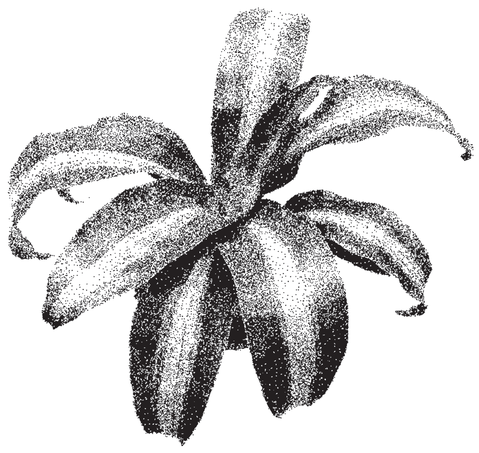
DATA ANALYSIS, VISUALIZATION & INTERACTION

Aviz is a research group of Inria dedicated to using visual representations and interactions to understand data. It creates new visual representations, along with new interactions, software infrastructures, and validates them with multiple methods including experiments. This poster showcases some of its recent research projects.

Aviz

informatiques mathématiques Inria

A



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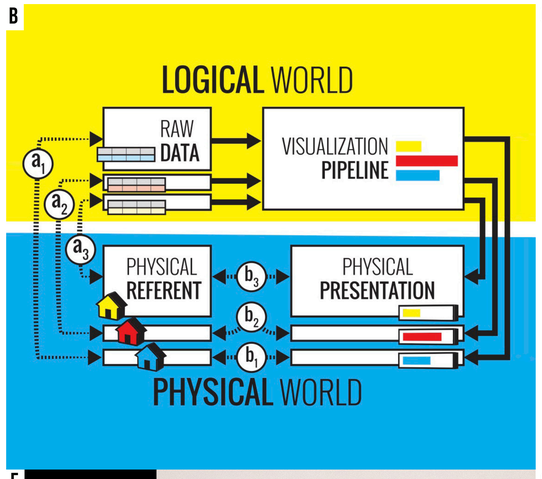

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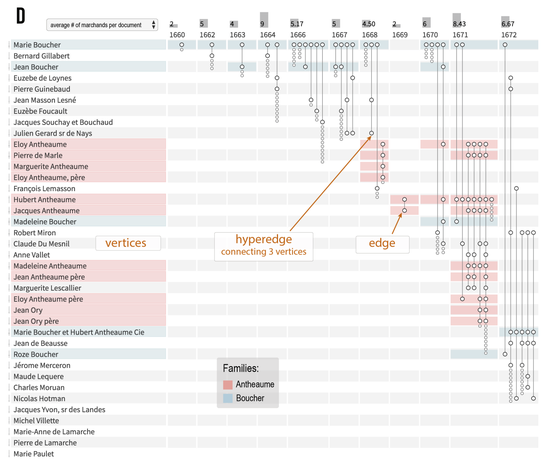
Wikipedia: Palestine 2001

D



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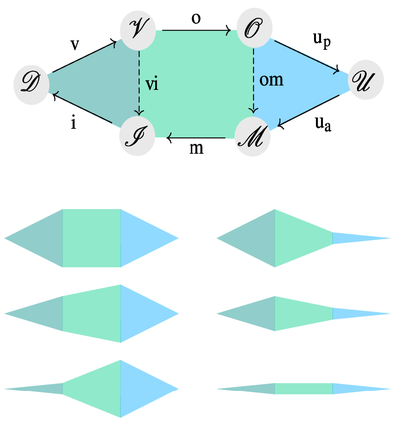

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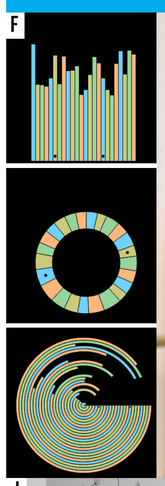

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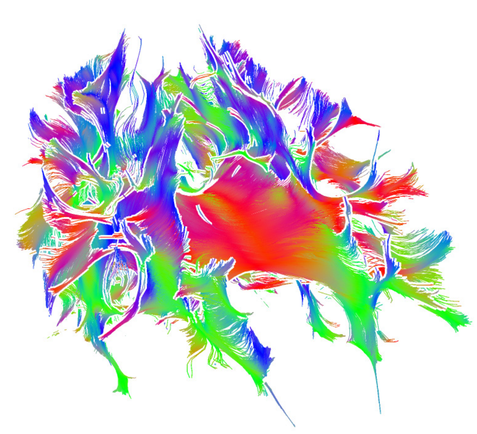

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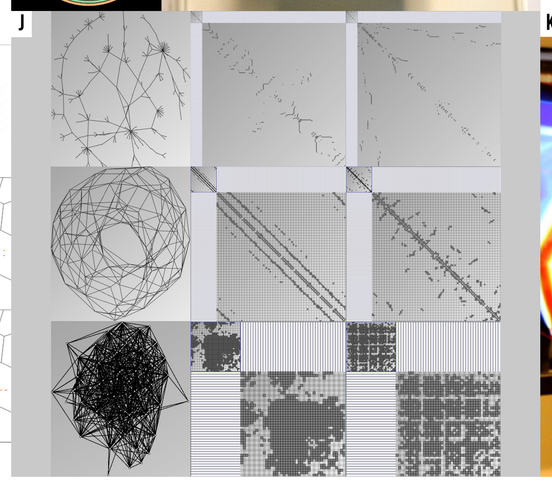

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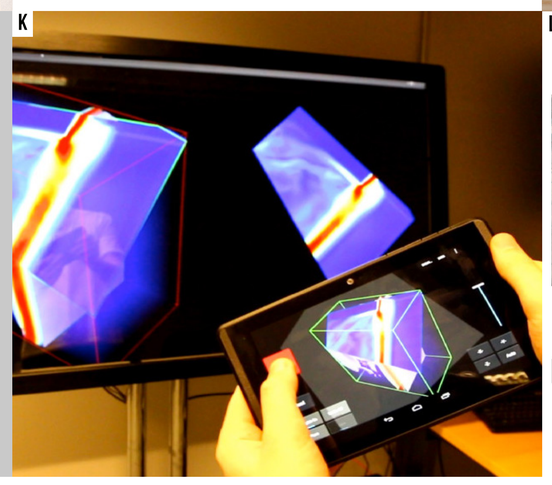

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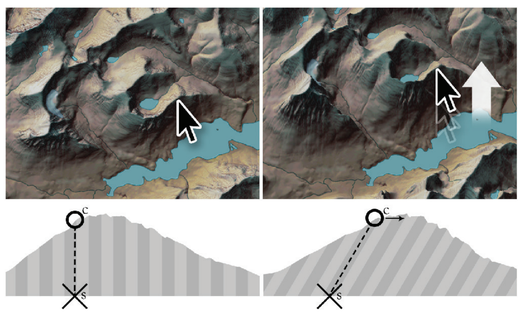

NEW VISUAL REPRESENTATIONS | NEW INTERACTIONS | SOFTWARE INFRASTRUCTURES | EXPERIMENTS & METHODS

ILLUSTRATIVE VISUALIZATION & NPR

Rendering techniques and visual representations inspired by traditional artistic and illustrative depiction.

A

2018 • ***A Survey of Digital Stippling***

In this article we survey techniques for the digital simulation of hand-made stippling—one of the core techniques developed within non-photorealistic/expressive rendering. Over the years, a plethora of automatic or semi-automatic stippling algorithms have been proposed. We not only provide an overview of the work on digital stippling but also examine its relationship to traditional stippling and to related fields such as halftoning.

Authors: **Domingo Martın, German Arroyo, Alejandro Rodrıguez, Tobias Isenberg**

G

2015 • ***Exploration of the Brain's White Matter Structure through Visual Abstraction and Multi-Scale Local Fiber Tract Contraction***

We present a visualization technique for brain fiber tracts from DTI data that provides insight into the structure of white matter through visual abstraction.

Authors: **Maarten H. Everts, Eric Begue, Henk Bekker, Jos B.T.M. Roerdink, Tobias Isenberg**

TANGIBLE

Moving data and controls to the physical world to exploit people's abilities to manipulate objects and collaborate.

B

2017 • ***Embedded Data Representations***

We introduce embedded data representations, the use of visual and physical representations of data that are deeply integrated with the physical spaces, objects, and entities to which the data refers. In this paper, we formalize the notion of physical data referents – the real-world entities and spaces to which data corresponds – and examine the relationship between referents and the visual and physical representations of their data.

Authors: **Wesley J. Willett, Yvonne Jansen, Pierre Dragicevic**

H

2016 • ***Zooids: Building Blocks for Swarm User Interfaces***

This paper introduces swarm user interfaces, a new class of human-computer interfaces comprised of many autonomous robots that handle both display and interaction. We describe the design of Zooids, an open-source open-hardware platform for developing tabletop swarm interfaces.

Authors: **Mathieu Le Goc, Lawrence Kim, Ali Parsaei, Jean-Daniel Fekete, Pierre Dragicevic, Sean Follmer**

MULTI-DIMENSIONAL DATA

Improving the visual representation and navigation of multi-dimensional data.

C

2018 • ***Time Curves: Folding Time to Visualize Patterns of Temporal Evolution in Data***

We explore the concept of abstraction as it is used in visualization, with the ultimate goal of understanding and formally defining it.

Authors: **Benjamin Bach, Conglei Shi, Nicolas Heulot, Tara Madhyastha, Tom Grabowski, Pierre Dragicevic**

I

2018 • ***A Declarative Rendering Model for Multiclass Density Maps***

Multiclass maps are scatterplots, multidimensional projections, or thematic geographic maps where data points have a categorical attribute in addition to two quantitative attributes. This categorical attribute is often rendered using shape or color, which does not scale when overplotting occurs. When the number of data points increases, multiclass maps must resort to data aggregation to remain readable. We present multiclass density maps: multiple 2D histograms computed for each of the category values.

Authors: **Jaemin Jo, Frédéric Vernier, Pierre Dragicevic, Jean-Daniel Fekete**

NETWORKS

New and hybrid visual representations and interactions for exploring networks.

D

2018 • ***Using Dynamic Hypergraphs to Reveal the Evolution of the Business Network of a 17th Century French Woman Merchant Hypergraph Visualization***

Parallel Aggregated Ordered Hypergraph (PAOH) is a novel technique to visualize dynamic hypergraphs. Hypergraphs are a generalization of graphs where edges can connect more than two vertices. Hypergraphs can be used to model co-authorship networks with multiple authors per article, or networks of business partners.

Authors: **Paola Valdivia, Paolo Buono, Catherine Plaisant, Nicole Dufournaud, Jean-Daniel Fekete**

J

2016 • ***Matrix Reordering Methods for Table and Network Visualization***

This survey provides a description of algorithms to reorder visual matrices of tabular data and adjacency matrix of networks. The goal of this survey is to provide a comprehensive list of reordering algorithms published in different fields such as statistics, bioinformatics, or graph theory.

Authors: **Michael Behrisch, Benjamin Bach, Nathalie Henry Riche, Tobias Schreck, Jean-Daniel Fekete**

3D SPATIAL DATA

Supporting large-scale data analysis and interaction with visualization on a high-resolution wall.

E

2018 • ***A Model of Spatial Directness in Interactive Visualization***

We discuss the concept of directness in the context of spatial interaction with visualization. In particular, we propose a model that allows practitioners to analyze and describe the spatial directness of interaction techniques, ultimately to be able to better understand interaction issues that may affect usability.

Authors: **Stefan Bruckner, Tobias Isenberg, Timo Ropinski, Alexander Wiebel**

K

2016 • ***Hybrid Tactile/ Tangible Interaction for 3D Data Exploration***

We present the design and evaluation of an interface that combines tactile and tangible paradigms for 3D visualization. While studies have demonstrated that both tactile and tangible input can be efficient for a subset of 3D manipulation tasks, we reflect here on the possibility to combine the two complementary input types.

Authors: **Lonni Besançon, Paul Issartel, Mehdi Ammi, Tobias Isenberg**

PERCEPTION & COGNITION

Studying how to best use our senses and cognitive capabilities to perceive visual representations and interact with them.

F

2018 • ***Glanceable Visualization: Studies of Data Comparison Performance on Smartwatches***

We present the results of two perception studies to assess how quickly people can perform a simple data comparison task for small-scale visualizations on a smartwatch. The main goal of these studies is to extend our understanding of design constraints for smartwatch visualizations.

Authors: **Tanja Blascheck, Lonni Besançon, Anastasia Bezerianos, Bongshin Lee, Petra Isenberg**

L

2015 • ***Lightweight Relief Shearing for Enhanced Terrain Perception on Interactive Maps***

We explore interactive relief shearing, a set of non-intrusive, direct manipulation interactions that expose depth and shape information in terrain maps using ephemeral animations.

Authors: **Wesley Willett, Bernhard Jenny, Tobias Isenberg, Pierre Dragicevic**

POSTER DESIGN: Nic Stark, nicstark.com

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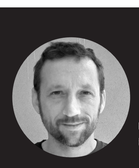

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