

stick figures by xkcd

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

Twitter Search for a keyword or phrase... UofC Search

Top Trending Topics

- Scott Pilgrim
- #youknowwhatsannoying
- Kat Stacks
- Prémio Multishow
- #11fys
- #ripaaliyah
- Dilma
- Major Major
- Elin
- Twitter BFFs

Search tip

Use source: immediately before a particular Twitter source (like a desktop or mobile app) to find tweets posted via that client. Example: weather source:twetie will find tweets containing "weather" and entered via Twetie.

New to Twitter? Twitter is a rich source of instant information. Stay updated. Keep others updated. It's a whole thing. Sign Up!

Realtime results for UofC

- UofCMedicine RT @UCalgary Training for a marathon? U of C running guru says listen to your body to avoid injury. @NationalPost: http://ow.ly/2uAS9 #uofc about 17 minutes ago via web
- juniper_gal @jimedoll --> Training for a marathon? U of C running guru Reed Ferber says listen to your body to avoid injury. http://ow.ly/2uAS9 #uofc about 1 hour ago via TweetDeck
- UCalgary Disputing Darwin: U of C biologist says study challenging 'survival of the fittest' doesn't undermine evol. theory. http://ow.ly/2uAxg #uofc about 1 hour ago via HootSuite
- UCalgary Training for a marathon? U of C running guru Reed Ferber says listen to your body to avoid injury. @NationalPost: http://ow.ly/2uAS9 #uofc about 1 hour ago via HootSuite
- CJSW Anybody out there? Tune in to CJSW 90.9FM for some great overnight tunes! We'll keep you awake => #yyyc #uofc about 7 hours ago via HootSuite
- jmcolls At UofC concert of new music. about 8 hours ago via Oslora for iPhone
- hardavebirk So 4.5 hour #UofC SU council mtng tonight. Really proud of all our reps for their hard work this summer and especially today! Love you guys about 10 hours ago via Twitter for BlackBerry®
- MattSaidREMAX "@UCalgary: #uofc students honoured for fighting local hunger: http://ow.ly/2u6WD #yyc..." about 10 hours ago via Twitter for BlackBerry®
- cochranepj RT @CJSW: Mayoral candidate Naheed Nenshi will be on CJSW 90.9FM this Thursday, Aug 26 at 8:30 am! Tune in! #yyc #uofc about 11 hours ago via HootSuite
- getMarco thinking about the possibility of UofC about 11 hours ago via web
- sillikate RT @CJSW: Mayoral candidate Naheed Nenshi will be on CJSW 90.9FM this Thursday, Aug 26 at 8:30 am! Tune in! #yyc #uofc about 11 hours ago via HootSuite
- rebaverrall @C_DIG Twitter Dinos? Are they related to UofC Dinos? => about 12 hours ago via HootSuite
- madisonjanne guess we know where all my savings from the summer are going... just looked up what books I need. uofc why must you take all my money :/ about 13 hours ago via Twitter for iPhone
- brendanryder Just ran into a friend from UofC that I met last year during their orientation week lol. At ikea of course. about 14 hours ago via Twitter for iPhone
- otafest @lItPending UofC still wins though. Don't like to toot the ole Otafest yuvuzza too much but....OTAFEST ROCKS! <3 xoxo about 15 hours ago via HootSuite

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Search Results

Keyword anywhere "information visualization" search found 96 titles. Limited by-- library:UCALGARY Pages << 1 2 3 4 5 >>

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1. Information Visualization [electronic resource]: Human-Centered Experiences and Perspectives Keren, Andreas Author INTERNET ACCESS 2008 1 copy available at University of Calgary : Internet accessible This book is the outcome of the Dagstuhl Seminar on "Information Visualization -- Human-Centered Issues in Visual Representation, Interaction, and Evaluation" held at Dagstuhl Castle, Germany, from May 28 to June 1, 2007. Informat...

2. Introduction to information visualization [electronic resource] Mazza, Riccardo, 1969- TK7882.16 INTERNET 2008 1 copy available at University of Calgary : Internet accessible Information Visualization is a relatively young field that is acquiring more and more consensus in both academic and industrial environments. This concise introduction to the subject explores the use of computer-supported interact...

3. Modeling and data mining in blogosphere [electronic resource] Agarwal, Nitin. TK5105.8884 INTERNET Synthesis lectures on data mining and knowledge discovery (Online) ; # 1. 2009 1 copy available at University of Calgary : Internet accessible

4. Information theory tools for computer graphics [electronic resource] Sbert, Mateu. T385 INTERNET Synthesis lectures on computer graphics and animation (Online) ; # 12. 2009 1 copy available at University of Calgary : Internet accessible

5. High fidelity haptic rendering [electronic resource] 1st ed. Ochiai, Mikiyo A. Q476.9.M6 INTERNET Synthesis lectures on computer graphics and animation (Online) ; # 2. 2006 1 copy available at University of Calgary : Internet accessible

6. IEEE Symposium on Information Visualization [electronic resource] : proceedings IEEE Information Visualization Symposium. TA1634 INTERNET 1996 1 copy available at University of Calgary : Internet accessible

7. Statistical methods in molecular biology Bang, Heejung, 1972- QH505. J39 V.620 Methods in molecular biology (Clifton, N.J.) ; v. 620. 2010 1 copy available at University of Calgary : MacKinnie Library Block While there is a wide selection of "by experts, for experts" books in statistics and molecular biology, there is a distinct need for a book that presents the basic principles of proper statistical analyses and progresses to more a ...

8. Two-dimensional information theory and coding : with application to graphics and high-density storage media Junnila, Jyrn. QA268. J87 2010 2010 1 copy available at University of Calgary : MacKinnie Library Block On order. This is an introduction to two-dimensional information theory and coding for students of electrical engineering and computer science at the advanced-undergraduate or beginning-graduate level, with emphasis on applications to trans ...

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CPSC 533C: Information Visualization, Fall 2006-2007 8 Nov 2007 ... Chapter 1. Readings in Information Visualization: Using Vision to Think. Stuart Card, Jack Mackinlay, and Ben Shneiderman, Morgan Kaufmann ... www.cs.ubc.ca/~tmn/courses/cpsc533c-06-fall/ - Cached

Information visualization: beyond the horizon - Google Books Result Chaomei Chen - 2009 - Computers - 316 pages The first book to examine information visualization in a broader context, this is a comprehensive introduction to visualization and virtual reality. books.google.com/books?id=184628340X...

Searches related to information visualization

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Goooooooooooooogle

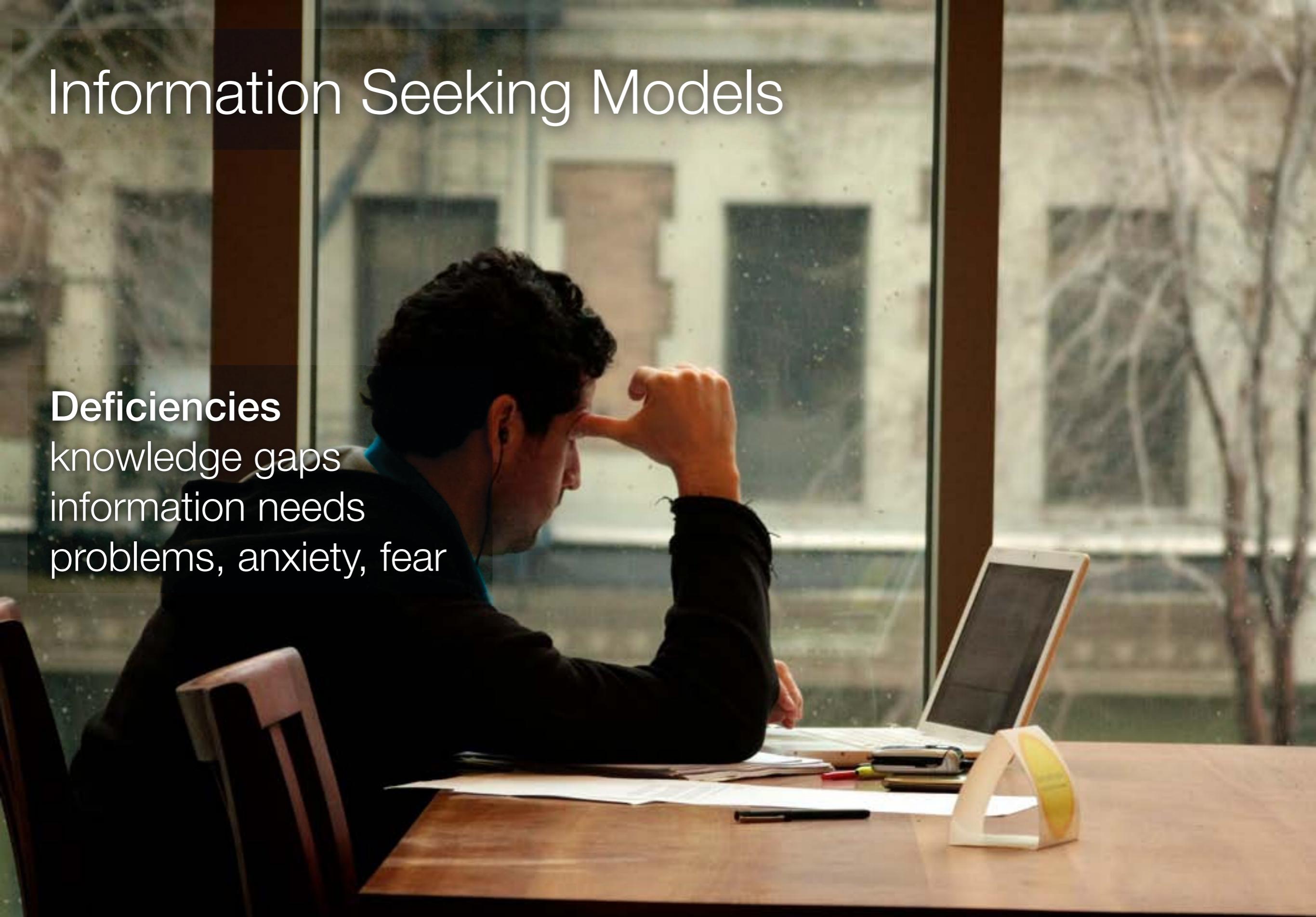
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Information Seeking Models

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

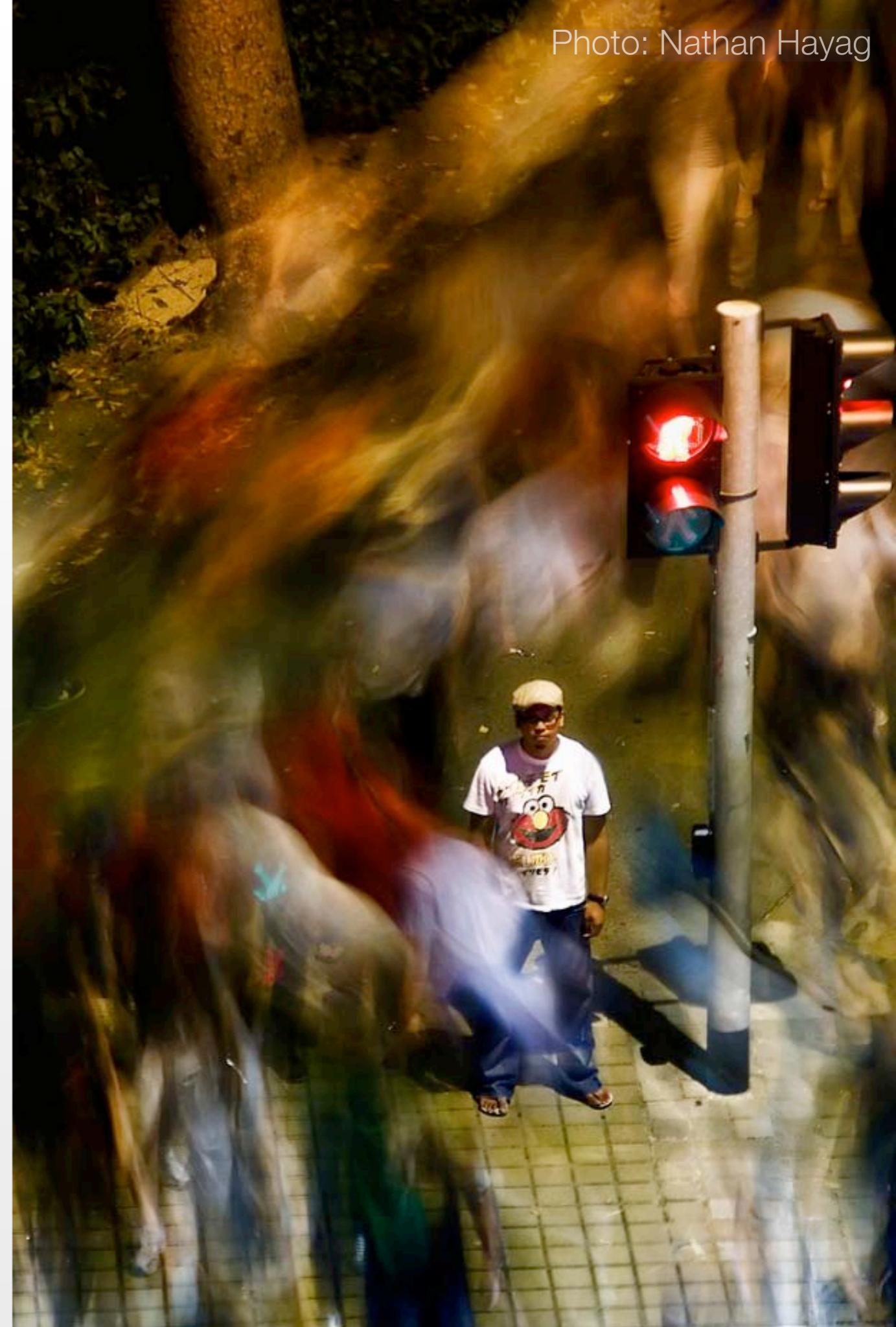
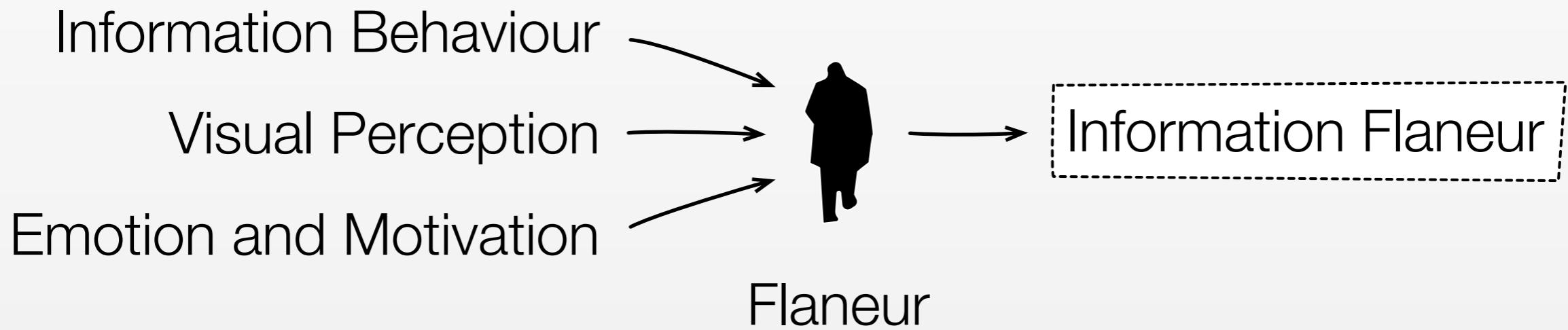




Photo: Keven Law

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

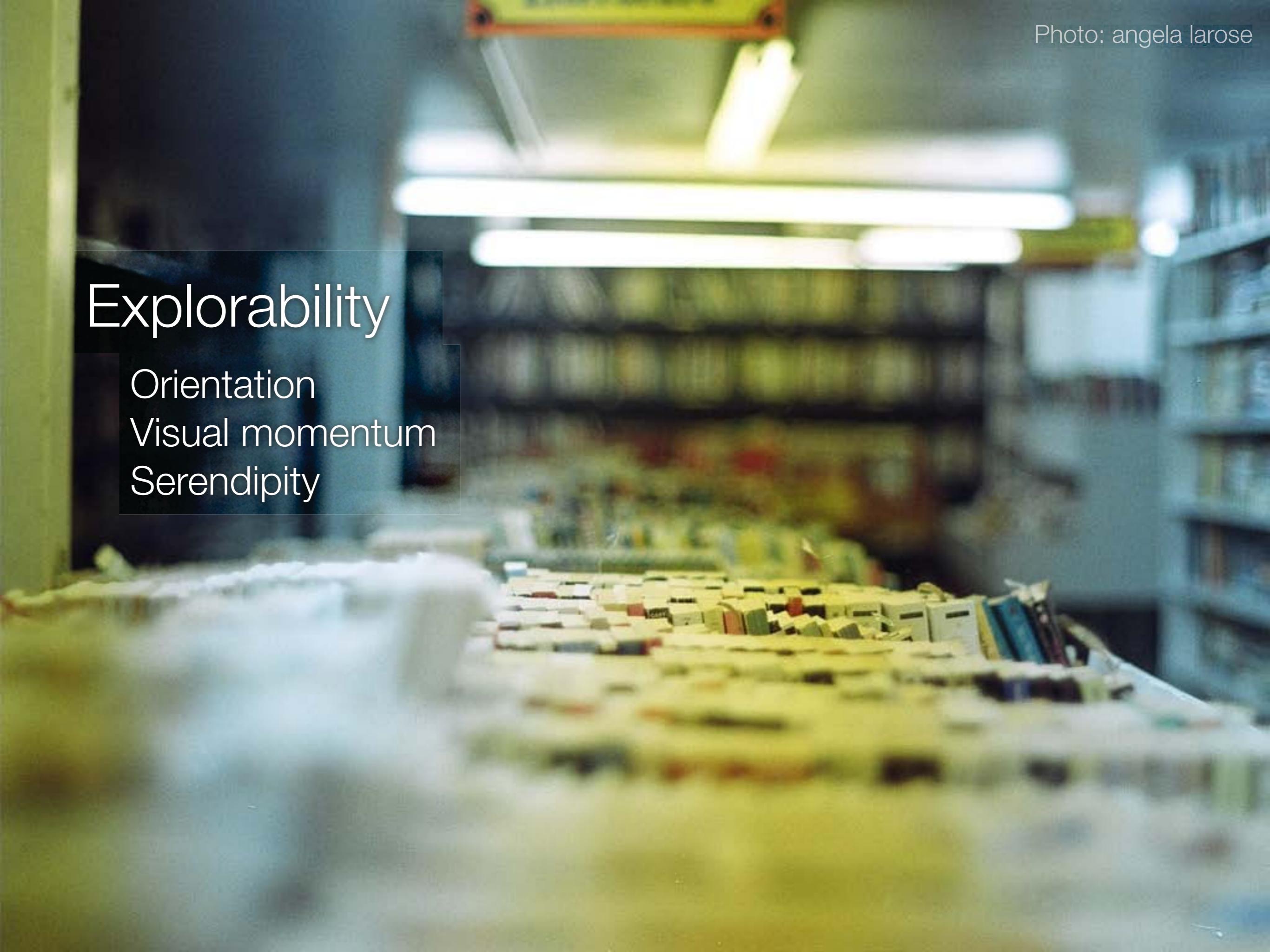
Create novel views and contribute content

Explorability

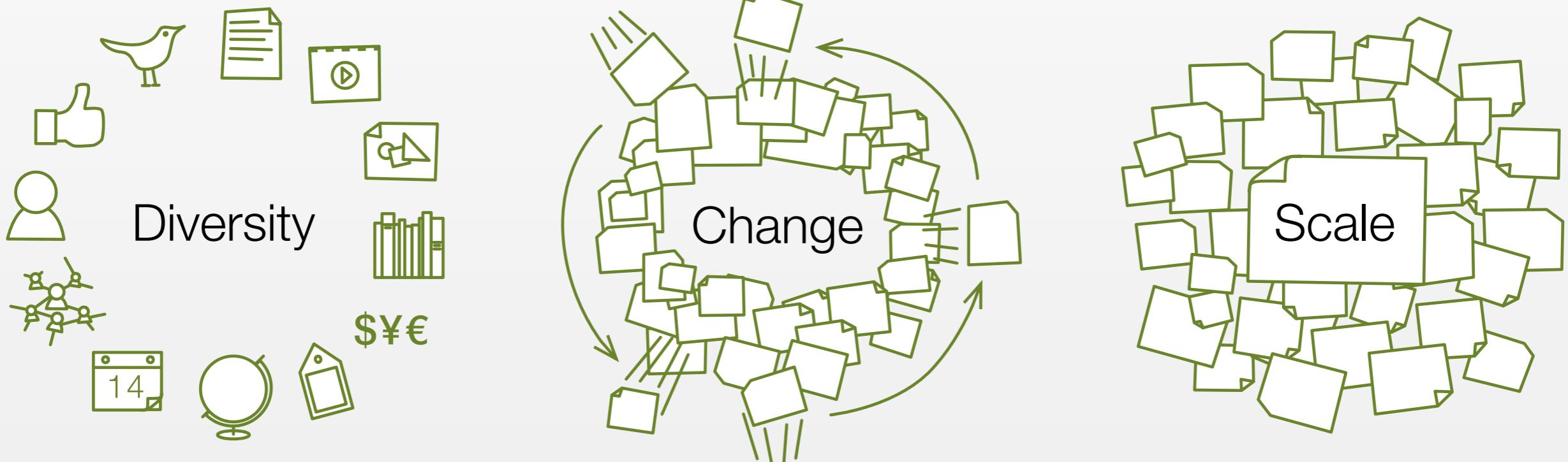
Orientation

Visual momentum

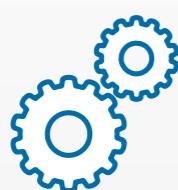
Serendipity



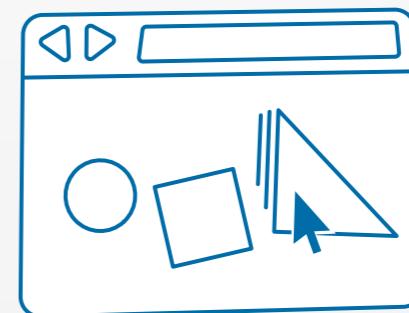
Growing Information Spaces



Technological Developments



Emerging semantics



Interactive graphics

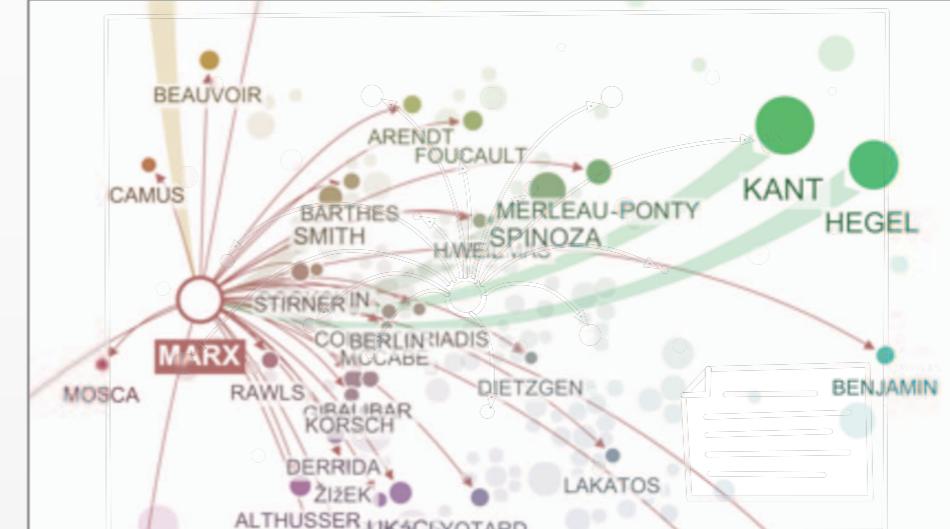


Web everywhere

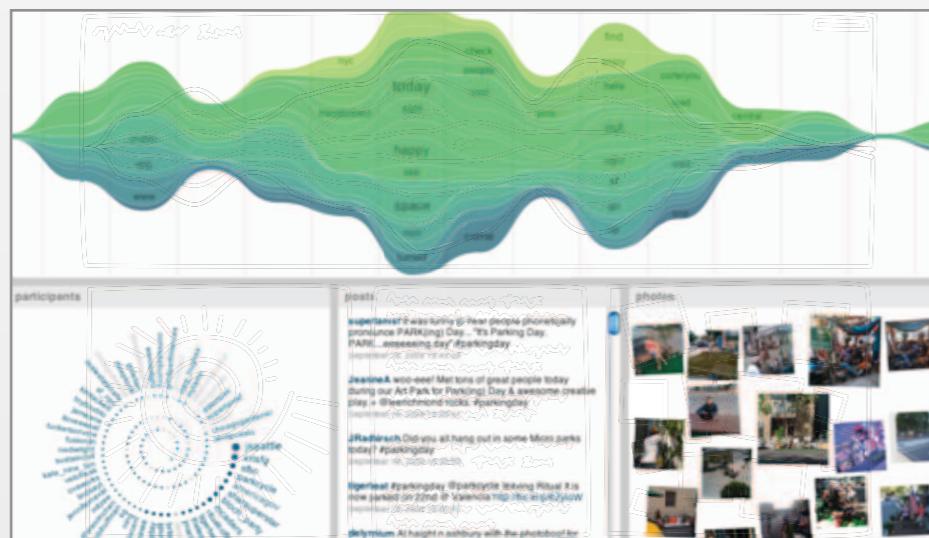
Support Exploratory Information Seeking



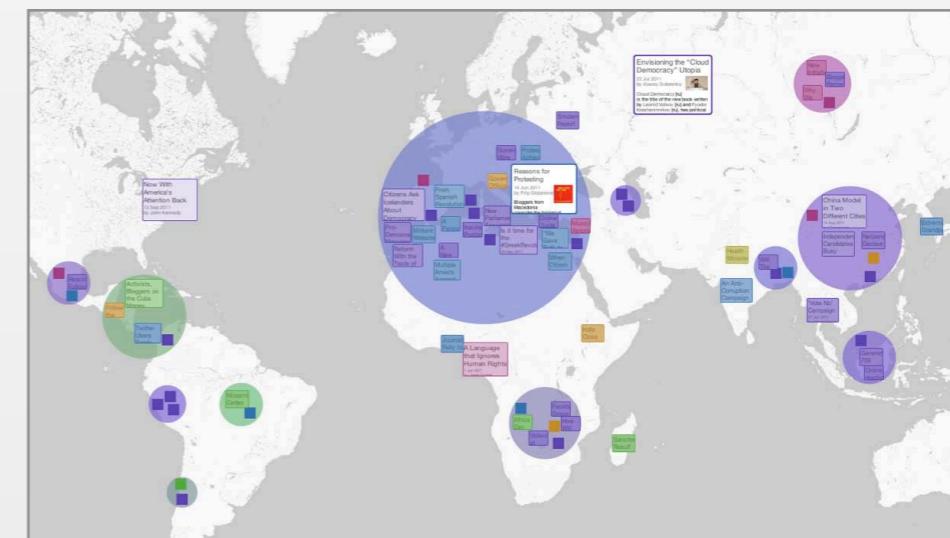
VisGets



EdgeMaps



Visual Backchannel

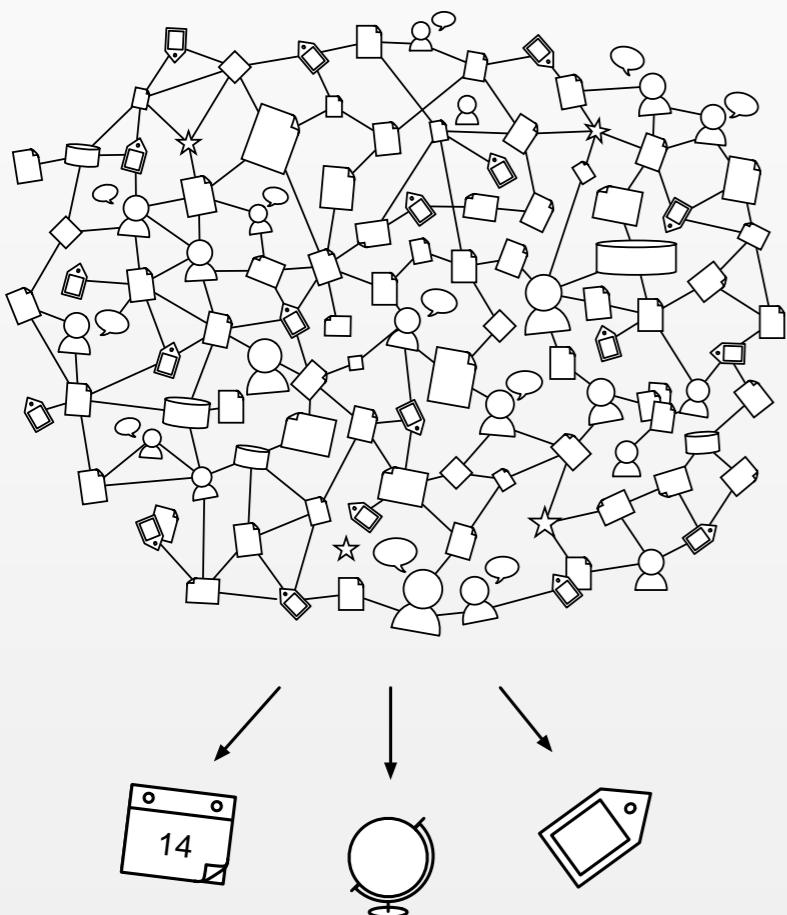


Fluid Views

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

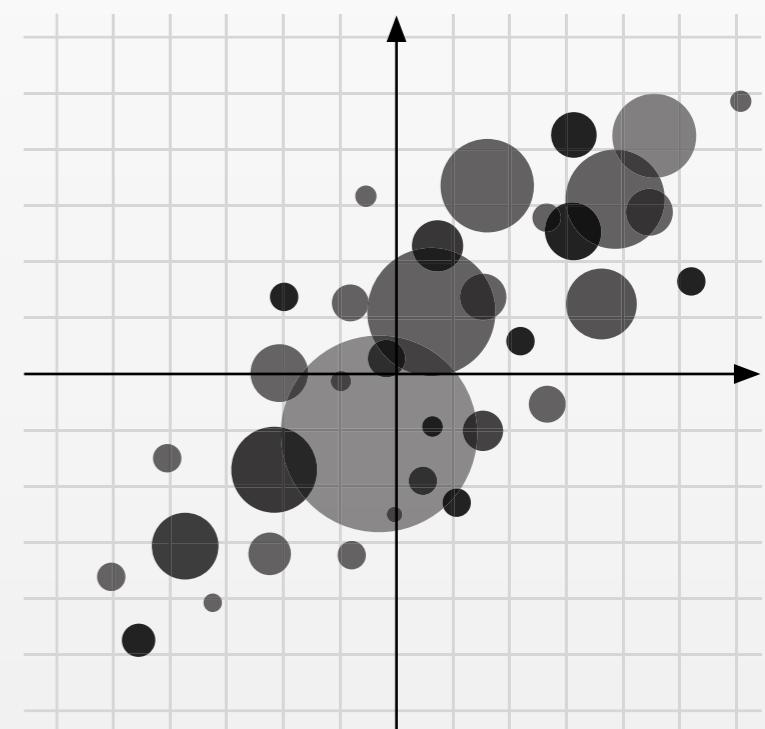


Information Seeking

- [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
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<http://www.duis-aute-irure-dolor.in/reprehenderit>
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Visualization



Design Goals

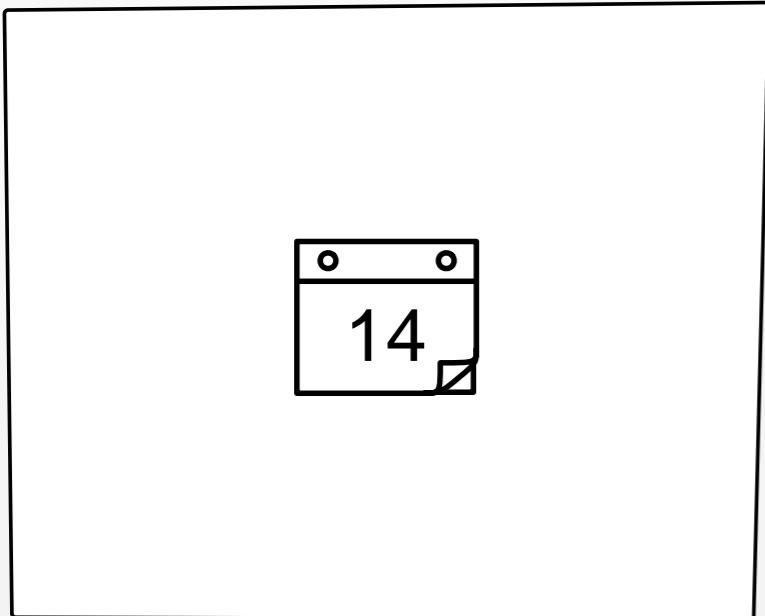
Casual formulation of complex queries

Summarize information collections

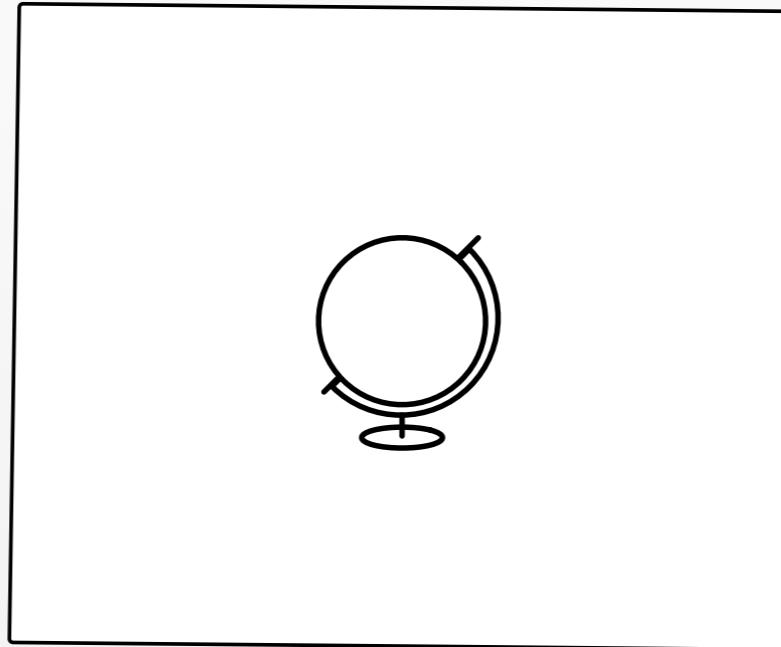
Indicate relationships across facets

Multidimensionality

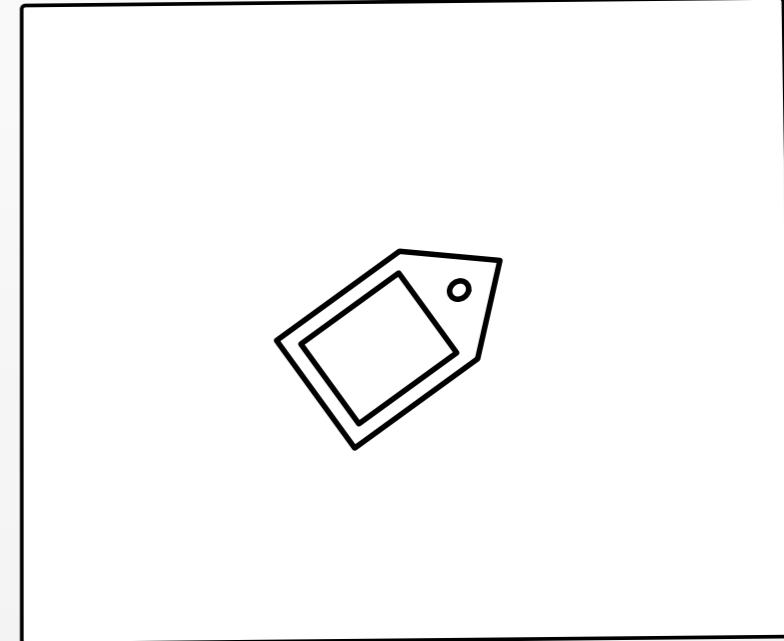
Time



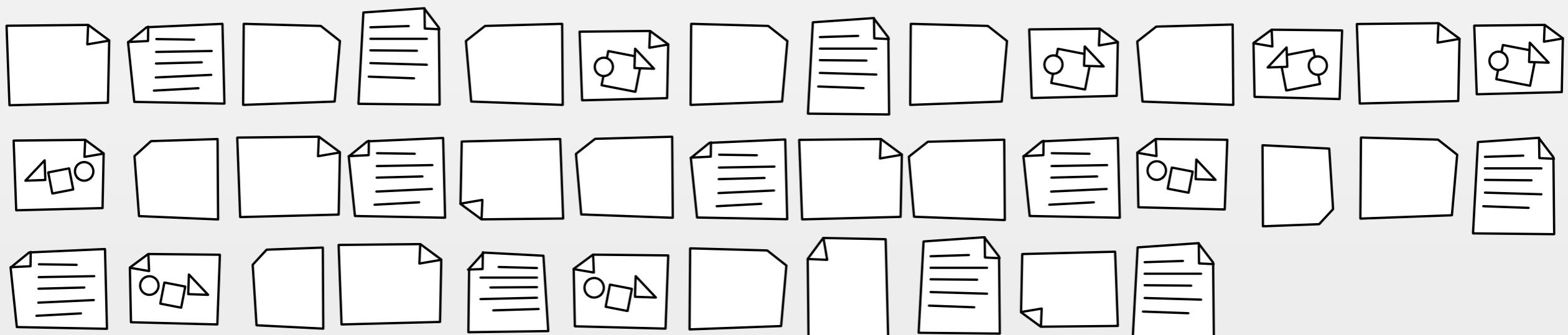
Place



Tags



Results



VisGets: Visualization Widgets

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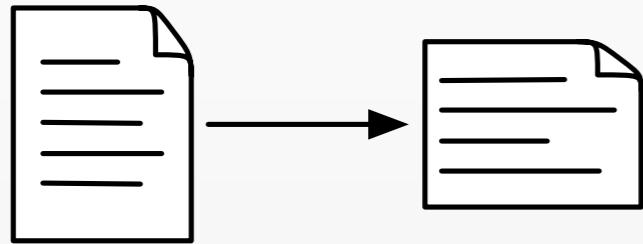
Results 671 time [time](#) title 1 2 3 4 5 6 7 8 9 10 11 12 13 14 >

Angola: Similarities between Cabinda and East Timor	Zimbabwe: Is it a crime to be white in Zimbabwe?	Ghana: Ghana National Media Commission	Africa: A blog to promote African literature	South Africa: Rugby Playing Its Part in Transformation	Ecuador: Tungurahua Volcano Erupts and Sparks Ash	Nigeria: Exclusive Interview with Nigerian civil activist	France: Questions and Controversy about IOC	Oil spill disaster in Singapore	Philippines: Destroying another landmark	Vietnam: Eating 'Op La' in Saigon	Vietnam: Report on online censorship	Colombia: Tweeting the May 30 Presidential Elections	Guinea: Waiting for Presidential Elections
Mexico: 165 Mexicans Die Each Day Due to Smoking	Guatemala: Cleaning Up the Ash from Pacaya Volcano	France : A Legal Review of the Burqa Ban Bill	Brazil: Rapper assaulted by Police Bassanova	India: Video Giving A Voice To Marginalised Community	Caucasus: Eurovision Semi-final roundup	Bahrain: On German Freedom	Pakistan: Minorities At Peril	India: Second Class Rail Travel	Pakistan: Attacks in Lahore at Ahmadi Mosque	Algeria, France: Film "Of Gods and Men" Snubbed	Bangladesh: FIFA World Cup, Memories From The	Zimbabwe: Outlawed newspaper coming back	Eritrea: Exiled editor reunites with family
Caucasus: Boobs, cleavage, and a rare animal in	Nepal: Financial Fraud	Russia: Blogger and Activist Arrested for Viral Video	Iran: Two Bloggers and Student Leader on Hunger Strike	Guatemala: Pacaya Volcano Causes State of Humanitarian	Israel: The Freedom Flotilla - PR Stunt or Humanitarian	Hungary: Facebook v IWW	Hungary: Bloggers Photo and Video Roundup	Jamaica: Dudus, Security & Seaga	Lebanon: Elections Vs Football	Bahrain: Abu Dhabi's Gold ATMs	Jordan: A Day with a Grave Digger	MENA: 15m Facebook Users	Qatar: The Al Jazeera Initiative for Internet Freedom

EdgeMaps

M Dörk, S Carpendale, and C Williamson. Visualizing Explicit and Implicit Relations of Complex Information Spaces.
Information Visualization journal 2012.

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

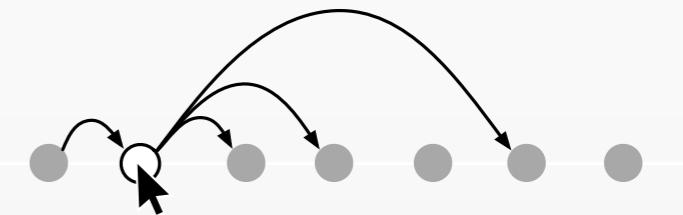
Implicit relations

Birth years



Layout

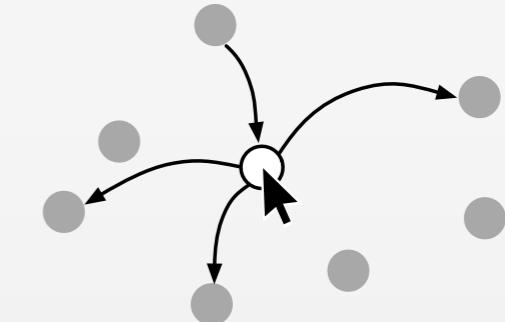
Timeline



Genres + interests

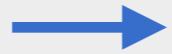


Similarity map



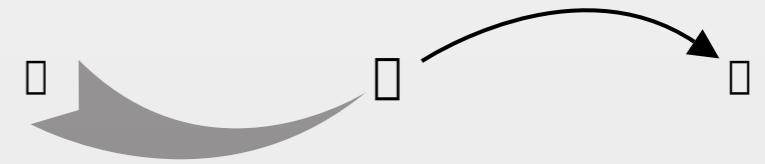
Explicit relations

Influence

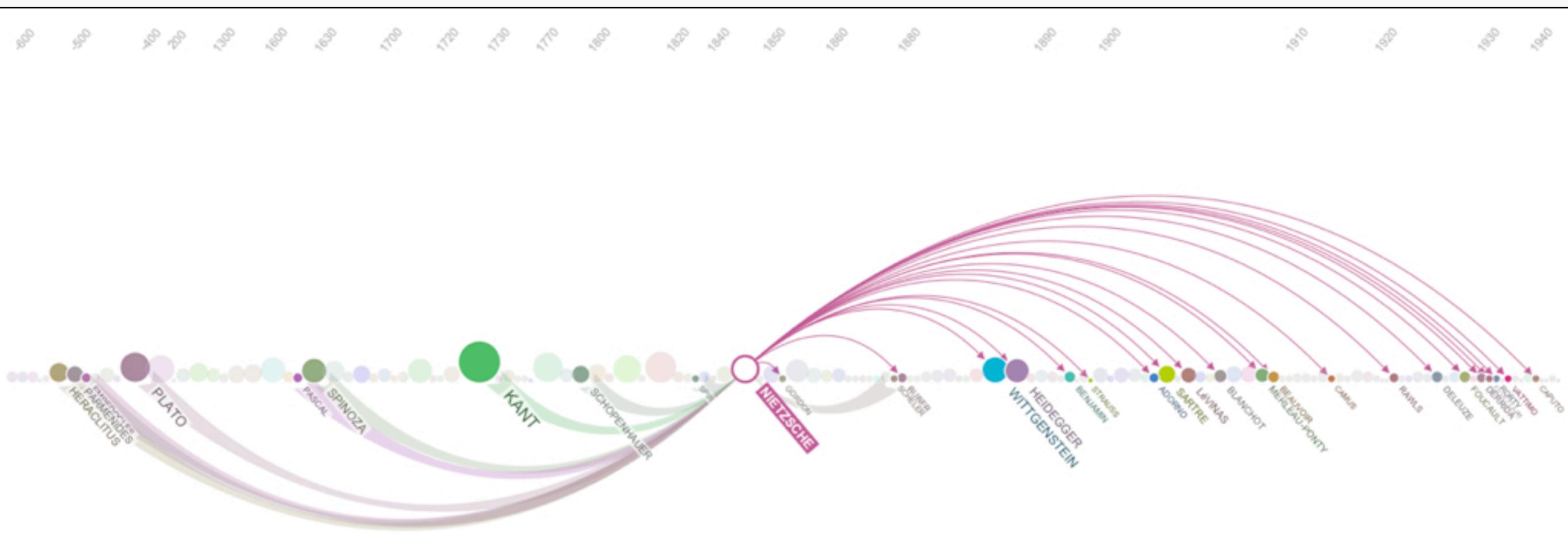


Linkage

Curved edges

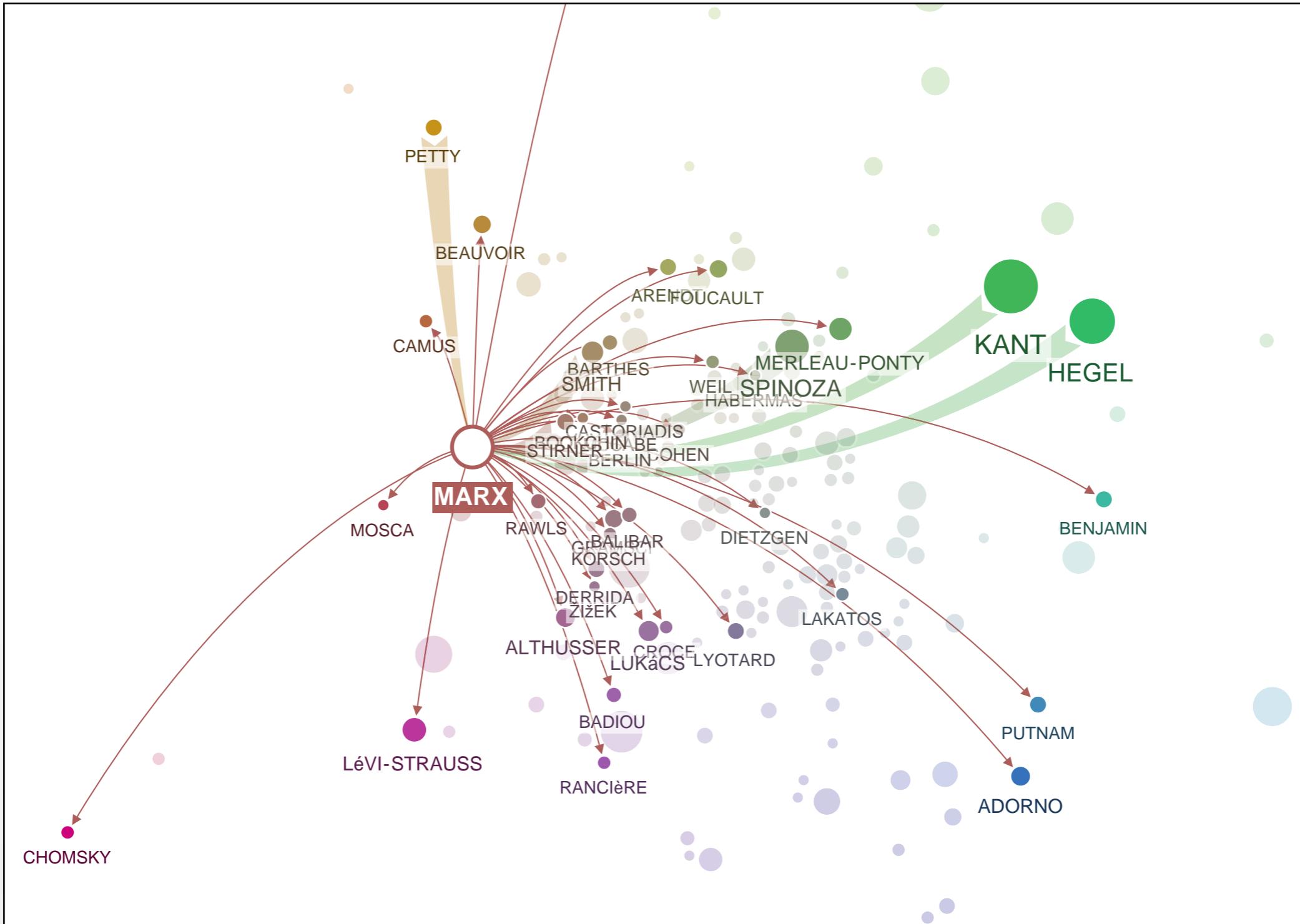


Timeline



Temporal extent and distribution of influence

Similarity Map



Topical extent and distribution of influence

Visual Backchannel

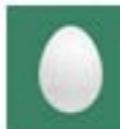
In collaboration with IBM Research

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 Weinkauf 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 Weinkauf 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

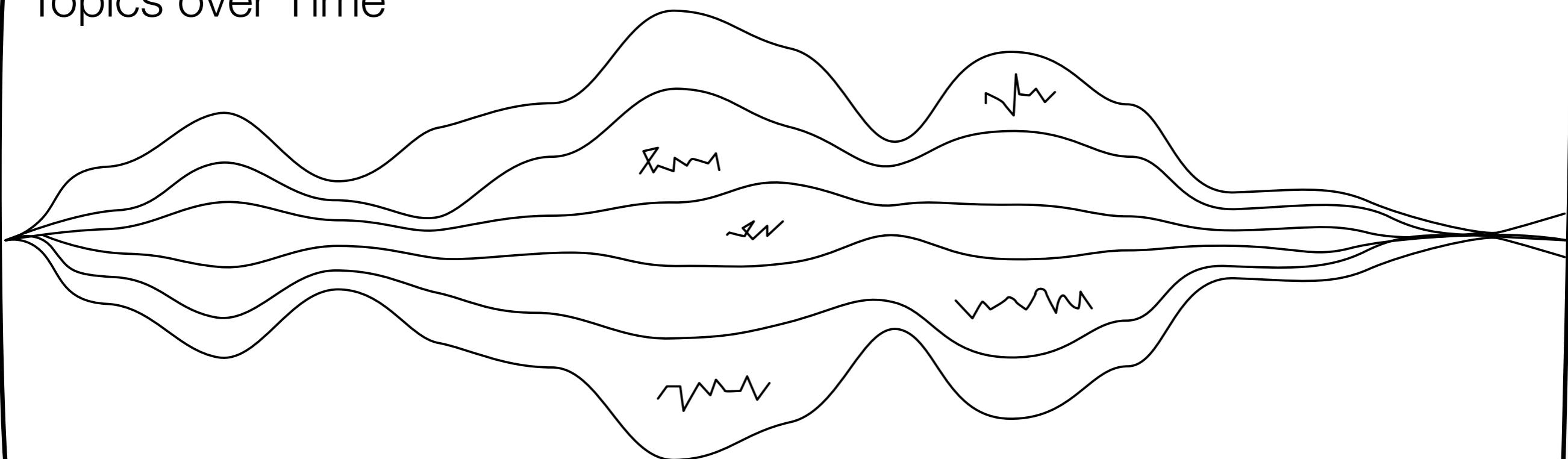
Summarize ongoing conversation

Integrate ‘now’ and ‘recent’

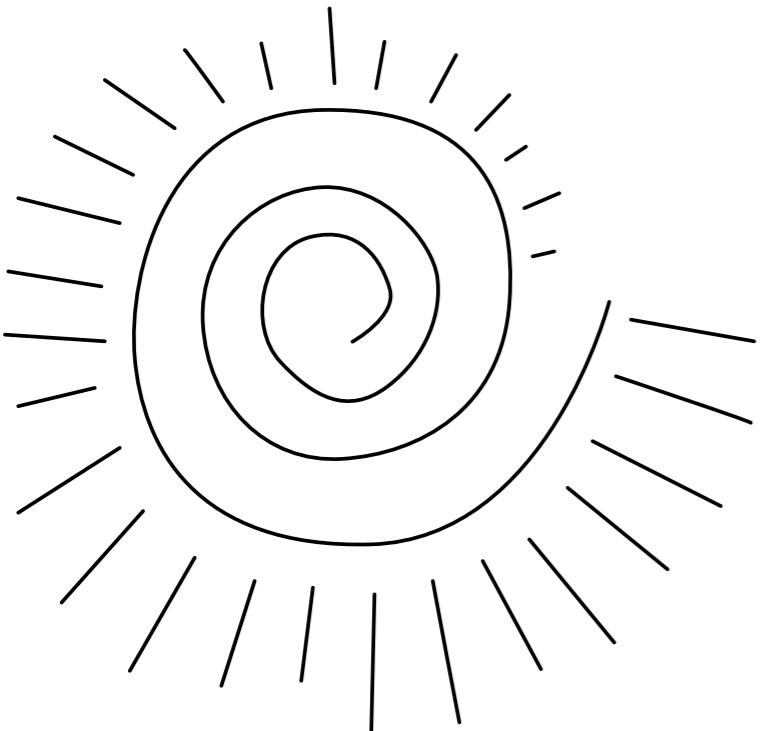
Provide flexible filtering techniques

Create organic aesthetics

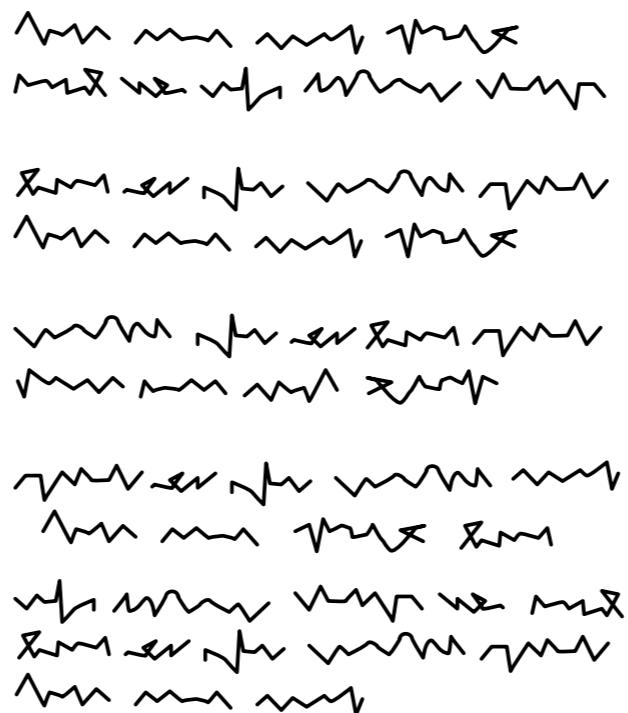
Topics over Time



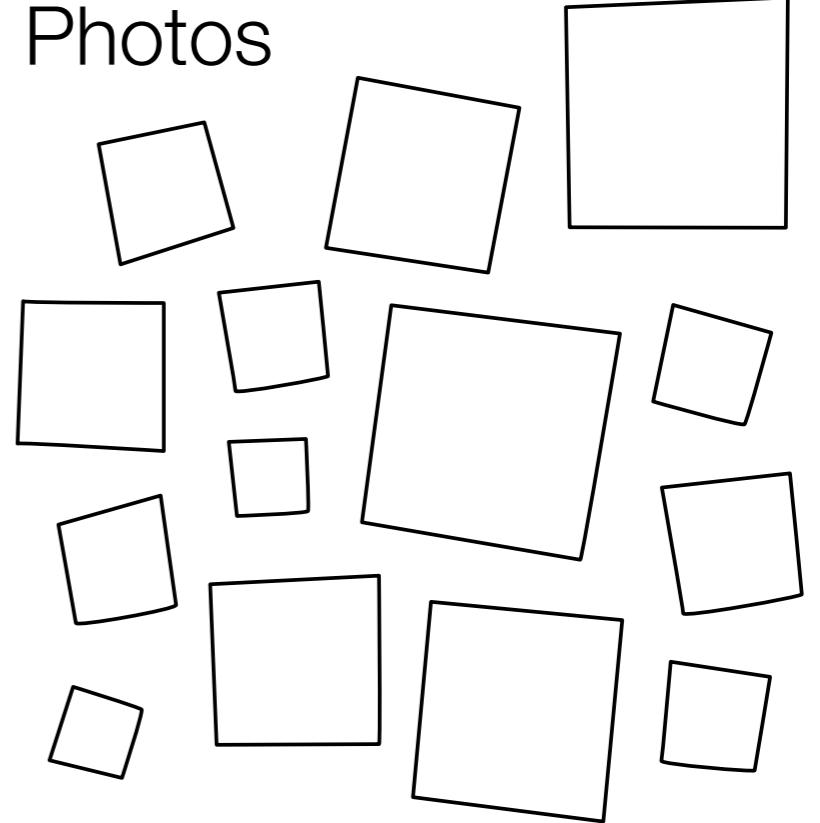
Participants



Posts



Photos

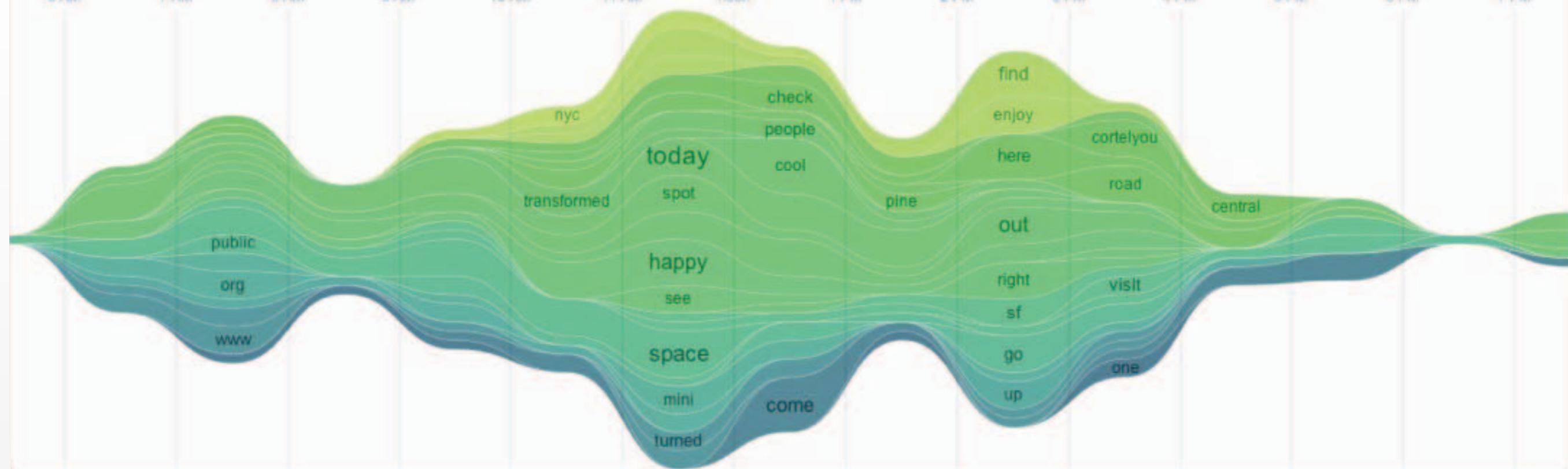


Park(ing) Day

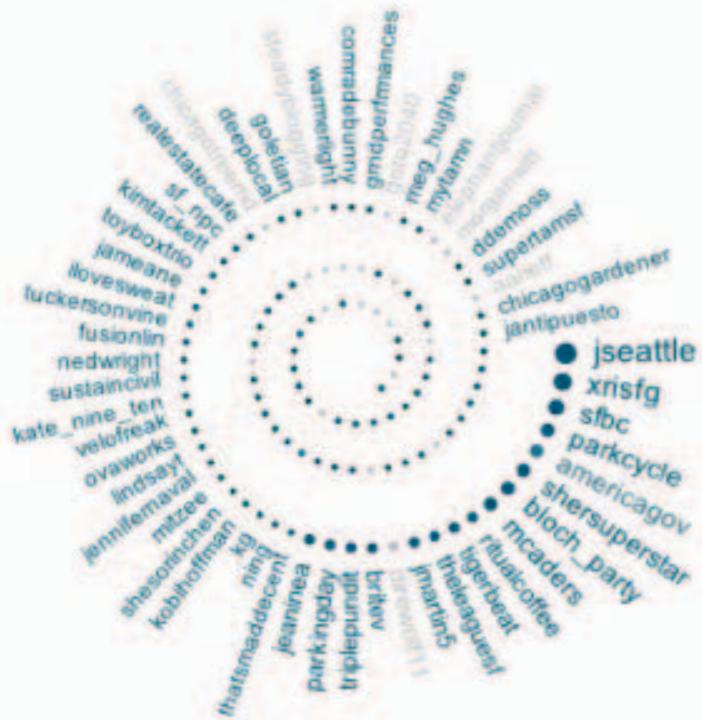
hide retweets [kick park](#) search

2009-09-18

6 AM 7 AM 8 AM 9 AM 10 AM 11 AM noon 1 PM 2 PM 3 PM 4 PM 5 PM 6 PM 7 PM



participants



posts

supertamsf It was funny to hear people phonetically pronounce PARK(ing) Day... "It's Parking Day, PARK...eeeeeeeing day" #parkingday
September 18, 2009 19:43:39

JeanineA woo-eee! Met tons of great people today during our Art Park for Park(ing) Day & awesome creative play. + @leerichmond rocks. #parkingday
September 18, 2009 19:39:41

JRadhirsch Did you all hang out in some Micro parks today? #parkingday
September 18, 2009 19:32:59

tigerbeat #parkingday @parkcycle leaving Ritual It is now parked on 22nd @ Valencia <http://flic.kr/p/6ZyloW>
September 18, 2009 19:20:25

delynnium At haight n ashbury with the photoboof for parkingday-come get pic-ed n parked! The best things r free baby!
September 18, 2009 19:18:42

dougfredericks <http://twitpic.com/l8lrg> - Ben and Adam at the Sacramento Park(ing) Day Park #parkingday

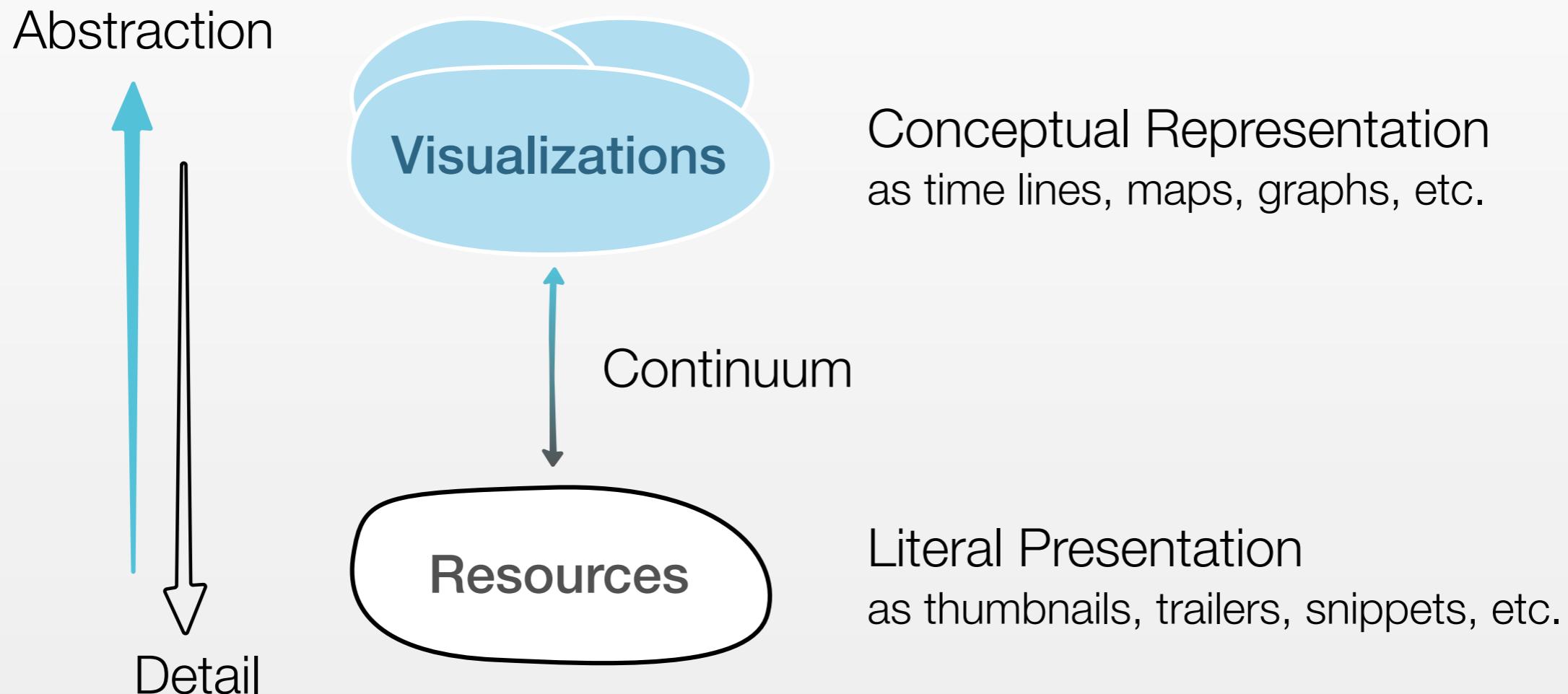
photos



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

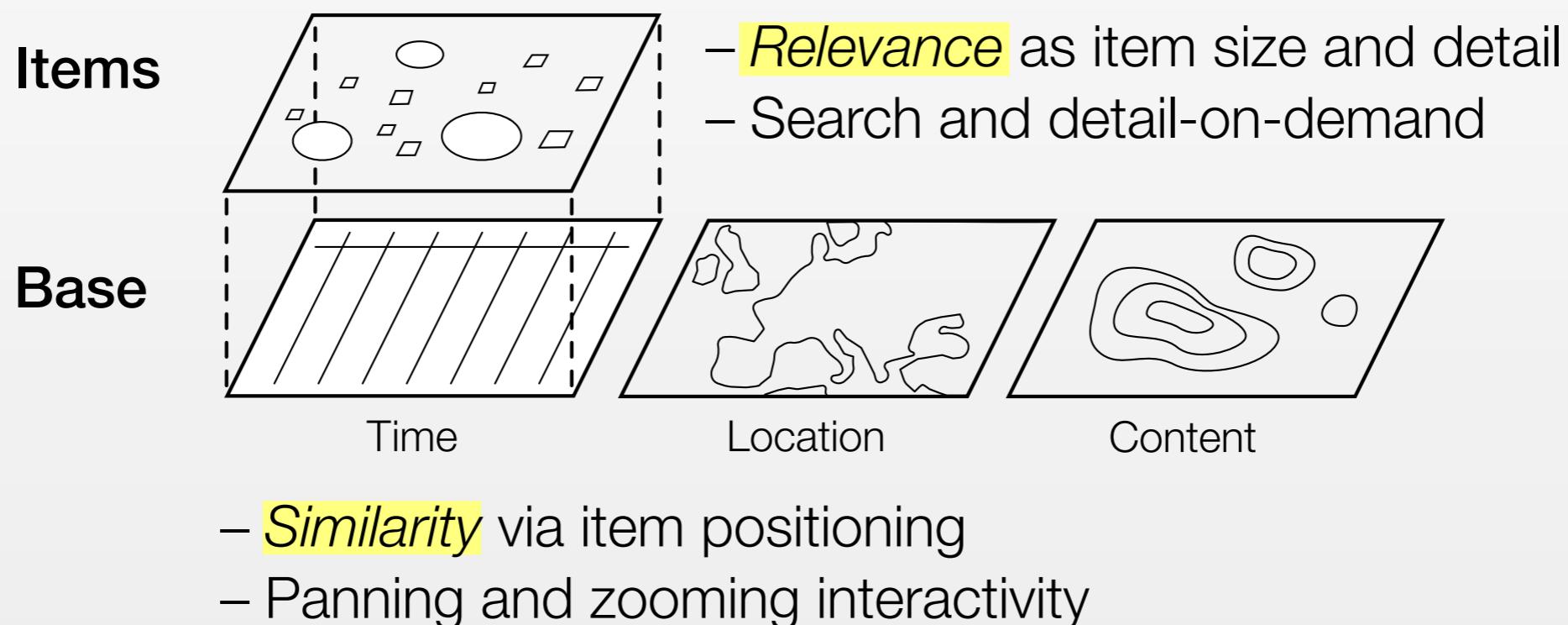
Display resource in context of collection

Scale results according to relevance

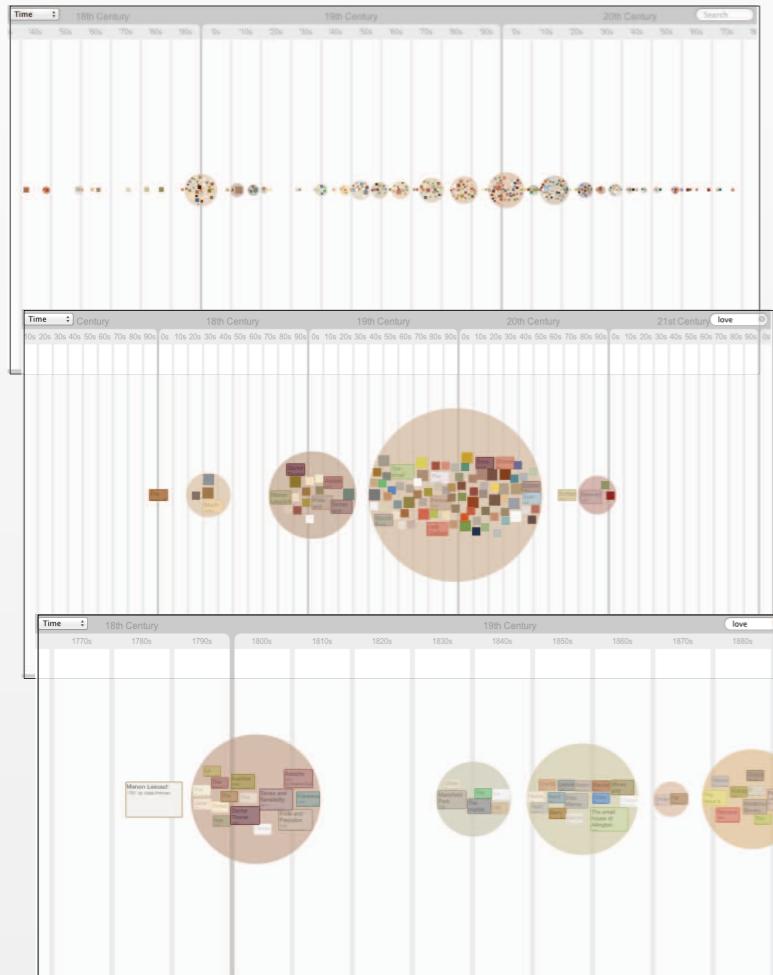
Provide clickable access to results

Fluid Views: Zoomable Search Environment

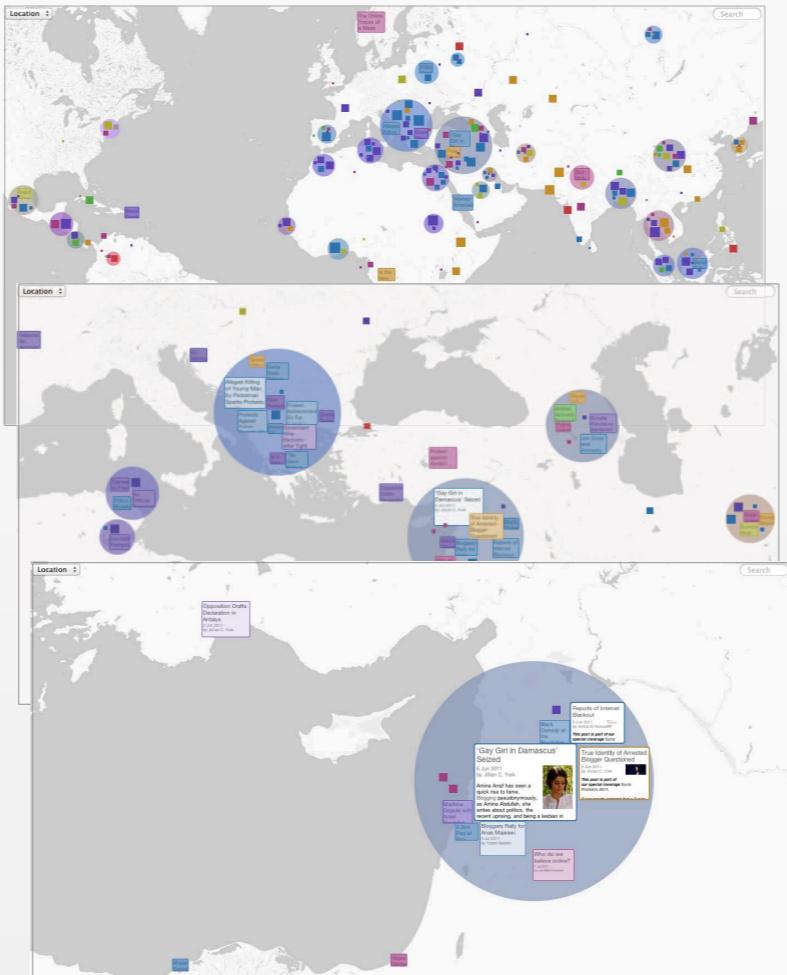
Integrate search relevance and visual encoding by combining semantic zooming, dynamic queries, dual layers



Fluid Views: Examples



Books

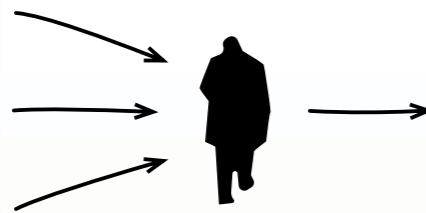


Blogs



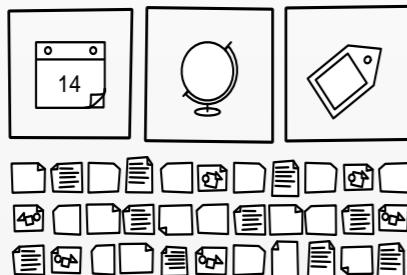
Photos

Conclusion



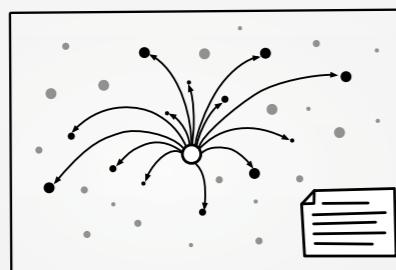
Information Flaneur

Model for positive information practices



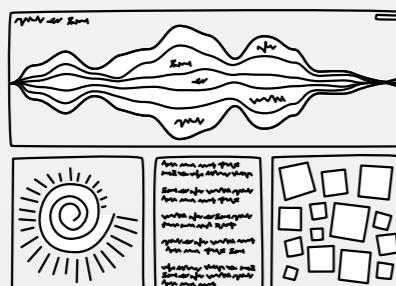
VisGets

Explore blogs along diverse facets



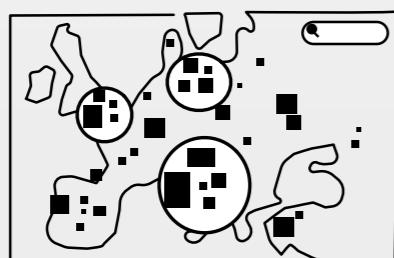
EdgeMaps

Integrate explicit and implicit relations



Visual Backchannel

Follow an evolving information stream



Fluid Views

Navigate resources at varying scales

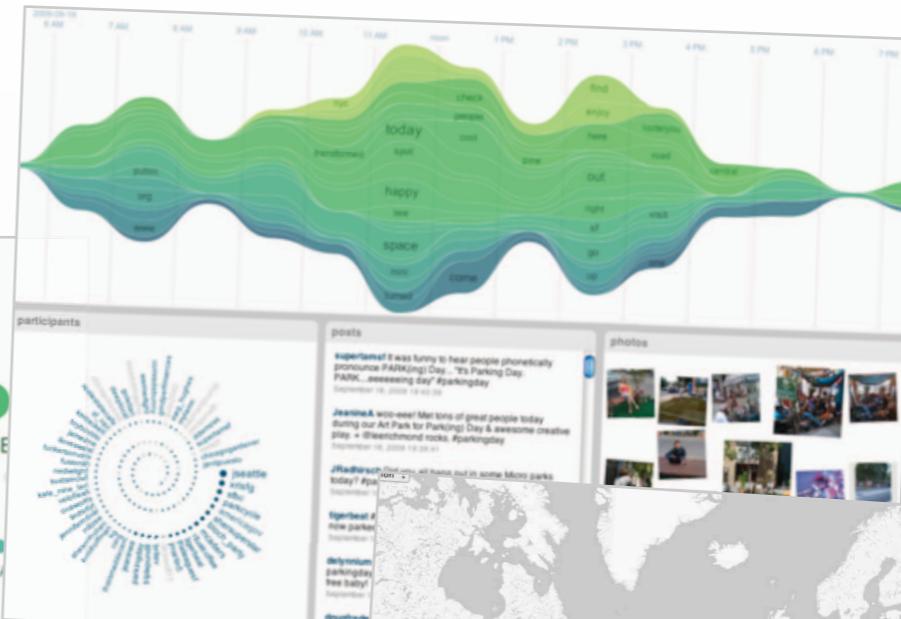
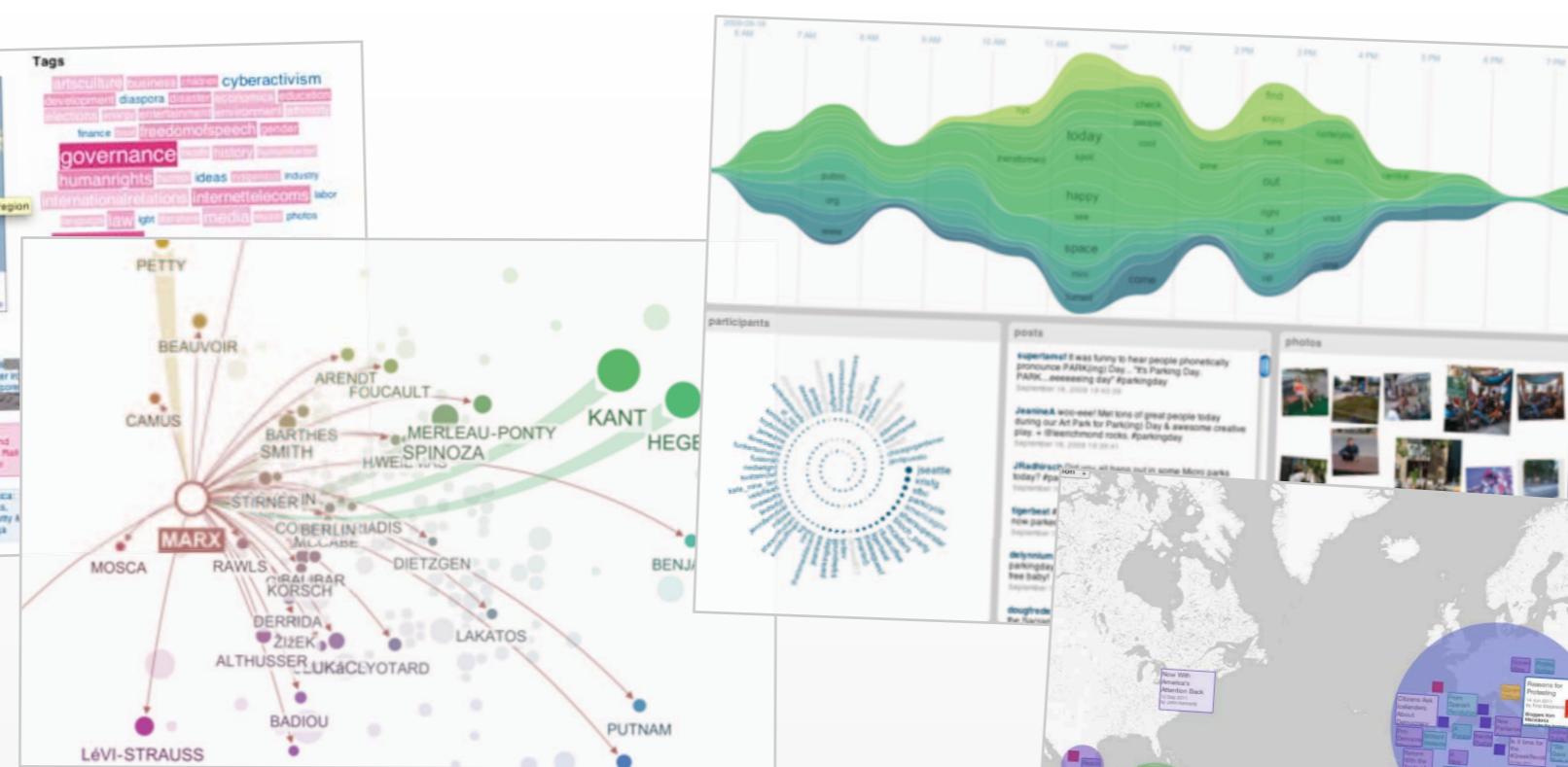
Open Questions – Next Steps

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



Thank you

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