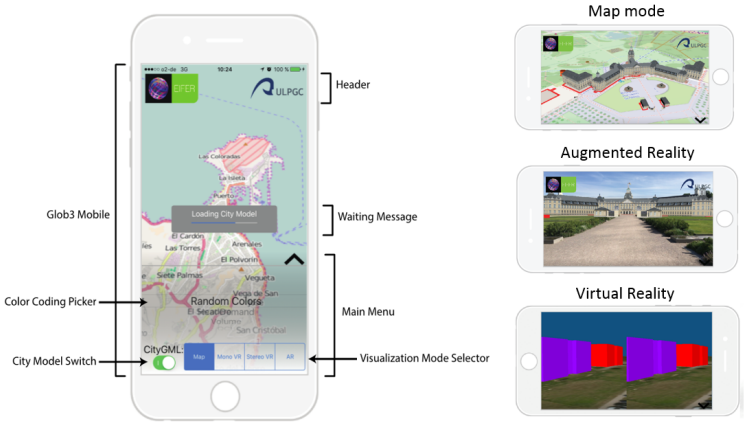

Figure 1, App layout with different visualisation modes.

As a use case, the visualisation of underground infrastructure such as pipes, electrical wires or telecommunication lines is demonstrated. The underground structures shown in (Figure 2,) are directly visualised from the CityGML Utility Network ADE extension.

Figure 2, Underground infrastructure stored as CityGML visualised as AR on-site.

In the showcase, we will demonstrate the AR and VR visualization modes of the developed application. To that effect, we will present a dummy utility network from Zurich so it can be directly shown at the conference venue and participants will be able to interact with the application.

References

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