



XXIII International Society for Photogrammetry and Remote Sensing (ISPRS) Congress
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ABSTRACT OF THE TUTORIAL 9

Usability methods and eye movement analysis for understanding the use of remotely sensed imagery, 3D geovisualizations and virtual reality

Duration:

Half day - 12 July 2016

Conveners:

Dr. Arzu Çöltekin

Dr. Raechel Bianchetti

Keywords:

image interpretation, usability, 3D, virtual reality, eye tracking, human factors

Target Group:

Graduate students and scientists writing papers about use and usefulness of imagery and 3D visualizations/VR, anyone who is interested in human factors in visualization, practitioners who would like to learn how to conduct usability studies with their products

Abstract:

While geographic imagery has been a valuable data source for producing abstract cartographic maps and 3D (terrain or city) models; they are also utilized directly for image interpretation or photorealistic 3D models and virtual reality. It has been demonstrated that these realistic visualizations can cause “information overload” (Eppler & Mengis, 2004). In fact, choosing realistic ones over abstract visualizations may be a bad decision in some cases. Based on these observations and empirical evidence; the “naïve realism” and “naïve cartography” theories have been proposed in recent years (Hegarty, Smallman, Stull, & Canham, 2009; Smallman & John, 2005). Thus, it is critically important to understand when such displays are usable, and how can we assess the underlying reasons of human errors with information rich, complex visualizations. Usability approaches for image interpretation vary from qualitative observations to controlled lab studies, and eye movement analysis has been suggested as a useful approach and was adopted by many in recent years (Bianchetti & MacEachren, 2015; Brus, Popelka, Brychtova, & Svobodova, 2012; Çöltekin, Heil, Garlandini, & Fabrikant, 2009). In this tutorial, we will provide several lectures on the usability methods and in particular what can we learn from eye movement analysis, and we will provide the participants with a small eye movement data set, which they can explore using a dedicated open source software and/or a GIS if they chose to do so.

Raechel Bianchetti’s CV

Dr. Raechel Bianchetti specializes in cognitive aspects of remote sensing image analysis. Her previous research has addressed the impacts of expert training and experience on the interpretation of imagery for forest disturbance detection and attribution. Her work is heavily influenced by historical developments in remote sensing and air photo interpretation, landscape perception, cognitive science, Geographic Object-Based Image Analysis (GEOBIA) and visual methods.

Raechel graduated from Pennsylvania State University in 2014 with a PhD in Geography. Her prior education includes a M.S. in Geography from the University of Idaho, a B.S. in Geography (minor in Geology), and B.Envs. in Environmental Science (Statistics and Geology emphasis).

Arzu Çöltekin's CV

Dr. Arzu Çöltekin is a *Research Group Leader and Senior Lecturer* with the Geographic Information Visualization and Analysis group at the Geography Department of the University of Zurich. Her research interests have two main tracks supporting geovisualization design: 1) bridging concepts in vision and visualization top-down via theories of vision, and, 2) testing these concepts with people via user experience studies bottom-up. Her interdisciplinary work covers topics related to visualization, vision, cartography, geographic information science, virtual environments, gazecontingent displays, eye tracking, and human-computer interaction. Dr. Çöltekin has been honored with a professorship offer in 2010 in Florida, USA following a two-day evaluation process (which she declined for personal reasons). She has delivered many invited talks at internationally reputed universities, as well as two large public speaking events (TEDxZurich 2011, TEDGlobal 2013). She is the recipient of scholarships from various institutions including IAESTE, Center of International Mobility Finland, The Scientific and Technological Council of Turkey, Finnish Cultural Foundation, National Research Center Canada. She is a member in conference program committees and lead or co-lead organizer scientific events with the ISPRS, AGILE, InfoVis (UK), IEEE VisWeek, Geocomputation, ETRA, AutoCarto and GIScience. She is an active member of several professional associations, including the ICA (International Cartographic Association) and ISPRS (International Society for Photogrammetry and Remote Sensing) commissions on Geovisualization and Virtual Reality. She serves as a co-chair in the latter.