New Multimodal Experiences for Communicating with an Audience about Data

Matthew Brehmer, Tableau Research
–
@ University of Utah SCII – Oct 5 2022
About Tableau Research
research.tableau.com

est. 2012 | director: Vidya Setlur

a team of 9 researchers + architects, working on:

visualization, human-computer interaction, natural language processing / generation, cartography, applied machine learning, …
New Multimodal Experiences for Communicating with an Audience about Data

From Jam Session to Recital: Synchronous Communication and Collaboration around Data in Organizations
VIS 2021, with Robert Kosara

The Information in our Hands
Information+ 2021

Augmented Chironomia for Presenting Data to Remote Audiences
UIST 2022, with Brian D. Hall and Lyn Bartram
From Jam Session to Recital
Synchronous Communication and Collaboration around Data in Organizations

VIS 2021, Matthew Brehmer and Robert Kosara
Communicating data to an audience

In N. Henry Riche, C. Hurter, N. Diakopoulos, and S. Carpendale, eds.,

Data-Driven Storytelling. AK Peters/CRC Press, 2018

gapminder.com/videos
From Jam Session to Recital
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Aim of this study:

Look beyond scenarios of individual, asynchronous consumption involving communicative data visualization …

Understand scenarios of synchronous communication around data
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Interviews with 18 people who prepare and / or deliver presentations involving data within their organizations.

Reflection on current practices and frustrations.

3 design probes examining different aspects of presenting data.
Key findings:

3 scenarios for synchronous communication around data; a spectrum of formality

Collaboration: role diversity, content handoff + repurposing

Both slideware and business intelligence tools unsatisfying, for different reasons
3 scenarios for synchronous communication around data; a spectrum of formality
Small collaborative team meetings around data can be likened to musical jam sessions.

“...showing them the doors, metaphorically speaking, the doors that are available that I found in the data, and then they would open them.” – P4, retail analyst
jam sessions as rehearsals for more formal presentations.

presentation materials used with manager to “prove our point with charts”
– P3, manufacturing analyst
Cross-functional team meetings around data can be likened to semi-improvised performances (e.g., live coffee house jazz).

“If you go to my engineering team, they care about the meaning […] for the sales team, you are just looking at quotas: have you met the goal or not?”

– P13, data strategist
Presentations to executives and customers can be likened to formal recitals at the concert hall.

“As soon as everyone’s tied off on the validity and the accuracy of the numbers, we screenshot what we have and put that image directly into a slide”
– P05, communications specialist
“I get this sense of failure every time I’m going into PowerPoint [...but] if it will take three hours to build a ten minute presentation, I ain’t gonna do it.”
– P18, regional vice president of sales

“I want to break up an otherwise boring series of charts [...] sometimes you need to do it in different ways to keep the [audience’s] attention.”
– P9, marketing manager

“...to feel like a presentation versus a demo.”
– P5, communications specialist
implications for tool design:

... creativity support, less tool-switching, support collaborative hand-offs

... interactive visualization, yet still a presentation, not a tool demo

... direct viewer attention on-the-fly
slideware-inspired reveal controls for any chart / dashboard component
💡 slideware-inspired reveal controls for a Tableau worksheet
A secondary display “presenter view” for a business intelligence workbook
a video “tour guide” for a business intelligence dashboard
a prototype video “tour guide” for a Tableau dashboard

gapminder.com/videos
Teachable Machine

Train a computer to recognize your own images, sounds, & poses.

A fast, easy way to create machine learning models for
”The Information in Our Hands”

Information+ Conference 2021
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”200 Countries, 200 Years, 4 Minutes” – Hans Rosling, BBC 2010
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Brian D. Hall, Lyn Bartram, and Matthew Brehmer

UIST 2022

The following is an example presentation supported by our environment...
Live ML anywhere

MediaPipe offers open source cross-platform, customizable ML solutions for live and streaming media.
Using space to talk and gesture about numbers
Evidence from the TV News Archive

Bodo Winter, Marcus Perlman*, and Teenie Matlock
University of California, Merced / *University of Wisconsin, Madison

This paper examines naturally occurring gestures produced in descriptions of numbers and quantities in television newscasts. The results of our analysis show that gestures reveal the metaphorical and spatial nature of numerical thinking. That is, speakers’ hands mimic known spatial mappings between space and quantity, including horizontal mappings (smaller quantities left, larger quantities right), vertical mappings (smaller quantities down, larger quantities up) and size-based mappings (smaller quantities “small”, larger quantities “large”). Speakers frequently switch between these different spatial mappings, and they sometimes combine them within the same gesture. This points to the flexibility of how metaphors can become expressed in gesture, and how domains such as number and quantity can be conceptualized through multiple compatible source domains.

Keywords: metaphor, mathematics, number, quantity, TV news
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to appear at ACM UIST 2022
- **Functional gestures**: modify system behavior
- **Illustrative gestures**
  - Deictic gestures
  - Iconic gestures
  - Metaphoric gestures
- **Affective gestures**: convey emotion and emphasis... used to persuade and argue
- **“Operational gestures”**: performed in relation to visual elements
- **“Expressive gestures”**: can precede, co-occur with, or follow an operational gesture
Chalktalk: A visualization and communication language – As a tool in the domain of computer science education.
Ken Perlin, Zhenyi He, and Karl Rosenberg

Embodied Interactions for Novel Immersive Presentational Experiences

Febrice Matulic  Lars Engeln
Christoph Träger  Raimund Dachselt
Interactive Media Lab Dresden
Technische Universität Dresden

Abstract
In this work, we introduce and propose a preliminary realisation of a concept to enhance live multimedia presentations, where presenters are directly integrated in their presentation content as interactive avatars. Using multimodal input, especially body gestures, presenters control those embedded avatars through which they can interact with the virtual presentation environment in a fine-grained fashion, i.e. they are able to manipulate individual presentation elements and data as virtual props. The goal of our endeavour is to create novel immersive presentational experiences for live stage performances (talks, lectures etc.) as well as for remote conferencing in more confined areas such as offices and meeting rooms.
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Discussion
Open Questions, Future Work …

Creativity support for presenting data

Remote + mixed collaborative environments, role diversity + knowledge asymmetry …

Maintaining suspense and dramatic reveals …

Interaction support for both presenter + viewer

Gestural interaction beyond interface control: gesture to support rhetoric and affect
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How Do People Communicate and Collaborate with Data in Organizations?

Data is everywhere in organizations, but how do people actually use it to communicate, present, and collaborate? Matt Brehmer and I investigated this question in a pair of studies that we report on in a paper to be published at the VIS 2021 conference this week, titled *From Jam Session to Recital: Synchronous Communication and Collaboration Around Data in Organizations*. In addition to asking about people’s uses of data presentations in meetings, we showed them a series of mock-ups for ideas that we thought would make for better recorded and live presentations.

adapted from:

*From Jam Session to Recital*
Synchronous Communication and Collaboration Around Data in Organizations

VIS 2021, Matthew Brehmer & Robert Kosara
Data Visualization Society fireside chat (Jan 24 2022)
Matthew Brehmer, Frank Elavsky, & Keke Wu, hosted by Amanda Makulec

youtu.be/rYVtNEH4e4o