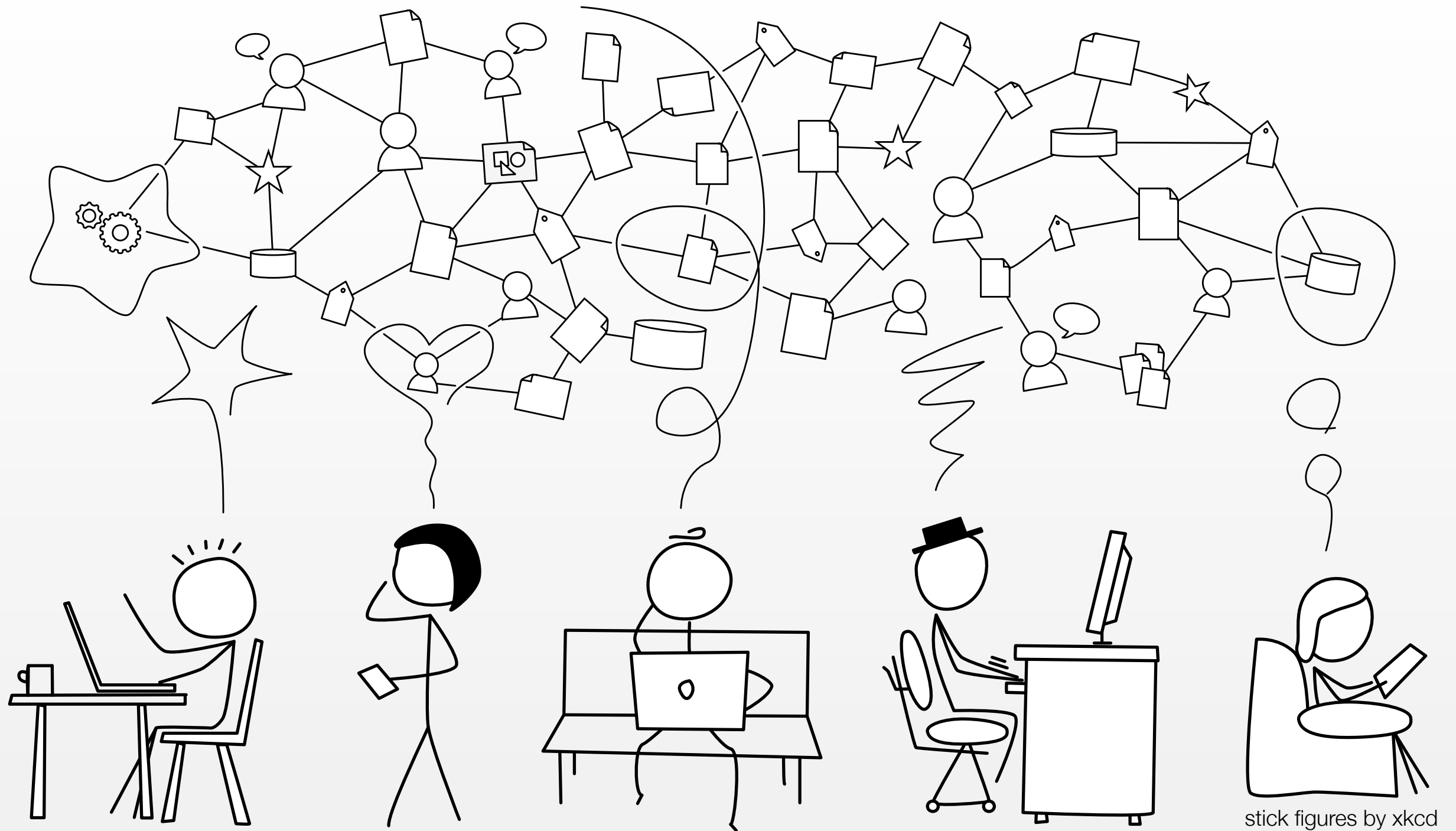




Visualization for Search

Strolling through Information Landscapes

Marian Dörk – PhD Candidate, Computer Science, University of Calgary
Advisors: Sheelagh Carpendale and Carey Williamson

Growing Information Spaces



Growing Information Overload

The screenshot shows the Twitter homepage with a search bar at the top containing 'UofC'. Below the search bar, there are sections for 'Top Trending Topics' and 'Realtime results for UofC'. The 'Realtime results' section displays a list of tweets related to the University of Calgary (UofC), including mentions of UofC training for a marathon, UofC disputing Darwin's theory, and UofC students honoured for fighting local hunger. The tweets are dated from about 1 hour ago to about 15 hours ago.

The screenshot shows the University of Calgary Library search results page for the keyword 'information visualization'. The page displays a list of 96 titles found, with the first 8 titles visible. The titles include 'Information Visualization [electronic resource]: Human-Centered Issues and Perspectives', 'Introduction to information visualization', 'Modeling and data mining in blogosphere', 'Information theory tools for computer graphics', 'High fidelity haptic rendering', 'IEEE Symposium on Information Visualization', 'Statistical methods in molecular biology', and 'Two-dimensional information theory and coding'. Each title is accompanied by a small thumbnail image and a brief description.

The screenshot shows the Google search results page for the keyword 'information visualization'. The page displays a list of search results, including 'Information visualization - Wikipedia, the free encyclopedia', 'Information Visualization: Perception for Design', 'Information visualization: perception for design - Google Books Result', 'Information Visualization', 'Some Information Visualization Resources on the Web', 'Amazon.com: Information Visualization (9780201596267): Robert L. Taylor', 'AT&T Information Visualization', 'CPSC 533C: Information Visualization, Fall 2006-2007', 'Information visualization: beyond the horizon - Google Books Result', and 'Searches related to information visualization'. The page also includes a sidebar with 'Sponsored links' and 'Data Visualization'.

Information Seeking Models

Deficiencies

knowledge gaps
information needs
problems, anxiety, fear

Positive traits and experiences

curiosity
serendipity
pleasure

Everyday Information Seeking

The Flaneur

Urban character at home in the boulevards, arcades, and cafés of Paris in the 1840s

Wandering streets without a destination, but with the goal to experience city life

[Benjamin 1973, Jenks 1995, Gluck 2003]

Curious Explorer



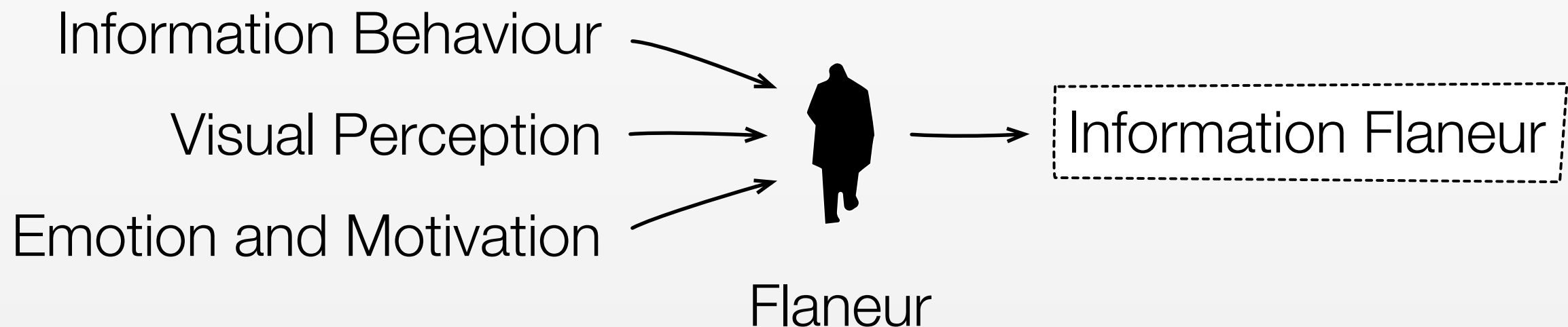
Photo: an untrained eye (Flickr)

Critical Spectator



Creative Mind

Use curious mindset towards city to reframe
how we think about information seekers



Promote a shift from deficiencies to
positive traits, activities, and experiences

The Information Flaneur



Curious exploration

Pursue diverse paths and representations



Critical reflection

Question information and reveal hidden links



Creative imagination

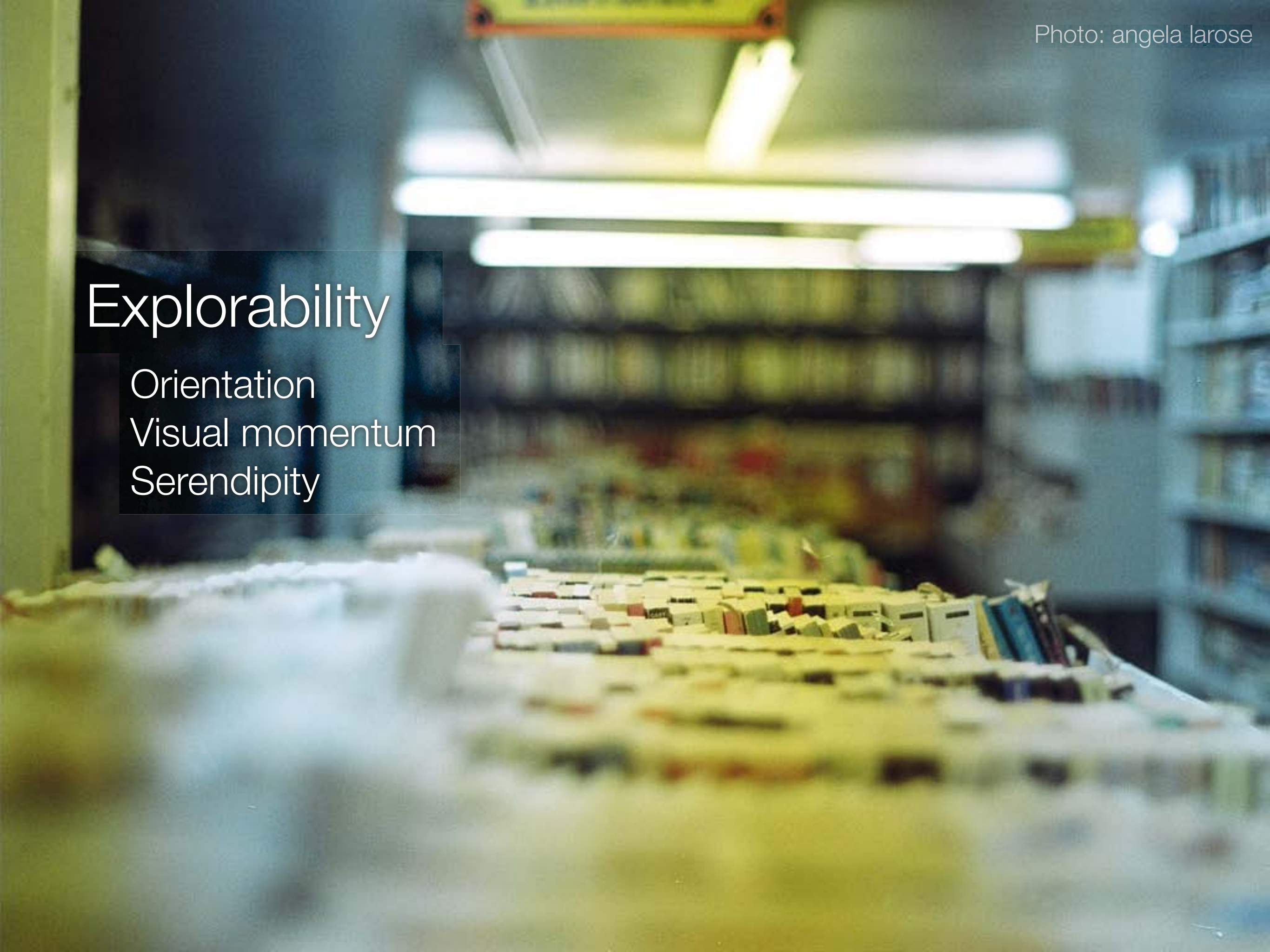
Create novel views and contribute content

Explorability

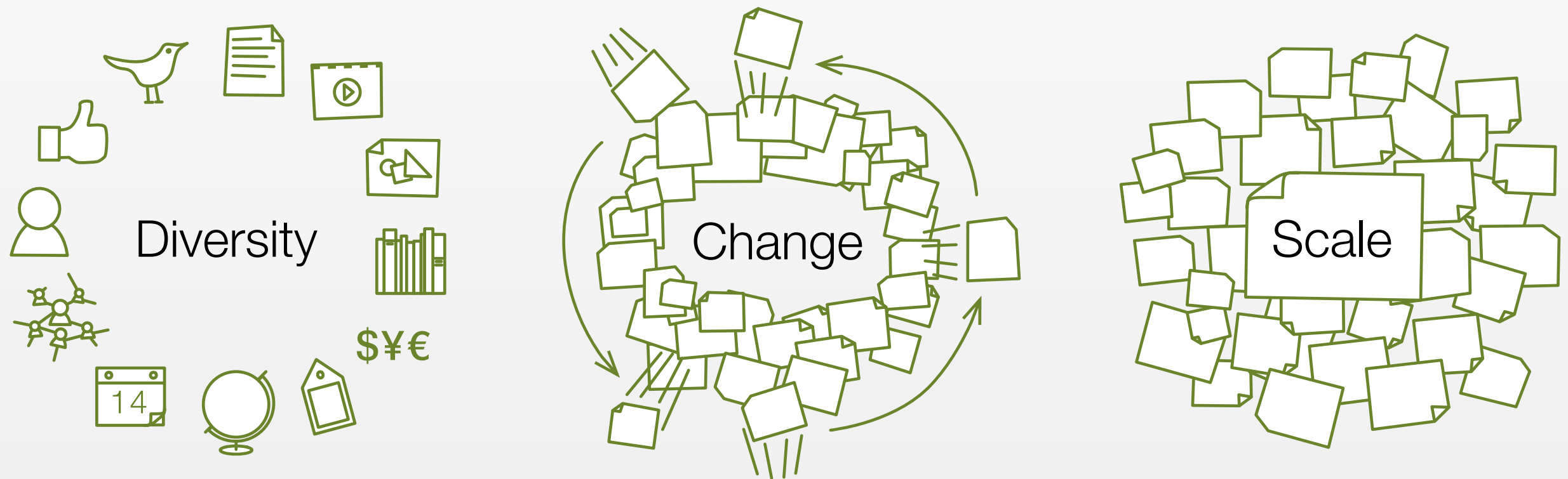
Orientation

Visual momentum

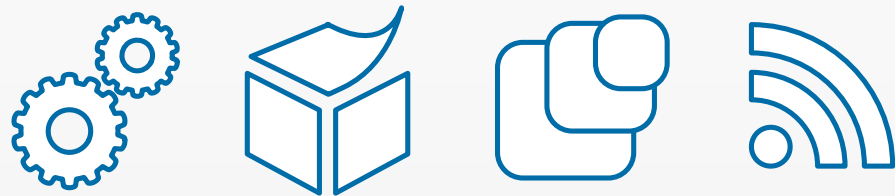
Serendipity



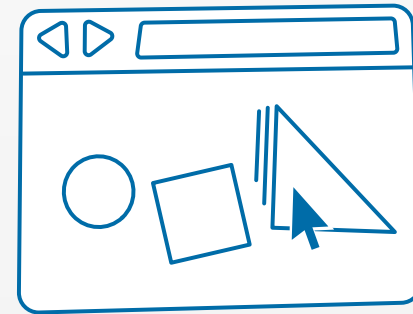
Growing Information Spaces



Technological Developments



Emerging semantics



Interactive graphics

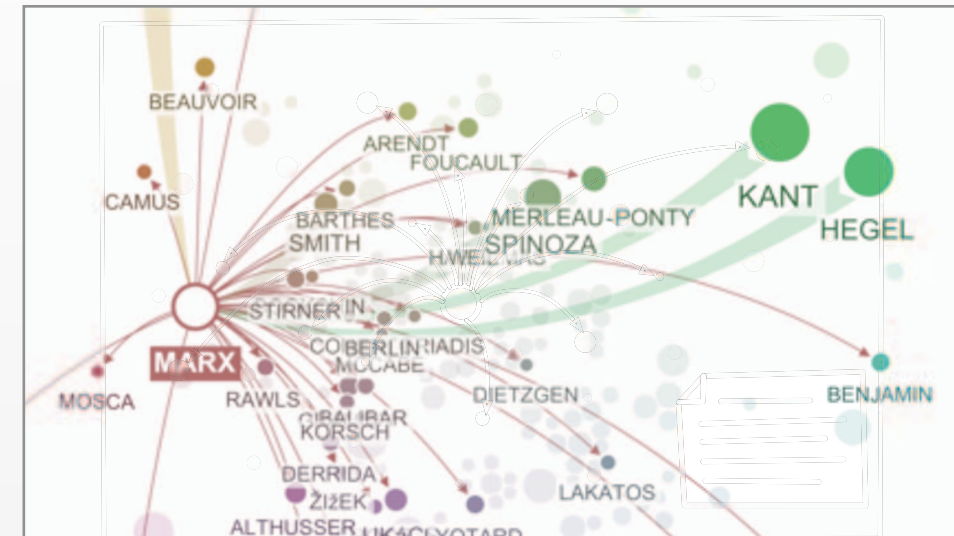


Web everywhere

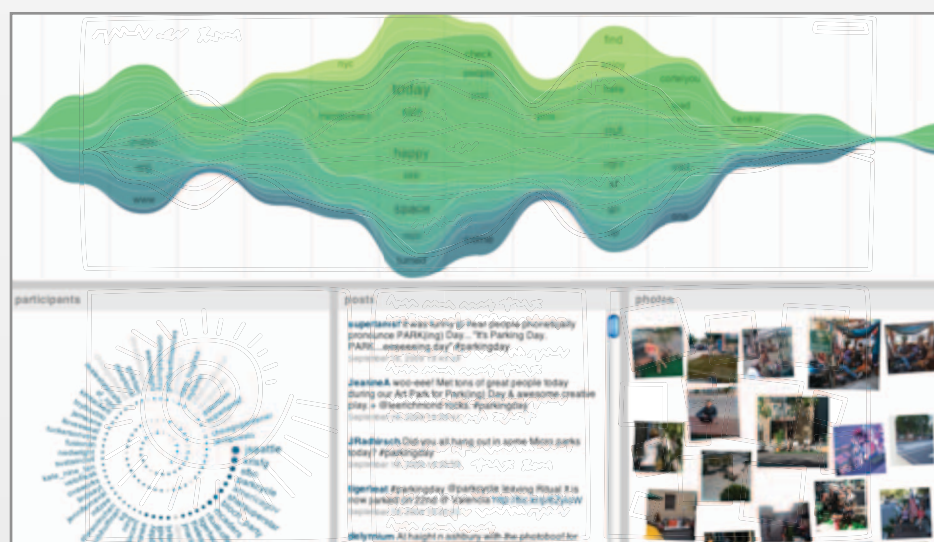
Support Exploratory Information Seeking



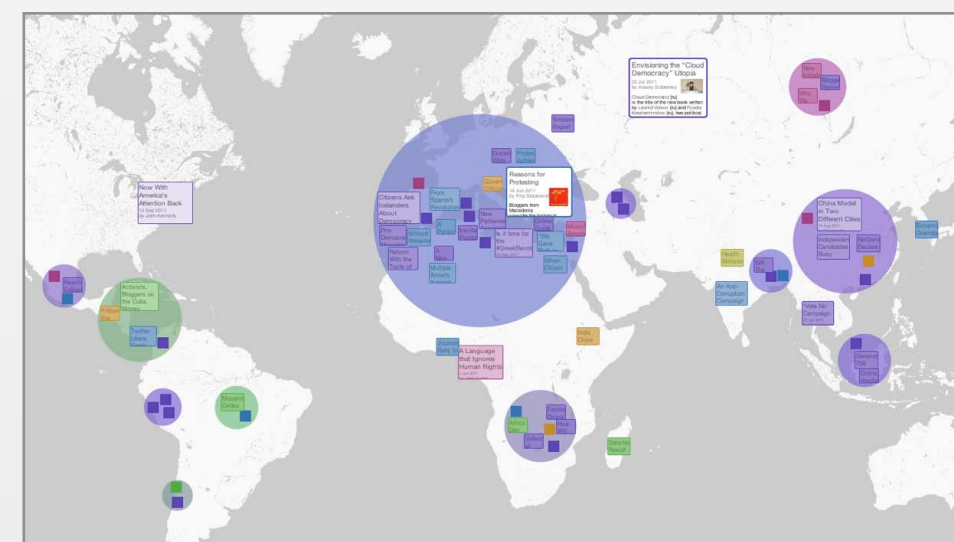
VisGets



EdgeMaps



Visual Backchannel

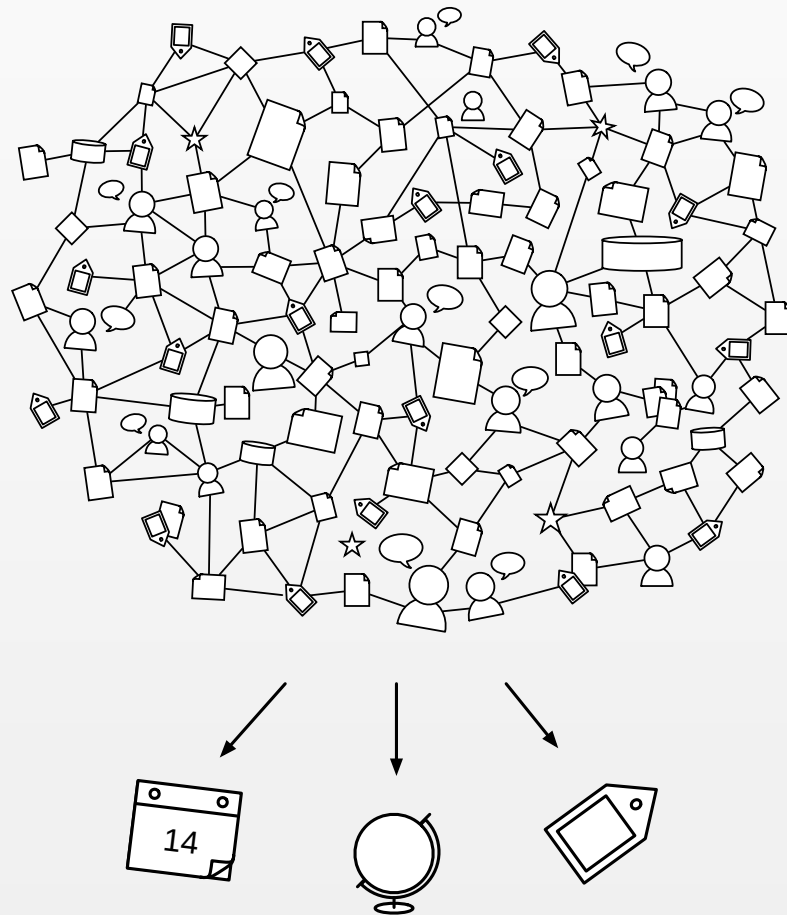


Fluid Views

VisGets

M Dörk, S Carpendale, C Collins, C Williamson. VisGets: Coordinated Visualizations for Web-based Information Exploration and Discovery. TVCG/InfoVis 2008.

World Wide Web



Information Seeking

Lorem ipsum dolor sit amet
http://www.ipsum.do/lor_sit.amet

Excepteur sint occaecat cupidatat non Proident
http://www.excepteur.sin/t_occaecat/cupidatat

Ut enim ad minim veniam, quis nostrud exercitation
http://www.utenim.ad/minim/veniam?quis=nostrud_exercitation

Duis aute irure Dolor in reprehenderit in voluptate velit esse
<http://www.duis-aute-irure-dolor.in/reprehenderit>

Sunt in Culpa qui Officia deserunt Mollit!
<http://www.suntinculpa.qui/officia/deserunt#mollit>

Consectetur adipisicing elit
<http://www.consectetur.ad/ipisicing/elit.html>

Excepteur sint occaecat cupidatat non Proident
http://www.excepteur.sin/t_occaecat/cupidatat

Ut enim ad minim veniam, quis nostrud exercitation
http://www.utenim.ad/minim/veniam?quis=nostrud_exercitation

Ut enim ad minim veniam, quis nostrud exercitation
http://www.utenim.ad/minim/veniam?quis=nostrud_exercitation

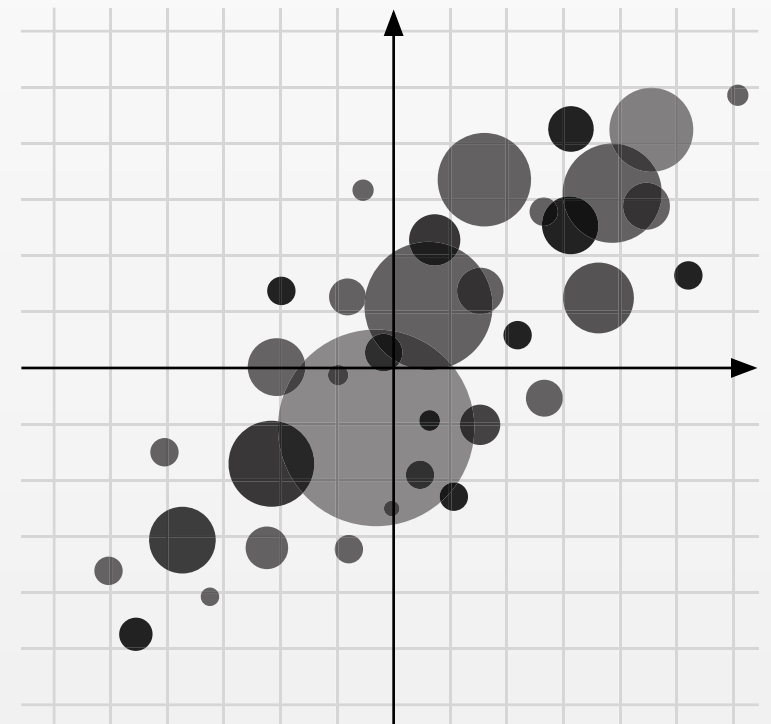
Duis aute irure Dolor in reprehenderit in voluptate velit esse
<http://www.duis-aute-irure-dolor.in/reprehenderit>

Sunt in Culpa qui Officia deserunt Mollit!
<http://www.suntinculpa.qui/officia/deserunt#mollit>

Consectetur adipisicing elit
<http://www.consectetur.ad/ipisicing/elit.html>

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 ... Next ►

Visualization



Design Goals

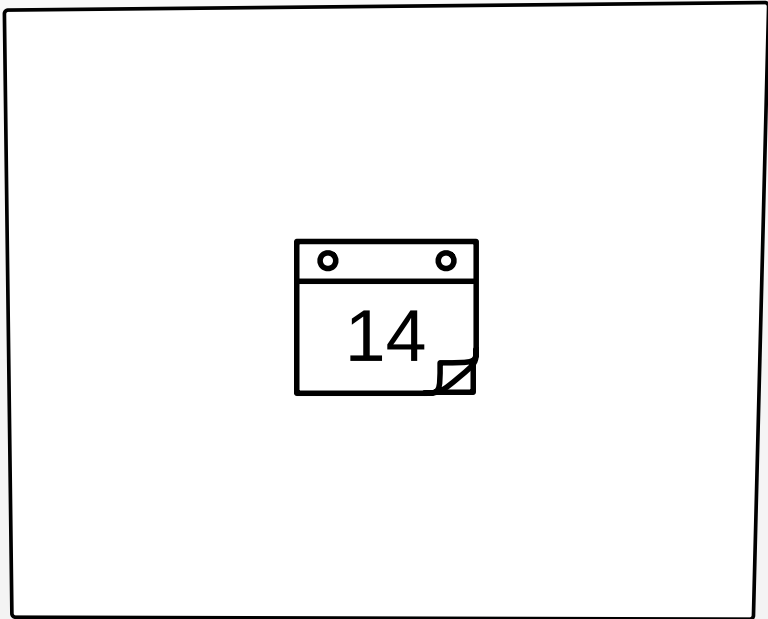
Casual formulation of complex queries

Summarize information collections

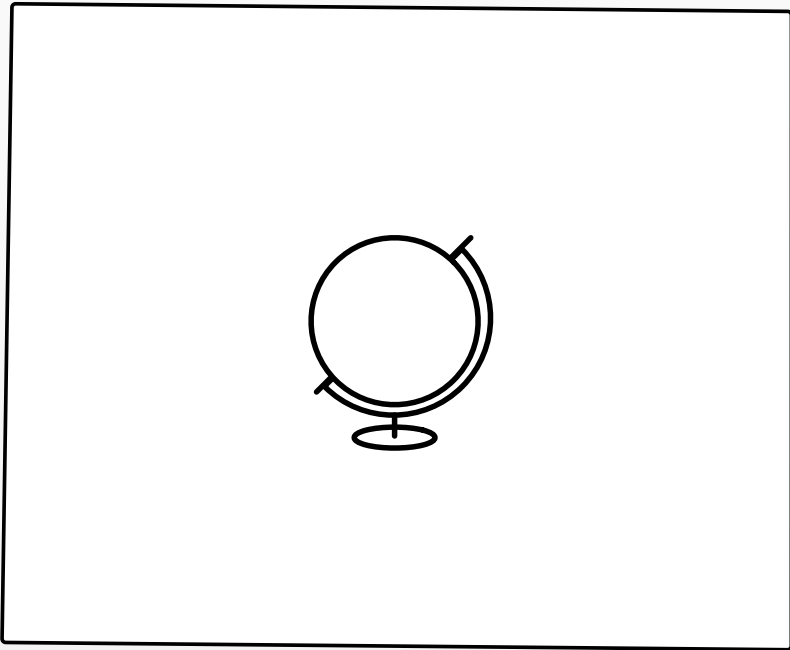
Indicate relationships across facets

Multidimensionality

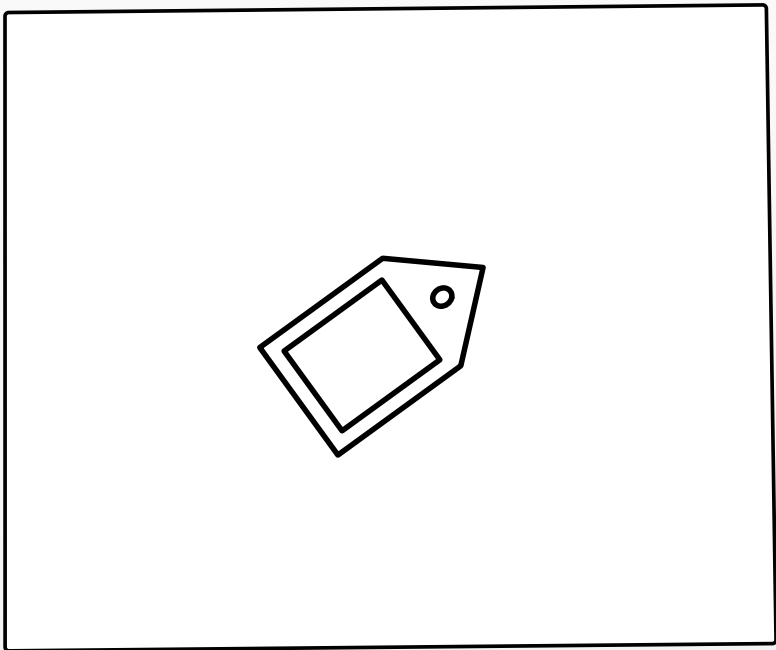
Time



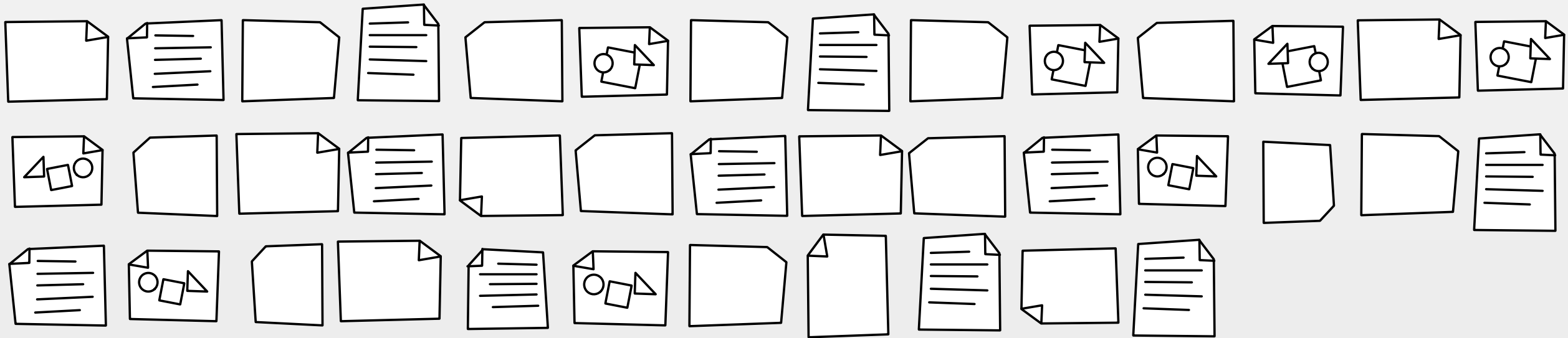
Place



Tags



Results

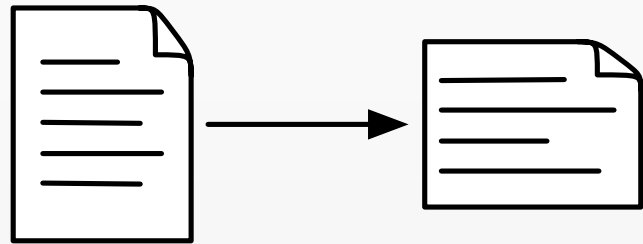


VisGets: Visualization Widgets



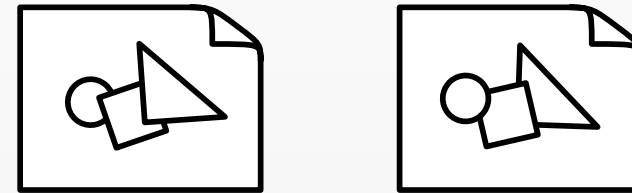
EdgeMaps

Explicit and Implicit Relations



Explicit relations
as **references**

- Web link structures
- Social graph
- Citation networks



Implicit relations
as **similarity**

- Page contents
- Interests and hobbies
- Paper keywords

Design Goals

Integrate explicit and implicit relations

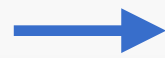
Reveal previously invisible data patterns

Create appealing colours and shapes

Visual Representation

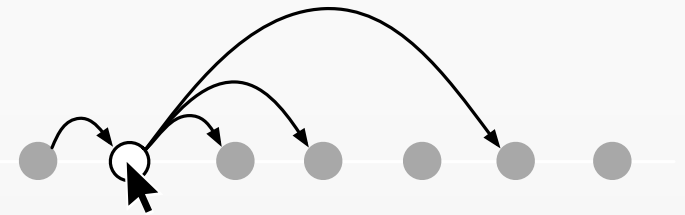
Implicit relations

Birth years



Layout

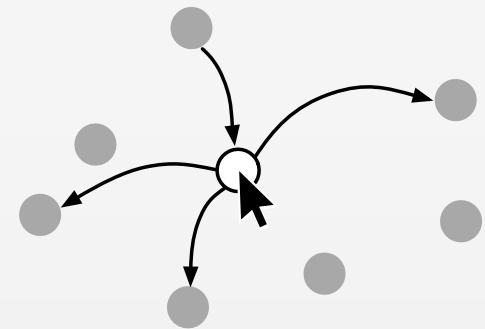
Timeline



Genres + interests

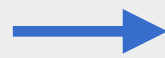


Similarity map



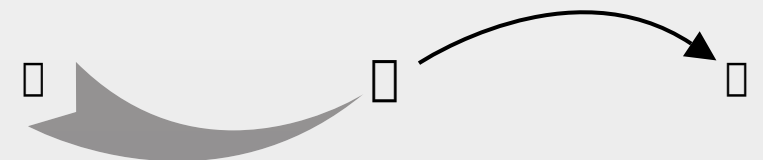
Explicit relations

Influence

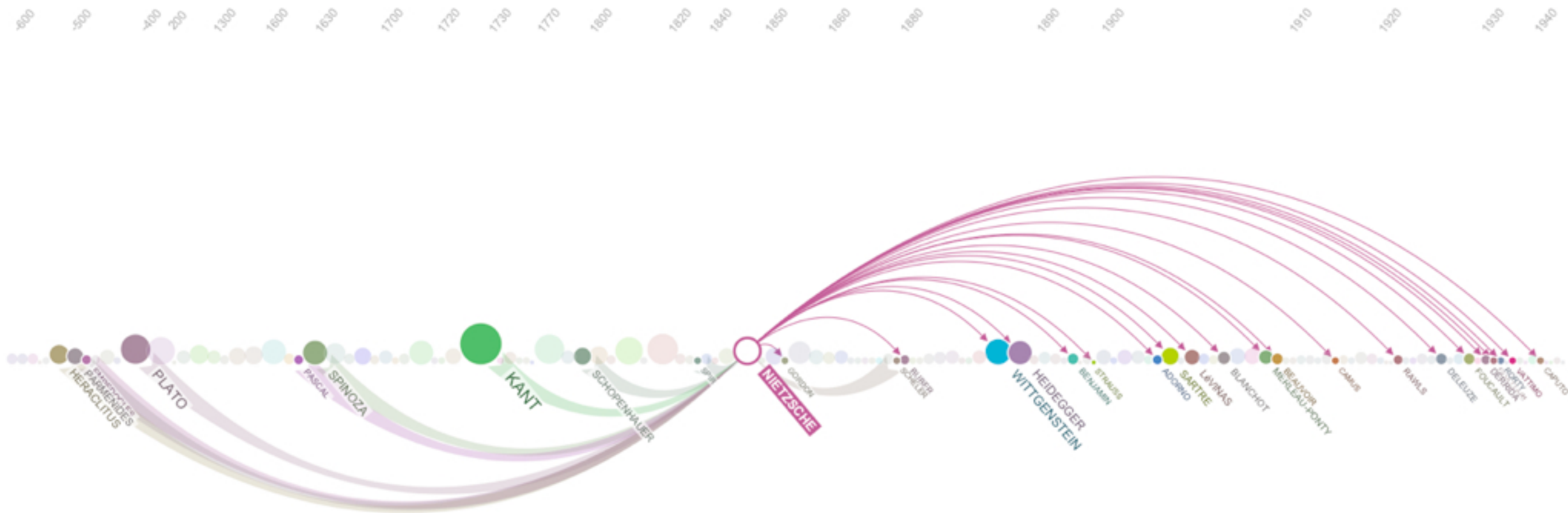


Linkage

Curved edges

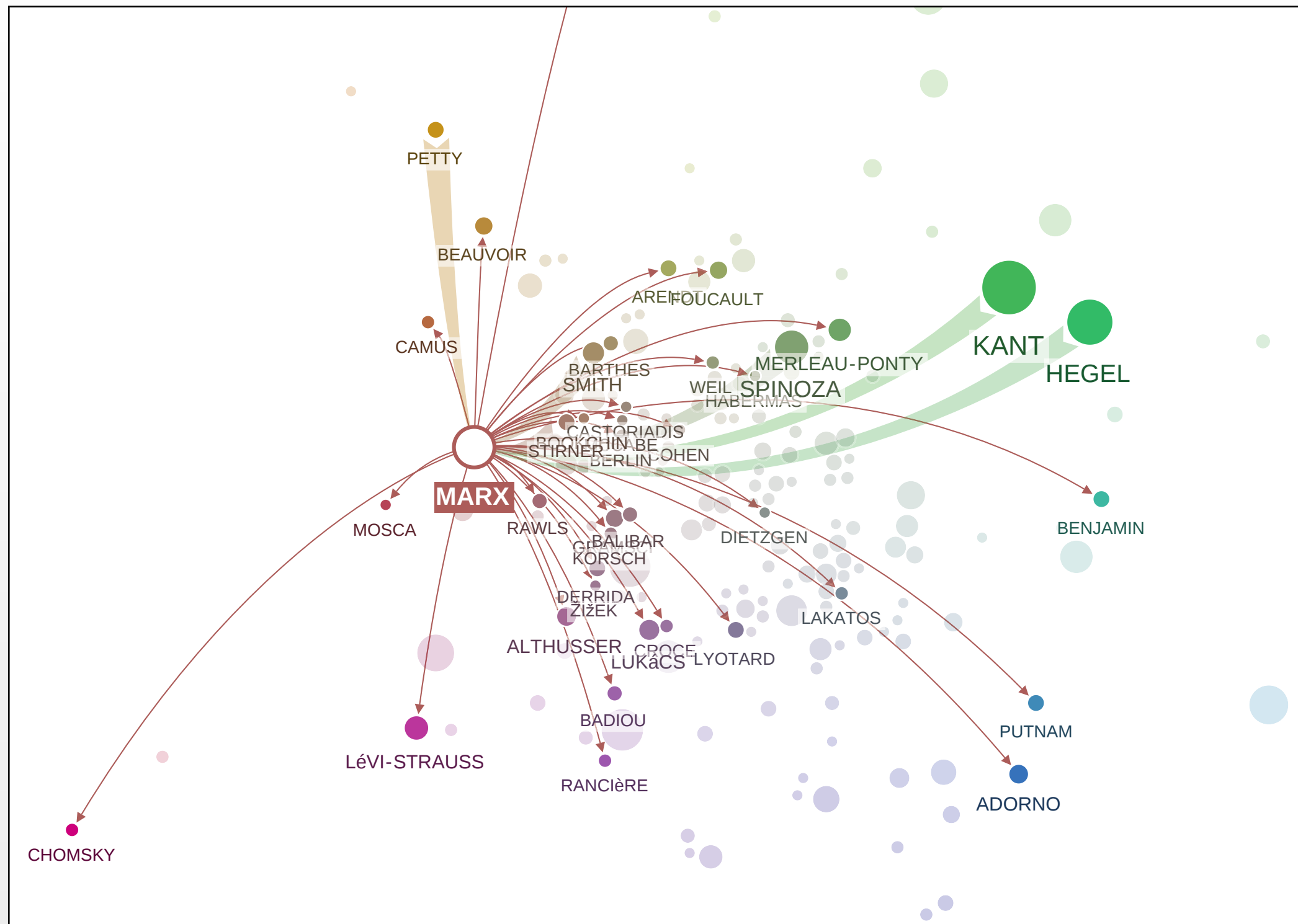


Timeline



Temporal extent and distribution of influence

Similarity Map



Topical extent and distribution of influence

Visual Backchannel

In collaboration with IBM Research

M Dörk, D Gruen, C Williamson, and S Carpendale. A Visual Backchannel for Large-Scale Events.
TVCG/InfoVis 2010.

Backchannels



Photo: Carlos Scheidegger

-  **syrinxsean** Agreed: RT **@HelwigHauser**: Tino Weinkauff on Streak Lines as Tangent Curves -- fantastic talk!! **#visweek**
17 minutes ago via TweetDeck
-  **jcukier** RT **@akuhn**: Attendee list not available, what a bummer for networking! **#visweek** cc **@ieeevisweek**
18 minutes ago via Twitter for iPhone
-  **HelwigHauser** Tino Weinkauff on Streak Lines as Tangent Curves -- fantastic talk!! **#visweek**
18 minutes ago via Twitter for iPhone
-  **timrdf** RT **@dr_tj**: How do we encode perceptual/cognitive facts in this info theory analog? **#visweek** **#vistheory**
20 minutes ago via Twitter for iPad
-  **akuhn** Attendee list not available, what a bummer for networking! **#visweek** cc **@ieeevisweek**
20 minutes ago via Twitter for iPhone
-  **fakeedwardtufte** **#visweek** I would chop down a thousand trees to save one bottle of chart ink
22 minutes ago via web
-  **statpumpkin** between **@scheidegger** and **@hadleywickham** I get all of the juicy tidbits from **#visweek** without being there! (plus snarky commentary if needed)
30 minutes ago via Tweetie for Mac

Too many voices in a sea of strangers

Losing focus: What just happened?

Design Goals

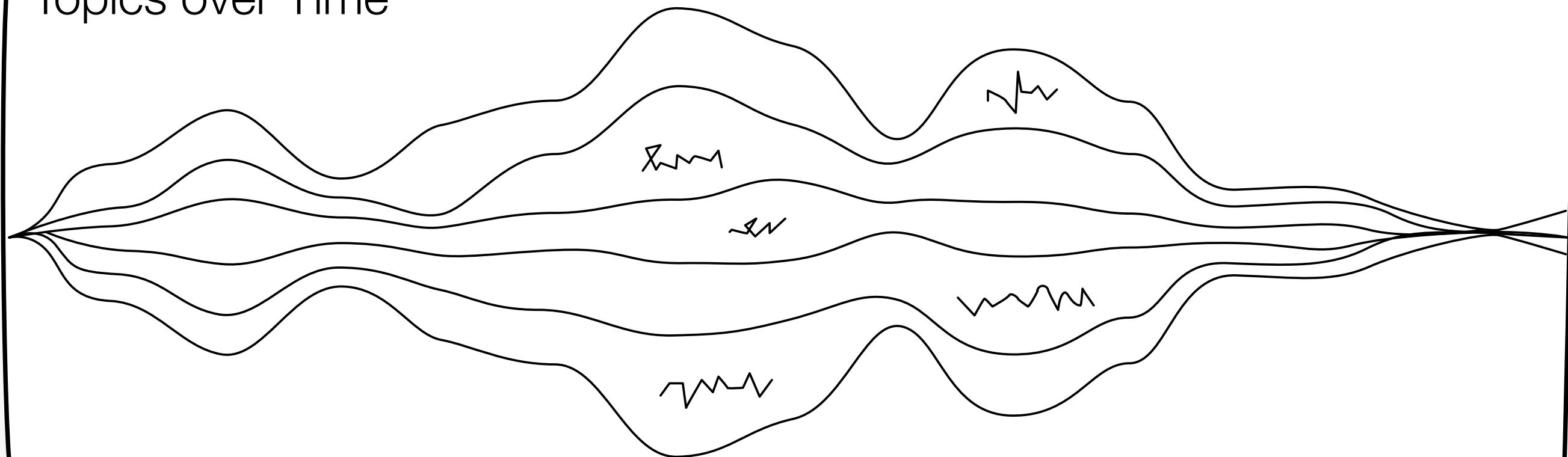
Summarize ongoing conversation

Integrate 'now' and 'recent'

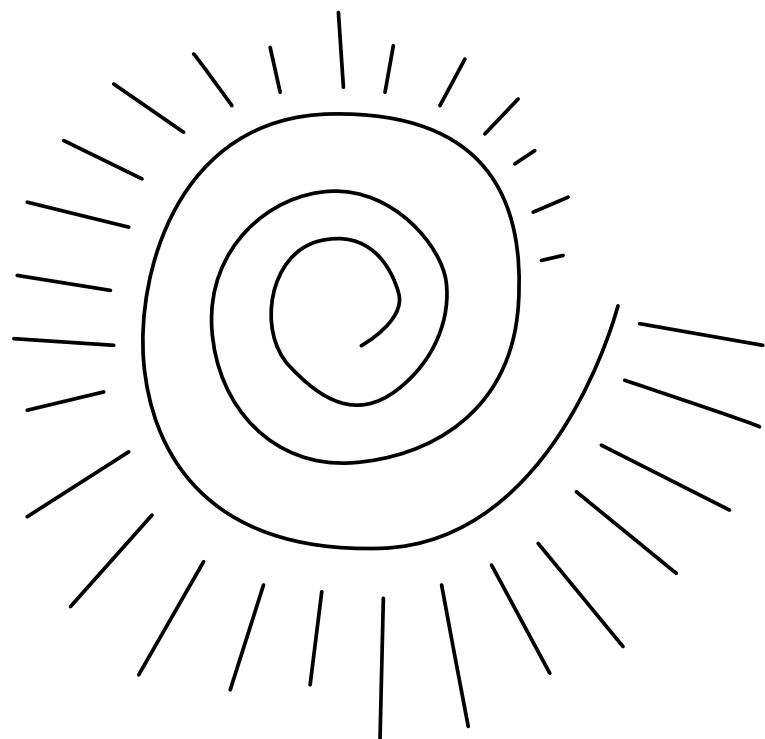
Provide flexible filtering techniques

Create organic aesthetics

Topics over Time



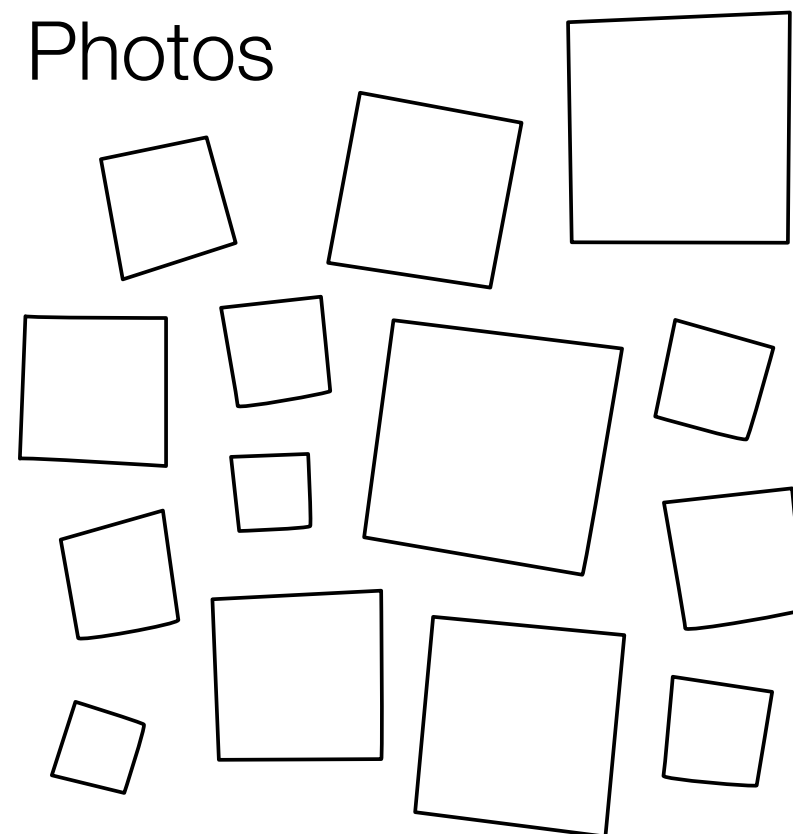
Participants



Posts

Wavy lines representing posts or content, organized into several horizontal groups of scribbled text.

Photos



7 PM

photos

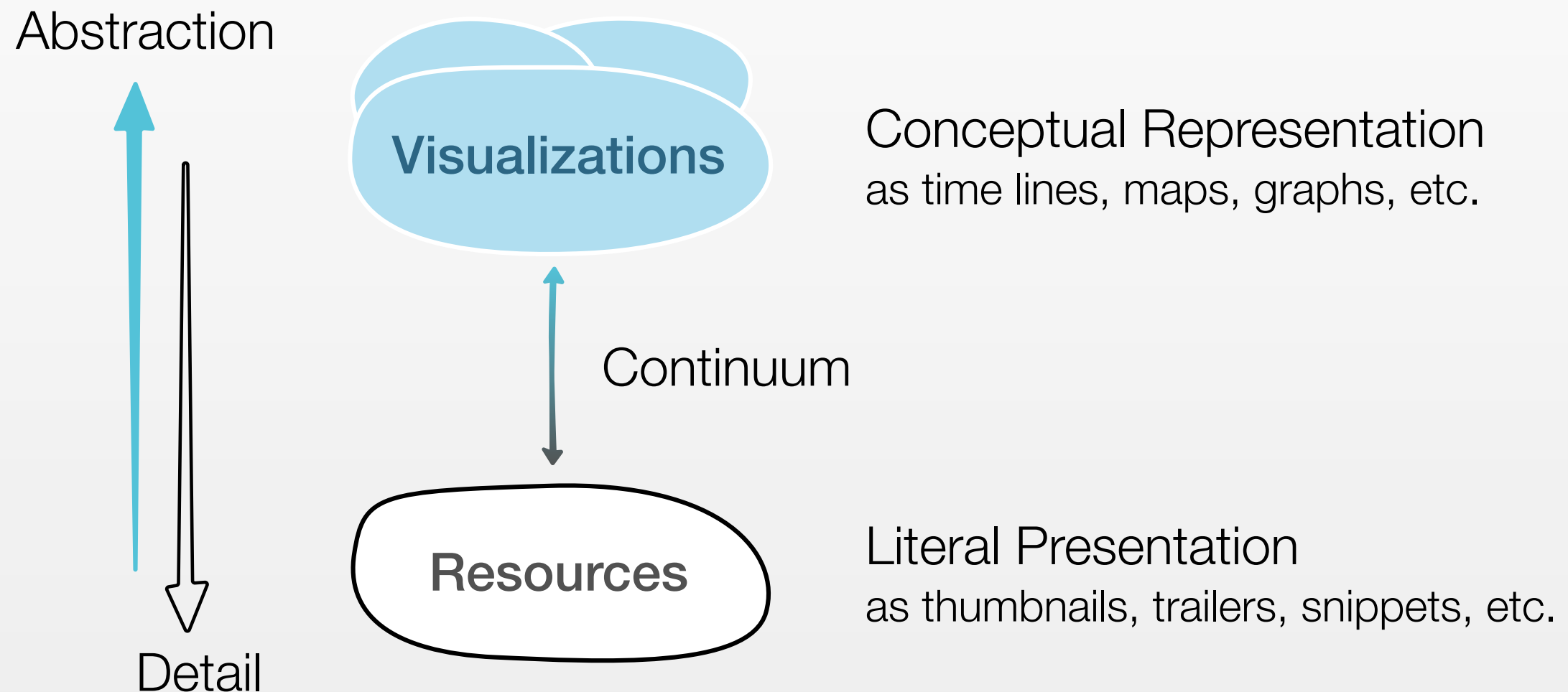
dougfredericks <http://twitpic.com/18lrg> - Ben and Adam at the Sacramento Park(ing) day Park #parkingday



Fluid Views

M Dörk, S Carpendale, and C Williamson. Fluid Views: A Zoomable Search Environment.
AVI 2012. *To appear.*

Bridging overview and detail



Design Goals

Ease transition from overview to detail

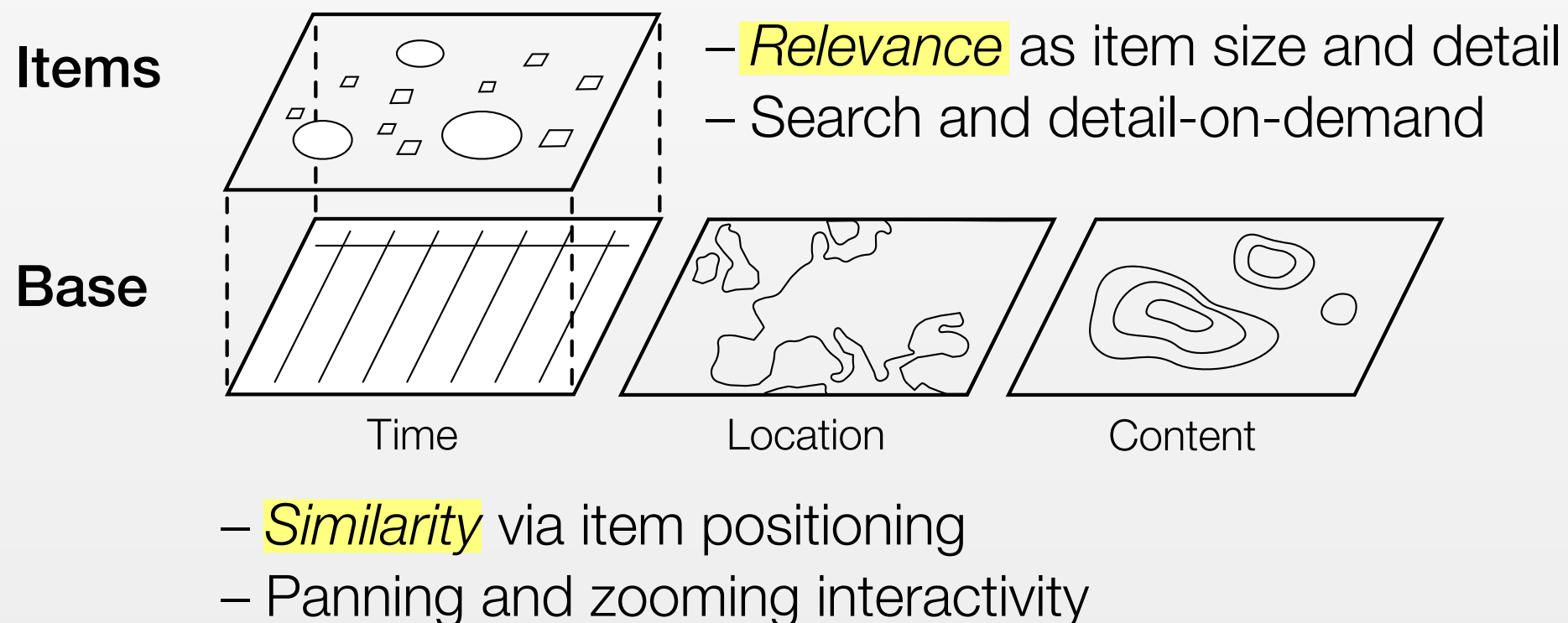
Display resource in context of collection

Scale results according to relevance

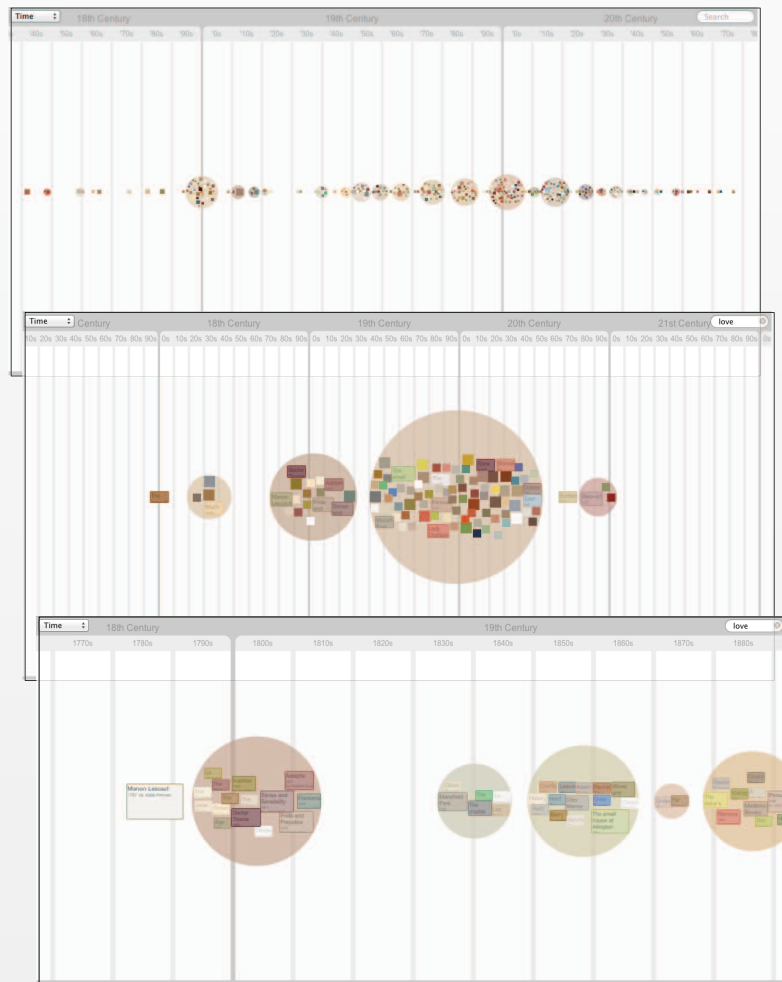
Provide clickable access to results

Fluid Views: Zoomable Search Environment

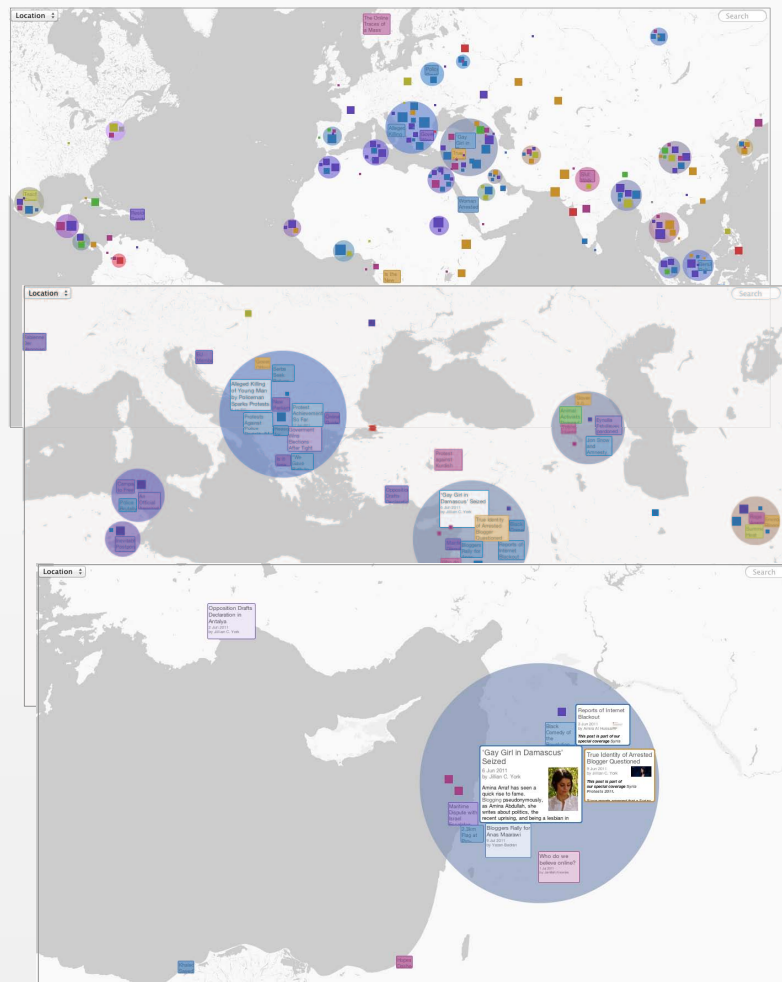
Integrate search relevance and visual encoding by combining semantic zooming, dynamic queries, dual layers



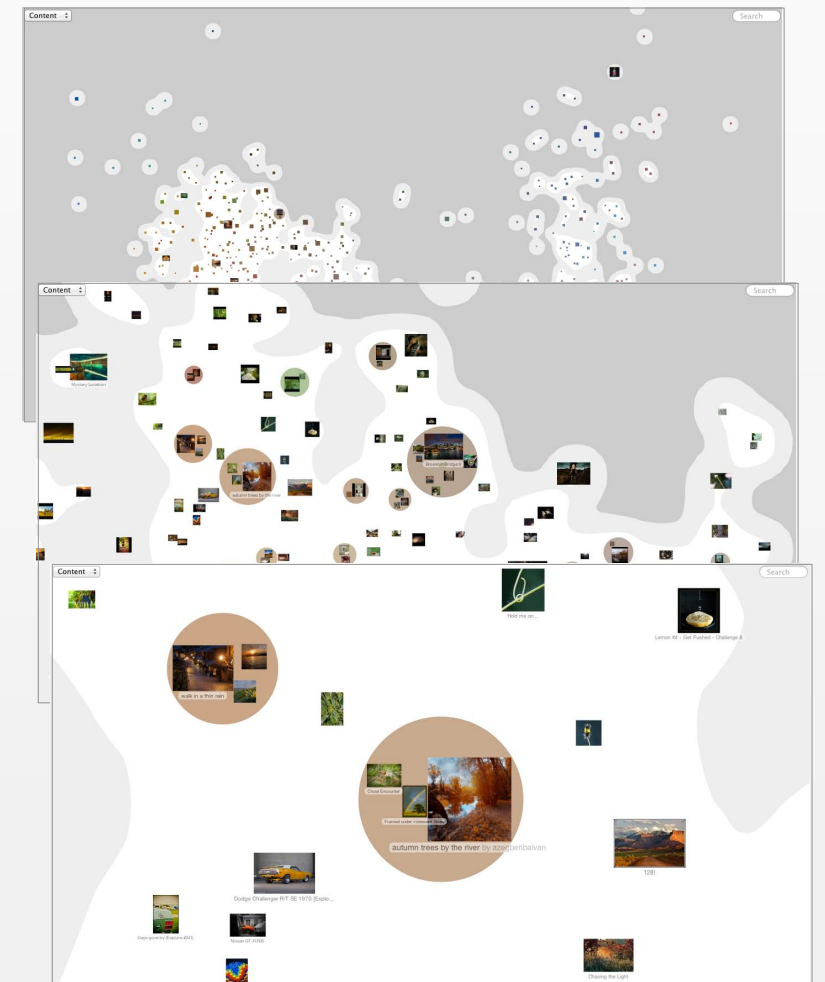
Fluid Views: Examples



Books

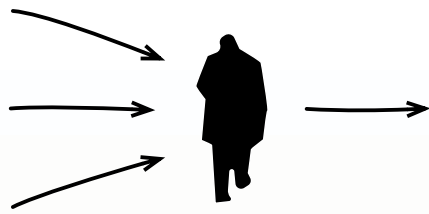


Blogs



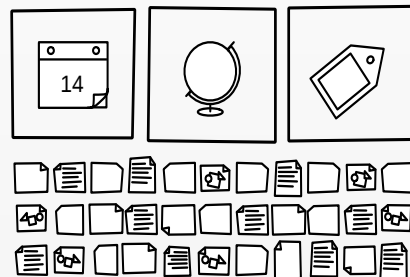
Photos

Conclusion



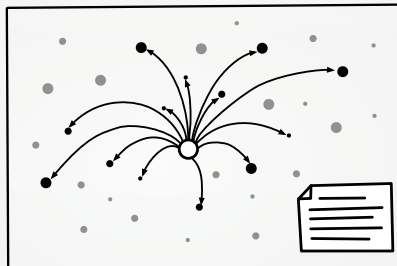
Information Flaneur

Model for positive information practices



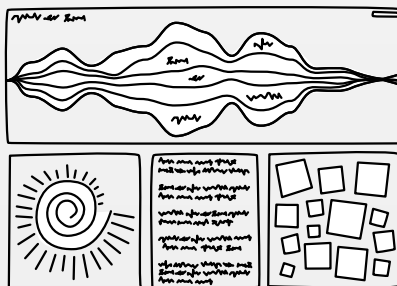
VisGets

Explore blogs along diverse facets



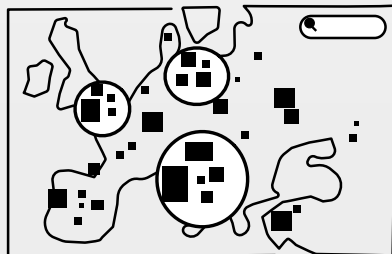
EdgeMaps

Integrate explicit and implicit relations



Visual Backchannel

Follow an evolving information stream



Fluid Views

Navigate resources at varying scales

Open Questions – Next Steps

Scalability to much larger information spaces

Learnability of search interfaces with visualizations

Role of visualization on orientation and curiosity

Creative/critical practices in search & visualization

