cVIS – Framework for Analyzing and Simulating Perceptual and Cognitive Processes in Visualization Research

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Eurographics Tutorial: Eye Tracking Visualization | 05/04/2015 | Zürich, Schweiz
Interdisciplinary Approach

We propose to use results of eye tracking experiments in the WHERE and WHAT space to formulate cognitive models for simulating visual search strategies. These simulations will lead to a better understanding of visualization parameters leading to optimize cognitive ergonomics of visualizations.
Parallel Scan-Path Visualization Technique

Gaze duration inside an AOI
→ Perceptual and cognitive process

Fixations outside given AOIs

Saccades between given AOIs

Will be annotated with semantic information.

Michael Raschke, Xuemei Chen, Thomas Ertl: *Parallel Scan-Path Visualization* – ETRA 2012
Michael Raschke, Dominik Herr, Tanja Blascheck, Michael Burch, Michael Schrauf, Sven Willmann, Thomas Ertl: *A Visual Approach for Scan Path Comparison* - ETRA 2014
Parallel Scan-Path Visualization Technique

**Task:** Read given position(s).

**Task:** Compare Triangles.
What can we find in WHAT space?

Semantic Models

Semantic Annotation on two levels:

- Visualization concept level
- Graphical elements level

Raschke, Michael, Heim, Philipp, Ertl, Thomas: Interaktive verständnisorientierte Optimierung von semantisch-annotierten Visualisierungen - INFORMATIK 2011
Semantic Annotation of Visualizations

Raschke, Michael, Strohmaier, Stefan, Blascheck, Tanja, Ertl, Thomas: Annotation of Graphical Elements in Visualizations for an Efficient Analysis of Visual Tasks, CHI 2014 Work in Progress
Annotation with Ontology

How to read a Visualization?
Cognitive Simulation
Cognitive Simulation
Framework

Ontology

Visualization

as stimulus

Annotation

of graphical elements

Eye Tracking Experiment

comparison

Analysis Optimization

Declarative Knowledge Production Rules

Simulation