

Basemap Layers Usability Evaluated by Eye tracking Device

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Abstract. The paper assesses usability of basemap layers on map portals. Satellite or topographic background under the thematic maps are mentioned as a base layers. There are used for orientation over the map. Map background play crucial role for map usability. The reaction time describes how fast user can find given target. It is dependent on selected map background. Moreover it influences popularity and usability of each map. The research based on eye tracking technology provides one of the most objective evaluation metric. Eye tracking system offers opportunity for design, analyze and evaluate both digital and analog maps. The research was made on SMI iView 250 RED device in Eye-tracking lab at Department of Geoinformatics, Palacký University in Olomouc. It is the first eye tracking lab in the Czech Republic in the field of Cartography and Geoinformatics. The eye position and eye direction is detected by the infrared light reflection from the cornea at 60Hz temporal resolution. System latency at 60Hz is < 25 ms. Forty-seven respondents in total (twenty-seven women and eighteen men in age range 19-28) participated in the survey. First eye tracking research took place in eye tracking lab followed by an oral discussion. Six maps in total were shown as a stimulus - three different couples of both satellite and standard basemap. The order of classic or satellite map background was randomly changed. The different city was given as a target on each map. User's reaction time from defining the goal to finding the goal was measured and tracked. The instructions were given by oral form once. When previous task is done the empty screen with the cross in the center is shown. The operator gives the following task and next map is shown. Wilcoxon test (paired sample) was used for statistical evaluation. According to results we cannot confirm that the difference by conventional criteria is statistically significant between maps in the first couple. In other two couples we can confirm that difference is statistically significant and standard basemap layer is more suitable for searching task compared to satellite basemap. By oral discussion with participants was confirmed that the color

and density imbalance on satellite map complicates orientation over the map.

Keywords: Basemap, Eye movement analysis, Eye tracking, Map Usability