EuroRV^3 2017

EuroVis Workshop on Reproducibility, Verification, and Validation in Visualization

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Preface

The fifth EuroRVVV (EuroVis Workshop on Reproducibility, Verification, and Validation in Visualization) workshop was co-organized by Kai Lawonn (University of Koblenz - Landau, Germany), Noeska Smit (University of Bergen, Norway), and Douglas Cunningham (BTU Cottbus-Senftenberg, Germany). The call for papers this year focused on the topic of 'Perception in Visualization'. Submitted papers underwent a one-stage peer-review process, and five papers were accepted for presentation. The full program featured a combination of paper presentations and invited talks.

Kai Lawonn, Noeska Smit, and Douglas Cunningham

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Keynote

Modifying Perceptual Experiments to Evaluate Visualization Techniques

Douglas Cunningham
Chair of the Graphic Systems Department at BTU Cottbus-Senftenberg, Germany

Abstract

From the drawings of a small child to the master pieces of great artists, the vast majority of images created by people are intentionally designed to communicate something specific. Whether or not the images are any good at conveying that information is an empirical question. This is just as true for the images created through visualization techniques. After spending a tremendous amount of thought, effort, and time designing and implementing a new technique to make complex information easily visible, it is only natural to want to know if the technique communicates as intended. The bad news it that reliably evaluating the effectiveness of a technique is every bit as complex as creating a new visualization technique. The good news is that since Gustav Fechner created the field of Psychophysics in 1860, perceptual psychologists have been perfecting the ability to systematical measuring what people can see in images. Although the images used by perceptual psychologists tend to be very simple (for important reasons), a number of scientists have altered these techniques in the last few decades to work with the realistic images computers are now capable of producing. In this talk, I will present the basic concept behind perceptual experiments, show how it can be expressed cleanly and accurately in a single equation, and show what implications this has for designing experiments for evaluating visualization techniques.

Invited Talk

Searching Where the Light is and Where it is not: Strategies for Better Studies

Robert Kosara
Research Scientist at Tableau Software, United States

Abstract

We want to know how perception works, so we run experiments. But what we do in those experiments often depends more on what we can measure than what we really want to know. In particular, we like to measure accuracy and response time. But do we really care that much about those? Do the people who use visualization? In this talk, I will give a brief overview of the kinds of experiments that are commonly run, and then sketch the next step: where do we go from here? What do we need to re-examine? What can we build on to learn more about what actually matters – both to visualization as a field and the people who ultimately use what we produce?

Invited Talk

Reproducibility in Perception-Based Medical Visualization Studies

Bernhard Preim
Head of the Visualization group at the Otto von Guericke University, Magdeburg, Germany

Abstract

In this talk, I re-examine a number of perception-based studies that were performed to understand depth and shape perception, e.g. in visualizations of vascular structures or DTI fiber tracts. The results of these experiments indicate whether some depth-encoding techniques, such as color scales, halos or lighting schemes improve perception over standard techniques and how different depth-encoding techniques perform relative to each other. Many questions arise w.r.t. trustworthiness and generalizability of the results. In this talk, I focus on the reproducibility, often also referred to as internal validity of the results.

Keynote

The Computational Modelling of Visual Attention: Saliency Model vs Saccadic Model

Olivier Le Meur
Associate Professor at the University of Rennes, France

Abstract

In this presentation, we propose a new framework to predict visual scanpaths of observers while they freely watch a visual scene. The visual fixations are inferred from bottom-up saliency and several oculomotor biases. Bottom-up saliency is represented by a saliency map whereas the oculomotor biases (saccade amplitudes and saccade orientations) are modeled using public eye tracking datasets. Our experiments show that the simulated scanpaths exhibit similar trends of human eye movements in a free-viewing condition. The generated scanpaths are more similar to human scanpaths than those generated by two existing methods. In addition, we show that computing saliency maps from simulated visual scanpaths allows to outperform existing saliency models. This presentation is based on the two following papers:

- Le Meur, O., & Liu, Z. (2015). Saccadic model of eye movements for free-viewing condition. Vision research, 116, 152-164.
- Le Meur, O., & Coutrot, A. (2016). Introducing context-dependent and spatially-variant viewing biases in saccadic models. Vision research, 121, 72-84.