Vitality

Promoting Serendipitous Discovery of Academic Literature with Transformers and Visual Analytics


Arpit **Narechania**


Alireza **Karduni**


Ryan **Wesslen**


Emily **Wall**

Georgia Tech Visualization Lab

UNC CHARLOTTE

EMORY UNIVERSITY

Northwestern University

Motivation / Problem: Story cognitive biases

Especially a problem for interdisciplinary studies (e.g., different disciplines use same words differently)

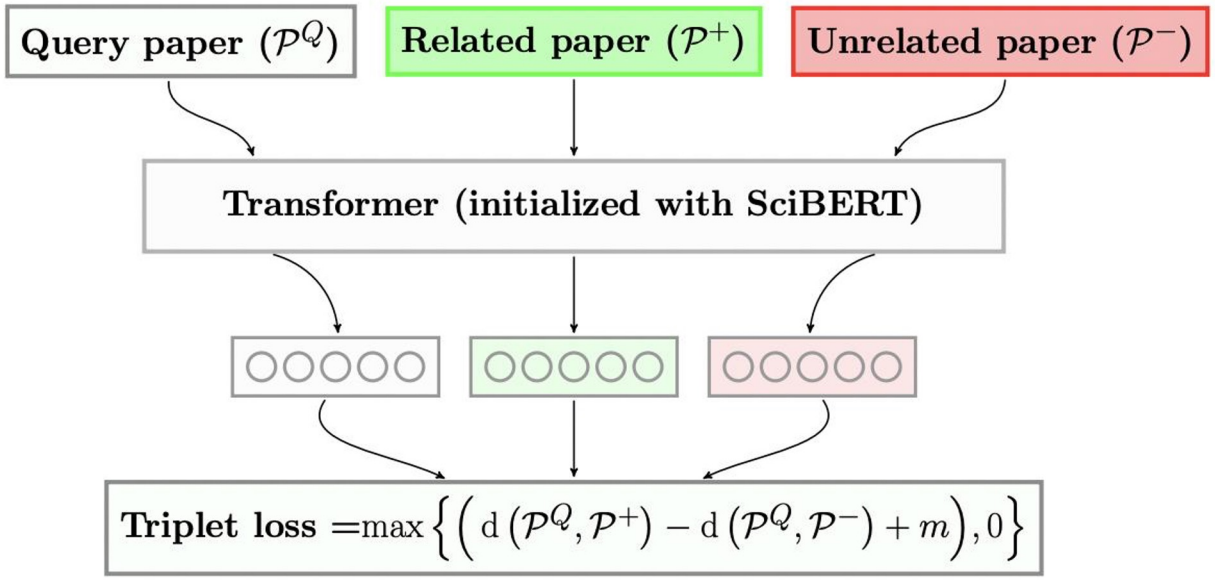
Transformers/Contextual embeddings

SPECTER: Document-level Representation Learning using Citation-informed Transformers

Arman Cohan[†*] **Sergey Feldman**[†*] **Iz Beltagy**[†] **Doug Downey**[†] **Daniel S. Weld**[†,‡]

[†]Allen Institute for Artificial Intelligence

[‡]Paul G. Allen School of Computer Science & Engineering, University of Washington



SPECTER **outperformed** nine (9) benchmarks (e.g., doc2vec, fasttext, SIF, ELMo, SciBERT, Sent-BERT) on seven (7) NLP tasks (SciDocs):

- **Document classification** (topic or subject header)
- **User activity prediction** (co-view or co-read)
- **Citation prediction** (cite or co-cite)
- **Recommendation**

Formative Study

Formative Study

DG1. Enable serendipitous identification of semantically related articles that do not necessarily have shared keywords through visual exploration.

Formative Study

DG1. Enable serendipitous identification of semantically related articles that do not necessarily have shared keywords through visual exploration.

DG2. Facilitate a familiar search functionality to what users are currently accustomed to, such as keyword and author search.

Formative Study

DG1. Enable serendipitous identification of semantically related articles that do not necessarily have shared keywords through visual exploration.

DG2. Facilitate a familiar search functionality to what users are currently accustomed to, such as keyword and author search.

DG3. Afford users to find semantically related articles by search based on the author's own ideas in the form of unpublished sentences / abstracts.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Morbi sed scelerisque nisl. Donec venenatis odio nec lectus pellentesque, in suscipit mi pharetra. Curabitur et condimentum nisi. Duis fringilla elementum ante, dictum rutrum elit tempus et. Pellentesque eget dapibus turpis. Phasellus a euismod justo, sit amet porta ante. Curabitur euismod sed neque vel consequat. Fusce a tristique justo. Ut dignissim lobortis luctus. Nullam nec scelerisque dolor. Nullam a mollis ipsum. Pellentesque ullamcorper felis at purus convallis commodo.

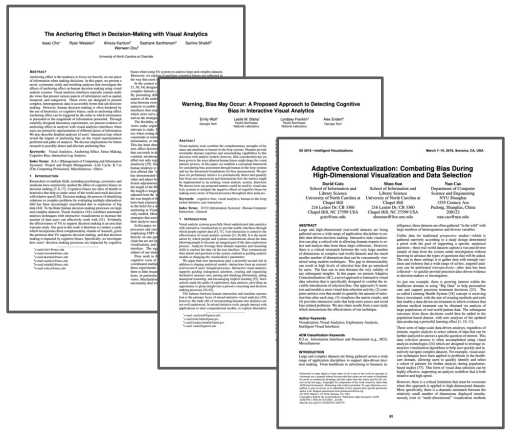
Formative Study

DG1. Enable serendipitous identification of semantically related articles that do not necessarily have shared keywords through visual exploration.

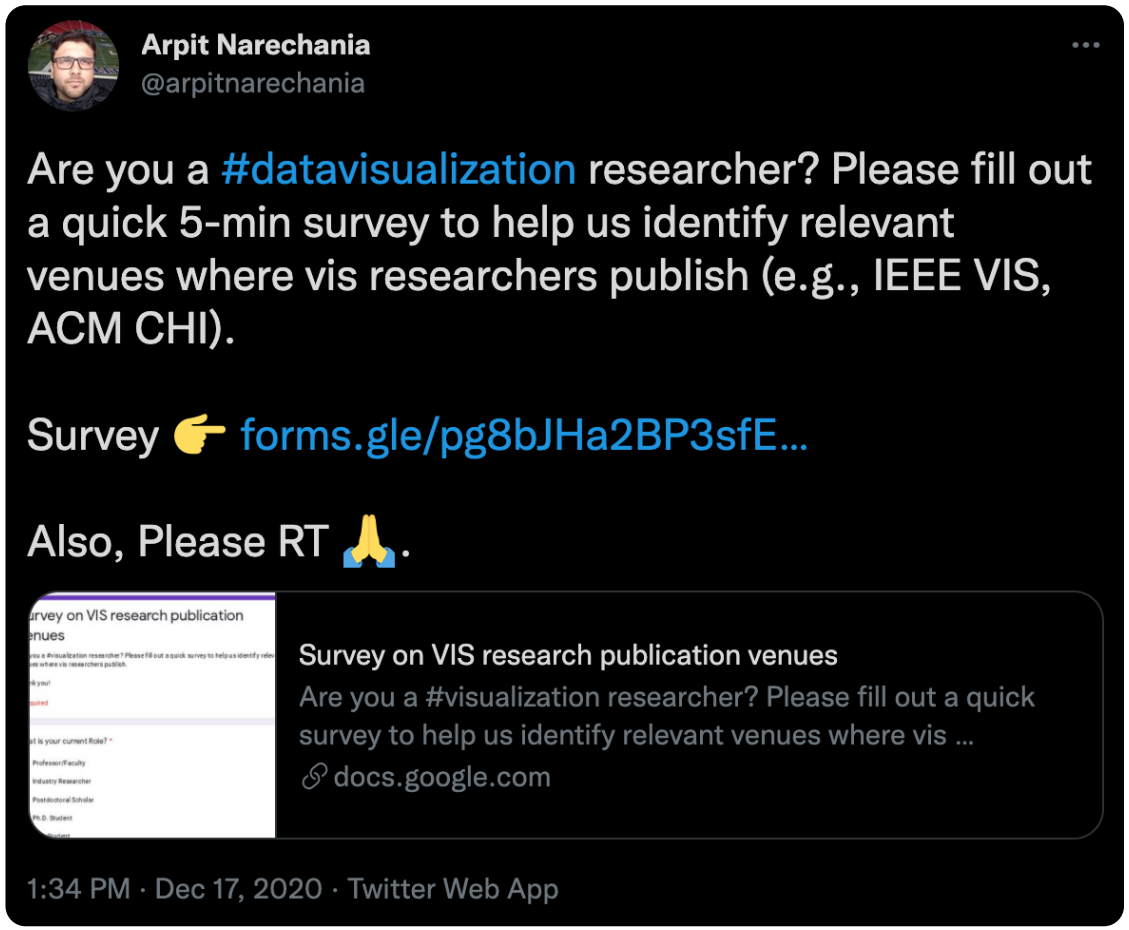
DG2. Facilitate a familiar search functionality to what users are currently accustomed to, such as keyword and author search.

DG3. Afford users to find semantically related articles by search based on the author's own ideas in the form of unpublished sentences / abstracts.

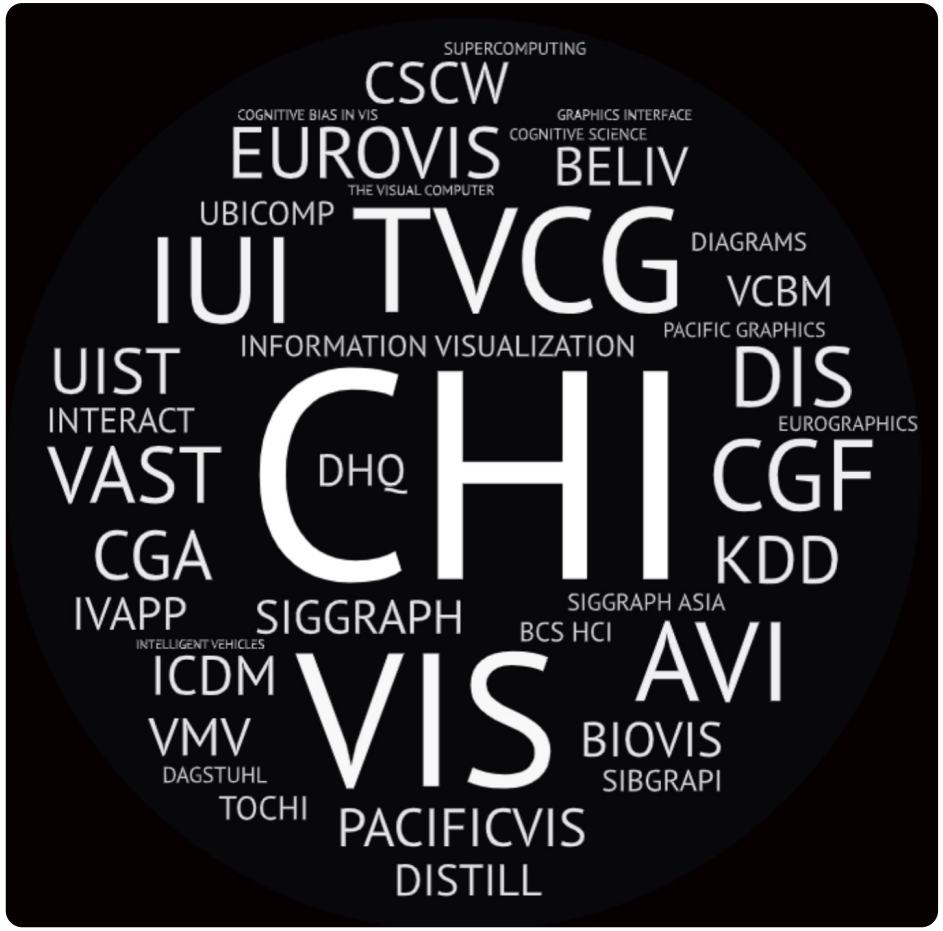
DG4. Enable users to interact with a visual overview of a group of papers.



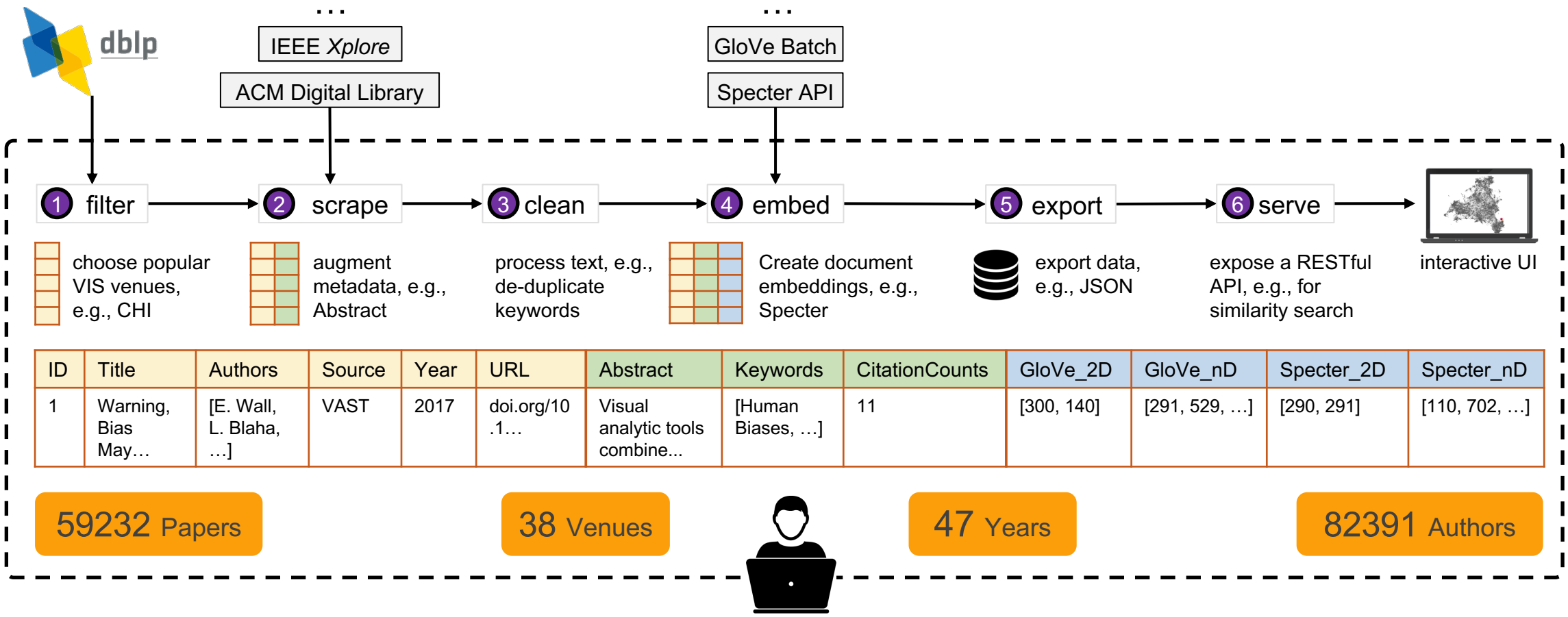
Where do VIS researchers publish?



twitter.com/arpitnarechania/status/1339640045754527749



System Architecture



ID	Title	Authors	Source	Year	URL	Abstract	Keywords	CitationCounts	GloVe_2D	GloVe_nD	Specter_2D	Specter_nD
1	Warning, Bias May…	[E. Wall, L. Blaha, …]	VAST	2017	doi.org/10.1…	Visual analytic tools combine...	[Human Biases, …]	11	[300, 140]	[291, 529, …]	[290, 291]	[110, 702, …]

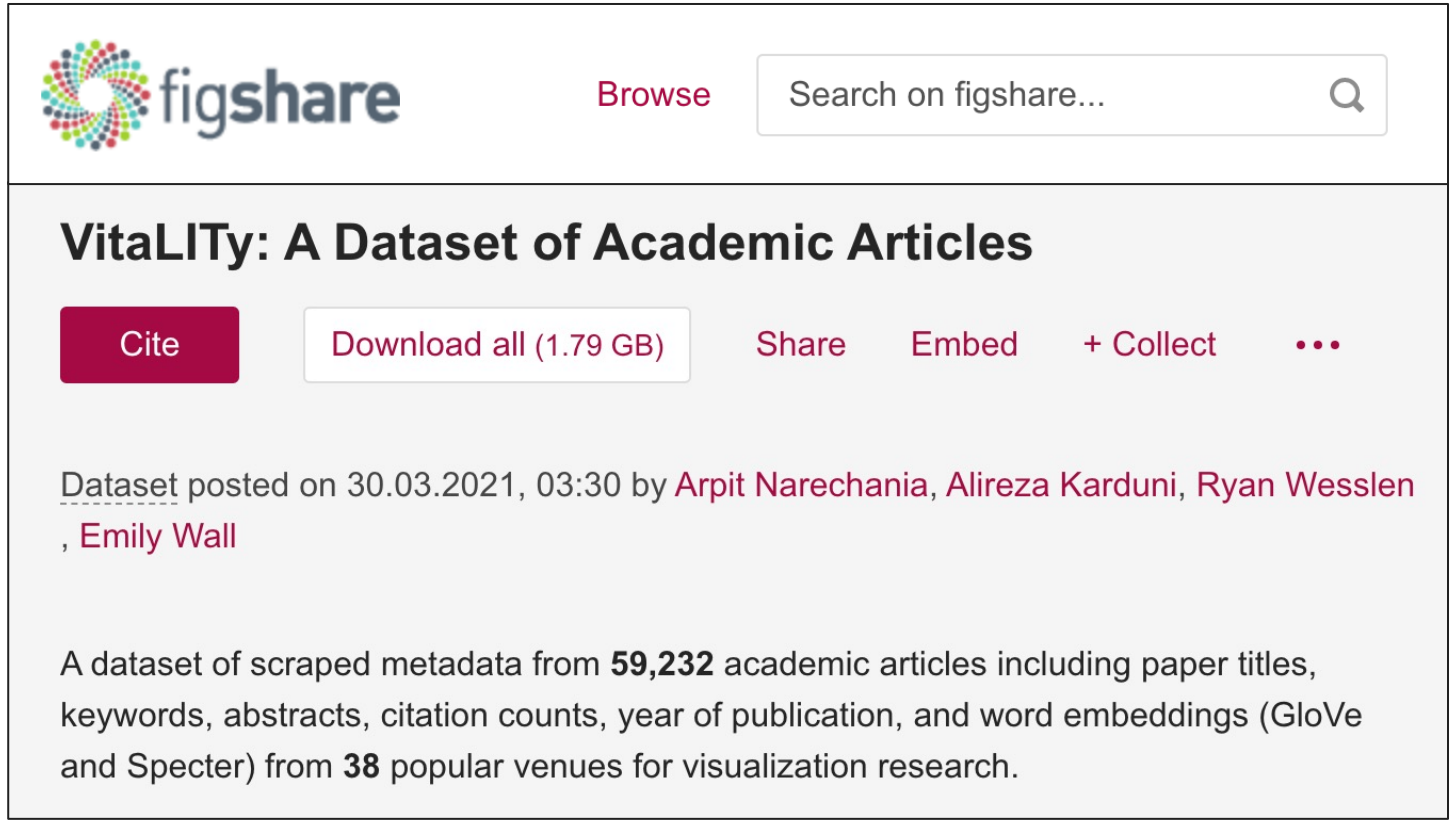
Dataset

59232 Papers

47 Years

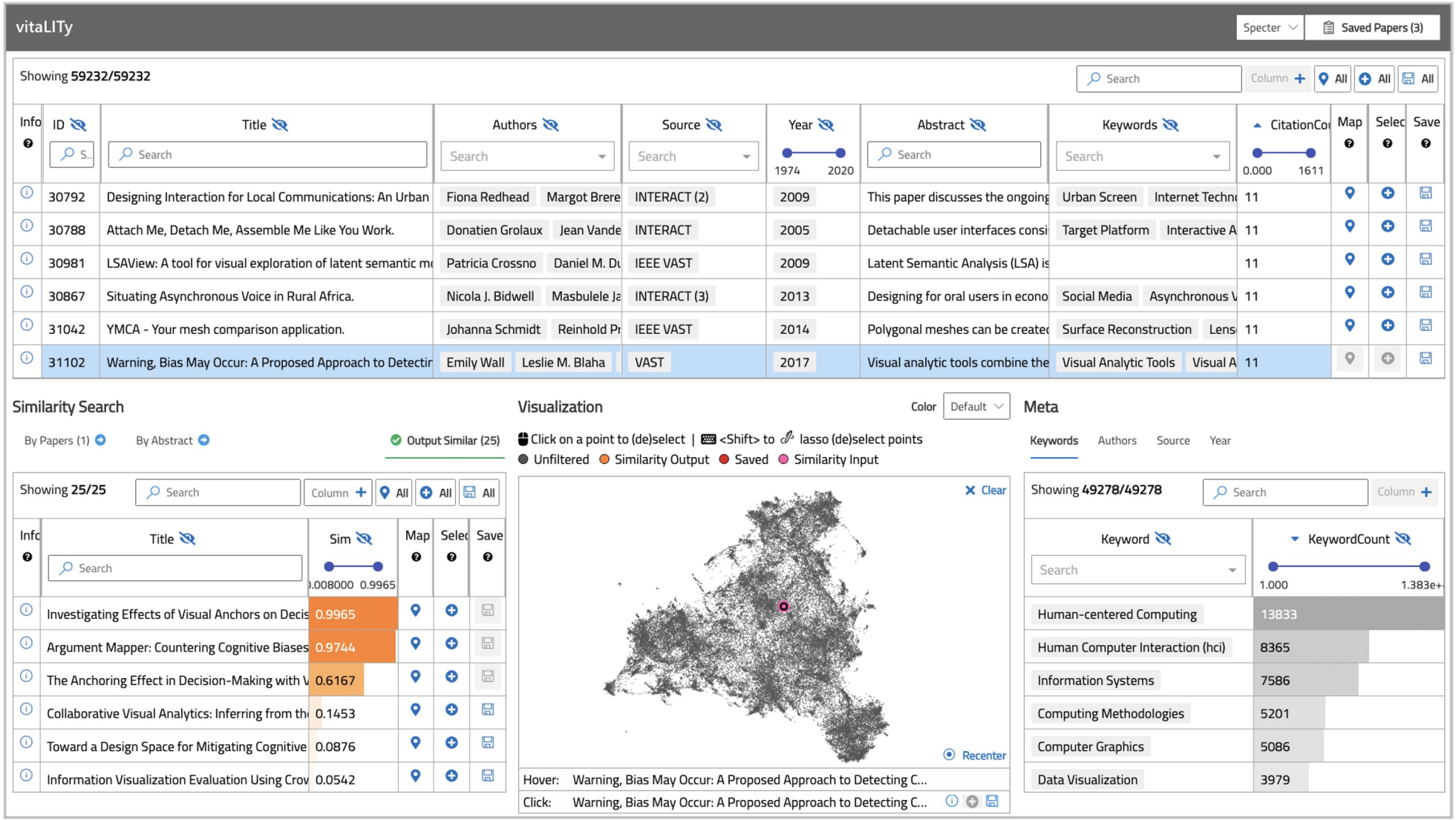
38 Venues

82391 Authors

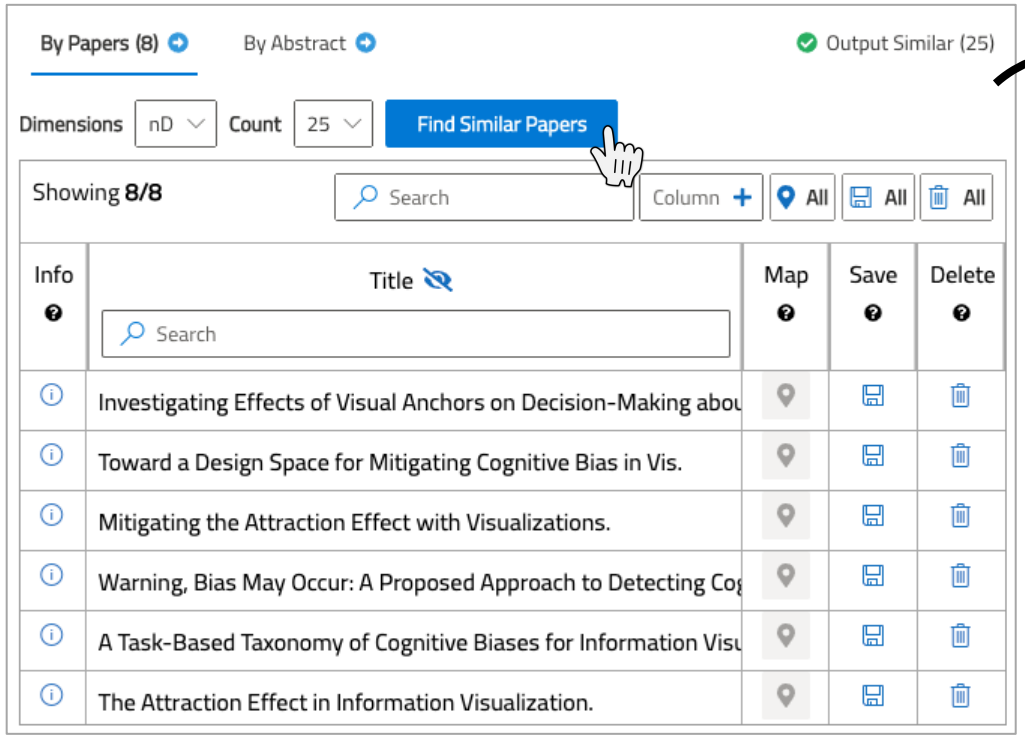


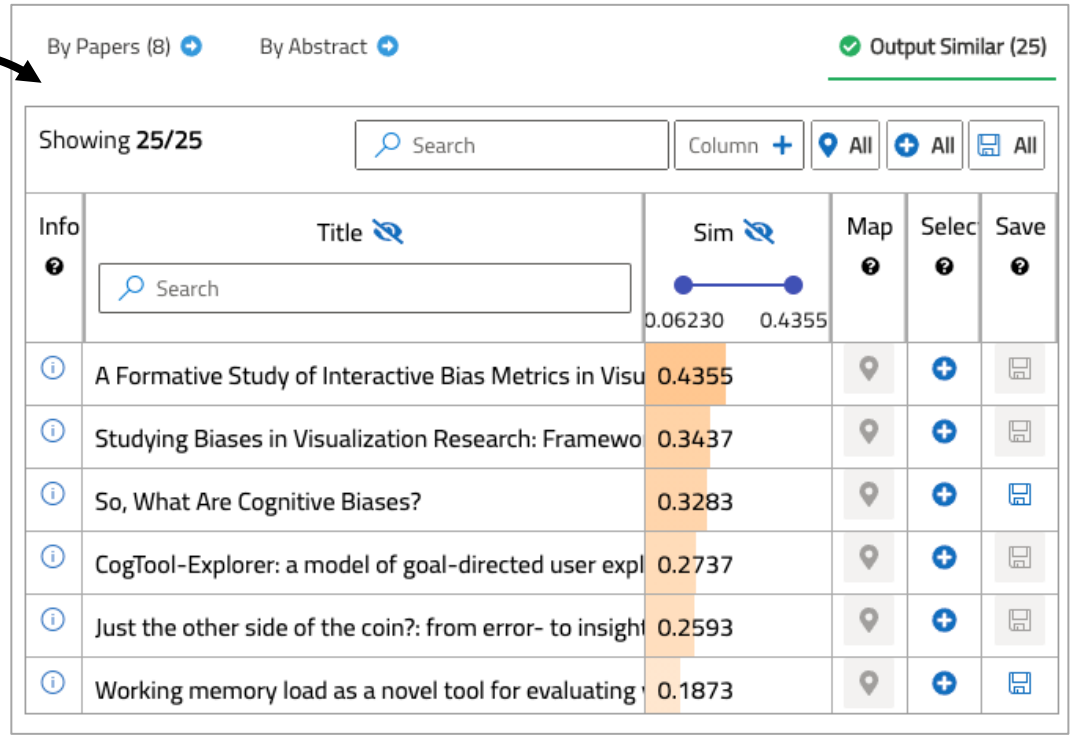
https://figshare.com/articles/dataset/VitaLITy_A_Dataset_of_Academic_Articles/14329151

System

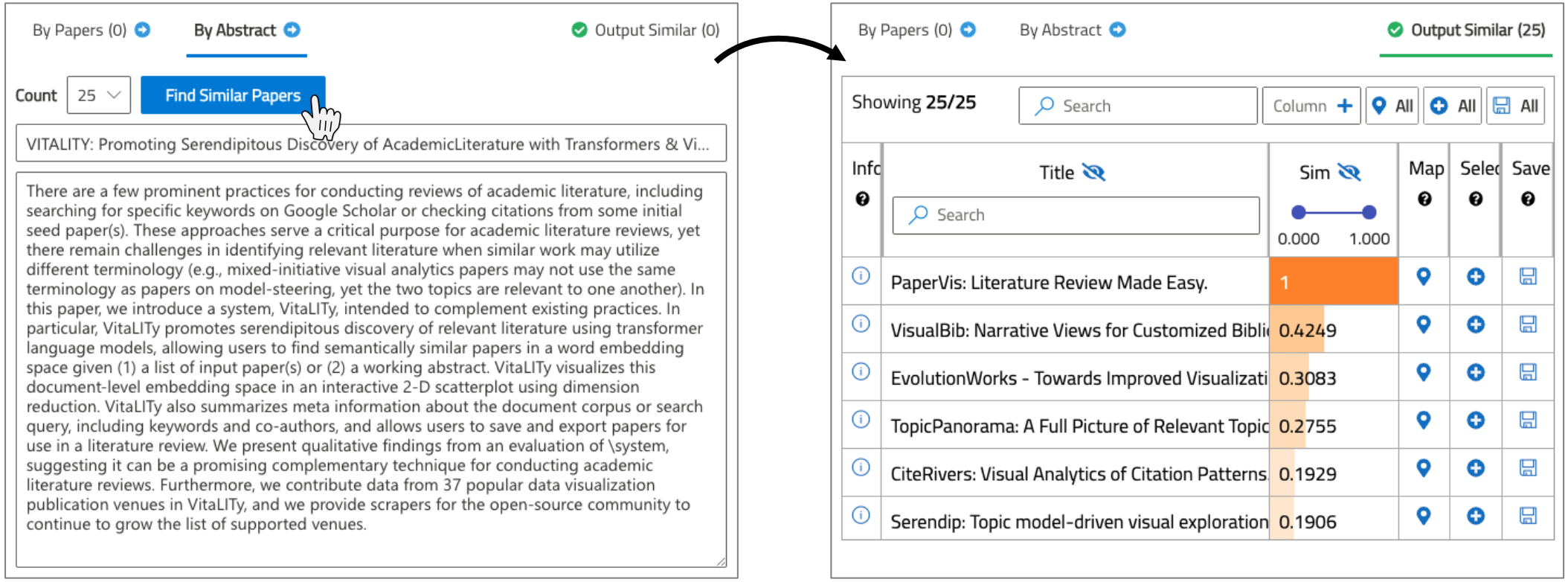

vitaLITy
Specter
Saved Papers (3)
Showing 59232/59232
Search
Column
All
All
All
Info
ID
Title
Authors
Source
Year
Abstract
Keywords
CitationCou
Map
Selec
Save
1974
2020
0.000
1611
30792 Designing Interaction for Local Communications: An Urban Fiona Redhead Margot Brere INTERACT (2) 2009 This paper discusses the ongoing Urban Screen Internet Techn 11
30788 Attach Me, Detach Me, Assemble Me Like You Work. Donatien Grolaux Jean Vande INTERACT 2005 Detachable user interfaces consi Target Platform Interactive A 11
30981 LSAView: A tool for visual exploration of latent semantic m Patricia Crossno Daniel M. Du IEEE VAST 2009 Latent Semantic Analysis (LSA) is 11
30867 Situating Asynchronous Voice in Rural Africa. Nicola J. Bidwell Masbulele Ja INTERACT (3) 2013 Designing for oral users in econo Social Media Asynchronous V 11
31042 YMCA - Your mesh comparison application. Johanna Schmidt Reinhold Pr IEEE VAST 2014 Polygonal meshes can be create Surface Reconstruction Lens 11
31102 Warning, Bias May Occur: A Proposed Approach to Detectir Emily Wall Leslie M. Blaha VAST 2017 Visual analytic tools combine the Visual Analytic Tools Visual A 11
Similarity Search
By Papers (1)
By Abstract
Output Similar (25)
Showing 25/25
Search
Column
All
All
All
Info
Title
Sim
Map
Selec
Save
0.008000
0.9965
Investigating Effects of Visual Anchors on Decis 0.9965
Argument Mapper: Countering Cognitive Biases 0.9744
The Anchoring Effect in Decision-Making with V 0.6167
Collaborative Visual Analytics: Inferring from th 0.1453
Toward a Design Space for Mitigating Cognitive 0.0876
Information Visualization Evaluation Using Crov 0.0542
Visualization
Color
Default
Click on a point to (de)select | <Shift> to lasso (de)select points
Unfiltered
Similarity Output
Saved
Similarity Input
Clear
Recenter
Hover: Warning, Bias May Occur: A Proposed Approach to Detecting C...
Click: Warning, Bias May Occur: A Proposed Approach to Detecting C...
Meta
Keywords
Authors
Source
Year
Showing 49278/49278
Search
Column
Keyword
KeywordCount
Search
1.000
1.383e+
Human-centered Computing 13833
Human Computer Interaction (hci) 8365
Information Systems 7586
Computing Methodologies 5201
Computer Graphics 5086
Data Visualization 3979

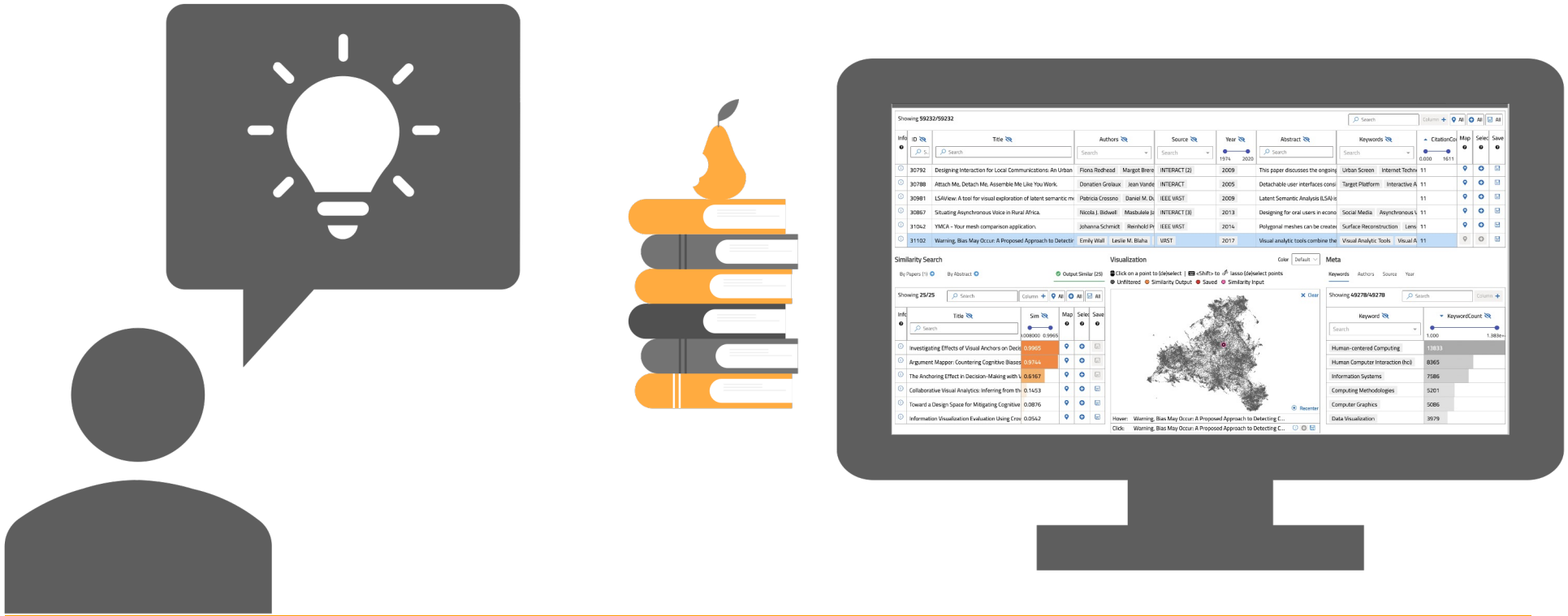
System | Search by a List of Seed Papers





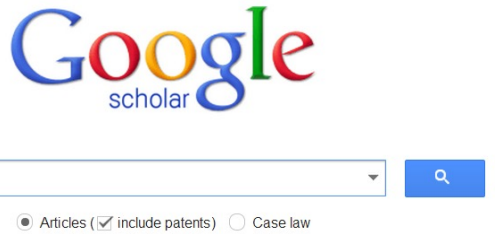
System | Search by a WIP Abstract





supporting serendipitous discovery

custom scrapers

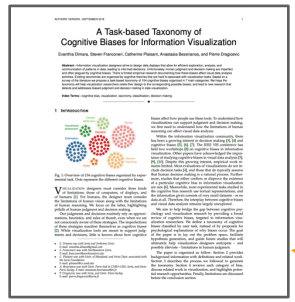


snowballing references

dblp
computer science bibliography

part of a larger workflow


Mitigating the Attraction Effect with Visualizations

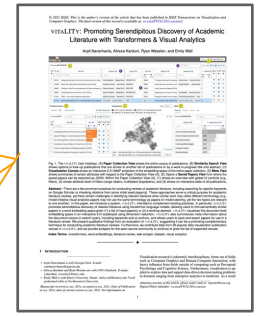

A Task-based Taxonomy of Cognitive Biases for Information Visualization


The Attraction Effect in Information Visualization

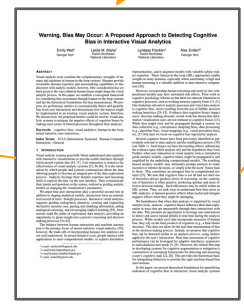

When (ish) is My Bus? User-centered Visualizations of Uncertainty in Everyday, Mobile Predictive Systems

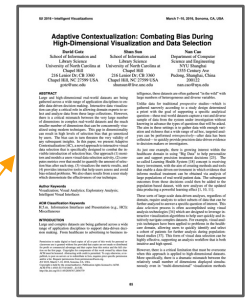

Hypothetical Outcome Plots Outperform Error Bars and Violin Plots for Inferences About Reliability of Variable Ordering

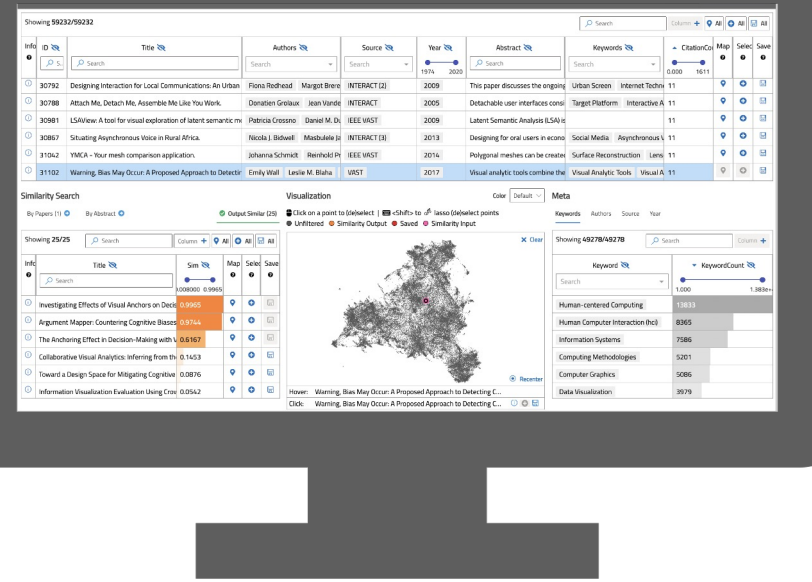

Can You Verify This? Studying Uncertainty and Decision-Making About Misinformation using Visual Analytics


VITALITY: Promoting Serendipitous Discovery of Academic Literature with Transformers & Visual Analytics


The Anchoring Effect in Decision-Making with Visual Analytics

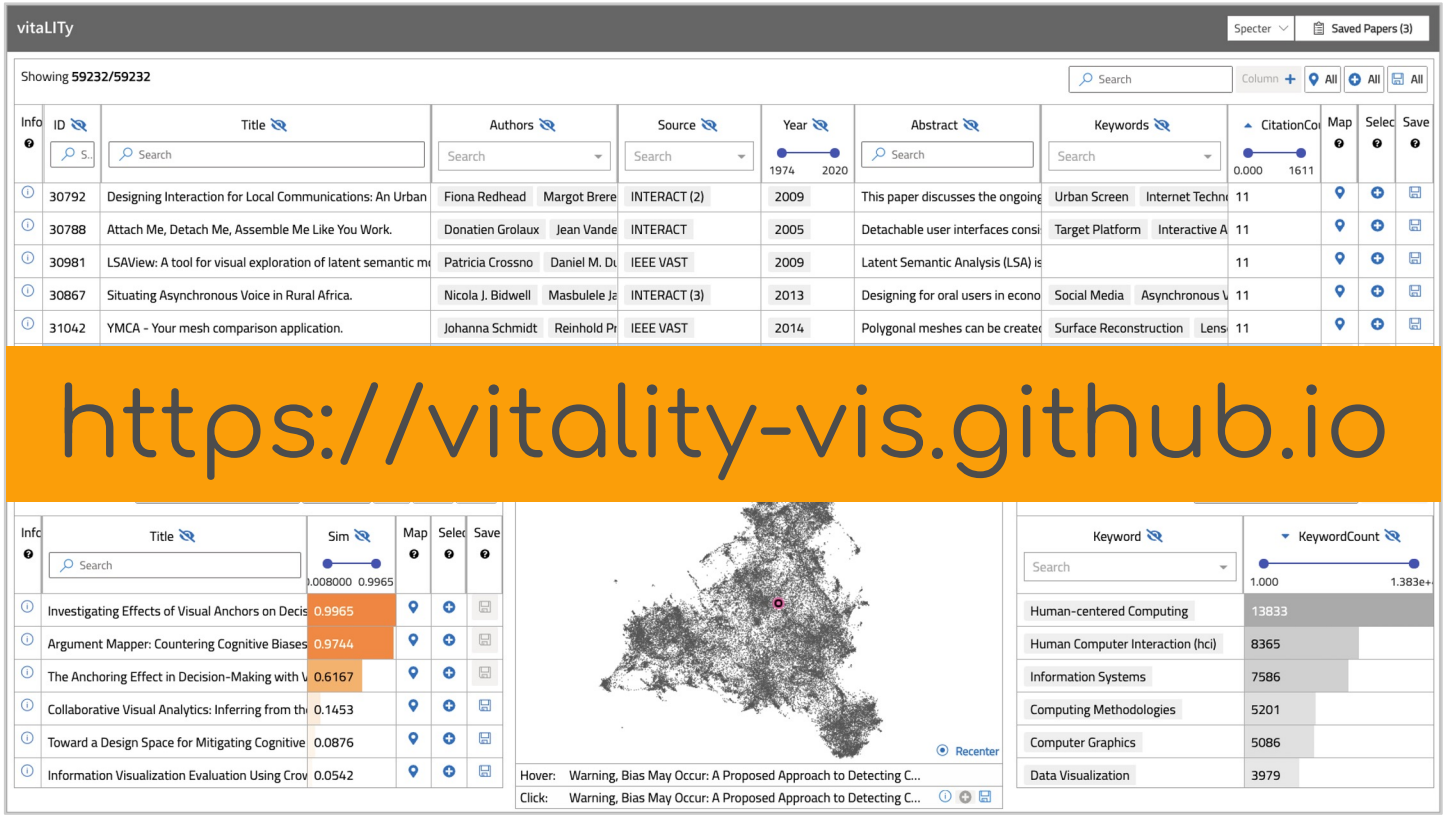

Warning, Bias May Occur: A Proposed Approach to Detecting Cognitive Bias in Interactive Visual Analytics


Adaptive Contextualization: Combating Bias During High-Dimensional Visualization and Data Selection



improve model + add citation data

Vitality



- Qualitative Evaluation
- Usage Scenarios
- Dataset
- Web Scrapers

Vitality

Promoting Serendipitous Discovery of Academic Literature with Transformers and Visual Analytics


Arpit **Narechania**


Alireza **Karduni**


Ryan **Wesslen**


Emily **Wall**

Georgia Tech Visualization Lab

UNC CHARLOTTE

EMORY UNIVERSITY

Northwestern University