Biswaksen Patnaik

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Research Summary

HCI, XR, Visualization, Physical Computing

I work at the intersection of Human-Computer Interaction and Data Visualization. My work leverages interactive data visualization as a platform for delving into **post-WIMP user interfaces** (*windows, icons, menus, pointer*). I am interested in designing multimodal-interaction techniques that support situated interaction.

Education

2019 – present

University of Maryland, College Park, MD, United States
Ph.D. in Computer Science, Advisor: *Dr. Niklas Elmqvist & Dr. Huaishu Peng*

Research: Enabling Ubiquitous Analytics (ad-hoc analytical environments in physical spaces) through Physical Computing and XR

2017 – 2019

University of Maryland, College Park, MD, United States
M.S. in Human-Computer Interaction, Advisor: *Dr. Niklas Elmqvist*
Research: Olfactory Analytics: Exploring the design space of smell for data visualization

2012 – 2016

National Institute of Technology, Rourkela, India
B.Tech. in Industrial Design

Work Experience

Jun - Aug 2019

Sussex Computer Human Interaction Lab, *Visiting Scholar*, University of Sussex, UK.
Advisor: Dr. Marianna Obrist, Dr. Sriram Subramanian, Dr. Niklas Elmqvist
Project: Exploring mid-air haptics for human-data interaction

May - Aug 2018

Human-Computer Interaction Group, *Research Intern*, Hasso-Plattner Institute, Germany.
Advisor: Dr. Patrick Baudisch
Project: Designing low-cost force feedback mechanisms for haptic devices for blind users

Feb - May 2017

Wearable Computer Lab, *Research Intern*, University of South Australia.
Advisor: Dr. Ross Smith, Dr. Bruce Thomas
Project: Investigating collaborative shape display interactions

May - Jul 2015

Keio-NUS CUTE Center, *Research Intern*, National University of Singapore.
Advisor: Dr. Nimesha Ranasinghe, Dr. Ellen Yi-Luen Do
Project: Designing user interface for digital-taste (simulating taste with electrical-stimulation)

May - Jun 2014

Ergonomics Lab, *Research Intern*, Indian Institute of Technology, Guwahati, India.
Advisor: Dr. Sougata Karmakar
Project: Designing ergonomic interventions for factory workers in blending workstations

Publications

Journal Papers

J1. **Biswaksen Patnaik**, Huaishu Peng, Niklas Elmqvist. Sensemaking Sans Power Interactive Data Visualization Using Color-Changing Ink. *IEEE Transactions on Visualization and Computer Graphics*, 2022.

J2. Pramod Chundury, **Biswaksen Patnaik**, Yasmin Reyazuddin, Christine W. Tang, Jonathan Lazar, Niklas Elmqvist. Towards Understanding Sensory Substitution for Accessible Visualization: An Interview Study. *IEEE Transactions on Visualization and Computer Graphics*, 2022.

J3. **Biswaksen Patnaik**, Andrea Batch, Niklas Elmqvist. Information Olfactation: Harnessing Scent to Convey Data. *IEEE Transactions on Visualization and Computer Graphics*, 2018.

J4. J Sanjog, **Biswaksen Patnaik**, Thaneswer Patel, Sougata Karmakar. Context-specific design interventions in blending workstation: an ergonomics perspective. *Journal of Industrial and Production Engineering*, 2015.

Conference Papers

C1. **Biswaksen Patnaik**, Huaishu Peng, Niklas Elmqvist. VisTorch: Interacting with Situated Visualizations using Handheld Projectors. *In Proceedings of the ACM Conference on Human Factors in Computing Systems*, to appear, 2024. [1,060/4,028, 26.3% acc. rate]

C2. Andrea Batch, **Biswaksen Patnaik**, Moses Akazue, Niklas Elmqvist. Scents and Sensibility: Evaluating Information Olfactation. *In Proceedings of the ACM Conference on Human Factors in Computing Systems*, 2020.

C3. Mohammed Rajik Khan, **Biswaksen Patnaik**, Sonalisa Patel. Design and Development of a Novel Sit-to-Stand and Mobility Assistive Device for Ambulation and Elderly. *In Proceedings of the International Conference on Research into Design*, 2017.

Workshop Papers

W1. **Biswaksen Patnaik**, Andrea Batch, and Niklas Elmqvist. Olfactory Analytics:Exploring the Design Space of Smell for Data Visualization. *AVI Workshop on Multimodal Interaction for Data Visualization*, 2018.

Awards

2019 – 2021 **Dean's Fellowship**. Departrment of Computer Science, University of Maryland College Park

2018 **Travel Award**. HCIM Student Travel Award, iSchool, University of Maryland College Park

Skills

Programing: Python; *Web*: HTML, CSS, JavaScript

Design & Analysis: d3.js, A-Frame, Autodesk (Inventor/Fusion360), CATIA, SOLIDWORKS, Adobe (Photoshop, Illustrator, PremeirePro), Unity, Ansys, Tableau, UX Research, Human Factors, User Study

Hardware: Arduino, Raspberry Pi, 3D Printing, Rapid Prototyping, Workshop Technology

Teaching & Service

Spring 2024   **Teaching Assistant**. *CMSC425: Game Programming*, Department of Computer Science, University of Maryland College Park

CHI 2024   **Reviewer**. ACM Conference on Human Factors in Computing Systems

April 2019   **Student Volunteer**. Human-Computer Interaction Lab Symposium, University of Maryland

Fall 2018   **Teaching Assistant**. *INST362: User-Centered Design*, iSchool, University of Maryland College Park

References

CA^3 **Dr. Niklas Elmqvist**
Center for Anytime Anywhere Analytics (CA^3)
Department of Computer Science, Aarhus University, Denmark
College of Information Studies, University of Maryland College Park, USA

Smart Lab   **Dr. Huaishu Peng**
Small Artifacts Lab (Smart Lab)
Department of Computer Science, University of Maryland College Park, USA