

Visual variables for pictorial signs in the city immersive geovisualization

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Abstract: On a map apart from position, expressed by X and Y coordinates – position, the basic qualitative visual variables by Bertin (1967) are form-shape, orientation and hue (Forrest 2015). A symbol map of nominal points can be used to represent the distribution of points of interest in a city by using signs with a complex graphic structure (Lambert & Zanin 2020). Such pictorial signs are quickly and intuitively interpreted because they are associated by graphical elements, e.g. a cup represents a coffeehouse.

In these considerations, we will focus on visual variables for pictorial signs in immersive geovisualization in the three-dimensional space of the city. Immersive geovisualization associated with the virtual reality system is here dedicated to direct observation of the streets and buildings in the city. It is in such a three-dimensional space that box symbols with an internal graphic structure are fitted. It is interesting what visual variables are appropriate for distinguishing the location of objects at a distance from the observer (Figure 1).

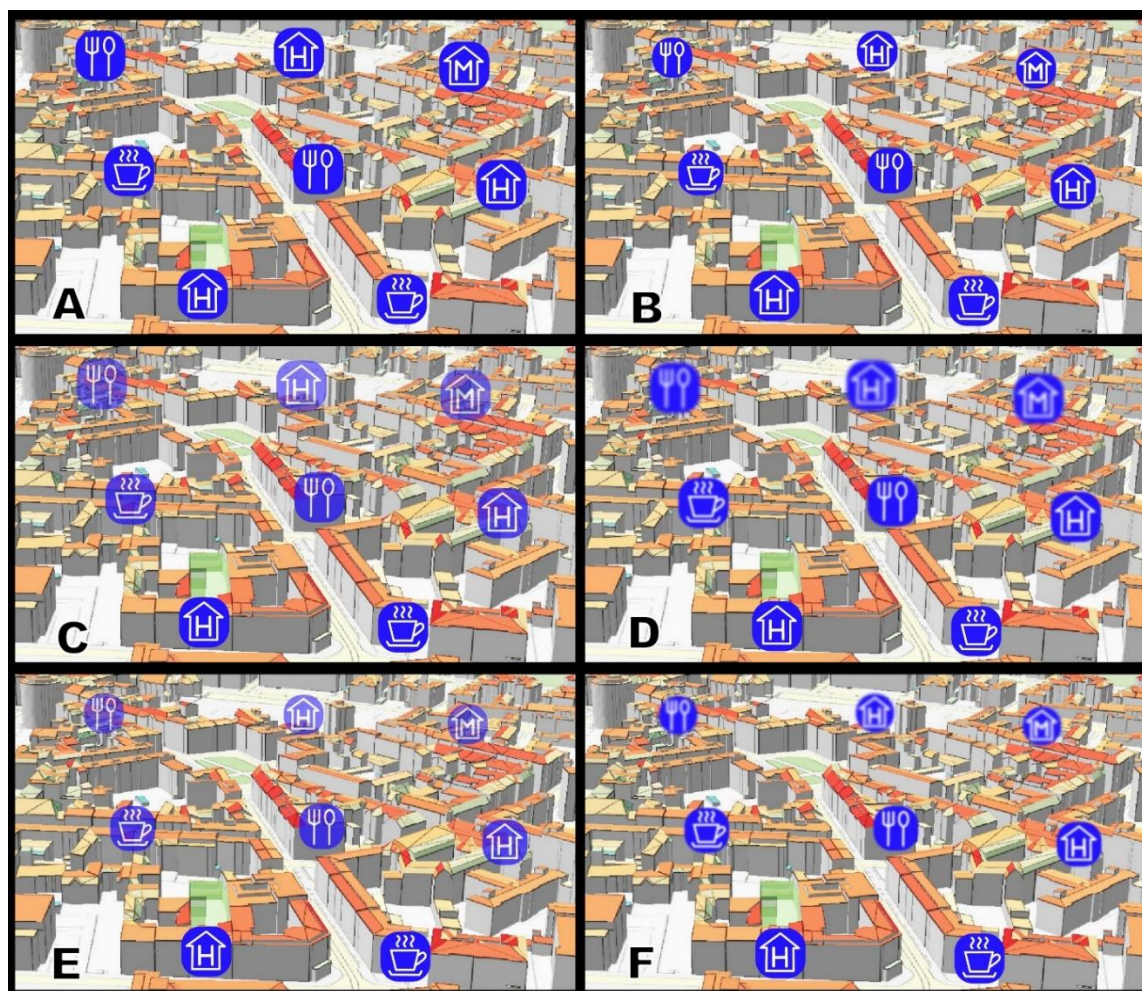


Figure 1. Juxtaposition of visual variables in city immersive geovisualization: A – position, B – position and size, C – position and transparency, D – position and sharpness-blur, E – position, size and transparency, and F – position, sharpness-blur and transparency (Fragment Poznań city from <http://sip.poznan.pl/model3d/#/legend> 2025/25/01).

The aim of this research is to indicate the effectiveness of point symbol visual variables for representing the distance of points of interest from the observer in city immersive geovisualization. In deed effectiveness is understood here in two ways: firstly as the ease of indicating the distance to objects from the observer and secondly as the user's opinion about the best representation of the distance to objects.

The key significance is the distance of objects from the observer in three zones according to the following variables: position, size, transparency and sharpness-blur. Such variables are used in augmented reality, where size and transparency work best for distinguishing the distance from the observer with a smartphone (Halik & Medyńska-Gulij 2016).

Figure 1 shows six variants for observing a fragment of a city with eight objects distributed in three zones of distance: nearest with hotel and coffeehouse, middle distance with coffeehouse, restaurant and next hotel and farthest zone with restaurant, hotel and museum. Based on research with users in VR goggles and on the monitor, it will be possible to indicate which of these variants is the most effective for representing objects by typical cartographic symbols in 3D city provided with specific variables.

References

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