VisualBib: Narrative Views
for Customized Bibliographies

Antonina Dattolo, Marco Corbatto
SASWEB Research Lab - Department of Mathematics, Computer Science and Physics
University of Udine, I-34170 - Gorizia, Italy
{antonina.dattolo, marco.corbatto}@uniud.it

Abstract—Existing citation indexes of scientific literature, like Scopus, WOS, Google Scholar and OpenAire, collect metadata of papers and authors. By using appropriate queries, it is possible to access these metadata, find specific papers and all associated details, as well as retrieve indices, metrics and information about authors. However, a big issue is that they generally do not aggregate the results of subseqent searches and do not offer explicit representations of author/citation relationships between found items. This paper introduces VisualBib, a Web application prototype conceived to support researchers who wish to create, modify, visualize and share bibliographies. Starting with a small set of papers or with a restricted number of authors, it generates, in real-time, an interactive visual representation of the corresponding bibliography; the user can explore the network of cited/citing references and dynamically add new papers in order to build up customized bibliographies which are represented using holistic, aggregated and graphical views.

Index Terms—Visual bibliography; Graphic organizer; Holistic view; Narrative view.

I. INTRODUCTION

One common issue for researchers is the search of scientific papers in order to build specific bibliographies to include in a publication or to share with colleagues and students. The search is generally carried out querying large citation indexes, like Scopus, Web Of Science (WOS), Google Scholar and OpenAire, which contain hundreds of millions of metadata about papers, authors and projects. The massive number of returned information is often presented in the form of long, linear lists; this requires a significant effort for researchers in order to examine the results and find correlations between them and, finally, collect most significant papers of a search session.

Furthermore, search engines do not generally support the creation, maintenance and sharing of bibliographies, neither the generation of holistic visual representations of the set of selected papers and their author/citation relationships. Also, although these repositories index millions of publications, none of them is exhaustive, and none of them offers the possibility to aggregate data contained in the other ones.

In order to find a solution to these open issues, we have modelled and implemented, VisualBib, a Web application prototype conceived with the objective to allow users to:

- generate, save and share *visual holistic* representations of small *bibliographies*, in the form of narrative views;

- easily explore *the network of cited/citing references* starting from a limited set of papers, in order to opportunely expand the bibliography;
- visualize their *personal scientific path*, through the sequence of their significant work carried out on a certain research topic;
- retrieve metadata from *multiple online repositories* in real-time without the need of static datasets.

The rest of this paper is organized as follows: Section II presents related work; Section I describes the graphic layout and the main features of VisualBib, and formally defines a narrative view; Section IV focuses on the VisualBib architecture, dwelling on the role of the graphic engine and the algorithm used to display the narrative view; it follows, in Section V, the evaluation carried out as a comparative study between VisualBib and Scopus. This study closes with conclusions and an outline of future work.

II. RELATED WORK

A recent, general survey [1] examines 109 different visual approaches for analysing scientific literature and patents, that emerged between 1992 and 2016; an interactive visual survey of 400 different techniques for text visualization is proposed in [2]. Both the surveys highlight the fundamental role of visual representations for a meaningful use of publications' metadata for scientific communities. Starting from these two studies and from the rest of current literature, we found a set of tools which propose graphic representations of bibliographic data and support researchers in analysing and exploring data and relationships. The first consideration is that the majority of them emerged some years ago, and are no longer under active development. None of them is a real-time application, in the sense that they work on pre-built datasets, or allow the user to upload limited datasets obtained from WOS or other repositories. Some tools have been proposed in occasion of InfoVis2004 contest [3]: among them, BiblioViz [4] integrates table and network 2D/3D views of bibliographic data; PaperLens [5] tightly couples views across papers, authors and references in order to empathise the popularity of a topic, the degree of separation of authors and the most cited papers/authors; CiteWiz [6] deals with authors, citations and metadata, features three different views and uses a central citation dataset in a simple XML-based file format designed for InfoVis; PaperCube [7], an evolution of CircleView, offers
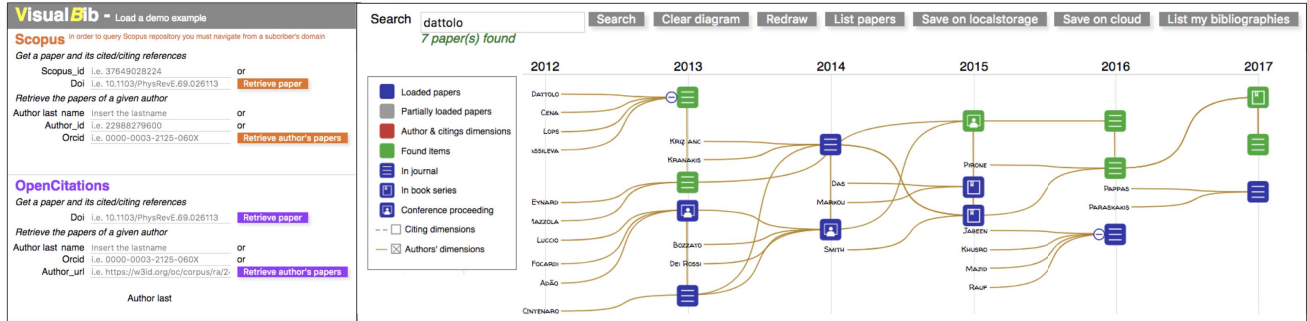
Fig. 1. Searching on Scopus and OpenCitations (left) - The narrative view for a bibliography (right).

a suite of alternative visualizations based on graph, hierarchy, and timeline structures. Unfortunately, the project appears to have been closed in 2009.

Complex visual metaphors have been adopted from Biblioviz [4] and Cybis [8]: both systems require special training before using them.

The genealogy of citation patterns, Citeology [9] is a Java program, which connects the titles of papers organized in a chronological layout; the dataset is pre-built and has been extracted from the ACM DL. PivotPaths [10] uses a graph representation of authors, publications, and keywords, all integrated in an attractive interface with smooth animations; the demo available online works on a limited dataset of papers in the fields of HCI, information retrieval, and visualization (up to 2012). The dataset was extracted from Microsoft Academic Search. Two active projects are CiteSpace III [11] and VosViewer, two freely available domain visualization tools for analysing emerging trends and changes in scientific literature; both these tools ask users to upload the dataset to work on.

Other visual interfaces for bibliographic visualization tools have been proposed recently: among them, JigSaw [12], a visual analytic system which provides multiple coordinated views of connected entities; CitNetExplorer [13], a Java tool which allows visualization of citation networks, offering expansion and reduction operations and clustering of publications. It also requires, in input, a dataset generated by WOS.

In summary: the active projects are few; none of them uses "live" repositories; few tools enable users to save and share their bibliographies; the interfaces are not always usable. We propose a Web application that overcomes these limitations, offering a simple to use visual representation for building up and sharing bibliographies.

III. VISUALBIB

This section firstly presents the graphic layout of VisualBib, and then defines the concept of narrative view.

A. A look to VisualBib

VisualBib is a Web application prototype, freely available at http://sasweb.uniud.it/visualBib/. It enables users to create, share and update narrative views of personal or thematic bibliographies.

Users can start to build up a bibliography by querying one of the two data providers present in the main form (as shown in Figure 1-left), with the aim of finding all the available publications of a single author, given his/her last name (or the ORCID, or the ID) or importing specific papers, identified by their DOI (or Scopus IDs).

Scopus is a commercial service therefore, in order to query it, the user must navigate from a subscriber's domain; this restriction does not apply to OC, being an open access index.

In the example proposed in Figure 1-right, a bibliography is visualized as a narrative view, where key elements are the papers, the years of publication, the paper typology, the authors, and the network of citations; it is displayed in a bi-dimensional space, where one dimension is time, arranged horizontally by years of publication and marked with vertical lines. The second dimension is spatial and is used to arrange the visual elements, which represent authors, papers and their relationships. The scale of both the axes is dynamically re-computed at every change in the bibliography in order to cover, respectively, the entire temporal range and the maximum number of items per column. The narrative view is accompanied by a legend (see Figure 1-right), which also contains two check boxes to show or hide the authorship and the citing dimensions. Three different icons allow the user to immediately distinguish between three typologies of publication: journal papers, books or book chapters, conference or workshop proceedings. Four different colours are used to identify the papers state: completely loaded papers (all the available data and metadata have been loaded) are coloured blue; gray denotes a partially loaded paper retrieved during a citation search (this operation returns only a subset of the papers metadata); red is used to emphasize semantic relationships during user interaction, as described later in this study; and, finally, green marks the papers found during a textual search: in Figure 1-right, seven papers match the search string dattolo.

Clicking on a paper icon, a window (see Figure 2-left) opens to show the bibliographic data; some items link to external Web pages; in our example, the authors, the title and the Scopus ID lead the user to the data provider's related Web pages.

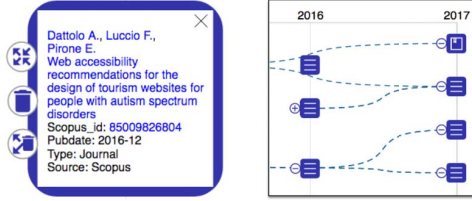A click on the four-arrows icon enables users to query the

Fig. 2. Some metadata (left) - A fragment of the network of citations (right).

data provider in order to get the list of the papers cited by the current paper and of those ones citing it; after choosing the subset of papers of interest from the two lists, they will be added to the narrative view and the citing relationships will become explicit. An example is displayed in Figure 2-right: dashed lines between papers point out the presence of a cited/citing relation. Furthermore VisualBib will insert, in the view, the authors of the new papers and will properly connect up each author with the sequence of his/her papers.

Due to the potentially high number of citations, the system offers the possibility to hide/show the references of a paper through the -/+ icon, situated on the left of the paper icon.

Interaction with VisualBib enables users to highlight in red (mouse-over) a paper and all its authors, or an author and all their papers.

B. Describing a narrative view

Formally, a narrative view for a bibliography is a labelled multigraph, defined by a 5-tuple $N = <P \cup A, position, authors, citations, AuthorPaths \cup CitationEdges>$ where

- $P = \{p_1, \ldots, p_{|P|}\}$ is a finite set of papers;
- $A = \{a_1, \ldots, a_{|A|}\}$ is the finite set of authors associated to the papers in P;
- $position : P \cup A \to X \times Y$, where $X \subset \mathbb{N}, Y \subset \mathbb{R}$ is a function to map papers and authors in the bi-dimensional space of the view: the X axis represents the years of the publications, extended, on the left, with an additional year and identified below by the notation $position_x$, while the Y axis defines the spatial dimension where to collocate papers and authors ($position_y$);
- $authors : P \to \mathcal{P}(A)$ returns the set of authors for a given paper p;
- $citations : P \to \mathcal{P}(P)$ returns the set of papers cited by the paper p;
- $AuthorPaths = \{(a, p_1, \ldots, p_n) \; \forall a \in A : a \in authors(p_i) \; \forall i = 1, \ldots, n\}$ is the set of paths that link every author with all his/her papers. The papers are sorted in ascending order by year of publication. The path is represented by a solid line and its label is a (the name of the author);
- $CitationEdges = \{(q, p) : q, p \in P, q \in citations(p)\}$ is the set of edges which connect each paper p to its cited papers. These edges are represented by a dashed line, while the label of each edge is (q, p).
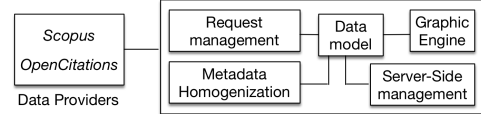

Fig. 3. The architecture of the VisualBib application.

IV. ARCHITECTURE AND IMPLEMENTATION

VisualBib is organized as a single page Web application, based on W3C standard languages, such as HTML5, CSS3 and SVG; it adopts the D3js [14] framework for data and DOM manipulation, and the visual element management; it uses AJAX techniques to perform Cross Origin Resource Sharing (CORS) calls and client-server interactions. VisualBib is compatible with modern browsers; known incompatibilities have been detected with Mozilla Firefox version older than 51, Microsoft Explorer and Safari. Visualbib notifies the user in case of an incompatible browser.

The main modules of the VisualBib architecture are shown in Figure 3.

Data providers

VisualBib retrieves data from two repositories:

- Scopus - scopus.com - indexes more than 70 million entries of bibliographic data and is accessible programmatically via dedicated Application Programming Interface (API), which offers 11 different query types [15]. The platform manages both simple requests based on API key and pre-flighted requests which generate a secure auth-token for the subsequent main request.
- OpenCitations (OC) - opencitations.net - is the expansion of the Open Citations Corpus (OCC), an open repository of scholarly citation data made available under a Creative Commons public domain. OC aggregates different open access data sources; it indexes about 7 million bibliographic resources. We harvest the repository in real-time using specific SPARQL queries through the API service made available by the platform [16].

Internal data model

For each bibliography, VisualBib manages an internal representation of significant metadata:

- for papers: authors (with links), title (with link), publication year, abstract, subject areas, Scopus or OC IDs (with links), DOI (as link), ISSN, references list. The links connect the metadata to the corresponding resource on the used repository (Scopus or OC);
- for authors: first, middle and last name (with link), preferred name, affiliation, ORCID, Scopus or OC ID, and the list of their papers loaded into the narrative view.

A suitable data structure [17], [18], represented by two multiple lists, contains cross-references, in order to replicate the many-to-many relations given by citations and authorships. The consistency of the structure is preserved during deletions of single or groups of papers, the loadings of new authors papers and cited/citing references.

Requests management and metadata homogenization

The data retrieval procedures from the two repositories differ substantially: although the availability of a common format for the data interchange (JSON), the typologies and the numbers of queries needed to get the same piece of information differ substantially and require specific management.

The *request management module* prepares the correct sequence of queries and manages the responses and the error conditions. The *metadata homogenization module* handles the data received from each repository, and carries out the necessary format conversions to make the data compatible with the internal data model; it performs the match of the incoming data in order to map new papers and authors to those already present in the internal data model; builds and shows suitable forms to let the users choose the set of papers and citations to import into the current bibliography; merges the new items into the internal data model and create new data connections according to the detected authorship and citing relations.

The AJAX requests are triggered by the following user actions: (a) search of an author given his/her last name; (b) search of an author given his/her ORCID, Scopus ID or a specific url of the OC ontology; (c) search of a paper given its DOI or Scopus ID.

Graphic engine

The *graphic engine* maps the data model into visual SVG DOM elements, generating narrative views, shown and described in Section I. Each paper generates a composite SVG element that is depicted as a coloured round-cornered square enriched with a specific icon that symbolizes the document type; each author is rendered as a single SVG text element, regardless of the number of his/her publications visible in the narrative view. The positioning of the items in a narrative view is critical for a proper interpretation of the information in the diagram. We identify 4 constraints to be respected:

1) no overlapping of the papers published in the same year: fixed a threshold d_{min} for the minimum distance between the papers having in common the publication year should be:

$$|position_y(p_i) - position_y(p_j)| \geq d_{min},$$

$\forall p_i, p_j$, where $p_i \neq p_j$, and $position_x(p_i) = position_x(p_j)$;

2) a balanced distribution of the papers along the vertical dimension: we first identify a central common axis in order to vertically position all papers around it. With this aim, we (a) find t_{max}, the year with the maximum number of publications: let $P_t = \{p \in P : position_x(p) = t \in T\}$ where $T = \{position_x(p) : p \in P\}$. Then

$$t_{max} : |P_{tmax}| = max|P_t|, \forall t \in T.$$

(b) define the extent of the vertical space, proportionally to the number of publications and the chosen d_{min}, as the open interval:

$$(0, |P_{tmax}| \cdot d_{min})$$

(c) position the central horizontal axis: chose as unity scale of the y axis $d_{min} = 1$; so, the central axis has the equation:

$$y = \frac{|P_{tmax}|}{2}$$

(d) position the papers along the vertical dimension: $\forall t \in T$, and $\forall p_i \in P_t$

$$position_y(p_i) = \frac{|P_{tmax}| - |P_t| - 1}{2} + i$$

where $i = 1, \ldots, |P_t|$.

The order of the papers determined by the index i is not significant, any of the $|P_t|!$ permutations of papers of any set P_t is adoptable. In this context, an interesting and open point would be to find a set of permutations of each P_t which minimizes the number of crossings of the authors and citing/cited links that join the papers. The cardinality of the solution space for this problem is $\prod_{t \in T} |P_t|!$

3) the correct positioning of the authors labels: for each authorPath $(a, p_1, \ldots, p_n) \in AuthorPaths$, we position the author's label in

$$position_x(a) = position_x(p_1) - 1$$

It is possible to see as, in the example of Figure 1-right, the authors' labels of the paper of the 2013 are positioned in 2012 column.

4) a regular space distribution between papers and authors labels in every year: in order to define the vertical coordinate of each author's label, avoiding collisions with other papers and labels, we decided to shift eventual paper icons and labels in collision towards the bottom. The constraint *1)* is also ensured between labels, but scaled by a constant 0.4, that takes into account the proportion between the height of the paper icons and the font used for the labels. For this reason, the minimum distance between papers is d_{min}, while the minimum distance between papers and labels, or labels and labels, is $0.4 \cdot d_{min}$.

Each *authorship relation* between two consecutive papers is rendered with a SVG path element which describes a *smooth cubic Bezier curve* between the two papers SVG icons. The path, as shown in Figure 1-right, is rendered in the colour goldenrod and, in order to reduce the complexity of the representation, any multiple relationships (same authors for subsequent papers) generates overlapped paths.

Each *citing relationship* between two papers generates a SVG edge, described, as shown in Figure 2-right, by a dashed cubic Bezier curve coloured in light-blue and linking the two papers SVG elements.

The Figure 2-left represents an enlarged version of the papers SVG composite elements, and contain textual metadata of the papers and the links to the external resources (specific Webpages of the paper and the authors on the source repository, and DOI link). These details are generated on demand.

Finally, the mouse over the papers' icon, or over the author's labels, triggers the graphic engine to highlight in red the appropriate SVG items in order to point out authors and citing relationships.

A. Server side management

With the aim to save and share the bibliographies created by users, VisualBib includes a minimal user profile management, using a server side module equipped with a MySql database server and a Php interpreter. Each bibliography is internally represented in JSON format; every time a new bibliography is saved (clicking on Save on cloud button in Figure 1-right),

the user is asked to specify an email address; the system generates a couple of unique urls for future access and/or for sharing it with other users, in both read-write and read-only modalities. The users may request to receive a list of their saved bibliographies by email, clicking on the List my bibliographies button in Figure 1-right. VisualBib also has a simpler mechanism (activatable by clicking on Save on localstorage button in Figure 1-right) to save a bibliography on client-side of the application, namely in the local storage of the browser: it is a permanent (but erasable) space for quick saving of non shareable data.

V. EVALUATION

In order to evaluate the impact of our visual approach, we have carried out a comparative study between VisualBib and Scopus. It is important to clarify that the activities performed by the participants involved a subset of the functionalities of the two platforms; for this reason, the evaluation referred only to the considered aspects.

The participants were recruited on a voluntary basis among undergraduate students, researchers and professors of University of Udine and other universities: in total they were 67 (37 F, 30 M): 31 of them (21 F, 10 M) evaluated the Scopus platform and the remaining 36 (16 F, 20 M) our application VisualBib.

We prepared two short presentations (about 15 slides each) and a live presentation to illustrate both platforms; before completing the survey, we asked the participants to perform 12 activities (the same for both the applications), consisting of specific bibliographic searches in order to guide them in interacting with the platform under test. In particular, we intended to evaluate:

- SUS_{-01}: the perceived usability level of the application using a simplified version of the well-known SUS (System Usability Scale) questionnaire [19], leaving out the first question and using the other 9 propositions. The results of SUS_{01} underlined the intuitiveness of the simpler interface of VisualBib and are briefly presented below. Readers interested in deepening the results of this phase of the evaluation will find them in [20].
- *7 features*: the value attributed by the users to seven general features of a platform for the bibliographic search and representations and the perceived presence of each feature in Scopus and VisualBib - propositions F1-F7;
- *other usability aspects*: the feelings about specific interaction features of the two applications (propositions I1-I4) and about the aesthetic and the innovative aspects of the graphical layout (proposition G1-G2).

SUS_{-01}: The distribution of SUS_{-01} is summarized, for the two samples, in Table I.

In order to compare the results we applied a hypothesis test for the difference between the means μ_s and μ_v (the Scopus and VisualBib SUS_{-01} means), fixing the null hypothesis $H_0 : \mu_s \geq \mu_v$. We have previously verified the normal distribution of the two samples using the Shapiro-Wilk normality test [21] obtaining the W test statistics $W_s \simeq 0.96$

TABLE I
THE DISTRIBUTIONS PARAMETERS OF THE TWO SAMPLES.

Platforms/Metrics	SCOPUS	VISUALBIB
Sample size	31	36
Min	31.00	36.00
1st Qu.	43.00	53.00
Median	53.00	72.00
Mean	52.39	68.53
Std. dev.	12.76	17.20
3rd Qu.	58.00	78.00
Max	86.00	100.00

and $W_v \simeq 0.95$, respectively, that are within the 99% critical value accepted range of the normal distribution hypothesis. The calculated standardized difference between the two sample means is $t \simeq 4.3$ corresponding to a p-value$\simeq 3 \cdot 10^{-5}$ which is less than the chosen significance level $\alpha = 0.01$ leading us to reject H_0 in favour of the alternative hypothesis $H_1 : \mu_s < \mu_v$. Regarding the absolute values of SUS_{-01} means, their relatively low values probably reflect the difficulty of a part of the participants in dealing with bibliographic search tasks.

7 features: The next section of the questionnaire investigates the *value* attributed by the users to the following general features and evaluates the perceived *level* of each features presence in the two platforms.

- F1   the presence of visual representation of information;
- F2   the availability of a holistic view of information;
- F3   the capability to build personalized bibliographies;
- F4   the capability of progressive integration of the bibliography;
- F5   the capability to share the bibliographies;
- F6   the capability to integrate papers of multiple authors;
- F7   the presence of multiple source for data retrieving.

In this case the 5 level descriptors for the responses were: not present at all, scarcely present, present, very present, predominant.

Figure 4 summarizes the given answers with regard to the level of importance and of presence attributed by the users to the 7 identified features. The boxes represent the interval between 1st and 3rd quartiles, while the black line is the median of the distribution.

Other usability aspects: Finally, we asked to the users to evaluate other usability aspects, listed below, using the same 5-Likert values used for the previous SUS-01 in their answer. Negative tone:

- I1   There is a lack of important features.
- I3   I felt confused using the application.

Positive tone:

- I2   I easily found the functions I needed.
- I4   I easily understood the functions.
- G1   The application proposes innovative elements.
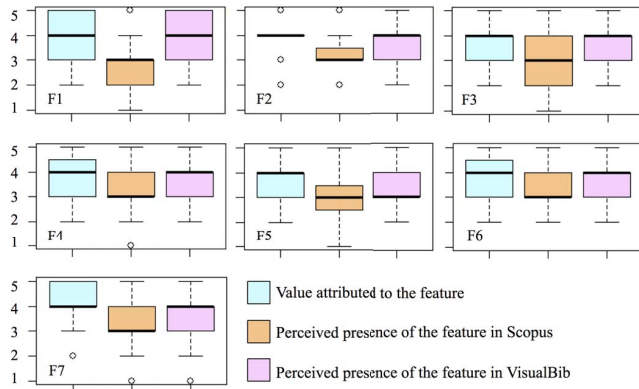- G2   I appreciate the interface and the graphic layout.

Fig. 4. The attributed values and the perceived presence.

The results are summarized in Table II: they are largely positive for VisualBib, except for I1, which encourages us to add new features to the application.

TABLE II
COMPARATIVE DISTRIBUTIONS OF ANSWERS:

Functionalities Negative questions	SCOPUS 🙂	SCOPUS 😐	SCOPUS 🔴	VISUALBIB 🙂	VISUALBIB 😐	VISUALBIB 🔴
I1	68%	23%	20%	61%	33%	6%
I3	39%	26%	35%	53%	36%	11%

Functionalities Positive questions	SCOPUS 🔴	SCOPUS 😐	SCOPUS 🙂	VISUALBIB 🔴	VISUALBIB 😐	VISUALBIB 🙂
I2	29%	45%	26%	11%	42%	47%
I4	29%	52%	19%	14%	28%	58%

General	SCOPUS	SCOPUS	SCOPUS	VISUALBIB	VISUALBIB	VISUALBIB
G1	26%	39%	35%	8%	19%	72%
G2	39%	42%	19%	14%	28%	58%

VI. CONCLUSIONS AND FUTURE WORK

In this paper, we proposed VisualBib, a Web application which offers some original features to support the researchers in creating, saving and sharing their bibliography, starting from a set of papers and authors. The user evaluation carried out and presented in this work and in [20] highlights the positive impact of the our visual model and the usability of the narrative views. We are already working on new features and improvements of VisualBib: we are implementing the import and export of papers using the Bibtex format; we planned to expand the list of the repositories to query; to experiment with new forms of visual representation in order to improve the fruition of bibliographic information also for wider bibliographies; to enable users to add publications not found in current data providers.

ACKNOWLEDGEMENTS

REFERENCES

[1] P. Federico, F. Heimerl, S. Koch, and S. Miksch, "A survey on visual approaches for analyzing scientific literature and patents," *IEEE Transactions on Visualization and Computer Graphics*, vol. 23, no. 9, pp. 2179–2198, Sept 2017.

[2] K. Kucher and A. Kerren, "Text visualization techniques: Taxonomy, visual survey, and community insights," in *2015 IEEE Pacific Visualization Symposium (PacificVis)*, April 2015, pp. 117–121.

[3] "Infovis 2004 contest: dataset and tasks." 2004, http://www.cs.umd.edu/hcil/iv04contest/info.html.

[4] Z. Shen, M. Ogawa, S. T. Teoh, and K.-L. Ma, "Biblioviz: A system for visualizing bibliography information," in *Proceedings of the 2006 Asia-Pacific Symposium on Information Visualisation - Volume 60*, ser. APVis '06. Darlinghurst, Australia, Australia: Australian Computer Society, Inc., 2006, pp. 93–102.

[5] B. Lee, M. Czerwinski, G. Robertson, and B. B. Bederson, "Understanding research trends in conferences using paperlens," in *CHI '05 Extended Abstracts on Human Factors in Computing Systems*, ser. CHI EA '05. New York, NY, USA: ACM, 2005, pp. 1969–1972.

[6] N. Elmqvist and P. Tsigas, "Citewiz: A tool for the visualization of scientific citation networks," *Information Visualization*, vol. 6, no. 3, p. 215232, 2007.

[7] P. Bergstrm and D. C. Atkinson, "Augmenting the exploration of digital libraries with web-based visualizations," in *2009 Fourth International Conference on Digital Information Management*, Nov 2009, pp. 1–7.

[8] G. Costagliola and V. Fuccella, "Cybis: A novel interface for searching scientific documents," in *Proceedings of the 15th International Conference on Information Visualisation (IV)*, pp. 276–281.

[9] J. Matejka, T. Grossman, and G. Fitzmaurice, "Citeology: Visualizing paper genealogy," in *CHI '12 Extended Abstracts on Human Factors in Computing Systems*, ser. CHI EA '12. New York, NY, USA: ACM, 2012, pp. 181–190.

[10] M. Dörk, N. H. Riche, G. Ramos, and S. Dumais, "Pivotpaths: Strolling through faceted information spaces," *IEEE Transactions on Visualization and Computer Graphics*, vol. 18, no. 12, pp. 2709–2718, 2012.

[11] C. Chen, F. IbekweSanJuan, and J. Hou, "The structure and dynamics of co-citation clusters: A multiple-perspective co-citation analysis," *Journal of the American Society for Information Science and Technology*, vol. 61, no. 7, pp. 1386–1409, 2010.

[12] C. Grg, Z. Liu, J. Kihm, J. Choo, H. Park, and J. Stasko, "Combining computational analyses and interactive visualization for document exploration and sensemaking in jigsaw," *IEEE Transactions on Visualization and Computer Graphics*, vol. 19, no. 10, pp. 1646–1663, Oct 2013.

[13] N. J. van Eck and L. Waltman, "Citnetexplorer: A new software tool for analyzing and visualizing citation networks," *Journal of Informetrics*, vol. 8, no. 4, pp. 802 – 823, 2014.

[14] "D3: Data driven documents." https://d3js.org/,.

[15] "Elsevier dev. - api specication." https://dev.elsevier.com/api_docs.html.

[16] "Occ sparql endpoint gui." http://opencitations.net/sparql.

[17] A. Dattolo and F. L. Luccio, "A state of art survey on zz-structures," in *Proceedings of the 1st Workshop on New Forms of Xanalogical Storage and FunctionCEUR*, no. 508, Turin, Italy, June 29 2009, pp. 1–6.

[18] ——, "A formal description of zz-structures," in *Proceedings of the 1st Workshop on New Forms of Xanalogical Storage and Function, CEUR*, no. 508, Turin, Italy, June 29 2009, pp. 7–11.

[19] J. Brooke, "Sus: a retrospective," *Journal of usability studies*, vol. 8, no. 2, pp. 29–40, 2013.

[20] M. Corbatto and A. Dattolo, "A web application for creating and sharing visual bibliographies," in *Semantics, Analytics, Visualization Proceedings of SAVE-SD 2017 and SAVE-SD 2018, Lecture Notes in Computer Science*, 2018, Springer.

[21] S. S. Shapiro and M. B. Wilk, "An analysis of variance test for normality," *Biometrika*, vol. 52, no. 3/4, pp. 591–611, 1965.