

# LitExplorer: A Visual Browser for Literature Collections

(With a Set Visualization Survey Example)

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Information Visualisation, Group 2, 26 June 2024

# Introduction

- LitExplorer:
  - Parse .bib entries and associated images.
  - To create a visual browser for literature collections.
  
- SetVis Survey Browser:
  - Application of LitExplorer for survey about set visualization.

# Related Work

1. TreeVis [2011]
2. SurVis [2015]
3. BioVis Explorer [2017]

# 1. TreeVis

- Created by Hans-Jörg Schulz [2011].
- A visual bibliography of tree visualization.
- Grid view of thumbnails.



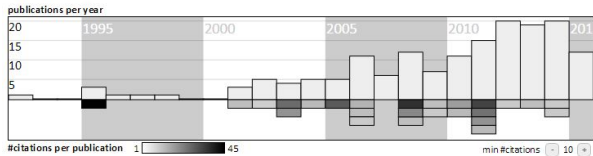
## 2. SurVis

- Created by Fabian Beck and colleagues [2016].
- Flexible online browser to present and analyze scientific literature.
- Open-Source.
- Implemented in JavaScript with JQuery.
- Initial inspiration for this project.

Selectors

search ...

## ▼ Timeline



## ▼ Keywords

type: **technique**<sub>71</sub> **application**<sub>55</sub> **evaluation**<sub>36</sub>  
 time: **animation**<sub>34</sub> **timeline**<sub>30</sub> **generic**<sub>15</sub>  
 paradigm: **node-link**<sub>35</sub> **matrix**<sub>15</sub> **generic**<sub>14</sub>  
 evaluation: **case\_study**<sub>203</sub> **user\_study**<sub>25</sub> **survey**<sub>18</sub> **none**<sub>11</sub> **expert**<sub>10</sub>  
 application: **social**<sub>45</sub> **generic**<sub>42</sub> **document**<sub>30</sub> **software\_engineering**<sub>30</sub> **infrastructure**<sub>12</sub>  
 biology<sub>12</sub>  
 other: **mental\_map**<sub>44</sub> **compound\_graph**<sub>38</sub> **3d**<sub>24</sub> **general-purpose\_layout**<sub>22</sub>  
**force-directed\_layout**<sub>22</sub> **directed\_graph**<sub>20</sub> **radial**<sub>18</sub> **weighted\_graph**<sub>18</sub>  
**juxtaposed\_node-link**<sub>15</sub> **online\_problem**<sub>15</sub> **offline\_problem**<sub>15</sub> **taxonomy**<sub>12</sub>  
**special-purpose\_layout**<sub>12</sub> **superimposed\_node-link**<sub>11</sub> **clustering**<sub>10</sub> **fixed\_nodes**<sub>10</sub>

## ▼ Authors

Burch, Michael<sub>19</sub> Welskopf, Daniel<sub>17</sub> Diehl, Stephan<sub>13</sub> Purchase, Helen C<sub>10</sub> Beck, Fabian<sub>10</sub>  
 Archambault, Daniel<sub>5</sub> Kobourov, Stephen G<sub>9</sub> Brandes, Ulrik<sub>8</sub> Vehlou, Corinna<sub>6</sub> Eades, Peter<sub>5</sub>

## ▼ Series

?<sub>40</sub> TVCG<sub>20</sub> GD<sub>18</sub> IV<sub>11</sub> CGF<sub>5</sub> EuroVis<sub>7</sub> PacificVis<sub>5</sub>

## ▼ Clusters

Clustering A:

**A.1**<sub>63</sub> type:application  
 paradigm:node-link  
 superimposed\_node-link  
**A.2**<sub>11</sub> layered\_matrices  
 intra-cell\_timelines  
 paradigm:matrix  
**A.3**<sub>34</sub> general-purpose\_layout  
 special-purpose\_layout  
 online\_problem  
**A.4**<sub>18</sub> integrated\_node-link  
 linear\_arrangement  
 juxtaposed\_node-link  
**A.5**<sub>26</sub> type:evaluation  
 evaluation:survey  
 application:generic

## new clustering:

number of clusters   keywords  authors

162 publications sorted by selector agreement and publication key

1. Abe11s2013Modular TVCG (2013) [DOI](#) | [Google Scholar](#) | [Google](#)  
**A Modular Degree-of-Interest Specification for the Visual Analysis of Large Dynamic Networks**  
 Abello, James Hadlak, Stefan Schumann, Heesun Schulz, Hans-Jörg  
*Abstract: Large dynamic networks are targets of analysis in many fields. Tracking temporal changes at scale in these networks is challenging due in part to the fact that small changes can be missed or drowned-out by the rest of the network. For static networks, current approaches allow the identification of ...*  
 type:technique timeanimation paradigm:node-link evaluation:case\_study application:document compound\_graph force-directed\_layout network\_metrics  
 online\_problem special-purpose\_layout  
 Cluster A.3  
[select similar](#) [cited by this 3](#) [citing this 2](#) [BibTeX](#)
2. Ahlers2014Replicable GraphViz (2014) [URL](#) | [Google Scholar](#) | [Google](#)  
**Replicable Security Monitoring: Visualizing Time-Variant Graphs of Network Metadata**  
 Ahlers, Volker Heine, Felix Hellmann, Bastian Kleiner, Carsten Renneis, Leonard Rossow, Thomas Steuerwald, Ralf  
*Abstract: Monitoring a computer network's security state is a difficult task as network components rarely share their information. The IF-MAP specification defines a client/server-based protocol that enables network components to share security information among each other, which is represented in a graph ...*  
 type:application timeanimation paradigm:node-link evaluation:none application:infrastructure graph\_difference  
 Cluster A.1  
[select similar](#) [cited by this 2](#) [BibTeX](#)
3. Ahmed2010Visual VINCI (2010) [DOI](#) | [Google Scholar](#) | [Google](#)  
**Visual analysis of history of World Cup: A dynamic network with dynamic hierarchy and geographic clustering**  
 Ahmed, Adel FU, Xiaoyan HONG, Seok-Hee Nguyen, Quan Hoang XU, Kai  
*Abstract: In this paper, we present new visual analysis methods for history of the FIFA World Cup competition data, a social network from Graph Drawing 2006 Competition. Our methods are based on the use of network analysis method, and new visualization methods for dynamic graphs with dynamic hierarchy and ...*  
 type:application time:timeline paradigm:node-link evaluation:case\_study application:sports 3d clustering compound\_graph radial superimposed\_node-link  
 Cluster A.1  
[select similar](#) [cited by this 5](#) [citing this 2](#) [BibTeX](#)
4. Ahn2011Temporal SBP (2011) [DOI](#) | [Google Scholar](#) | [Google](#)  
**Temporal Visualization of Social Network Dynamics: Prototypes for Nation of Neighbors**  
 Ahn, Jae-wook Taieb-Maimon, Merav Sapan, Avinai Plaisant, Catherine Shneiderman, Ben  
*Abstract: Information visualization is a powerful tool for analyzing the dynamic nature of social communities. Using Nation of Neighbors community network as a testbed, we propose five principles of implementing temporal visualizations for social networks and present two research prototypes: NodeX and Tem ...*  
 type:application time:animation time:timeline paradigm:node-link evaluation:expert application:social directed\_graph  
 Cluster A.1  
[select similar](#) [cited by this 2](#) [citing this 5](#) [BibTeX](#)
5. Ahn2013Task TVCG (2013) [DOI](#) | [Google Scholar](#) | [Google](#)  
**A Task Taxonomy for Network Evolution Analysis**  
 Ahn, Jae-wook Plaisant, Catherine Shneiderman, Ben  
*Abstract: Visualization has proven to be a useful tool for understanding network structures. Yet the dynamic nature of social media networks requires powerful visualization techniques that go beyond static network diagrams. In order to provide strong temporal network visualization tools, designers need to ...*  
 type:evaluation time:generic paradigm:generic evaluation:expert application:generic evaluation\_framework tasks taxonomy  
 Cluster A.5  
[select similar](#) [cited by this 5](#) [citing this 4](#) [BibTeX](#)

[about](#) [related surveys](#)

### 3. BioVis Explorer

- Created by Andreas Kerren and colleagues [2017].
- A visual guide to BioVis techniques.
- Similarity map of thumbnails.



# BioVis Explorer


A Visual Guide to BioVis Techniques (PLOS ONE article)  
 Provided by ISOVIS group

Help About Summary Add entry Other surveys ▾

Home **Advanced**

Techniques displayed:  
**150**

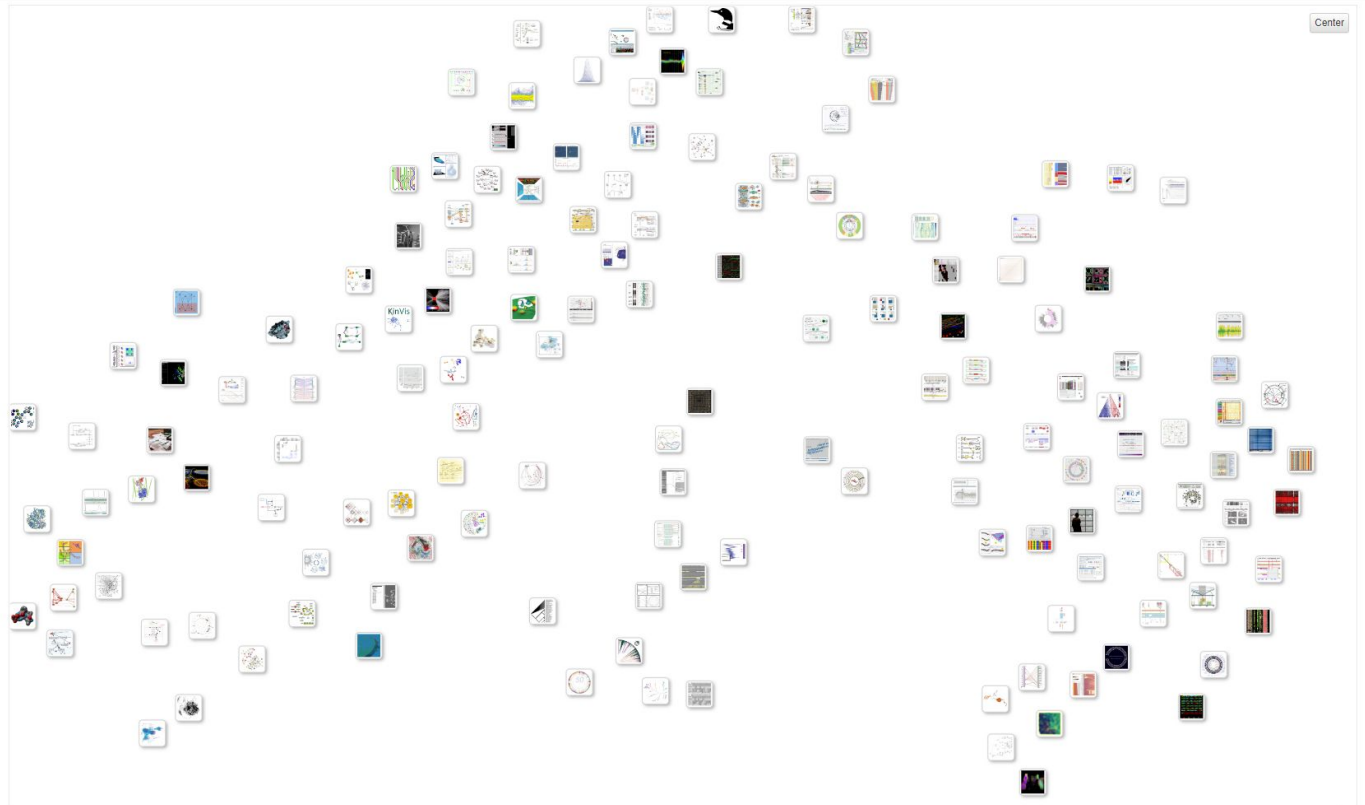
Search:

Time filter:  
 2000 2021  


Types of Data

Properties of Data

Tasks



Screenshot of BioVis Explorer taken by authors of this presentation, from <https://biovis.lnu.se/>

# Data Preparation

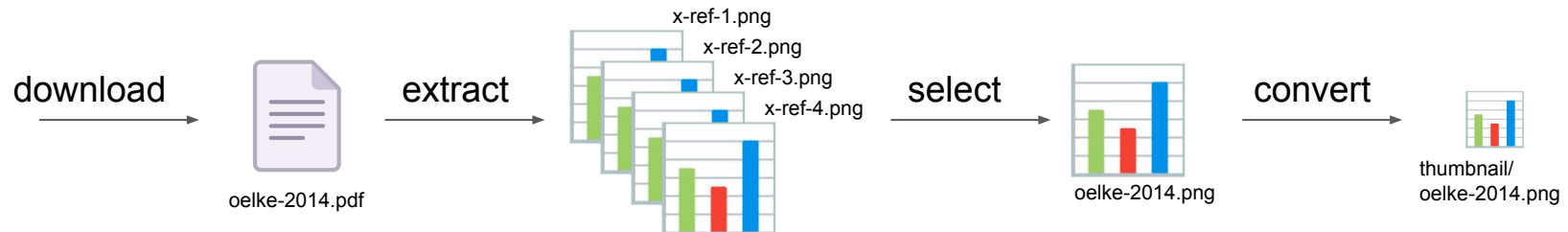
.bib Entries and Images

# Formatting .bib Entries

- Ensure necessary fields:
  - Normal: author, title, date, doi, abstract
  - Custom: category, name
- Automatic validation in Python
- Missing fields were fetched from the <https://api.crossref.org/swagger-ui/index.html#/> API (otherwise manually)

# Image Extraction

- Parse .bib file
- For each entry:
  - Download PDF from <https://www.sci-hub.se/> API (otherwise manually)
  - Extract all images from PDF with PyMuPDF (otherwise manually)
  - Manually note the x-ref of the wanted image
  - Convert image to thumbnail with Pillow



# Image Permissions

- We don't own the extracted images.
- Doesn't necessarily fall under *fair use*.
- Requests to publishers (e.g. IEEE) for bulk permissions.
- Requests to individual authors.
- For now:
  - Public survey hosted without images.
  - Images included in local version.

# LitExplorer

# LitExplorer

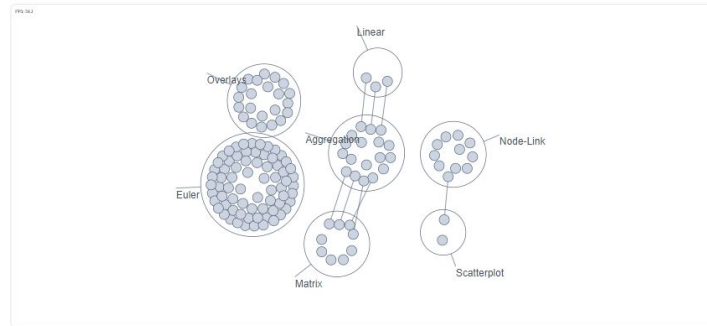
- Fallback when permissions for images are missing.
- Support modern and deprecated .bib fields (date, year-month-day).
- Modern web technologies (Svelte, Tailwind).
- Custom fields:
  - `category = "Matrix, Aggregation"`
  - `name = "UpSet"`
- Visualize membership in multiple categories.

## LitExplorer

### Timeline



### Categories



### Authors

Peter Rodgers 23 Gem Stapleton 18 John Howse 6 Andrew Blake 4 Luana Micallef 4 Leishi Zhang 4  
 Jean Flower 4 Aidan Delaney 4 Oliver Deussen 3 Anselm Spoerri 3 Peter Chapman 3 Nathalie Henry Riche 3  
 Paolo Simonetto 3 undefined John Howse 3 Stirling Chow 3 Frank Ruskey 3 Hendrik Strobel 2 John Stasko 2  
 Ferran Hurtado 2 Matias Korman 2

### Names

Euler 22 Venn 12 Parallel Tag Clouds 2 Set'o'gram 2 Wellformed Euler 2 Area-Proportional Euler 2  
 VennMaster 2 DiTop-View 1 UpSet 1 SearchCrystal 1 Potential Field Function 1 Comparison 1  
 Affiliation Networks 1 Matrix Browser 1 Scatter 1 Jigsaw 1 Colored Spanning Graphs 1 AfricaMap 1

Search in 131 items

Table Image Grid 131/131 items Columns

|   | Image | Author ↑↓                                | Title ↑↓   | Date ↑↓    | Name ↑↓                  | Categories ↑↓       |     |
|---|-------|--|--|------------|--------------------------|---------------------|-----|
| + |       | Daniela Oelke et al.                     | Comparative exploration of document collections: a visual analytics approach               | 2014-06    | DiTop-View               | Overlays            | ... |
| + |       | Alexander Lex et al.                     | UpSet: Visualization of intersecting sets  | 2014-12-31 | UpSet                    | Aggregation, Matrix | ... |
| + |       | Anselm Spoerri                           | Coordinating linear and 2d displays to support exploratory search                          | 2007-07    | SearchCrystal            | Overlays            | ... |
| + |       | Jevgēnijs Vihrovs et al.                 | An inverse distance-based potential field function for overlapping point set visualization | 2014-01    | Potential Field Function | Overlays            | ... |
| + |       | Peter Chapman et al.                     | Visualizing sets: An empirical comparison of diagram types                                 | 2014       | Comparison               | Euler               | ... |
| + |       | Stephen P. Borgatti and Daniel S. Halgin | Analyzing affiliation networks   | 2014       | Affiliation Networks     | Node-Link           | ... |
| + |       | E. Ziegler et al.                        | Visualizing and exploring large networked information spaces with Matrix Browser           | 2002       | Matrix Browser           | Matrix              | ... |
| + |       | Xiu Liu et al.                           | Visualization of sets  | 2005       | Scatter                  | Scatterplot         | ... |

Screenshot of LitExplorer, showing our set visualization survey



# LitExplorer

Publicly hosted at <https://info-vis-24.github.io/lit-explorer/>

(no images for lack of permissions)