

IRREDUCTIONIST VIZ

Mediating nuance from networks
to semantic maps

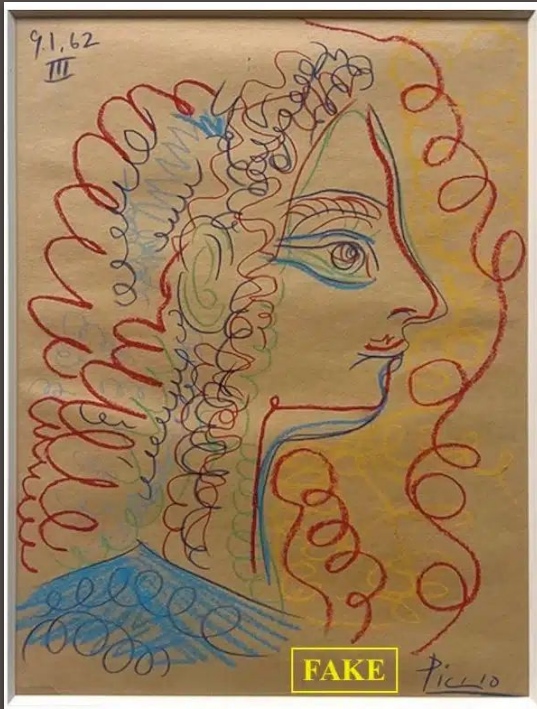
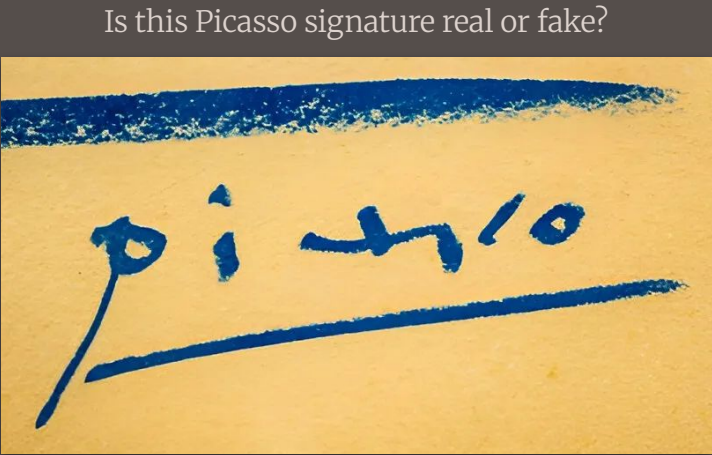
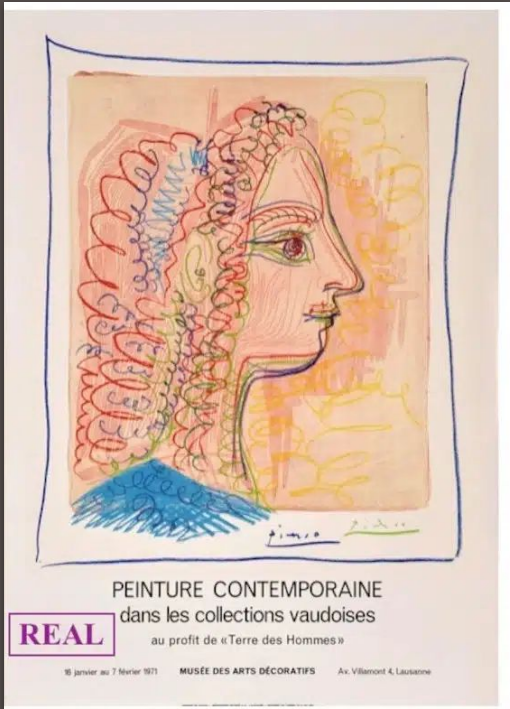
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tantlab

MASSHINE

What is ambiguity?

What is ambiguity?



What is ambiguity?

Is the “liger” a lion or a tiger?



Lion



Tiger

What is ambiguity?

Is the okapi a zebra or a donkey?



Zebra



Donkey

What is ambiguity?



River bank

What does “bank” refer to?



Financial institution

What is ambiguity?

Let's make the distinction between:

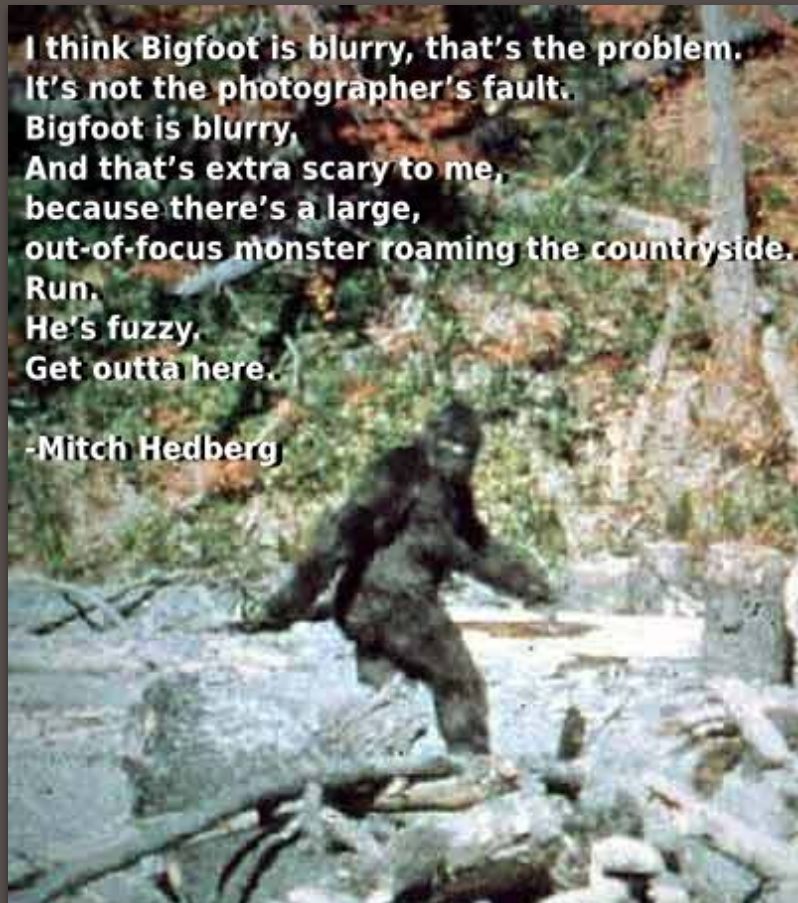
- Ambiguity
- Uncertainty
- Polyvalence
- Contradiction
- etc.

The point is to avoid conflating two very different things:

- A **blurry picture** of a sharp thing
(i.e., the measurement process has an accuracy problem)
- An accurate picture of a **fuzzy thing**
(i.e., no measurement issue)

I think Bigfoot is blurry, that's the problem.
It's not the photographer's fault.
Bigfoot is blurry,
And that's extra scary to me,
because there's a large,
out-of-focus monster roaming the countryside.
Run.
He's fuzzy.
Get outta here.

-Mitch Hedberg

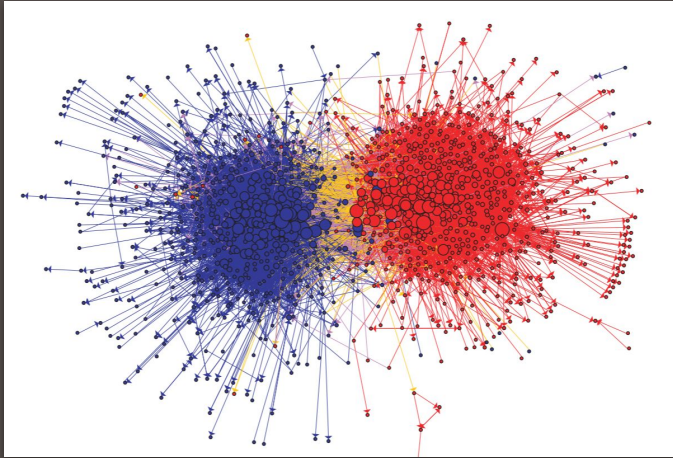


What is ambiguity: the *wink*



What is ambiguity: with networks

Clusters are non-ambiguous
(there are two; they are big and clear)



Adamic, L. A., & Glance, N. (2005). The political blogosphere and the 2004 US election: Divided they blog. Proceedings of the 3rd International Workshop on Link Discovery, 36–43.
<http://www.cyberjournalist.net/news/001461.php>

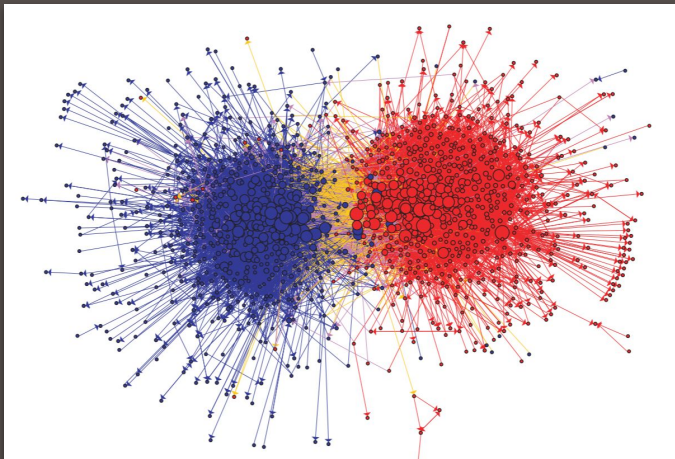
No obvious divide in two clusters
(although there are some tiny clusters)



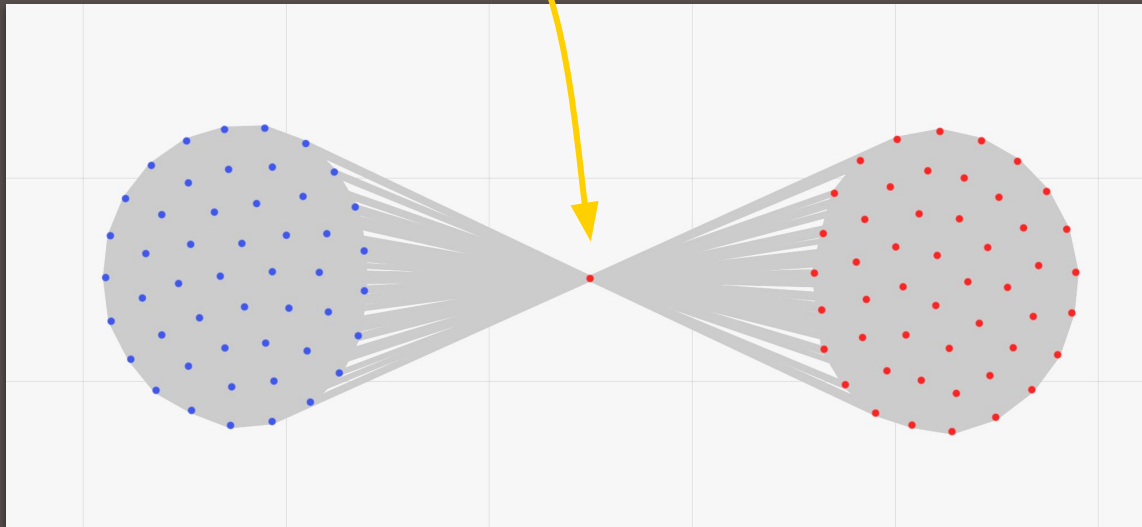
Venturini, T., Jacomy, M., & Jensen, P. (2021). What do we see when we look at networks: Visual network analysis, relational ambiguity, and force-directed layouts. Big Data & Society, 8(1), 20539517211018488.
<https://doi.org/10.1177/20539517211018488>

What is ambiguity: with networks

Which cluster does this node belong to?

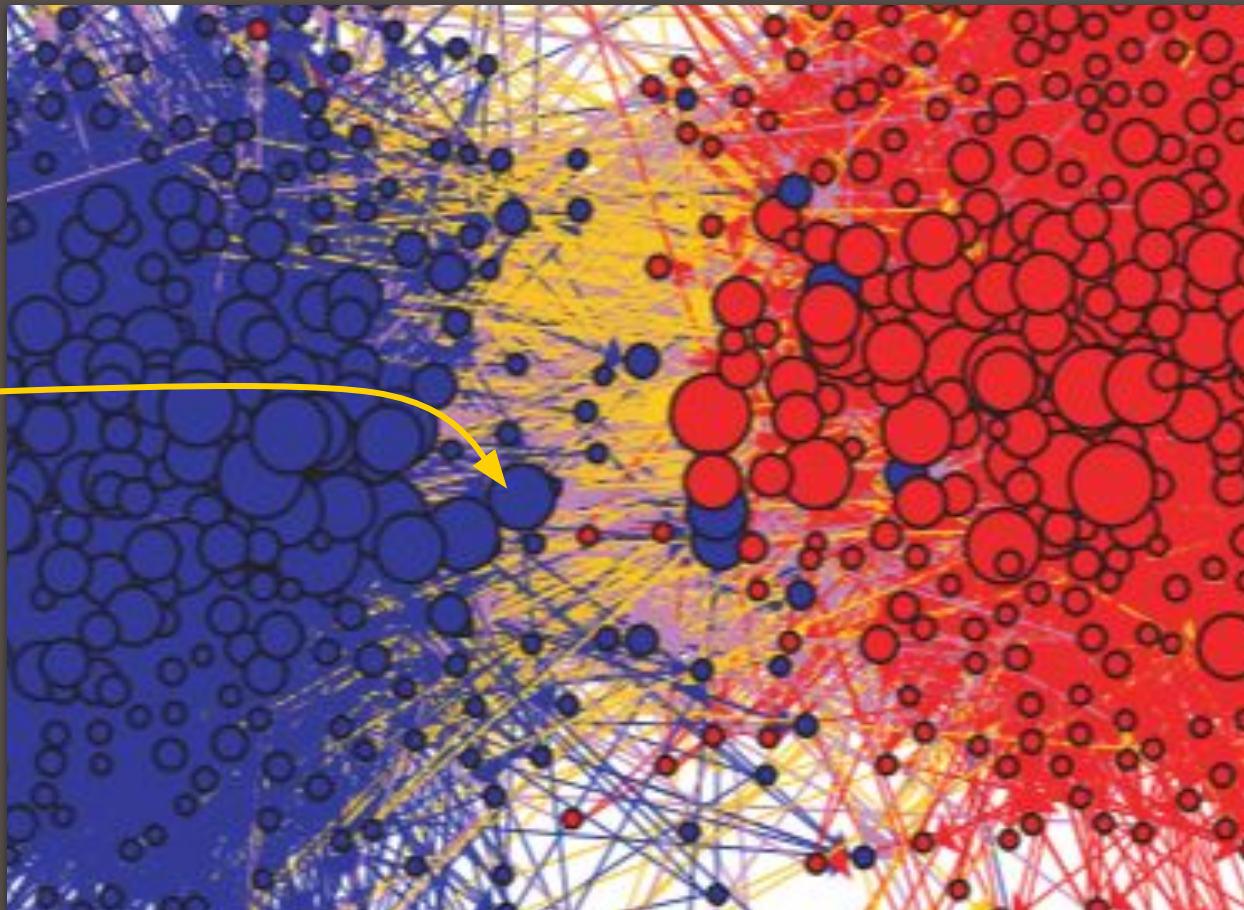


Adamic, L. A., & Glance, N. (2005). The political blogosphere and the 2004 US election: Divided they blog. Proceedings of the 3rd International Workshop on Link Discovery, 36–43.
<http://www.cyberjournalist.net/news/001461.php>



What is ambiguity: with networks

Why is this node
at that place?
(or any node, in fact)

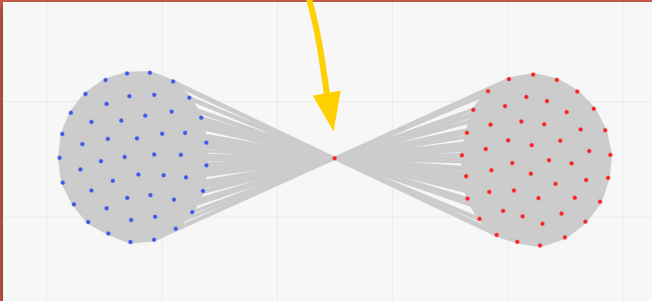


Community detection ambiguity

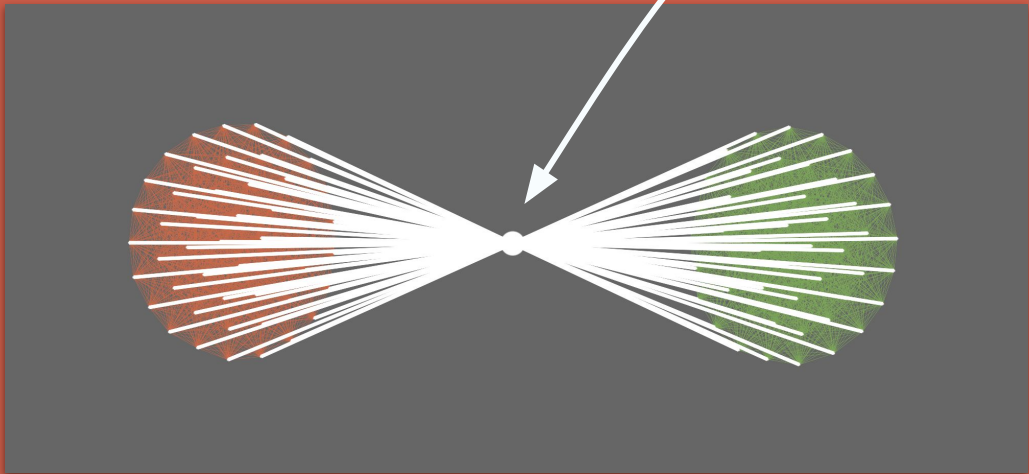
Jacomy, M., Elli, T., Benedetti, A., Plique, G. Ooghe-Tabanou, B., Girard, P., and Jacomy, A. (2025; forthcoming) Cluster ambiguity in networks as substantive knowledge. CHR2025

Community detection ambiguity in Gephi Lite

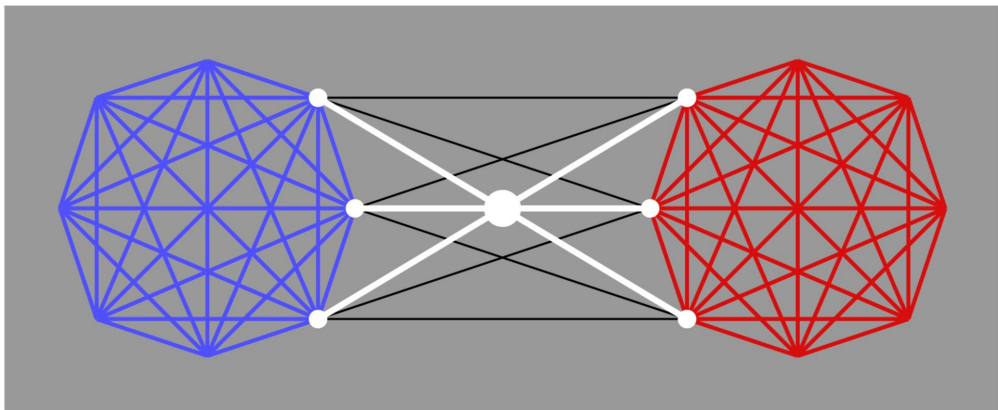
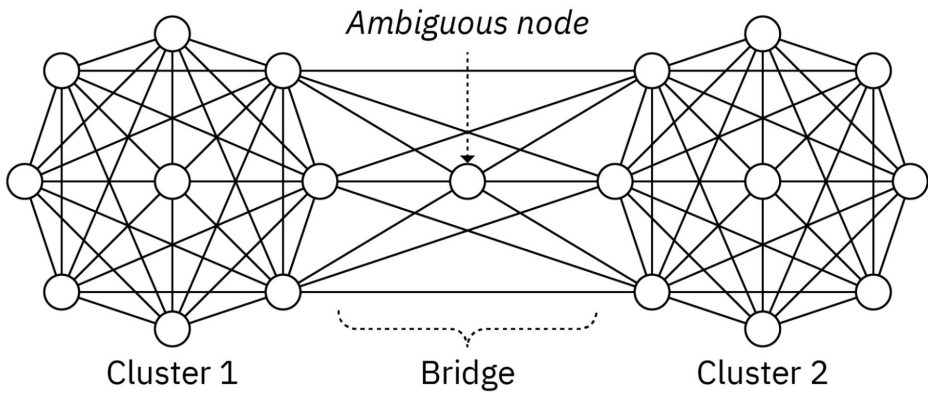
This node is equally well suited to belonging to each cluster



In white, we highlight the ambiguous nodes and clusters

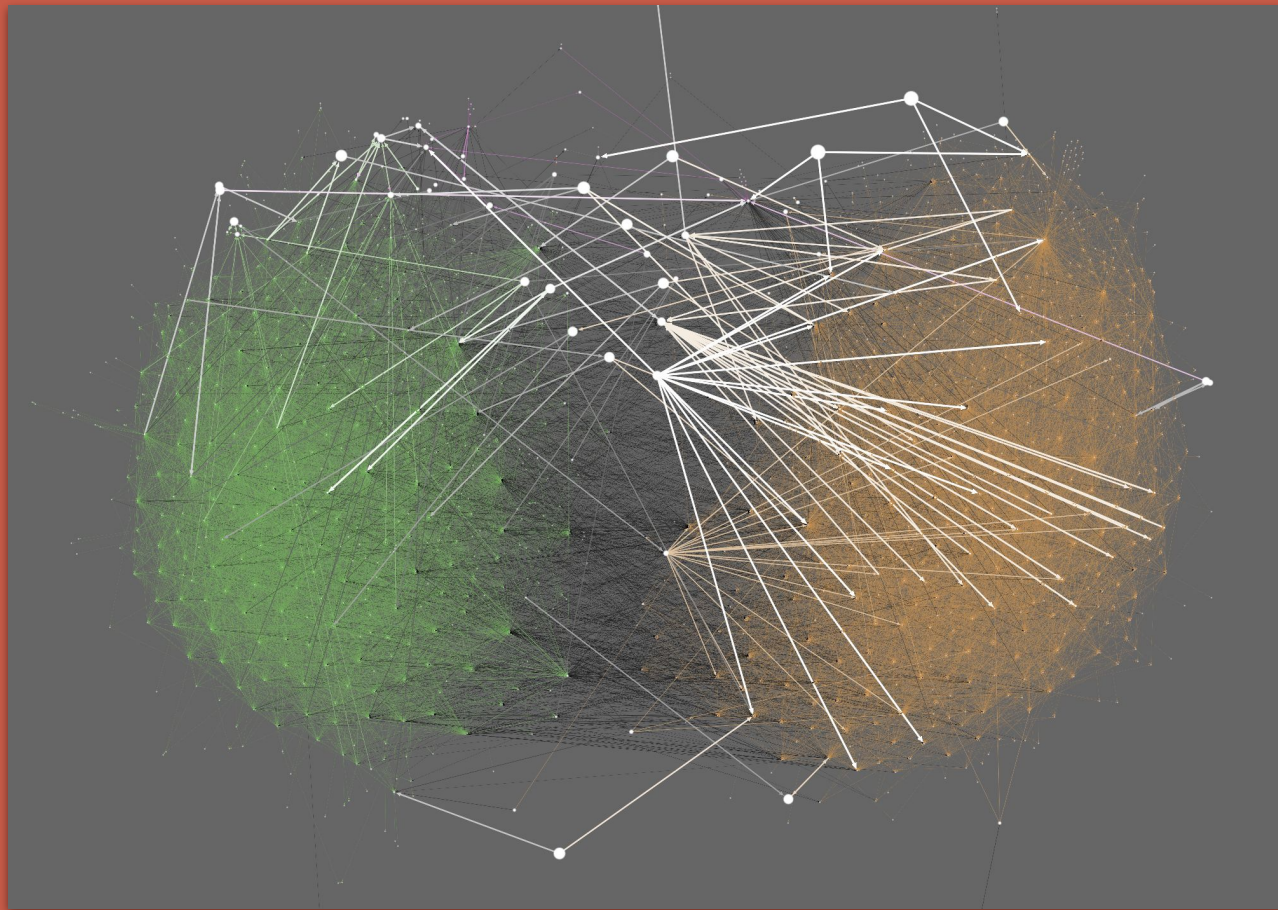
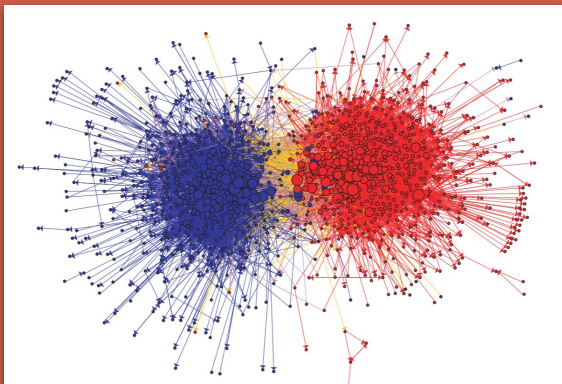


Community detection ambiguity in Gephi Lite

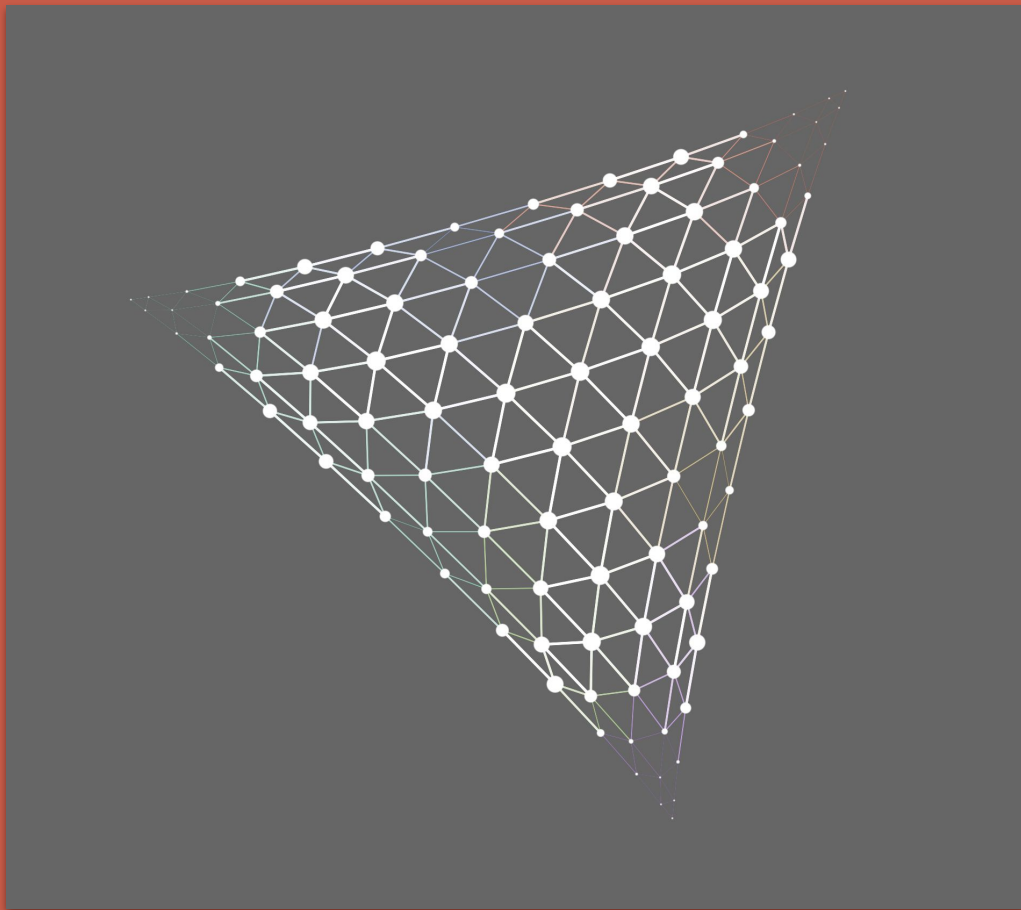


Ambiguity visualization (principle)

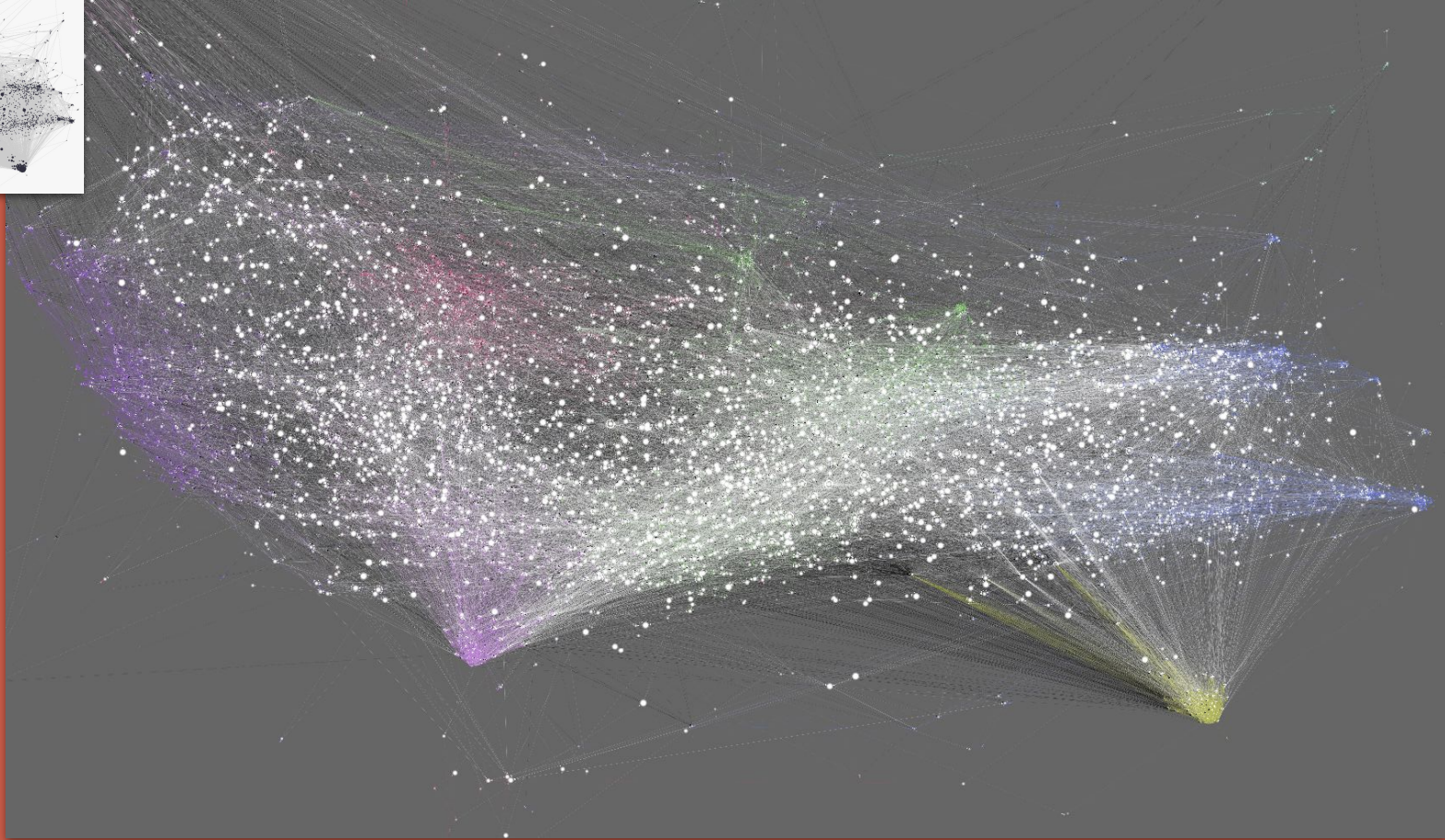
Community detection ambiguity in Gephi Lite



Community detection ambiguity in Gephi Lite



Community detection ambiguity in Gephi Lite



Irreductionist visualization

Visual patterns conveying polyvalence, ambiguity, multistability...

Irreductionism is not anti-reductionism

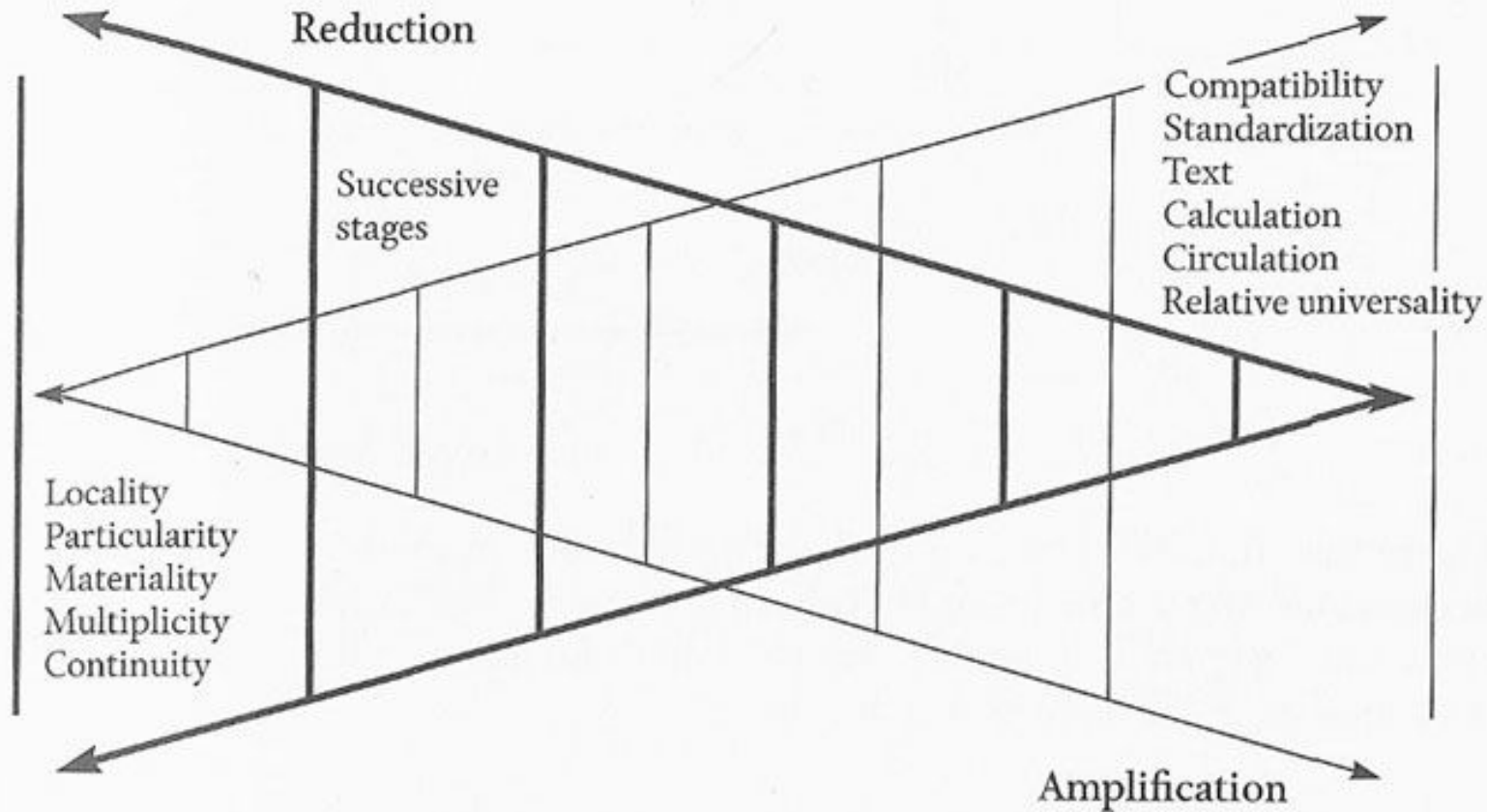
“1.1.1. Aucune chose n’est par elle-même, réductible ou irréductible à aucune autre.”

No thing is, by itself, reducible or irreducible to another thing.

—Latour, B. (1984). *Irréductions. Les microbes: guerre et paix; suivi de, Irréductions.*

Irreductionism conceives reduction as translation.
It aims at *reversible* reductions.

Reduction is a trade-off



Latour, B. (1995). The 'pedofil' of Boa Vista: a photo-philosophical montage. *Common knowledge*, 4(1).

Visualization is a trade-off

Faithful, detailed, specific...



...abstract, legible, universal

Reduction

Successive
stages

Compatibility
Standardization
Text
Calculation
Circulation
Relative universality



Locality
Particularity
Materiality
Multiplicity
Continuity

*Full reduction
is not the
gold standard*

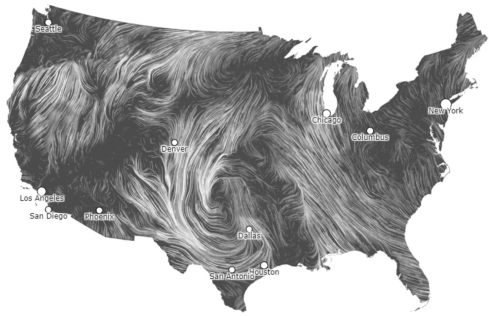
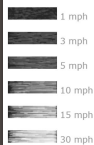
The (reductionist) perspective is inevitably partial. Situate it: make it visible and leverage it. Let the reader navigate the reduction.

Amplification

wind map

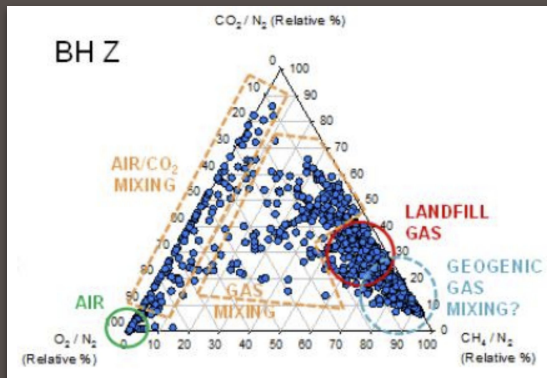
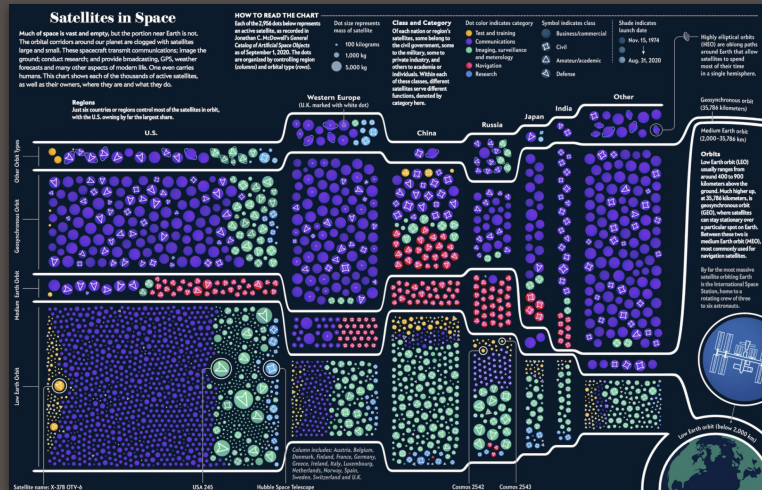
March 21, 2012
4:00 pm EST
(time of forecast download)

top speed: 29.7 mph
average: 8.1 mph



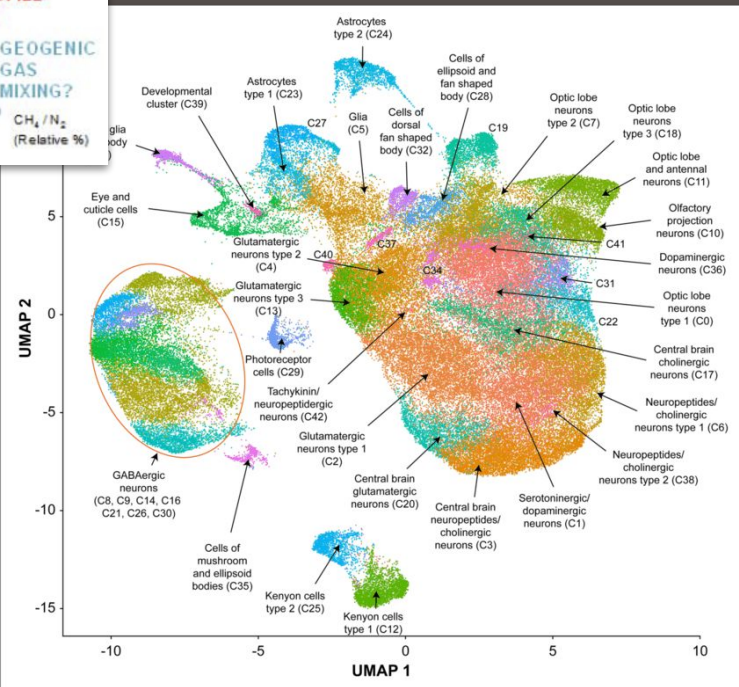
The Wind Map project by
Fernanda Bertini Viégas
and Martin Wattenberg

Space Wars, by
Nadieh Bremer, for the
Scientific American
(2020)



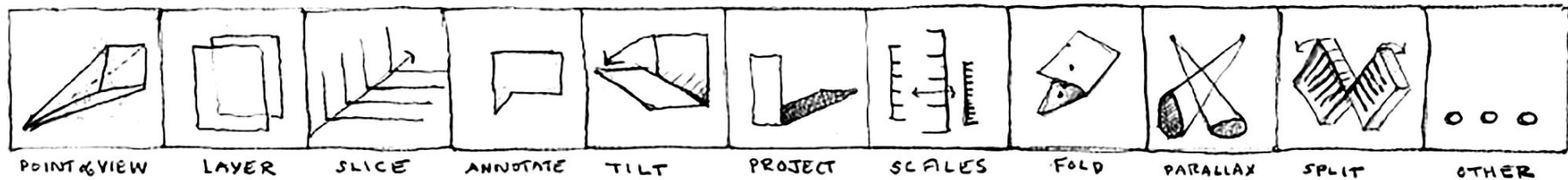
A ternary plot from a natural science [paper](#)

Dimensionality reduction
plot of cells having a similar
“expression pattern”.



Dimensions of interpretation and “non-representational” approaches

DIMENSIONS



POINT OF VIEW: Author Attribute, Now slider, multiple values in contrast, use vanishing points; perspectivize to inhabit

LAYER: Partial knowledge, evidence, toggle values along slider

SLICE: Display on attributes, co-occurrence, any facet of data, track patterns

ANNOTATE: Add attributes to data, nodes, edges, text, image; add cell row or subelement

TILT: Skew along a line of bias or inquiry

PROJECT: Onto various planes according to angles of emphasis

SCALES: Relative scales kept distinct but with points of common

FOLD: Match on points and patterns to see discrepancies and

PARALLAX: Multiple view lines into data, time models, maps, ma

SPLIT: Cut in any dimension and view, slice, to see into, move, chan

OTHER: Contrast, shift, see into, move, order, arrange, sequence

“graphical means to produce interpretative work using **visual argument structures** such as contradiction, ambiguity, parallax, and point of view that are **fundamentally hermeneutic** in character.”

Dimensions of interpretation and “non-representational” approaches



“non-representational approaches use graphical means as a primary method of **modeling** human-authored interpretation *rather than* to **display** pre-existing data sets.”

Why is it either or?

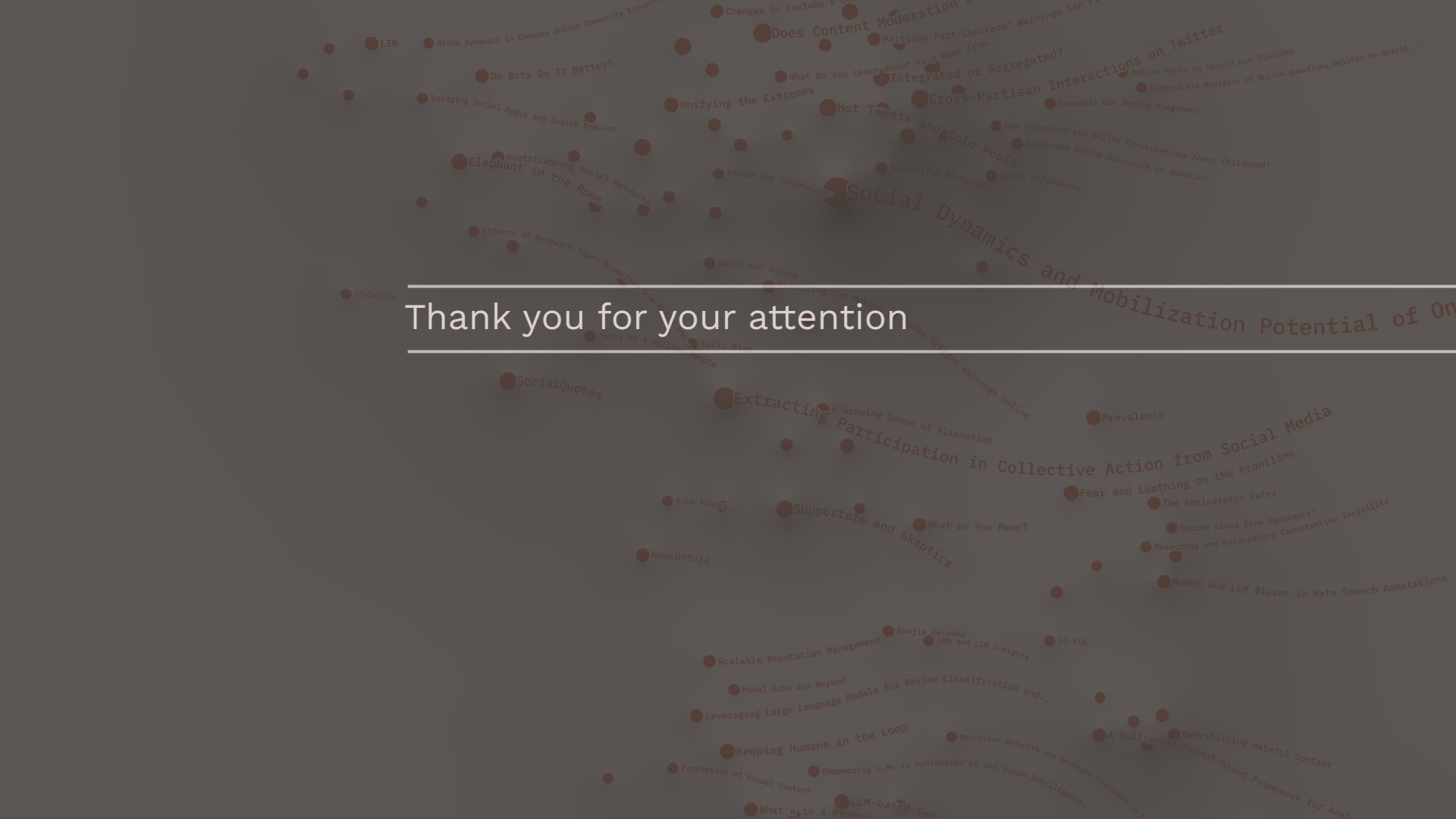
DISPLAY

“The display functions as a **surrogate** for the data—which is itself a surrogate, adequate or inadequate, for some phenomena.”

“In a representational paradigm, ... the display stands for the data, is a re-presentation of the data.”

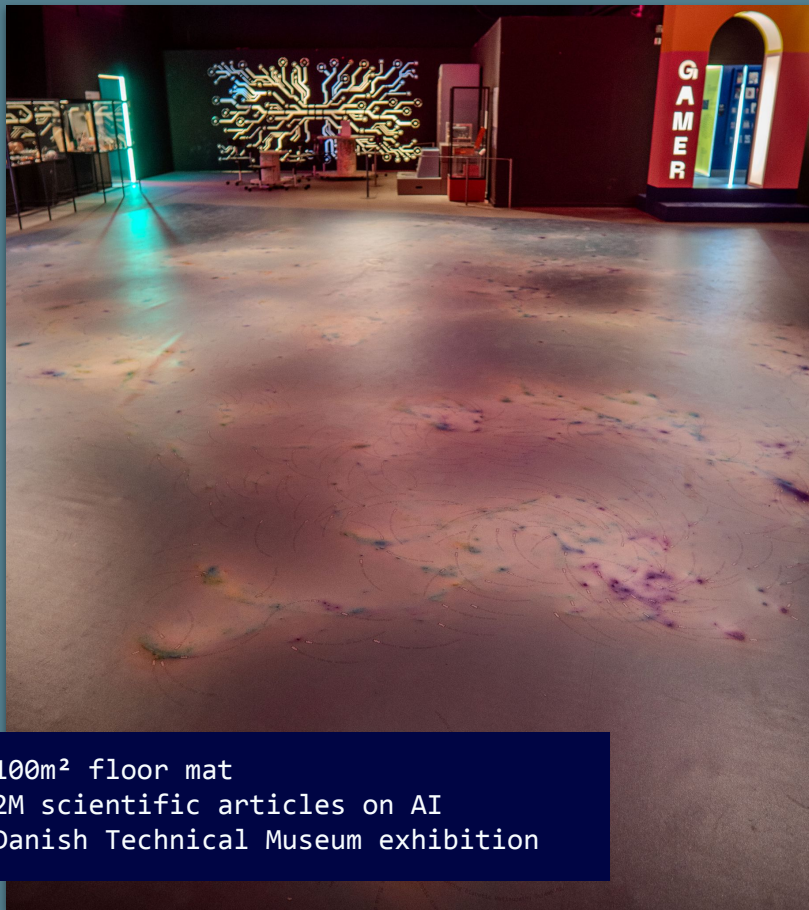
MODELING

“is a primary mode of creating an abstract scheme or structure of analysis or argument. ... [It] uses graphical means to **produce interpretative work** using visual argument structures such as **contradiction, ambiguity, parallax, and point of view** that are fundamentally hermeneutic in character.”



Thank you for your attention

Printed to walk on it (2025)



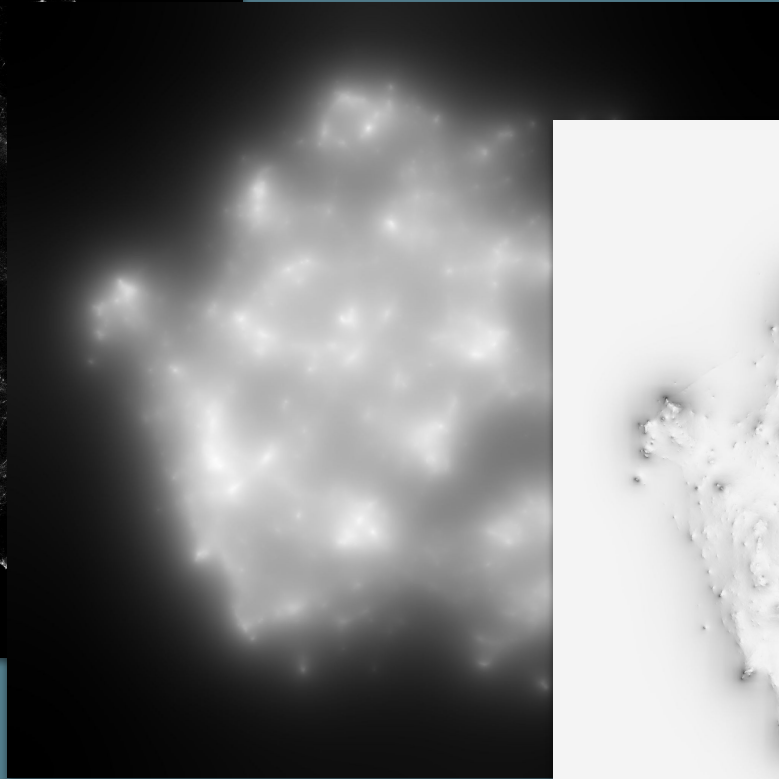
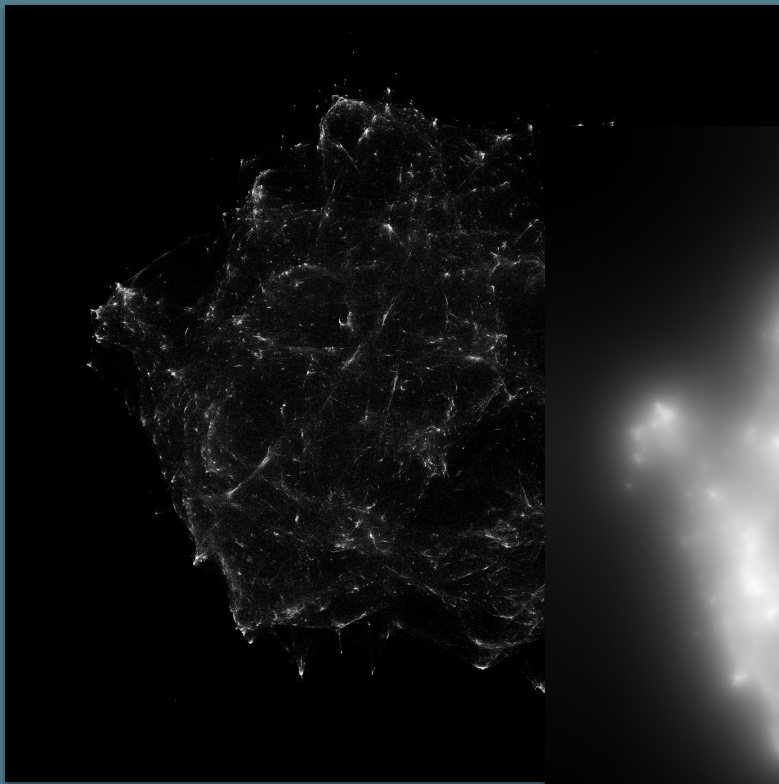
100m² floor mat
2M scientific articles on AI
Danish Technical Museum exhibition



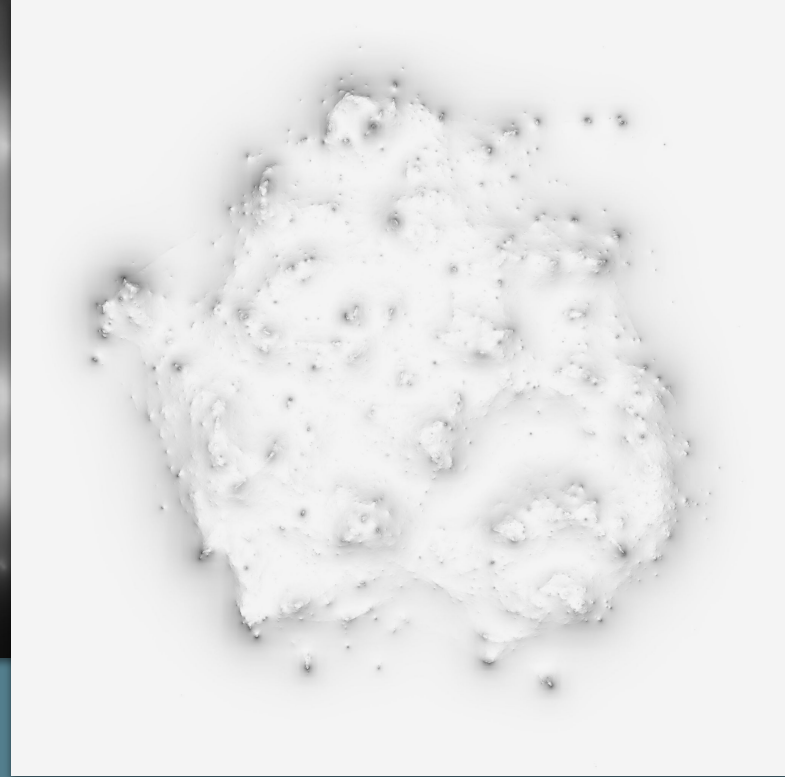
<https://grounding-ai.github.io/>

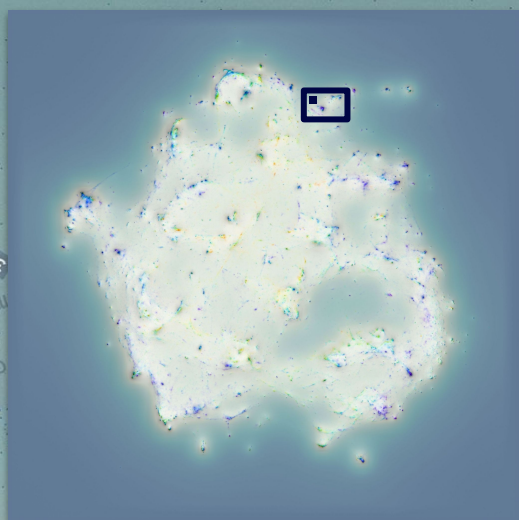
1793 Chicken diet optimization
Algorithmic Advances in Microscopy



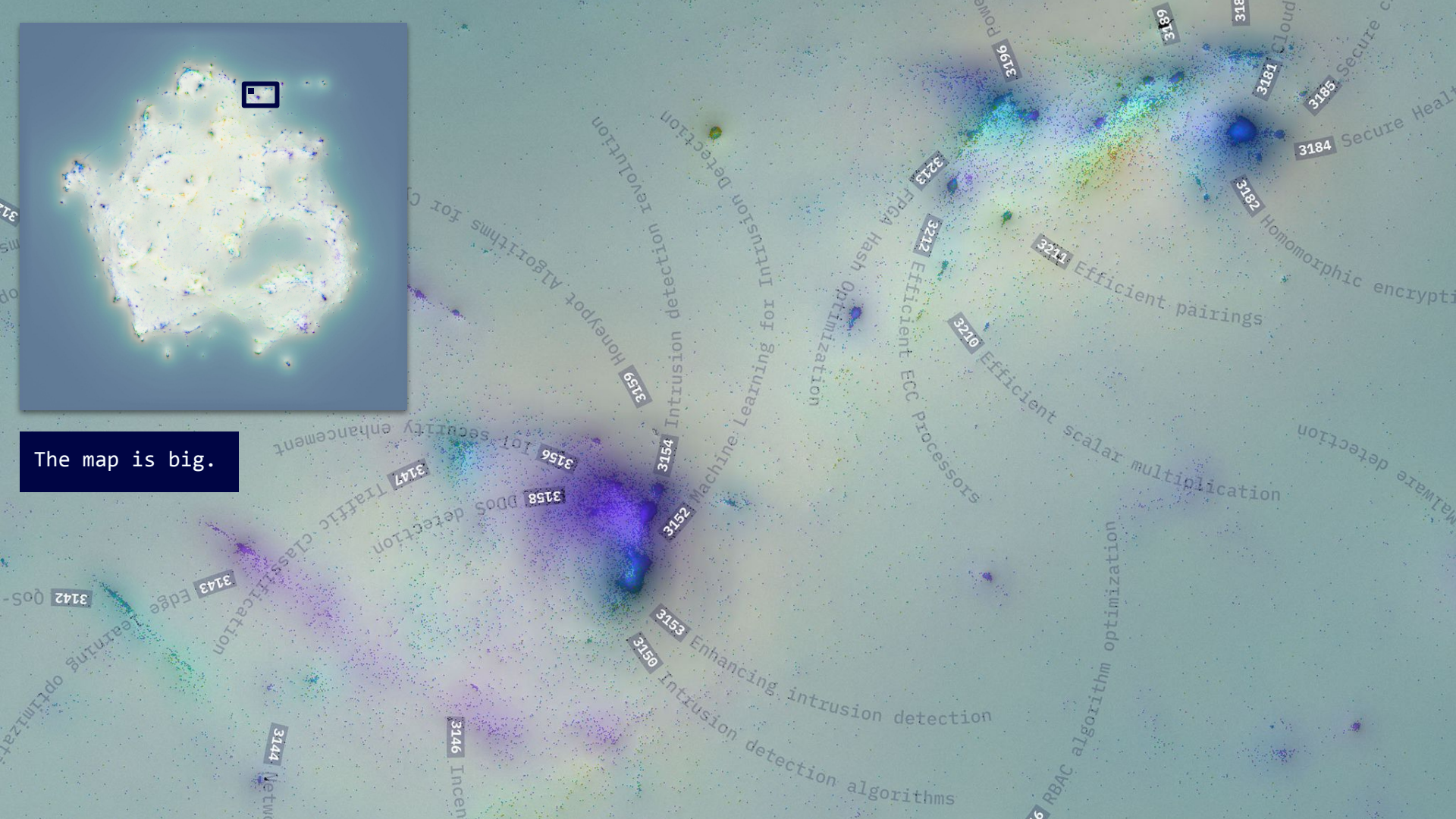


The design aims to bring focus to the clusters (“islands” of this “atoll”)

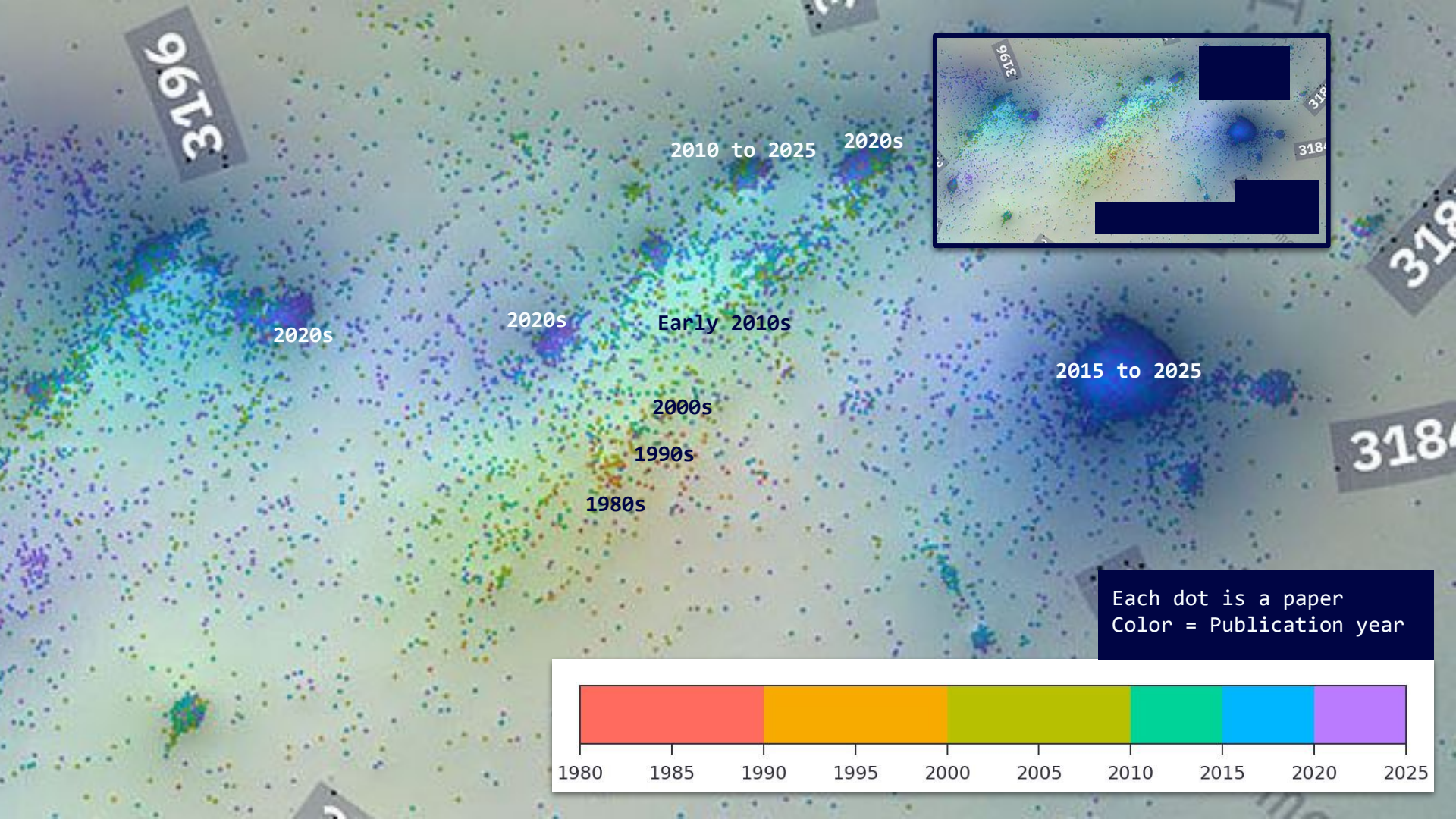




The map is big.

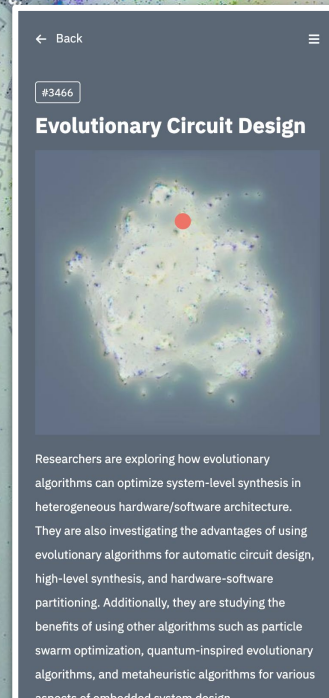
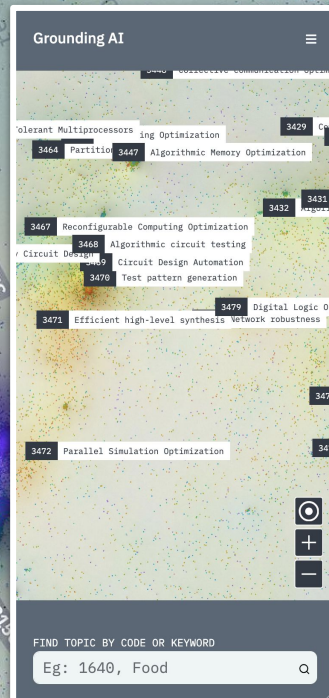
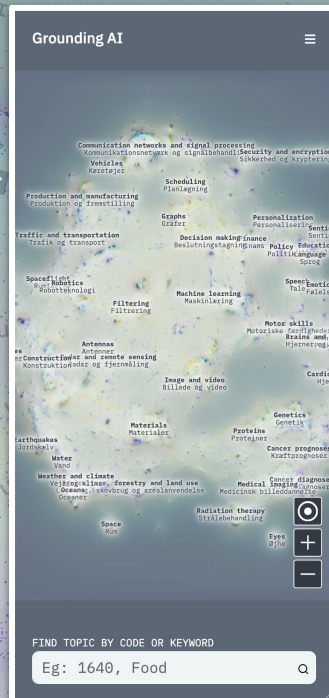


3196 Power
3181 Cloud
3189 Secure c
3184 Secure Heal
3182 Homomorphic encrypti
3217 Efficient pairings
3210 Efficient scalar multiplication
3212 Efficient ECC Processors
3213 FPGA Hash Optimization
3154 Intrusion detection revolution
3159 Honeypot Algorithms for C
3156 IoT security enhancement
3147 Traffic classification
3158 DDoS detection
3155 Machine Learning for Intrusion Detection
3150 Enhancing intrusion detection
3146 Intrusion detection algorithms
3144 Network
3146 Incen
3143 Edge Learning optimization
3142



Each label is a cluster summarized and titled using a LLM.

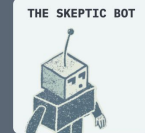
Application / smartphone app:
<https://grounding-ai.github.io/web-application/>



algorithms, and metaheuristic algorithms for various aspects of embedded system design.

Get some synthetic opinions on this topic

THIS IS A SYNTHETIC OPINION GENERATED BY AI.
IT IS MEANT TO SPARK DEBATE.



What's your opinion on that matter?

I want to react to this page because...

☐ I understand that my comment is for **public consumption**, and should not contain any private or sensible information.

Submit comment

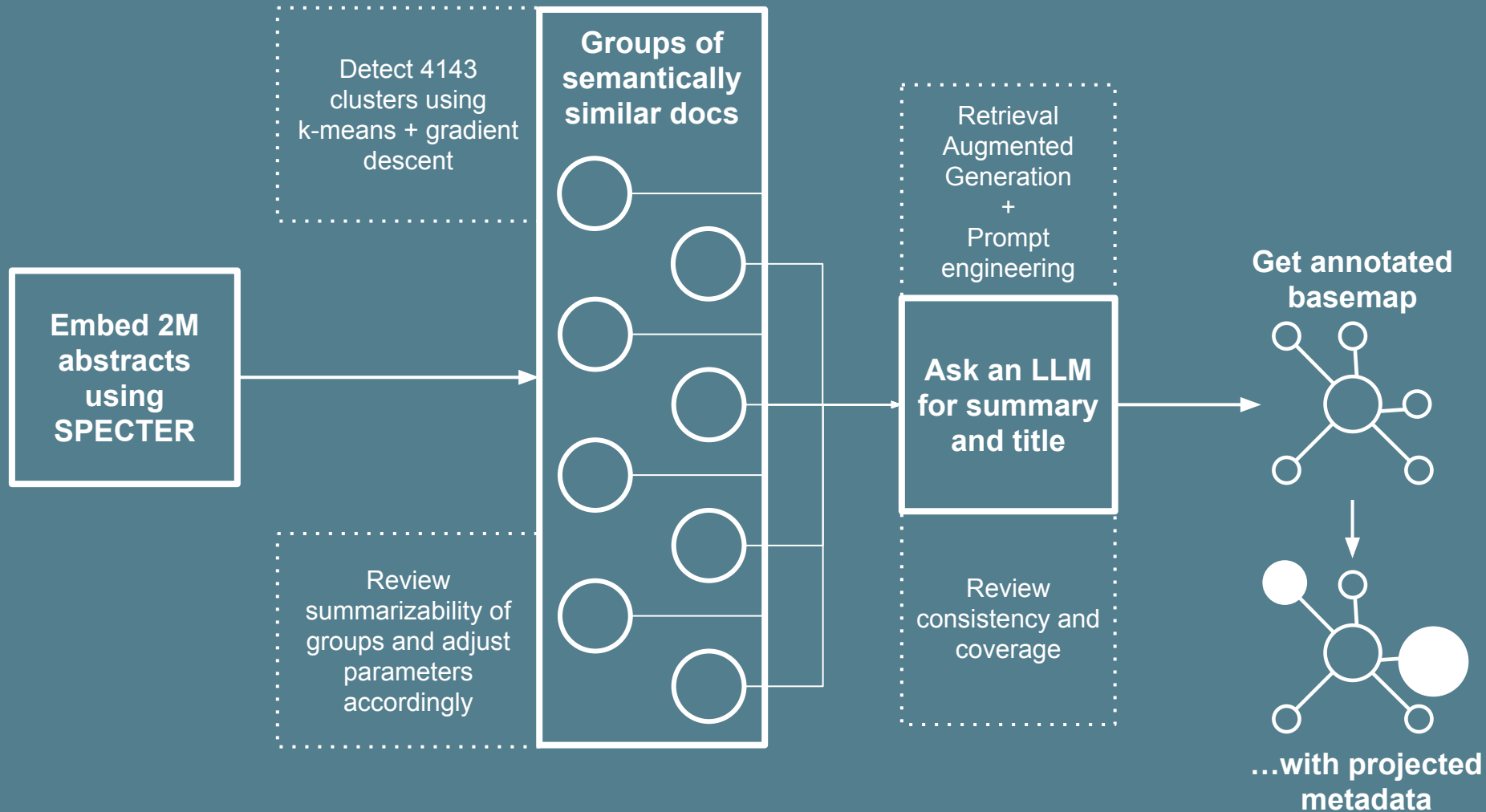
FIND TOPIC BY CODE OR KEYWORD

Eg: 1640, Food

Q

Application / smartphone app:

<https://grounding-ai.github.io/web-application/>



Connected-closeness

Jacomy, M. (2023). Connected-closeness: A Visual Quantification of Distances in Network Layouts. Journal of Graph Algorithms and Applications, 27(5), 341–404.
<https://doi.org/10.7155/jgaa.00626>

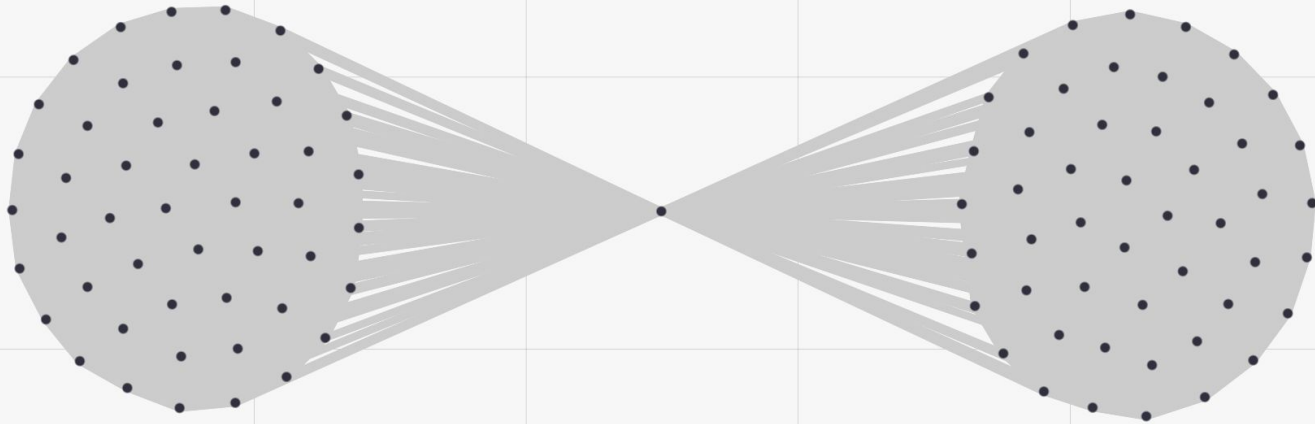
Connected-closeness



Layout quality

Connected Closeness

49% of edges are shorter than Δ_{\max}
thanks to the layout
Grid size = $\Delta_{\max} = 381$



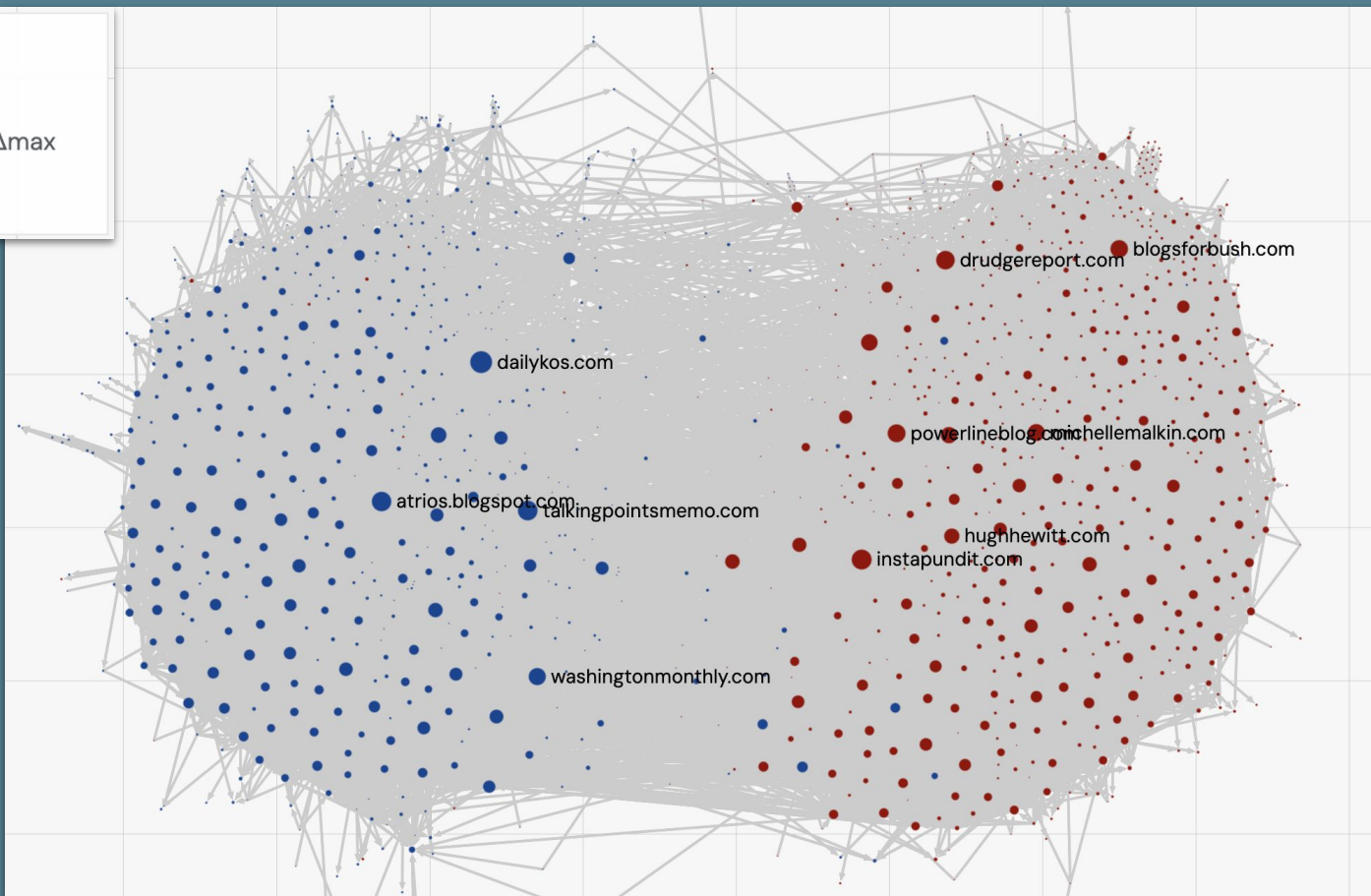
Connected-closeness



Layout quality

Connected Closeness

54% of edges are shorter than Δ_{\max}
thanks to the layout
Grid size = $\Delta_{\max} = 528$



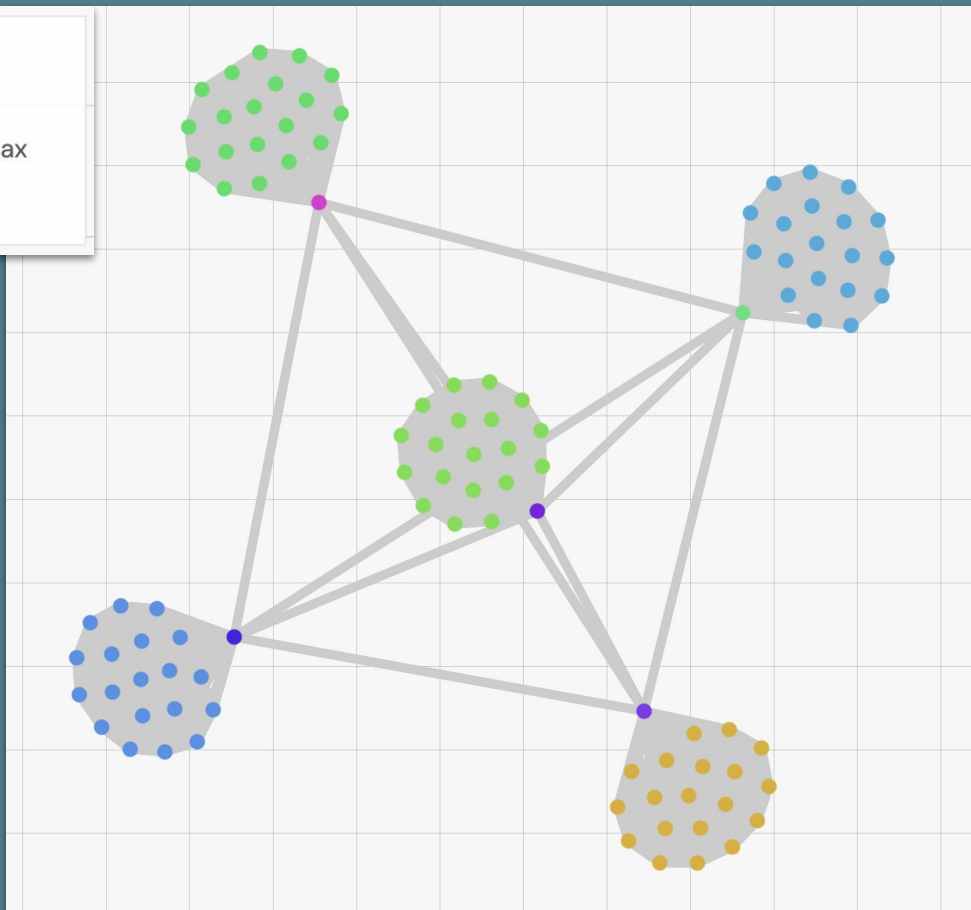
Connected-closeness



Layout quality

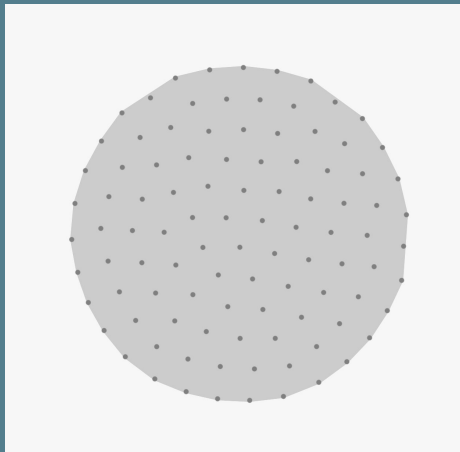
Connected Closeness

81% of edges are shorter than Δ_{\max}
thanks to the layout
Grid size = $\Delta_{\max} = 100$



Connected-closeness

Clique
(everything is connected)

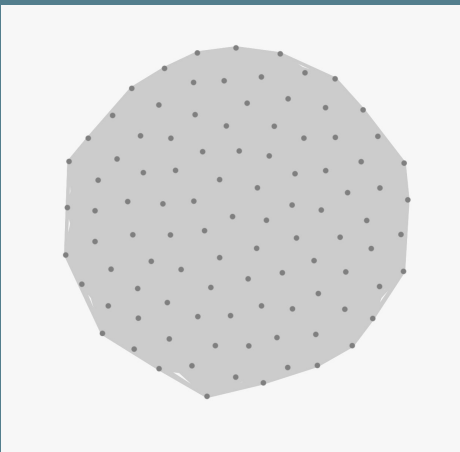


Layout quality

Connected Closeness

N/A of edges are shorter than Δ_{\max} thanks to the layout
Grid size = $\Delta_{\max} = N/A$

75% chance
that 2 nodes are linked

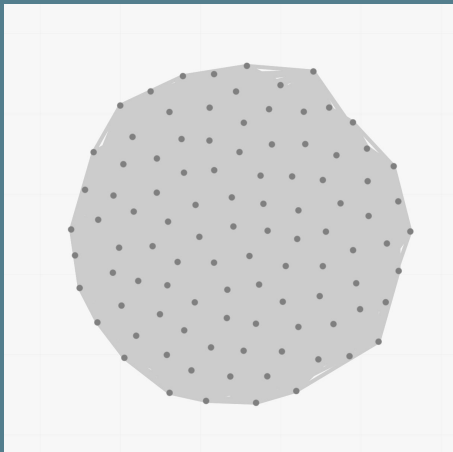


Layout quality

Connected Closeness

6% of edges are shorter than Δ_{\max} thanks to the layout
Grid size = $\Delta_{\max} = N/A$

50% chance
that 2 nodes are linked

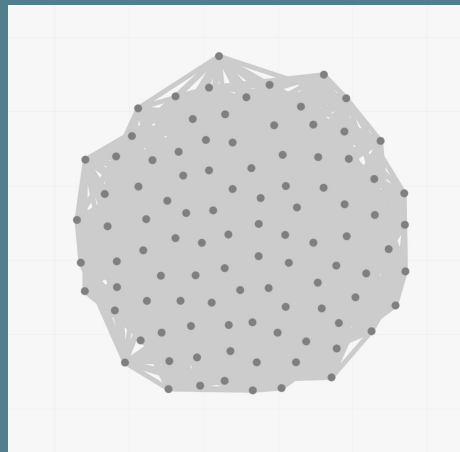


Layout quality

Connected Closeness

10% of edges are shorter than Δ_{\max} thanks to the layout
Grid size = $\Delta_{\max} = 225$

25% chance
that 2 nodes are linked



Layout quality

Connected Closeness

17% of edges are shorter than Δ_{\max} thanks to the layout
Grid size = $\Delta_{\max} = 171$

Node positions are
uncharacteristic

Node positions are
increasingly characteristic