

FOUR EYES

IMAGING

INTERACTION

INNOVATIVE

INTERFACES

Four Eyes Lab

Friday May 27th 2016

2016 Open House

3rd floor, Elings Hall, UC Santa Barbara

5 – 9 pm

The [Four Eyes Lab](#), directed by [Matthew Turk](#), [John O'Donovan](#), and [Tobias Höllerer](#), supports research in imaging, interaction, and innovative interfaces, looking beyond the traditional graphical interface to develop novel interaction technologies and enable new applications that are mobile, highly interactive, and multimodal. Such systems should perceive the user's actions and intentions, display rich representations of the world and task-specific information, and provide intuitive and powerful ways for users to interact with their applications.

Project Description



Scene Capture and Novel View Generation for User-perspective Magic Lenses

Domagoj Baričević

Generating novel views of a live scene (i.e. views that have not been directly observed) is important to many augmented reality scenarios. This work explores this problem in general, in particular scene reconstruction, and presents a specific example of the user-perspective magic lens.



Guided Capture & Virtual Navigation of Reconstructed Scenes

Benjamin Nuernberger and Lennon Grinta

We present methods for virtual navigation and guided capture of reconstructed scenes (via collaboration or automatic methods). The latter is realized with disambiguating 2D annotations in 3D and Google Project Tango for live remote collaboration.



Design the Driver's Info Center of the Future

Renate Häuslschmid

New technology will enable the display of 3D information within the driver's view as an augmentation of the real world. The so-called Head-Up or Windshield Display allows the driver to access and interact with any type of information. We want to find out, which information is of interest for you as a driver/passenger and where you would like to see this information. Help us designing your future automotive info center!



Studying the Effects of Field of Regard on the Transfer of Full Surround Mixed Reality Training

Tibor Goldschwendt

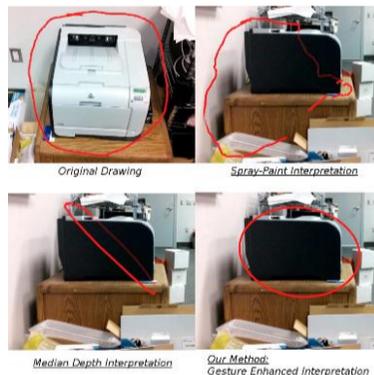
We study the impact of field of regard on virtual reality training transfer with the AlloSphere. Participants were asked to learn how to eliminate fires by controlling water-dropping helicopters. The result of this study shows that field of regard has a significant impact on the transfer of virtual reality training.



Hololens

Brandon Huynh and Adam Ibrahim

Come see a short demo of the new Microsoft HoloLens Augmented Reality device and hear about our upcoming research.



Annotation Interpretation for AR-based Remote Collaboration

Kuo-Chin Lien and Benjamin Nuernberger

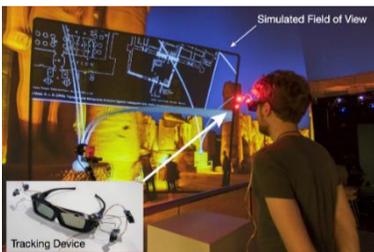
We present a method for collaborative augmented reality (AR) that enables users from different viewpoints to interpret object references specified via 2D on-screen circling gestures.



vMemo

Yun Suk Chang, Ilyne Han, Maneesh Karipineni, Michael Radbel, and Matthew Ruth

Construction sites contain multiple faults (some can have over 10,000 faults), so it is troubling for construction workers to mark and locate these faults on a list or 2D map. To help the construction walk-through process, my team has built an Augmented Reality app that posts virtual memos to mark and locates the faults in 3D space. We also implemented a map that tracks the user's location to provide additional geographic information.



Evaluating Wide-Field-of-View Augmented Reality with Mixed Reality Simulation

Donghao Ren, Tibor Goldschwendt, Yun Suk Chang, and Tobias Höllerer

In this study, we look into one aspect of anticipated future augmented reality: wide field of view. We experiment with annotations that link elements far apart in the visual field. We conducted a study comparing user performance within an information-seeking scenario, comparing two different fields of view and presence and absence of tracking artifacts. A constrained field of view significantly increased task completion time.



The Exorcism of Elings

Nataly Moreno and Samuel Dong

The Exorcism of Elings is an augmented reality installation set on the third floor of Elings Hall. Ghosts have possessed some of the objects on the third floor. The player is to investigate the situation and exorcise all of the ghosts from Elings. Once they have found all of the clues, the player will discover the true purpose of the ghosts and their mysterious leader. Through this game, techniques in designing effective augmented reality experiences are demonstrated. The installation focuses on increasing immersion, even on a personal smartphone or tablet. It does this by taking the weaknesses of current augmented reality libraries and integrating them into the game mechanics. By designing the installation around these limitations, the experience seems more engaging and avoids breaking the player's suspension of disbelief.

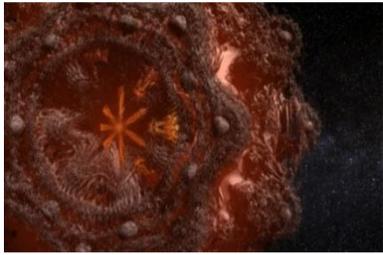
Project Description (Continued)



Perceptual Grouping in Computer Vision

Sven Dickinson

Separating objects from their background is a critical precursor to object recognition. The human vision system relies on powerful perceptual grouping cues, such as symmetry and closure, to perform such figure-ground segmentation. Inspired by our own human visual system, we develop algorithms that can exploit these same cues to segment objects in a computer vision setting.



3D Fractal Computer Animation

Han-Wei Kung

I made a computer animation that visualized 3D Mandelbrot set. My goal of this work is to research the mathematical properties of Mandelbrot, with a hope of creating interesting and visually beautiful animation. Ultimately I want to extend this animation to a 360-degree stereo film to explore the power of storytelling that an immersive film could offer.



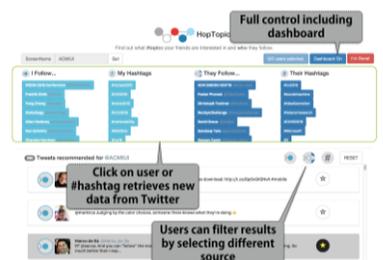
Getting Inside Climate Change

Andreas Butz, Donghao Ren, and Evan Barnett

Classical InfoViz is concerned with deriving new insights from visual representations of abstract data. For the very pressing topic of climate change, many insights have already been gained, but they fail to trigger appropriate reactions of decision and policy makers.

The allosphere constitutes a very impressive display with the potential to immerse groups of spectators deeply into visual and acoustic worlds. In this project, we collected existing data, simulations and predictions on climate change and are currently integrating it into a narrated story about the impending consequences of climate change under different scenarios.

In contrast to classical visualizations, this visually immersive story is meant to leave strong impressions and emotional reactions and thereby target decision makers through a different channel. It is not meant to obtain new insights, but rather to immerse its spectators deeply inside the existing ones.



HopTopics

Byungkyu Kang, Nava Tintarev, and John O'Donovan

Microblogs such as Twitter have become well-established access points for breaking news and other information. In these platforms, social connections support information flow, but these connections are not always the best information curators. In this paper, we focus on the informational and user experience benefits of user-driven topic exploration in microblog communities, in a transparent, controllable and personalized manner. To this end, we introduce ``HopTopics'' -- a novel interactive tool for exploring content that is popular just beyond a user's typical information horizon in a microblog, as defined by the network of individuals that they are connected to.



Cosmetics & Culture: An Analysis of Online Product Reviews

Shinsuke Nakajima, John O'Donovan, Byungkyu (Jay) Kang, and Jenny Vien

Cosmetic products are inherently personal. Many people rely on product reviews when choosing to purchase cosmetics. However, reviewers can have tastes that vary based on personal, demographic or cultural background. Prior work has discussed methods for generating attribute-based explanations for item ratings on cosmetic products, based on associated text-based reviews. This paper focuses on evaluating explanation interfaces for product reviews and related attributes. We present the results of a cross-cultural user study that evaluates five associated explanation interfaces for cosmetic product reviews across groups of participants from three different cultural backgrounds.



MovieMiner

James Schaffer and John O'Donovan

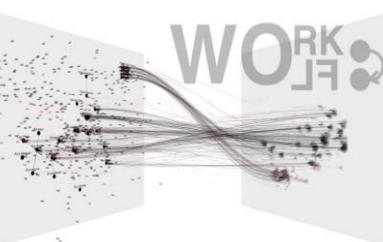
In many real-world applications that support item recommendation, search functionality is frequently offered to users in parallel. In this setup, users must make active choices between query-driven search and personalized, profile-based recommendations. We conducted a study (N=526) on users of Movie Miner --a movie discovery tool that supports search and recommendation in parallel. Analysis of user cognitive metrics, observed behavior, task outcomes, and user experience metrics produced several key findings that we believe are important for the design of recommender systems: 1) user experience with such systems may be measured along one single scale rather than a collection of individual factors (understandability, control, usefulness, trust, etc.), 2) users that understand ``movie data'' and exhibit higher cognitive attention display different usage patterns than their peers, 3) control over, and explanations from the recommender improved task outcomes, 4) increased effectiveness of recommendations improved user experience, and 5) interacting with a recommender can cause a perceptual bias, but this can be avoided by helping the user understand the system via interactive feedback and explanations.



Interactive Mood-based Music Recommendations

John O'Donovan

We will show a live demo of the MoodPlay system, which is an interactive music recommender system that gives you personalized music recommendations, tailored to whatever mood you happen to be in. Explore a huge space of musical artists in an interactive mood-space. Use navigation trails to fine-tune your recommendations. This is an ongoing project, and the presentation will describe experiments and results from two recent studies with the system.



Workflow and Network Visualization Study

Donghao Ren, Laura Marusich, Jonathan Z Bakdash, John O'Donovan, Heather Roy, Sue Kase, Daniel Cassenti, James Schaffer, Wan-Yi Lin, and Tobias Höllerer

We investigated human understanding of node-link and matrix network visualizations in a large-scale online experiment. The large sample size (N = 600) in our experiment leads to high statistical power and thus more precise estimation of detailed effects than previous research. Findings indicate that participant understanding was best for the node-link visualization, with higher accuracy and faster task times than the matrix visualizations.