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New Multimodal Experiences for Communicating with an Audience about Data

Matthew Brehmer, Tableau Research

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@ 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

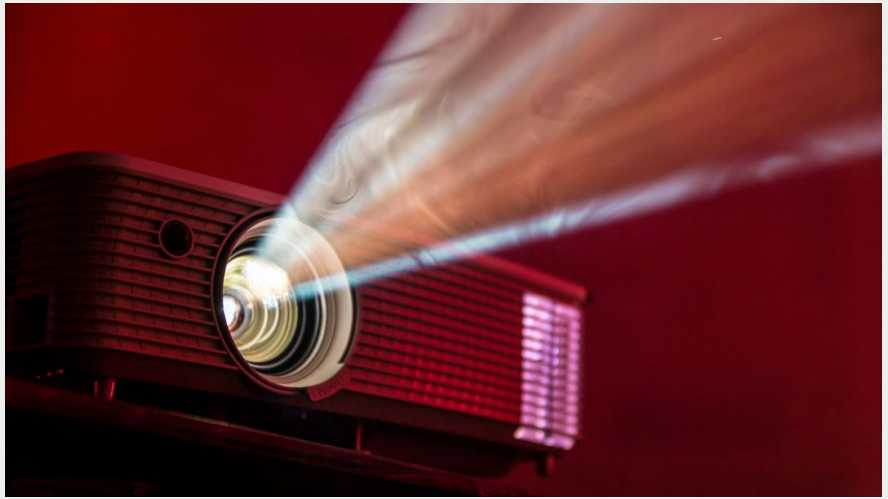
– – –

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

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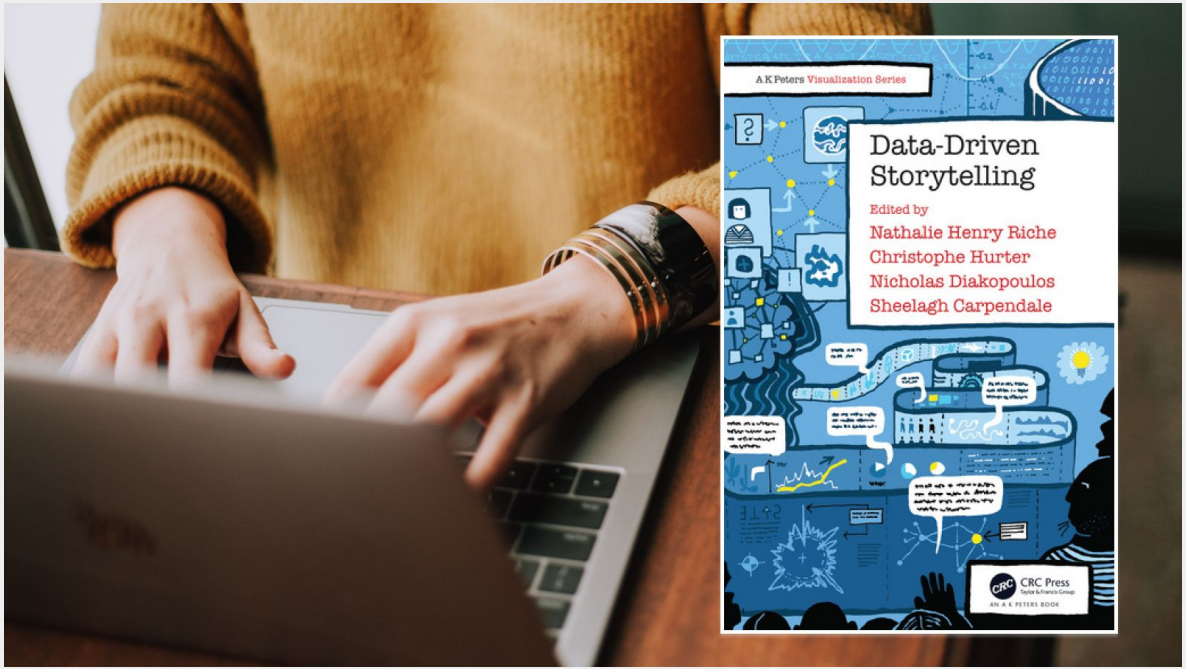
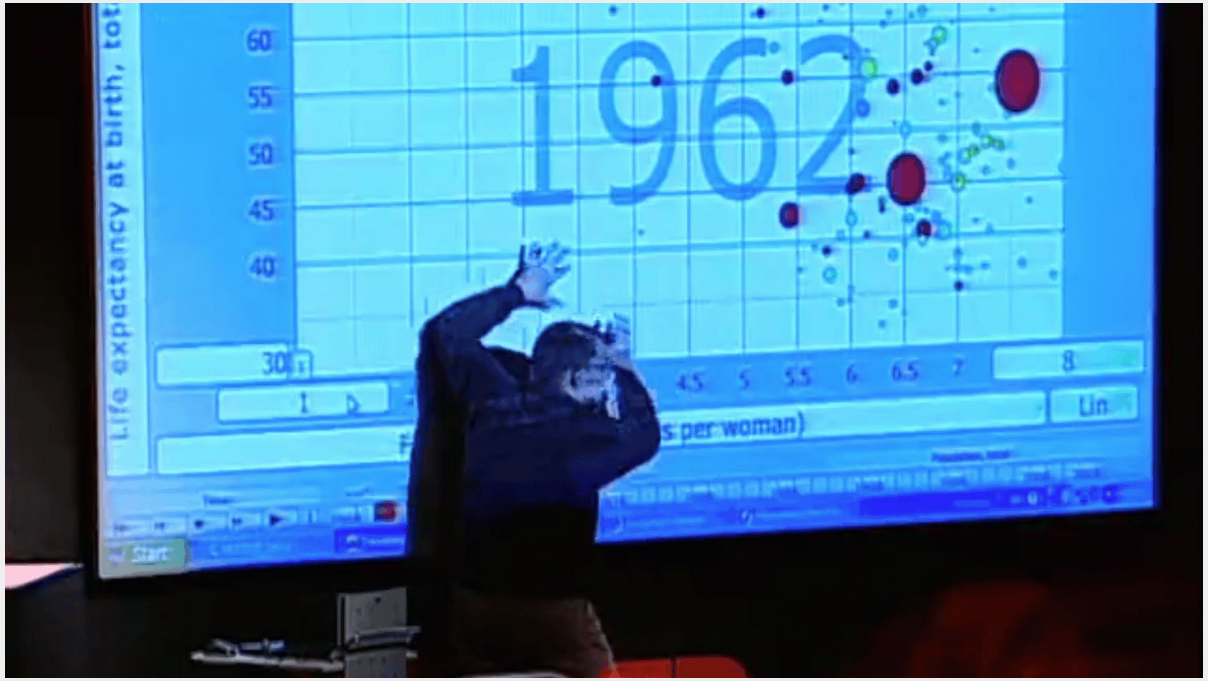
VIS 2021, Matthew Brehmer and Robert Kosara



Communicating data to an audience

S. Drucker, S. Huron, R. Kosara, J. Schwabish, and N. Diakopoulos.
In N. Henry Riche, C. Hurter, N. Diakopoulos, and S. Carpendale, eds.,

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



👆**Hans Rosling's TED Conference Talks (2006, 2007)**

gapminder.com/videos

From Jam Session to Recital

Synchronous Communication and Collaboration around Data in Organizations

— — —

VIS 2021, Matthew Brehmer and Robert Kosara

From Jam Session to Recital

Synchronous Communication and Collaboration around Data in Organizations

– – –

VIS 2021, Matthew Brehmer and Robert Kosara

Aim of this study:

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

Understand scenarios of synchronous communication around data

From Jam Session to Recital

Synchronous Communication and Collaboration around Data in Organizations

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VIS 2021, Matthew Brehmer and Robert Kosara

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.

From Jam Session to Recital

Synchronous Communication and Collaboration around Data in Organizations

– – –

VIS 2021, Matthew Brehmer and Robert Kosara

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

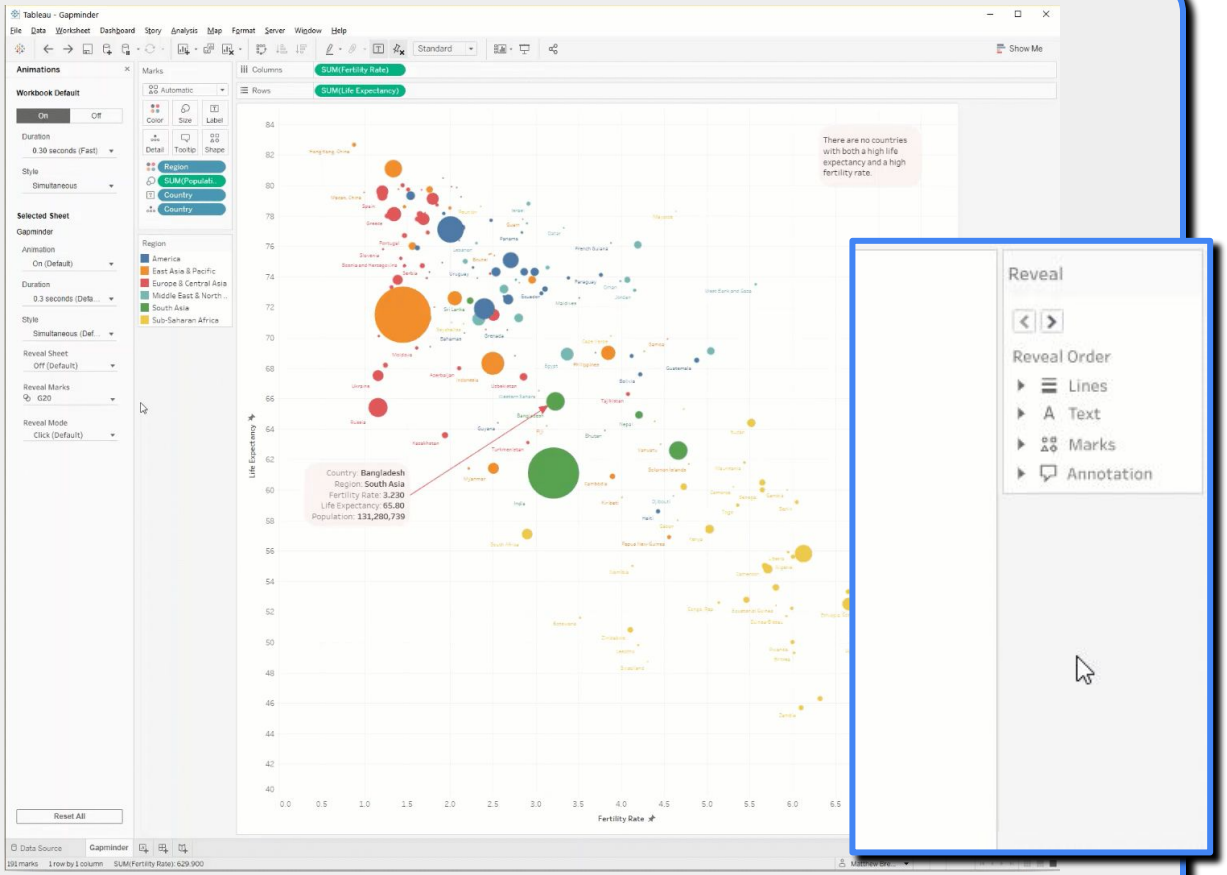
implications for tool design:

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

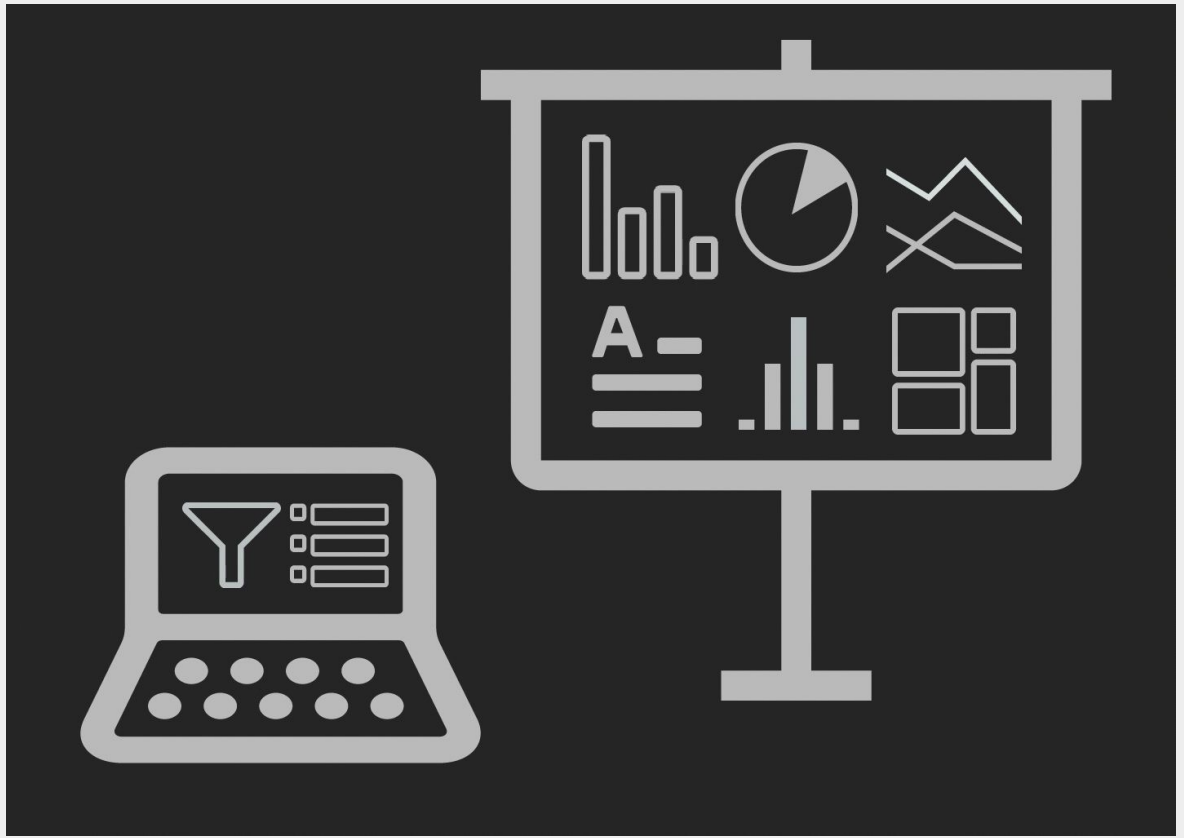
… interactive visualization, yet still a presentation, not a tool demo

… direct viewer attention on-the-fly

slideware-inspired reveal controls for any chart / dashboard component

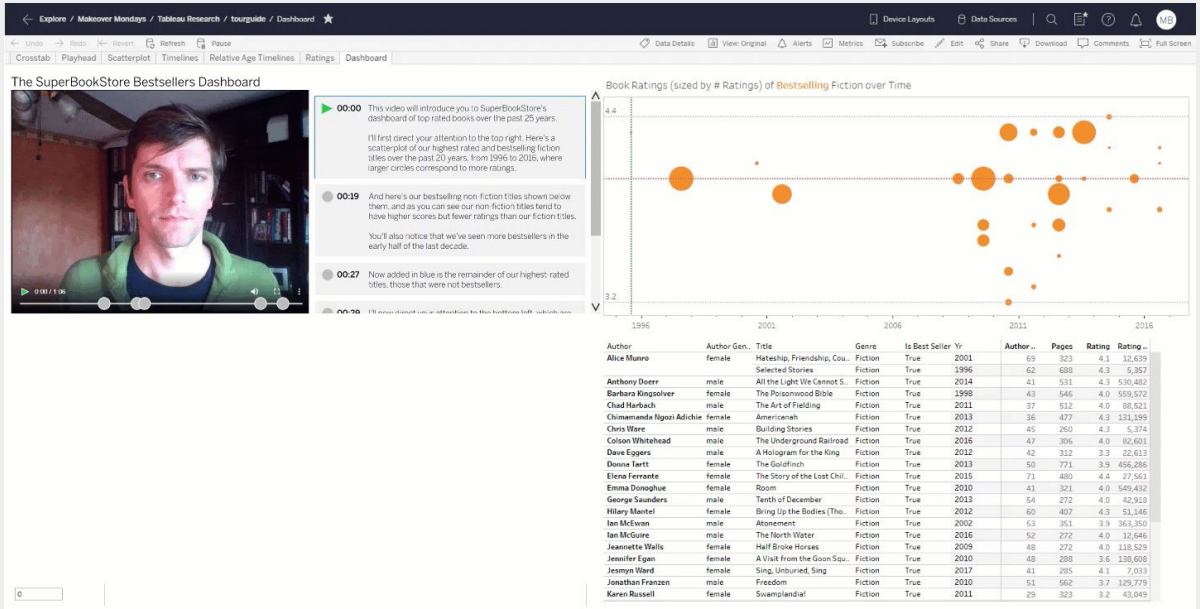


👆slideware-inspired reveal controls for a Tableau worksheet

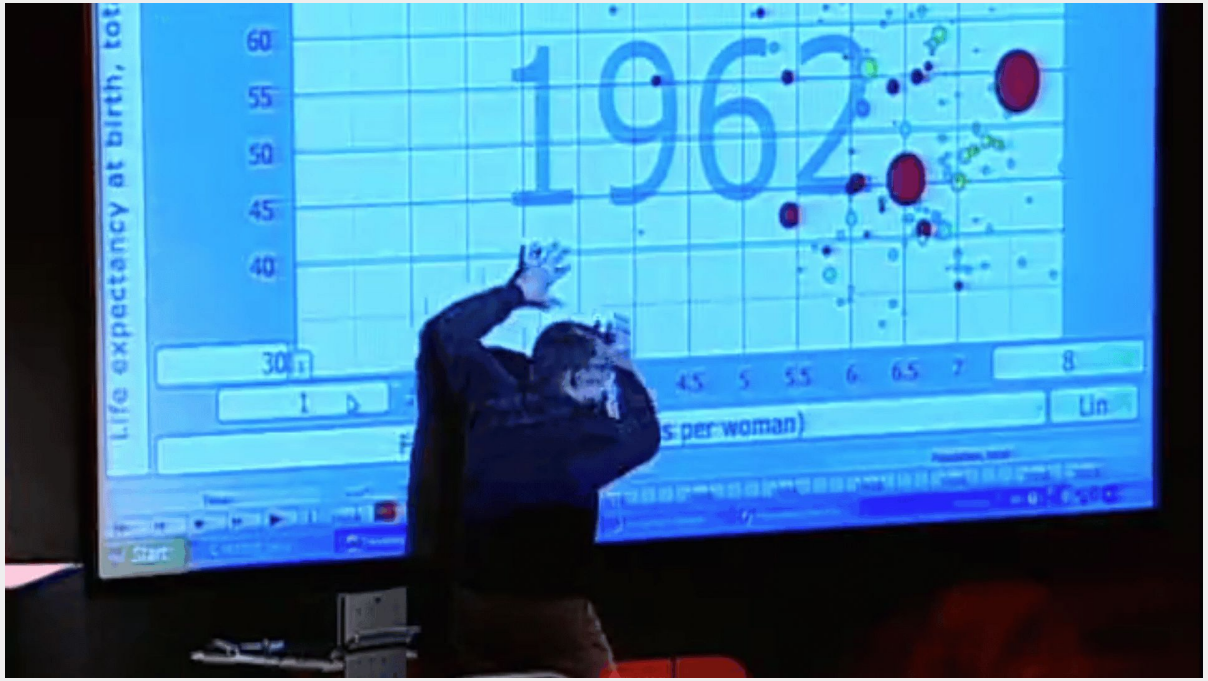


A secondary display “presenter view” for a business intelligence workbook

👆a video “tour guide” for a business intelligence dashboard

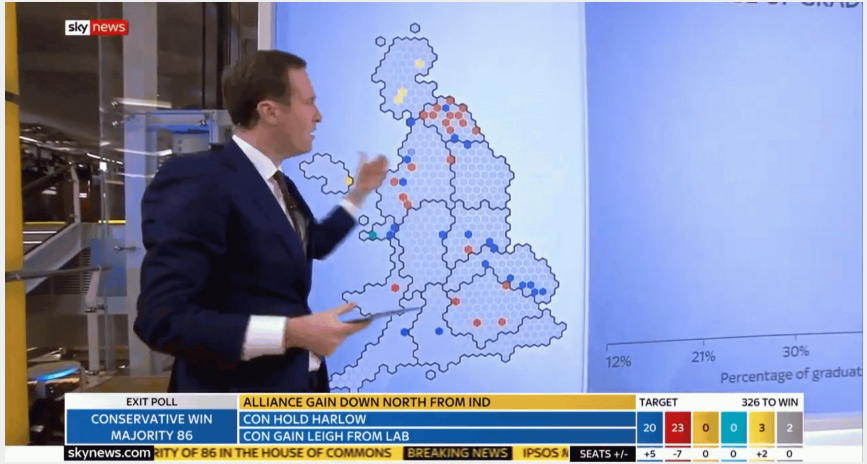


👆a prototype video “tour guide” for a Tableau dashboard



👆**Hans Rosling's TED Conference Talks (2006, 2007)**

gapminder.com/videos


sky news
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21%
30%
Percentage of graduat
EXIT POLL
CONSERVATIVE WIN MAJORITY 86
ALLIANCE GAIN DOWN NORTH FROM IND
CON HOLD HARLOW
CON GAIN LEIGH FROM LAB
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RITY OF 86 IN THE HOUSE OF COMMONS
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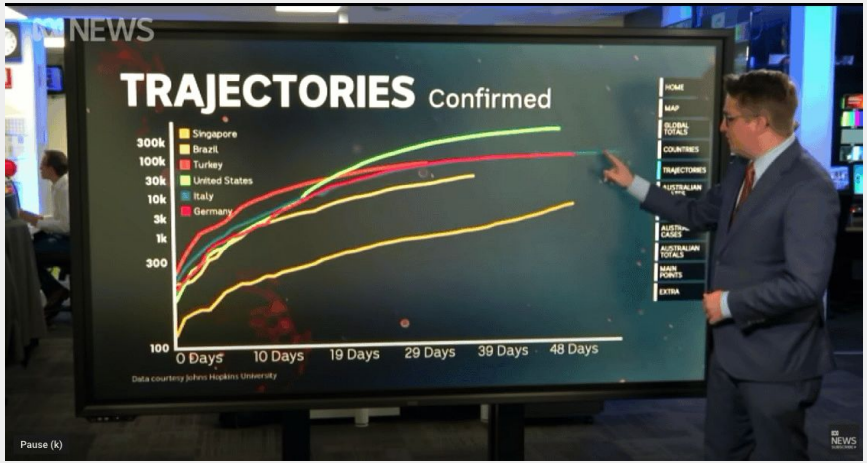
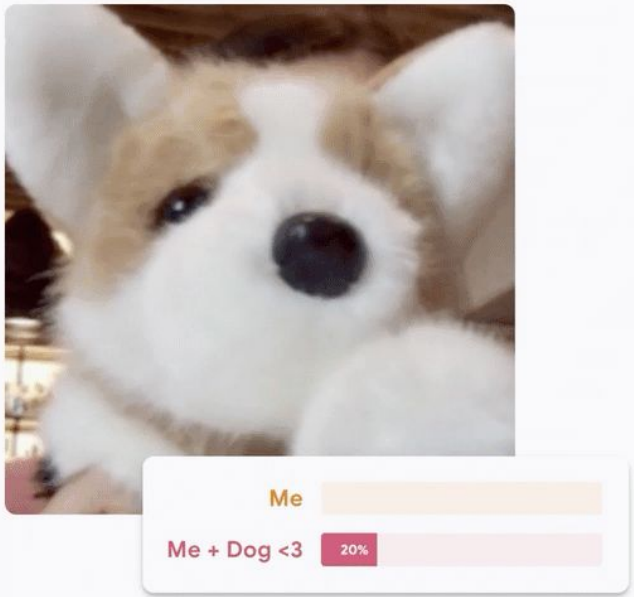

NEWS
TRAJECTORIES Confirmed
Singapore
Brazil
Turkey
United States
Italy
Germany
300k
100k
30k
10k
3k
1k
300
100
0 Days
10 Days
19 Days
29 Days
39 Days
48 Days
Data courtesy Johns Hopkins University
HOME
MAP
GLOBAL TOTALS
COUNTRIES
TRAJECTORIES
AUSTRALIAN CASES
AUSTRALIAN TOTALS
MAIN POINTS
EXTRA
Pause (k)

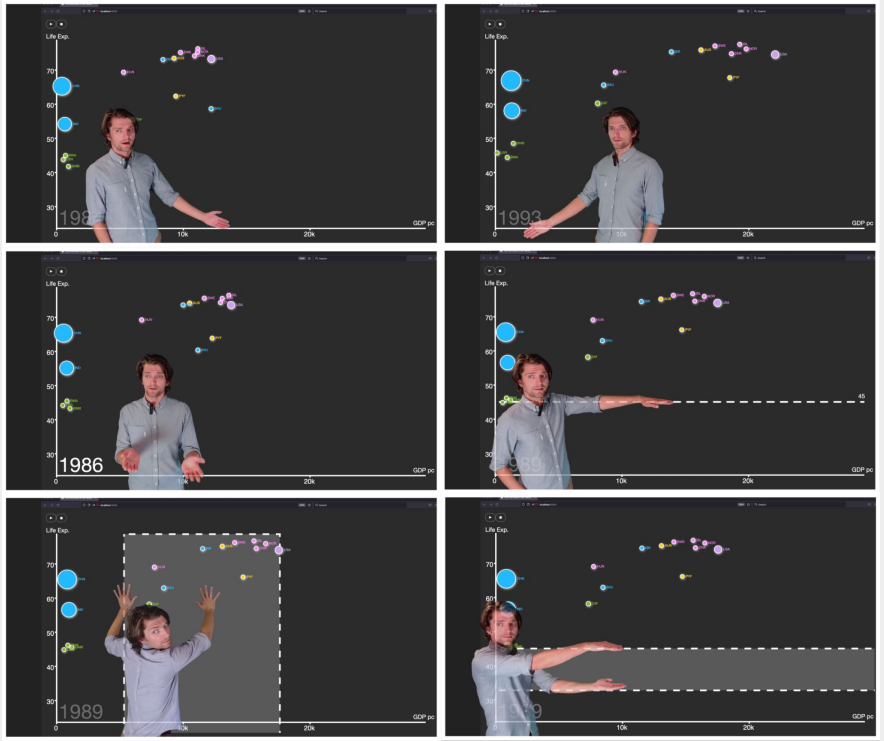
👆***"The Information in Our Hands"*** – Information+ Conference 2021



Teachable Machine

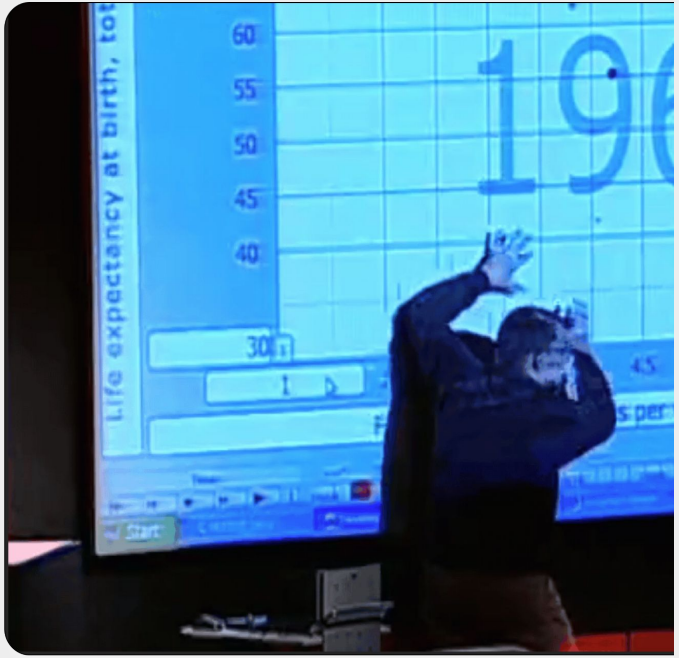
Train a computer to recognize your own images, sounds, & poses.

A fast, easy way to create machine learning models for



👆”*The Information in Our Hands*”

Information+ Conference 2021



👆**Hans Rosling’s TED Conference Talks (2006, 2007)**

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👆*”200 Countries, 200 Years, 4 Minutes”* – Hans Rosling, BBC 2010

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Matthew Brehmer
TABLEAU RESEARCH

Augmented Chironomia for Presenting Data to Remote Audiences

Brian D. Hall, Lyn Bartram, and Matthew Brehmer

–

UIST 2022

The following is an example presentation supported by our environment.

MediaPipe

Live ML anywhere

MediaPipe offers open source cross-platform, customizable ML solutions for live and streaming media.

ARTICLE

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.

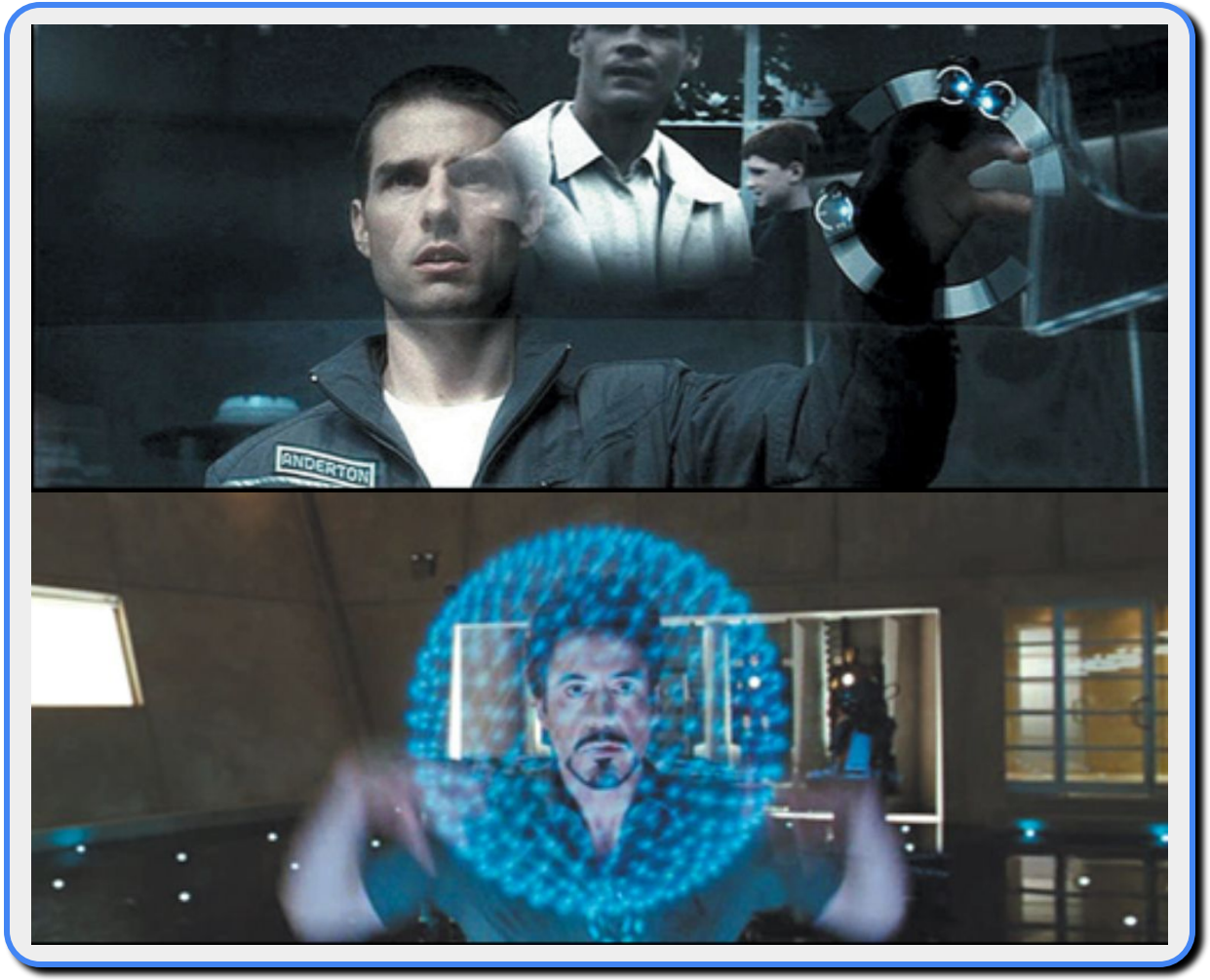
Keywords: metaphor, mathematics, number, quantity, TV news

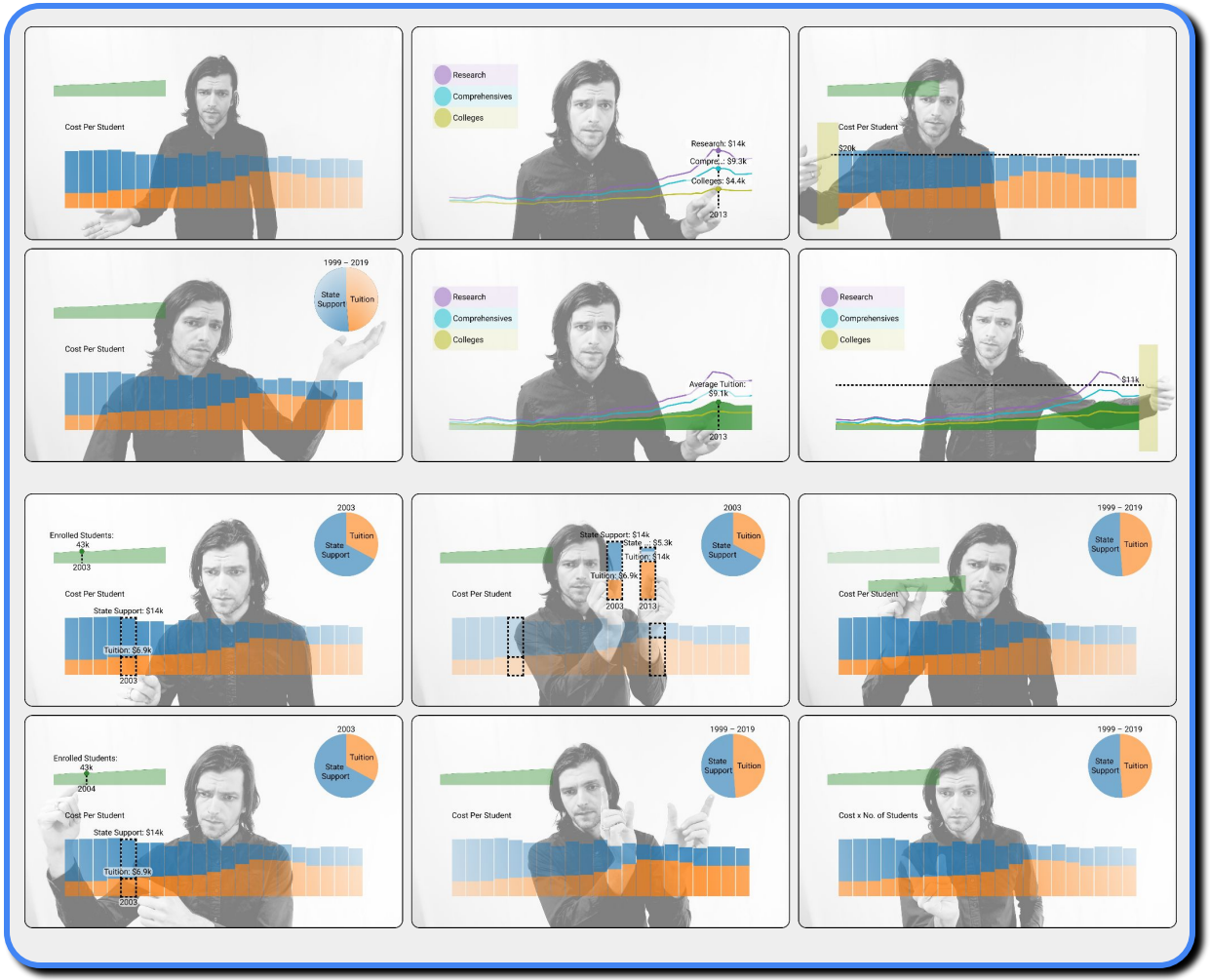
A Pacificat .
B Auditores mitigabit .
E Modus agendi .
F Admiratur .
I Flocci facit
K Deprecatur
Cambrai, Bibl. mun., ms. 0837
Avignon, Bibl. mun., ms. 1094

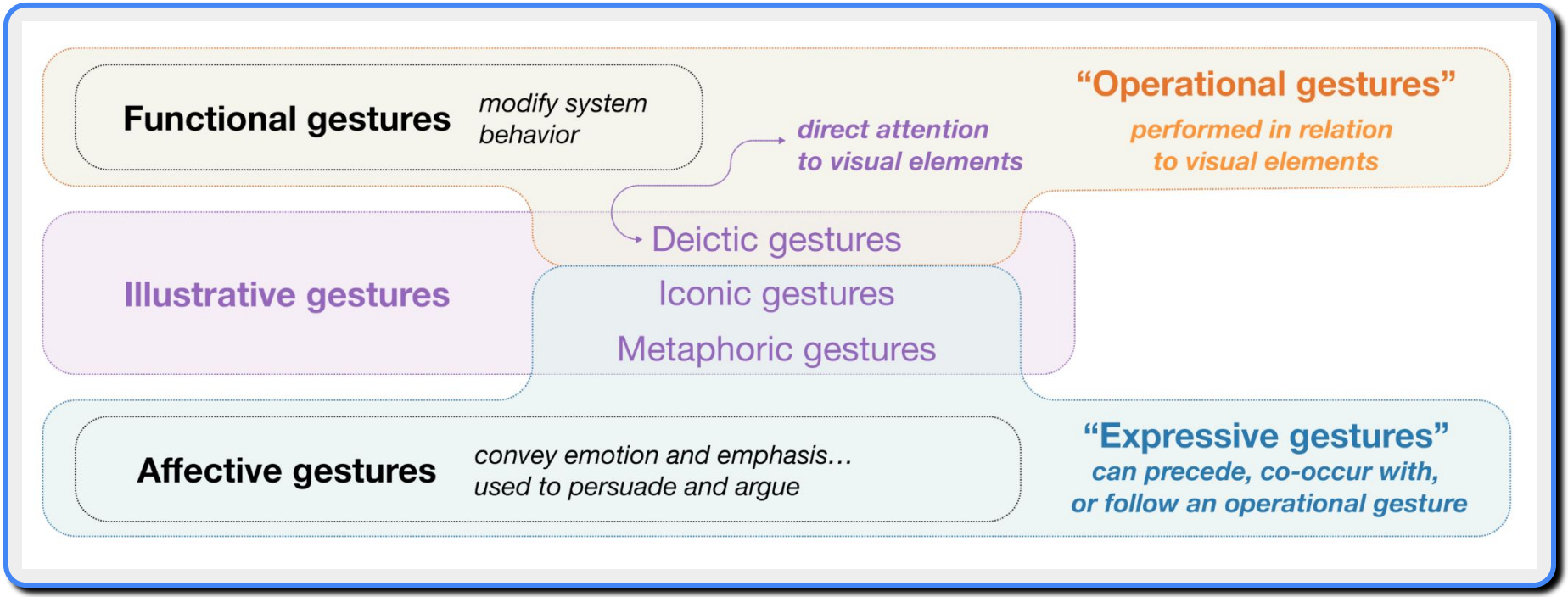
👆***Augmented Chironomia for Presenting Data to Remote Audiences***

Brian D. Hall, Lyn Bartram, Matthew Brehmer

to appear at ACM UIST 2022


ANDERTON


Cost Per Student
Research
Comprehensives
Colleges
Research: $14k
Compre.: $9.3k
Colleges: $4.4k
2013
Cost Per Student
$20k
1999 – 2019
State Support
Tuition
Cost Per Student
Research
Comprehensives
Colleges
Average Tuition: $9.1k
2013
Research
Comprehensives
Colleges
$11k
2003
Enrolled Students:
43k
2003
Cost Per Student
State Support: $14k
Tuition: $6.9k
2003
2003
State Support: $14k
State Support: $5.3k
Tuition: $14k
Tuition: $6.9k
2003
2013
Cost Per Student
1999 – 2019
Cost Per Student
2003
Enrolled Students:
43k
2004
Cost Per Student
State Support: $14k
Tuition: $6.9k
2003
1999 – 2019
Cost Per Student
1999 – 2019
Cost x No. of Students


Functional gestures
modify system behavior
direct attention to visual elements
"Operational gestures"
performed in relation to visual elements
Deictic gestures
Illustrative gestures
Iconic gestures
Metaphoric gestures
Affective gestures
convey emotion and emphasis…
used to persuade and argue
"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

arXiv preprint (2018) 1809.07166

Embodied Interactions for Novel Immersive Presentational Experiences

Fabrice 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.

Differences Between Institution Type
Research
Comprehensives
Colleges

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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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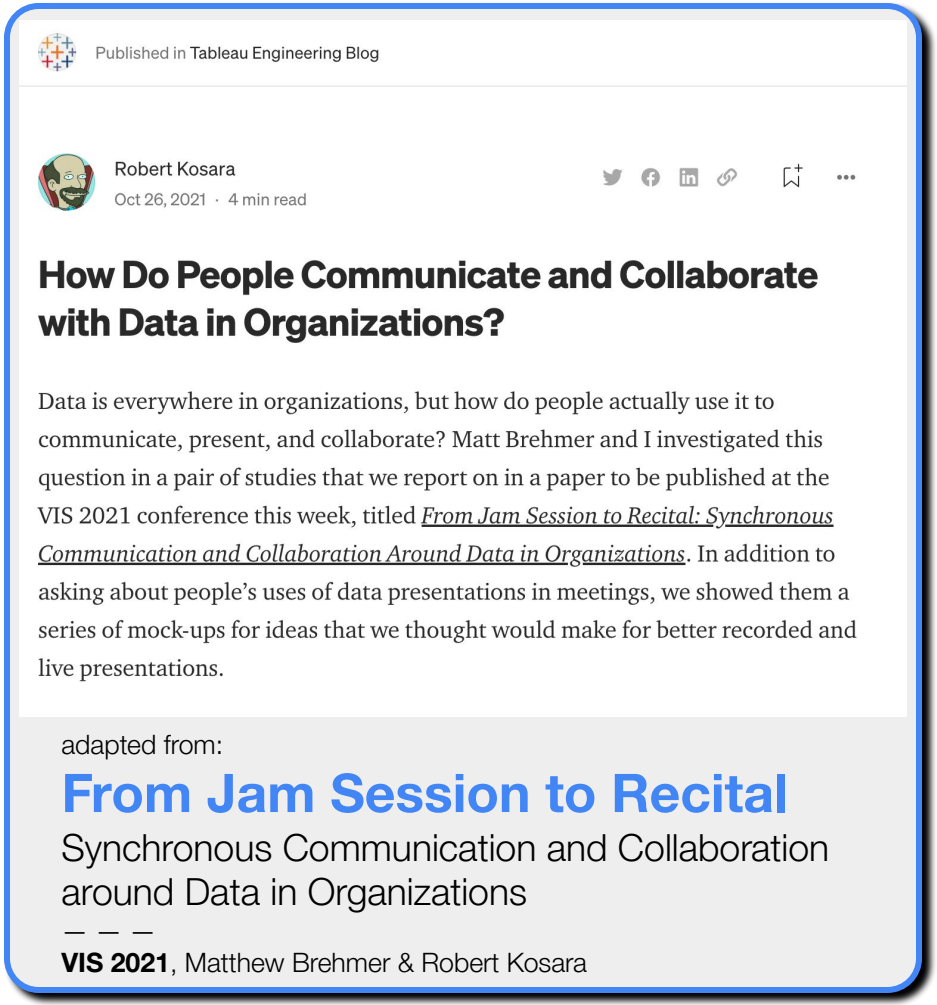
Published in Tableau Engineering Blog
Robert Kosara
Oct 26, 2021 · 4 min read
How Do People Communicate and Collaborate with Data in Organizations?
Data is everywhere in organizations, but how do people actually use it to communicate, present, and collaborate? Matt Brehmer and I investigated this question 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

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–
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