DEEP
LEARNING
INSTITUTE

PRAIRIE VIEW
A&M UNIVERSITY

DLI Accelerated Data Science Teaching Kit

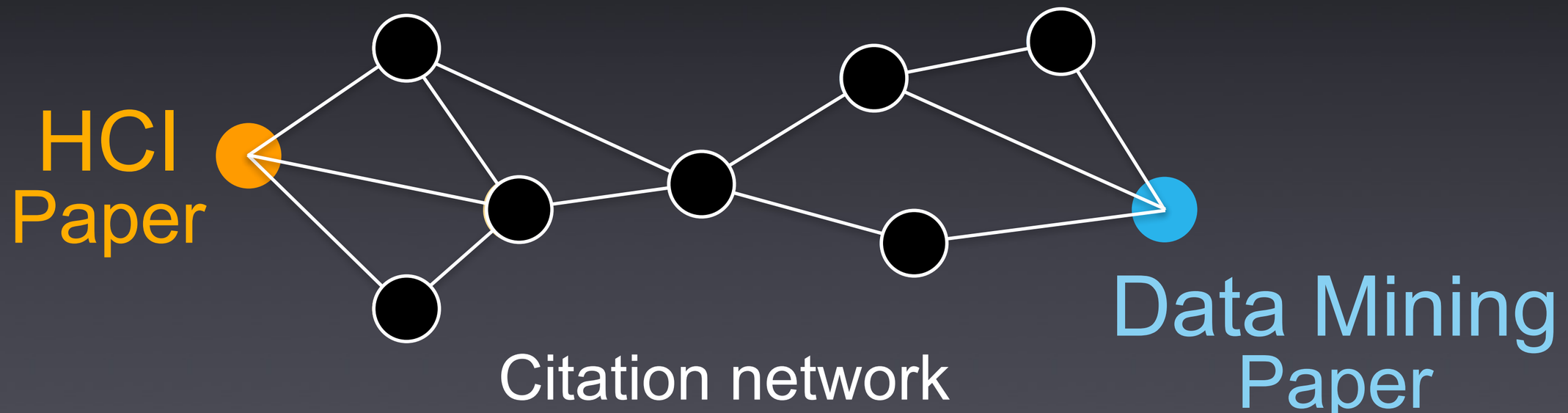
Lecture 17.5 - Interactive Graph Exploration

Human-In-The-Loop Graph Mining

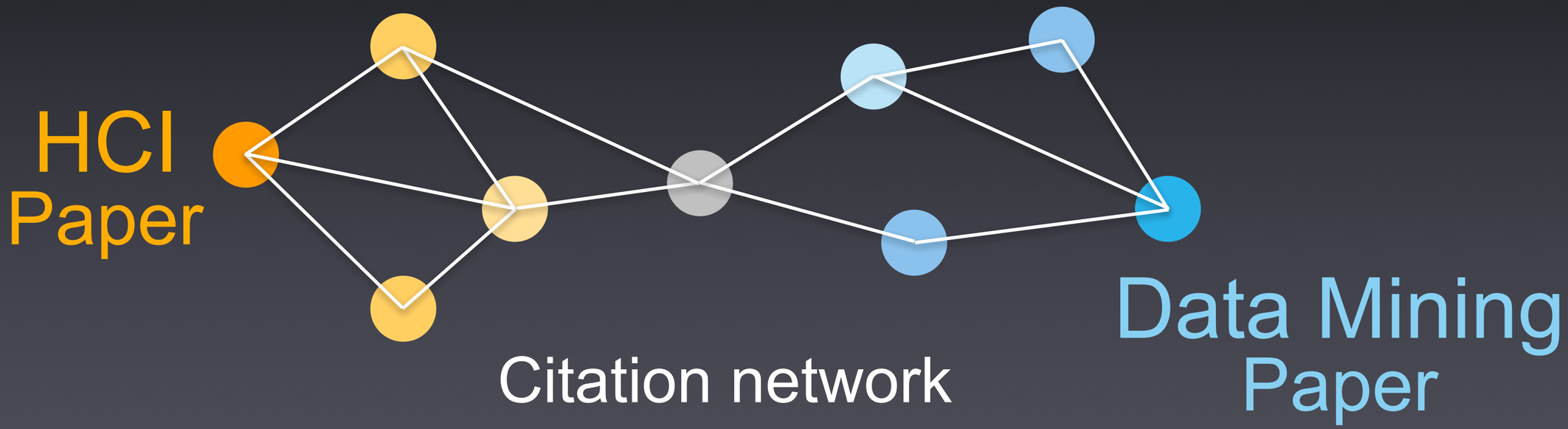
Apolo:
Machine Learning + Visualization
CHI 2011

Apolo: Making Sense of Large Network Data by Combining Rich User Interaction and Machine Learning

Finding More Relevant Nodes



Finding More Relevant Nodes

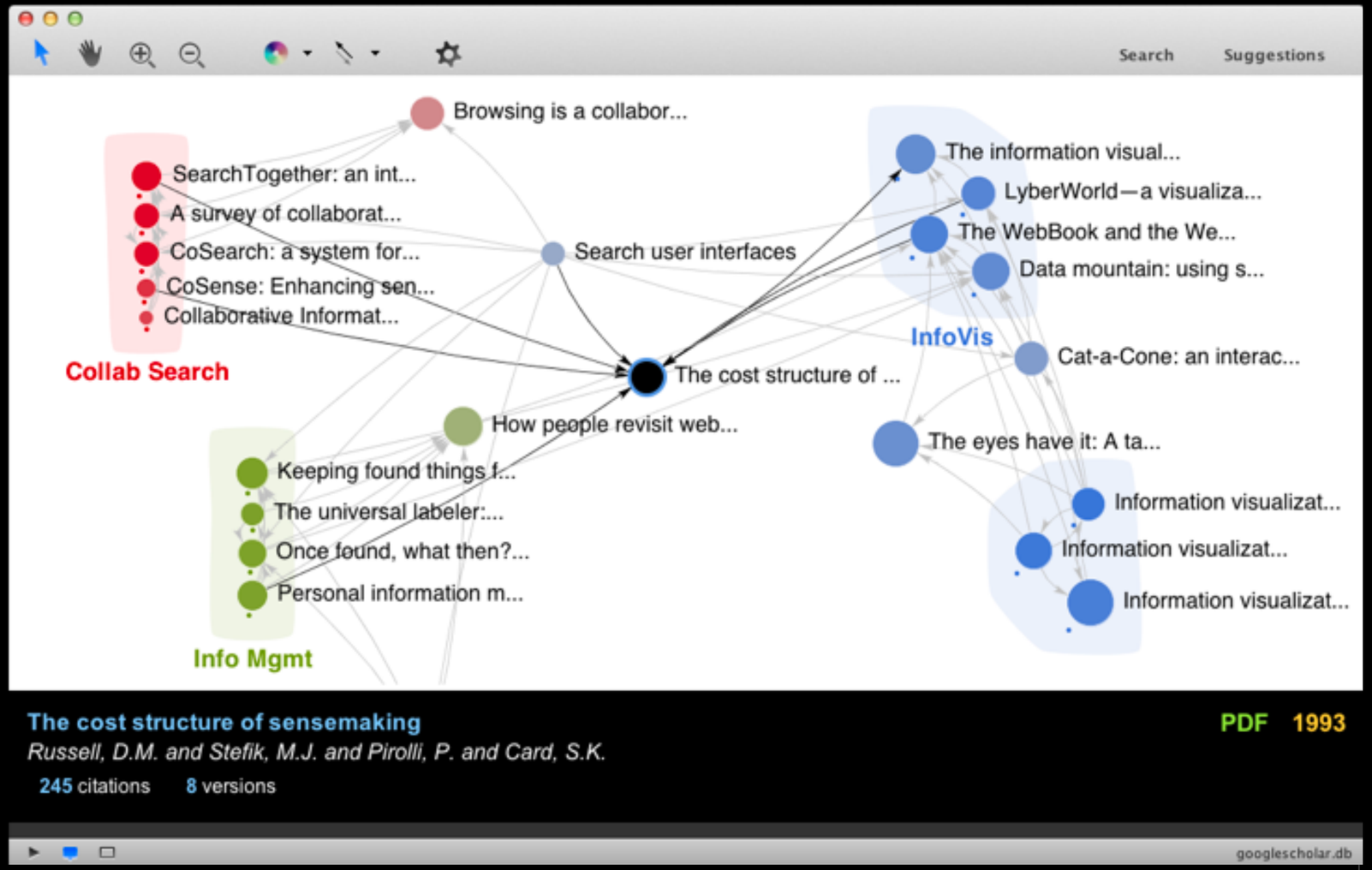


Apolo uses guilt-by-association

(Belief Propagation, similar to personalized PageRank)

Mapping the Sensemaking Literature

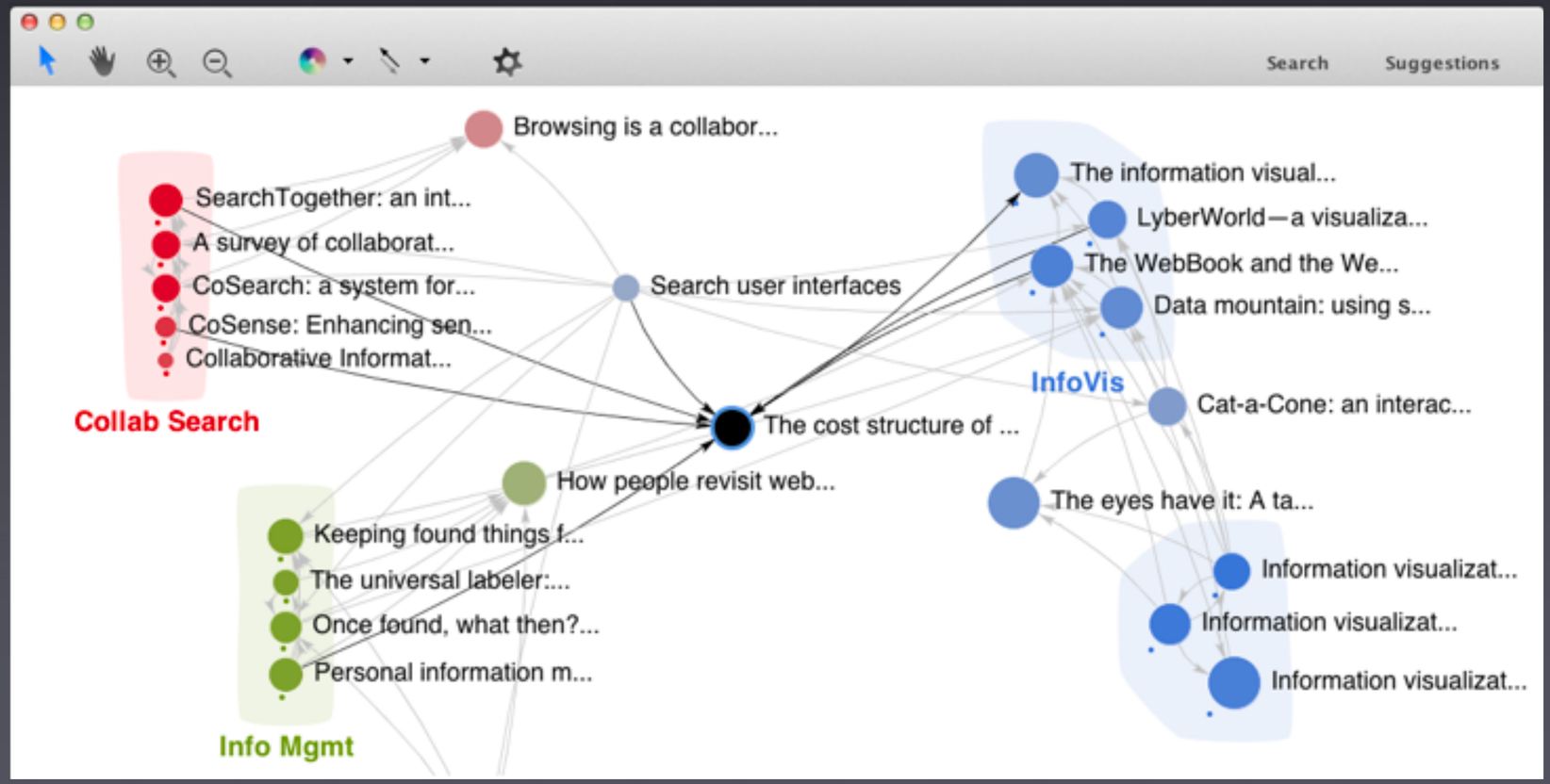
Nodes: 80k papers from Google Scholar (node size: #citation)
Edges: 150k citations



Key Ideas in Apolo

Specify exemplars

Find other relevant nodes (BP)



Apolo’s Contributions

1 Human + Machine

It was like having a **partnership** with the machine.

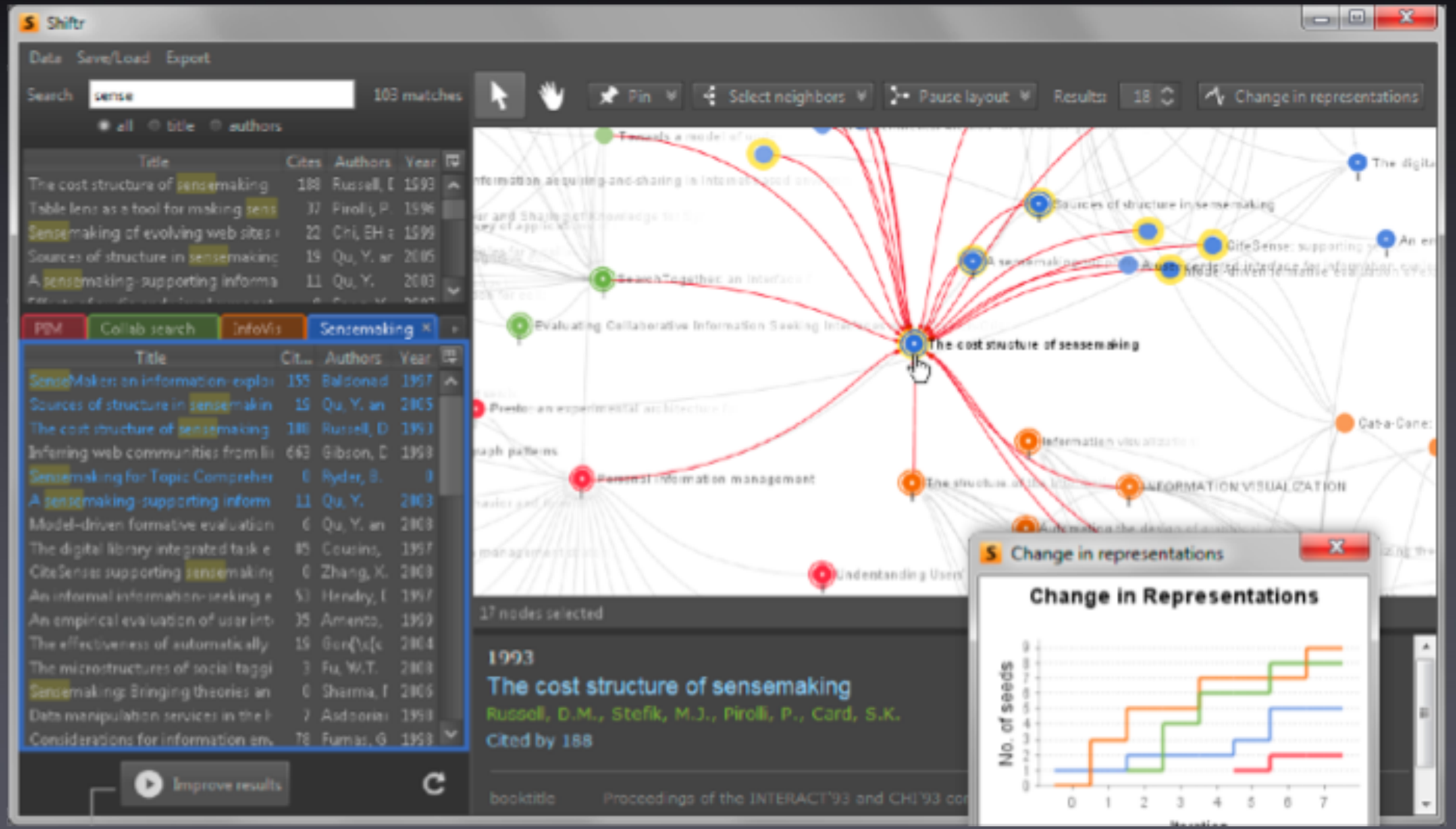
Apolo User

2 Personalized Landscape

Apolo v1


Cluster Data
Add Group
Recommendations:
Not Interested
Automatically generating user inte...
Decision-Theoretic User
Daniel S. Weld
Krzysztof Z. Gajos
End User Programming
End users creating effective softw...
End user software engineering: chi...
Invited research overview: end-us...
Brad A. Myers
Margaret M. Burnett
Mary Beth Rosson
Andrew Jensen Ko
Alan F. Blackwell
Show: All
Brad
Brad A. Myers
The garnet user interface developm...
Using HCI Techniques to Design a M...
Creating charts by demonstration.
The Amulet User Interface Developm...
Easily Adding Animations to Interfac...
Simplifying video editng using metad...
SILVER: simplifying video editing wit...
Text Entry
In-stroke word completion.
Integrating isometric joysticks into...
Eyes on the road, hands on the whe...
An alternative to push, press, and t...
Maximizing the guessability of symb...
Few-key text entry revisited: mnem...
Text entry from power wheelchairs: ...
Joystick text entry with date stamp, ...
Show: Papers
Interface Generation
Huddle: automatically generating i...
UNIFORM: automatically generatin...
Demonstrating the viability of auto...
Jeffrey Nichols
Brandon Rothrock
Duen Horng Chau

Apolo v2


Shiftr
Data
Save/Load
Export
Search
sense
103 matches
all
title
authors
Pin
Select neighbors
Pause layout
Results
18
Change in representations
Title
Cites
Authors
Year
The cost structure of sensemaking
188
Russell, D
1993
Table lens as a tool for making sens
37
Pirolli, P.
1996
Sensemaking of evolving web sites
22
Chi, EH
1999
Sources of structure in sensemaking
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Qu, Y. an
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A sensemaking supporting informa
11
Qu, Y.
2003
PIM
Collab search
InfoVis
Sensemaking
Title
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SenseMaker: an information-explor
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The cost structure of sensemaking
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Sensemaking for Topic Comprehen
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Ryder, B.
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A sensemaking supporting inform
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Qu, Y.
2003
Model-driven formative evaluation
6
Qu, Y. an
2003
The digital library integrated task e
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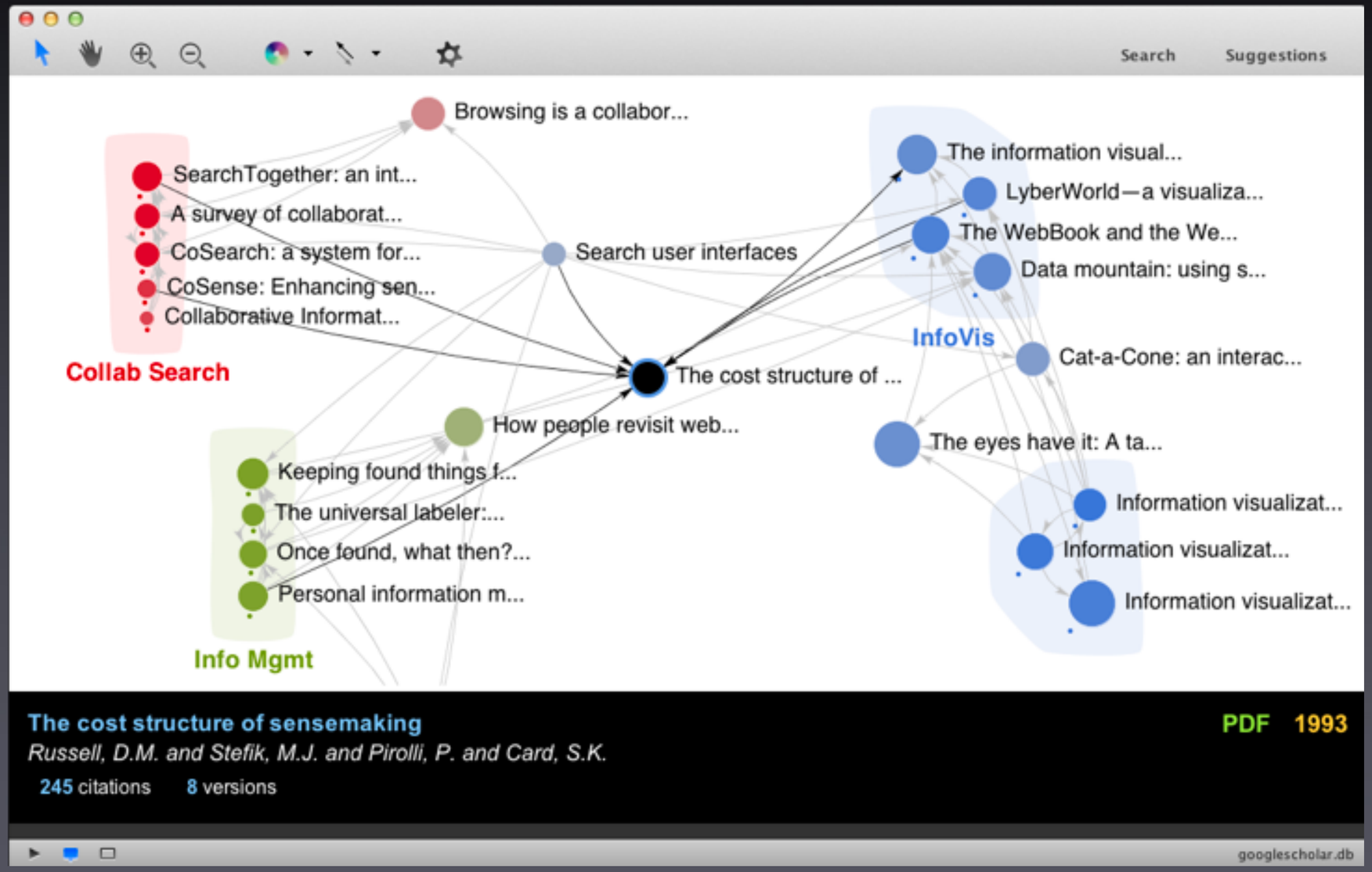
Cousins,
1997
CiteSense: supporting sensemaking
0
Zhang, X.
2003
An informal information-seeking e
53
Hendry, I
1997
An empirical evaluation of user int
35
Amento,
1999
The effectiveness of automatically
19
Gon{\c{c
2004
The microstructures of social taggi
3
Fu, W.T.
2008
Sensemaking: Bringing theories an
0
Sharma, I
2005
Data manipulation services in the I
7
Asdonia
1998
Considerations for information en
78
Furnas, G
1998
Improve results
The cost structure of sensemaking
Evaluating Collaborative Information Seeking
Personal information management
Understanding Users
Information visualization
INFORMATION VISUALIZATION
Data-Cone:
17 nodes selected
1993
The cost structure of sensemaking
Russell, D.M., Stefik, M.J., Pirolli, P., Card, S.K.
Cited by 188
booktitle
Proceedings of the INTERACT'93 and CHI'93 co
Change in representations
Change in Representations
No. of seeds
0
1
2
3
4
5
6
7
8
9

Apolo v3

22,000 lines of code. Java 1.6. Swing.
Uses SQLite3 to store graph on disk

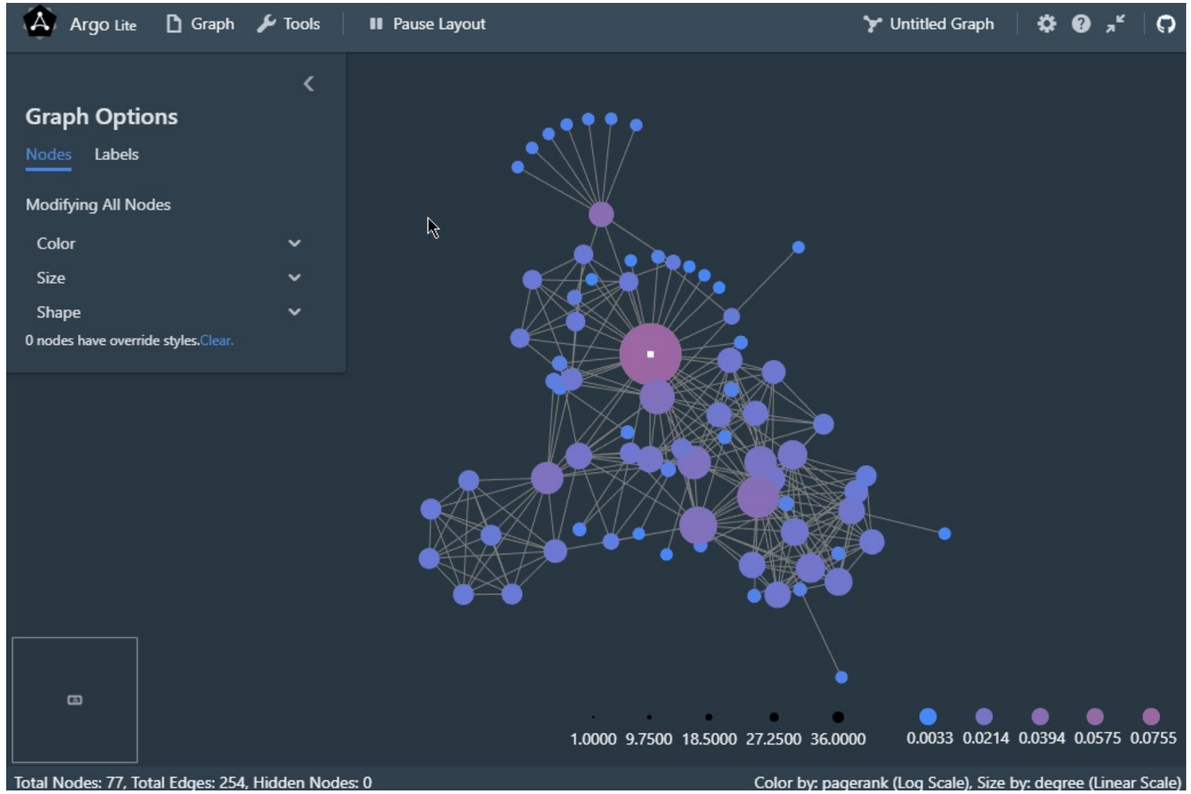


Argo Lite

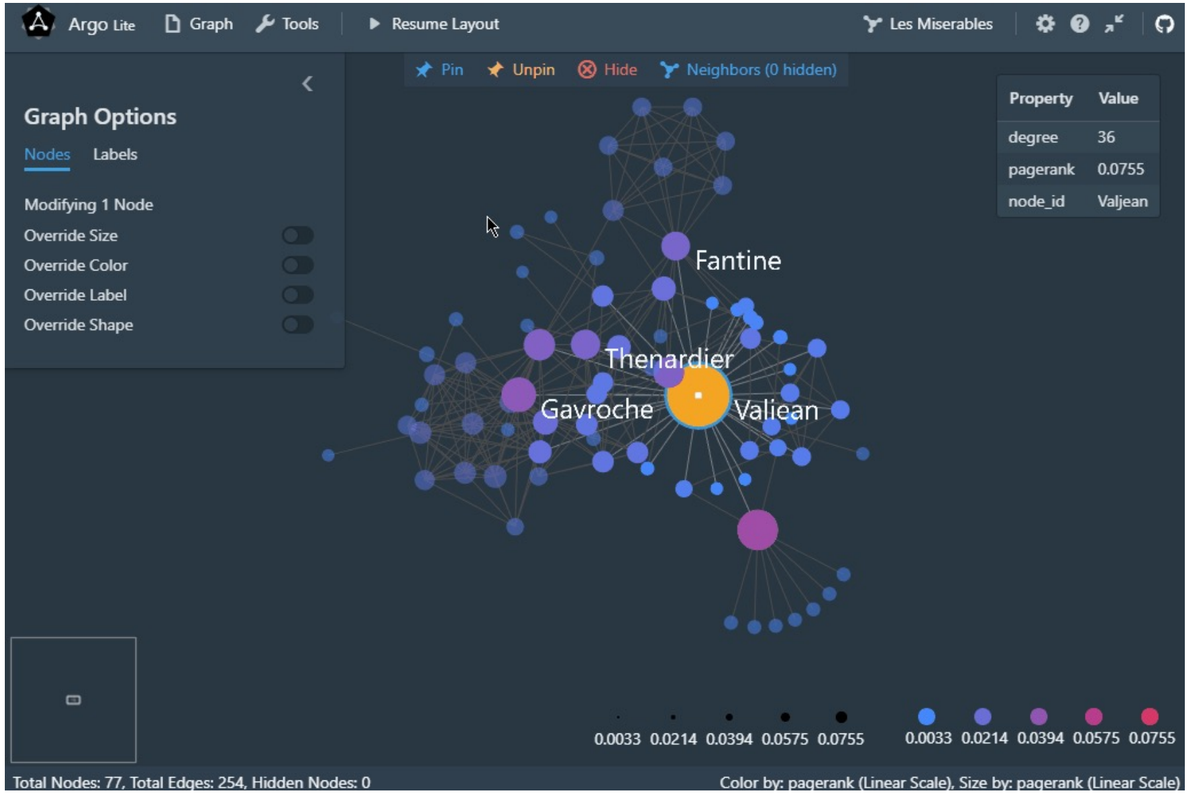
Interactive Graph Visualization in Browsers

Try at poloclub.github.io/argo-graph-lite

Runs on desktops & mobile devices



Easy sharing or embedding via URLs



Argo Lite: Open-Source Interactive Graph Exploration and Visualization in Browsers. Siwei Li, Zhiyan Zhou, Anish Upadhayay, Omar Shaikh, Scott Freitas, Haekyu Park, Zijie J. Wang, Susanta Routray, Matthew Hull, Polo Chau. CIKM 2020.

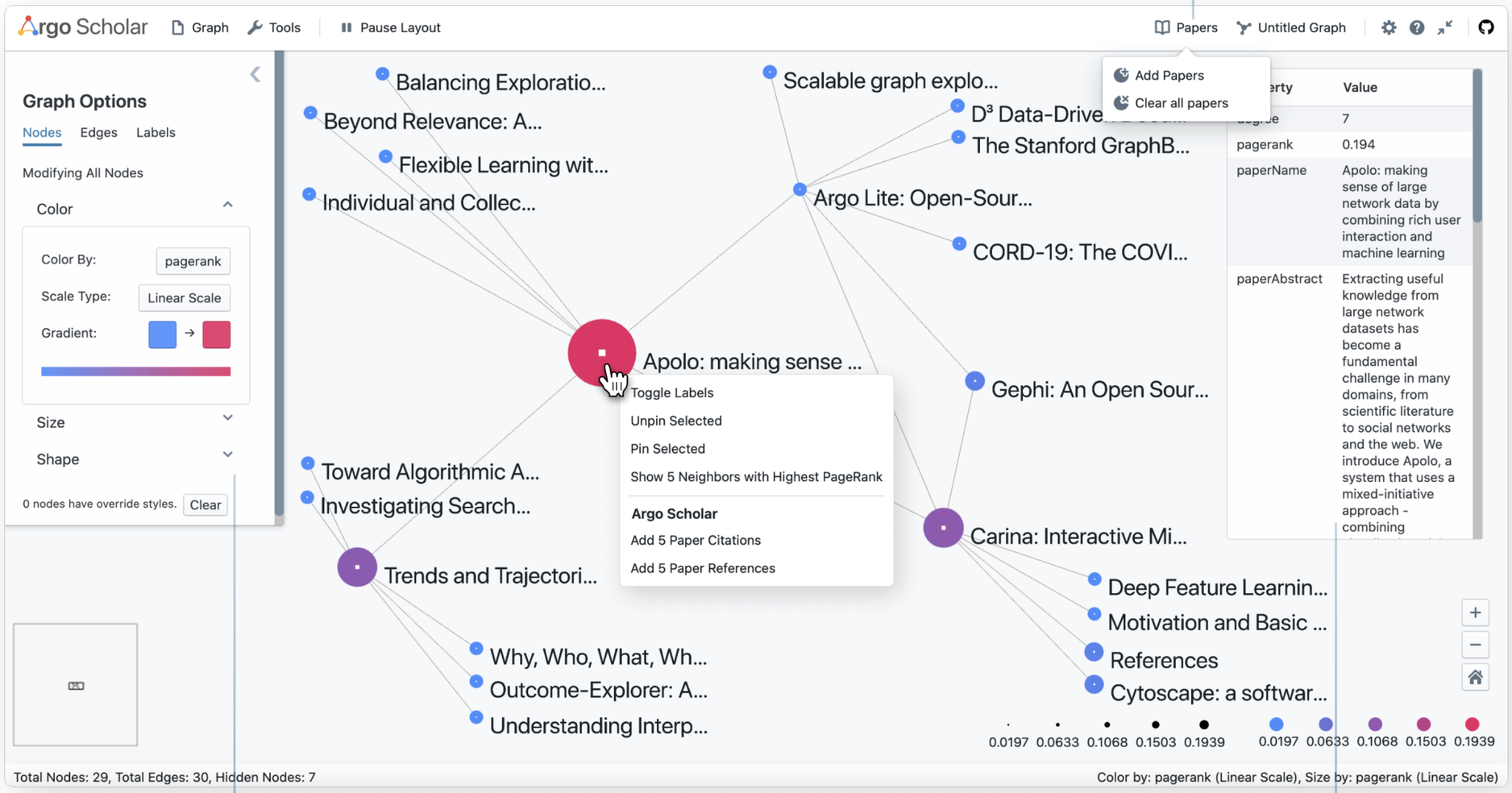
VIS 2021 | MIT License

Argo Scholar

Visual Exploration of Literature in Browsers

Try at poloclub.github.io/argo-scholar

Creates new exploration or adds papers via their Semantic Scholar CorpusIDs



Modify visual properties of graph of papers (e.g., color, size, labeling)

Shows key paper information

1.
Access ~200M Papers on Semantic Scholar

2.
Shareable Literature Graphs via URLs

3.
Incremental Exploration of paper references & citations

Argo Scholar: Interactive Visual Exploration of Literature in Browsers. Kevin Li, Haoyang Yang, Anish Upadhayay, Zhiyan Zhou, Jon Saad-Falcon, Polo Chau. VIS 2021 Research Poster.

Practitioners' Guide to Building (Interactive) Applications

What kinds of prototypes?

- Paper prototype, lo-fi prototype, high-fi prototype

Important to involve REAL users as early as possible

- Recruit your friends to try your tools
- Lab study (controlled, as in Apolo)
- Longitudinal study (usage over months)
- Deploy it and see the world's reaction!

- Take courses on human-computer interaction (HCI), human factors, user interface design

Practitioners' Guide to Building (Interactive) Applications

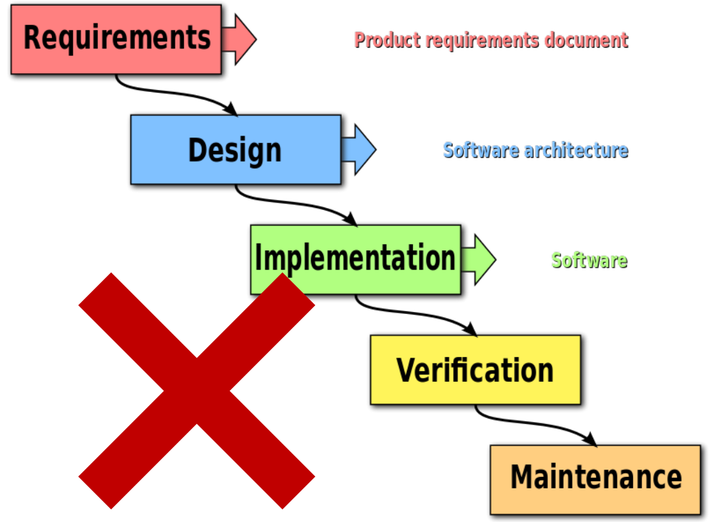
Think about scalability early

- Identify candidate scalable algorithms early on

Use iterative design approach, as in Apolo and industry

- Why? It's hard to get it right the first time
- Create prototype, evaluate, modify prototype, evaluate, ...
- Quick evaluation helps you identify important fixes early — save you a lot of time overall

Waterfall model
(software engineering)



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Thank You