FROM DESKTOPS TO TABLETOPS:
OPPORTUNITIES & CHALLENGES

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THE RADICAL PROMISE OF THE MULTI-TOUCH INTERFACE

Jeff Han, 2006
MULTI-TOUCH SURFACES (WALL DISPLAYS & TABLETOPS)

- Research centres
- Museums
- News
- Classrooms
WHO AM I & WHAT AM I DOING

MULTIDISCIPLINARY BACKGROUND & INTERESTS
How can we combine fine arts and computer science?

How can art make CS reach beyond CS audiences?
WHO AM I & WHAT AM I DOING

FOLLOWING A DREAM: CONNECTING ART AND COMPUTER SCIENCE

MSC. Information Visualization, 2006-2008
WHO AM I & WHAT AM I DOING

FOLLOWING A DREAM: INVESTIGATING MULTI-TOUCH SURFACES

PhD in Collaborative Visualization, 2008-2014
WHO AM I & WHAT AM I DOING

MY AREAS OF INTERESTS

- Large Interactive Surface
- Collaborative Visual Analytics (CVA)
- Visual Analytics (VA)
- Computer Supported Collaborative Work (CSCW)
- Human-Computer Interaction (HCI)
MAIN THEMES OF MY WORK

- Understanding the need for a new tool
- Designing visual tools for communication
- Helping people to make decision by making information more accessible & more meaningful
- Evaluating & analyzing the effects
MY PHD JOURNEY

2008-2010
Gaining a better understanding, IEEE VAST 2010, InfoVis 2012

2010-2012
Designing, Implementing, evaluating a tool, HICS 2013, ITS 2011

2012-2014
Proposing new features, IEEE VAST 2014, Best Paper Award
WHAT I WANT TO SHARE TODAY

- Overview
- Design Challenges: Tabletops
- Design Challenges: Collaborative Visual Analytics (CVA)
- Projects:
  - Observational user study
  - CoSpaces
- Contributions & Future Work
WHY COLLABORATE VISUAL ANALYTICS (CVA)?

- **Collaboration:**
  - Diverse backgrounds
  - Quality of work
  - Individual bias
  - Task Load

- **Visual Analytics**
  - Visual representation
  - Interactive exploration
DESIGNING FOR TABLETOPS: SOME CHALLENGES

- Orientation
- Fluid interactions
- Territoriality: individual vs. group space
- Awareness
- Changes in collaboration styles
LET’S TALK ABOUT THE DESIGN PROCESS

1. Understand the problem (real problems!)
2. Design a tool (make lots of mistakes!)
3. Evaluate the tool (this is the hardest step!)
4. Reflect on the design (this is how you advance the field!)
FINDING THE ISSUES: OBSERVATIONAL STUDY


DESIGNING A USER STUDY: CAREFUL CONSIDERATIONS

- Task: a business scenario (sales projection decisions)
- Dataset: sales of clothing items in 8 US states for 3 years
- Tool: a current tool from SAP
- Participants: 9 groups of 3
- Process: 90 min
- Observations: videos & interviews, analyzed participants’ notes
- Data analysis: qualitative evaluation methods
QUANTITATIVE VS. QUALITATIVE EVALUATION METHODS

- Numeric information
  - Objective
  - Limited
- Non-numeric information
  - Highly subjective
  - Much harder to deal with, why? why it's important?
HOW TO DO QUALITATIVE ANALYSIS WELL?

- limit the bias:
  - More than one coders
  - Independent coding
  - Triangulation of mixed-methods
AWARENESS PROBLEMS I DISCOVERED IN MY STUDY

- Notetakers lost track of what others were doing
- Suggests: integrate notes within the application
USER STUDY: CHALLENGES

- Task design and choosing the dataset
- Participants (number, real analysts, conditions)
- Motivation (e.g., incentives, prizes, etc.)
- Length of the study (break in the middle)
- Analyzing massive data (We spent nearly 2 months on analyzing gathered information)
COSPACES (COLLABORATIVE WORKSPACES)


COSPACES: VIDEO
MOST IMPORTANT RESULTS

- Groups found chart-saving and note functions very useful
- Worksheet flexibility facilitated analysis
- Tabs were not used as much as we expected
THINGS I HAVE DONE IN MY RESEARCH

Critical role of note taking

Integrating record keeping

LCW, and metrics

Multi-display eco system

Metrics for engagement

MANY INTERESTING DIRECTIONS

What is next?
ACM ISS (INTERACTIVE SURFACES & SPACES), 2016
THANK YOU!
NARGES MAHYAR

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SLIDES, PAPERS, AND MORE:
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WHO AM I & WHAT AM I DOING

METHODS

- Ethnography
- Observational User Study
- Case Study
- System Building
- Qualitative & Quantitative Evaluation
INTERESTING LINKS

- Jeff Han, Demo, 2007, Multi-touch wall display:
  - https://www.youtube.com/watch?v=JfFwgPuEdSk

- Jeff Han, Ted Talk, 2006:
  - https://www.ted.com/talks/jeff_han_demos_his_breakthrough_touchscreen?language=en
TEACHING PHILOSOPHY

- Engaging and motivating students
- Integrating research and teaching
- Providing a collaborative environment
- Being available and accessible
- Fostering creativity & respecting individual differences
- Developing critical thinking & reasoning
TEACHING EXPERIENCES

- TA : CS courses: instructor, marker, admin
- Guest lecturer: several HCI Courses
- Fine art instructor
- Co-founder & instructor, Creative Children Institute
TEACHING GOALS

- Prepare students to play a leading role in the inception of new media and the design of innovative technologies.

- Equipping students with the knowledge, skills and experiences that prepare them to work in an ever-changing and challenging world.
WHAT IS HUMAN-COMPUTER INTERACTION (HCI)

- The design and evaluation of systems, applications, or devices that utilizes computation or information and communication technology to support human activity in a manner that respects the users physical, cognitive, social, and cultural needs and aspirations.

- Kellogg S. Booth, 2016
WHAT IS CSCW

- How collaborative activities and their coordination can be supported by means of computer systems.

- CSCW is the study of the tools and techniques of groupware as well as their psychological, social, and organizational effects.

- Jonathan Grudin ‘88
CSCW MATRIX

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<tr>
<th>Same place (co-located)</th>
<th>Different place (remote)</th>
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<tbody>
<tr>
<td>Same time (synchronous)</td>
<td>Face-to-face interactions</td>
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<td>Different time (asynchronous)</td>
<td>Continuous Task</td>
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<td>Remote interactions</td>
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<td>Communication + Coordination</td>
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