Citation index of scientific issues

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Abstract**:** A Web-based citation index of author's citations in scientific issues (journals, books, conference proceedings etc) is developed. The index includes database, administrator and user interface. The administrator interface supports functions related to introduction, updating and preservation of groups of author's and issue's data. The user interface provides possibility of entering data about own issues as well as receiving reports by keywords, authors and quoted authors. The system is implemented with scientific issues of the researchers from the University of Forestry, Sofia, Bulgaria.

Keywords: citation index, author, scientific issue, bibliometry.

1. INTRODUCTION

There are different scientometric identifiers and citation measures evaluating scientific issues. They are studied and analyzed by scientometry and particularly – by bibliometry. The citation number (citability), journal impact factor (the average number of citations received per article published in the journal), cited half-life (the number of years covered by the most recent half of a journal's citations) and others are the most utilized of them. These citation measures are often used by research librarians in making or recommending journal purchasing or cancellation decisions [1]. Scholars are often evaluated by the prestige of the journals in which they publish; both the citation rankings themselves and the availability of journals on library shelves are contributing elements in establishing journal prestige.

The citation is important aspect of author rights and author's contributions. The international scientific community gives great significance of the citability. By reason of that, special issues and information systems (called citation indexes) are published and supported.

A citation index [3] is kind of information system which database comprises publications in periodics (and eventually books, dissertations, research reports, dictionaries, thesauri etc), citing others publications. It gives the possibility for multiple bibliometric references: number of citations per author and per article, number of articles per author, thematic references and other statistics.

2. CITATION INDEXES SURVEY

The development of citation indexes starts since 1950 in the Institute for Scientific Information (ISI), Philadelphia [4] (now part of Thomson Corporation), where have been created and published the three of the biggest indexes - Science Citation Index (SCI), Social Sciences Citation Index (SSCI), and Arts & Humanities Citation Index (AHCI). These indexes are available by Web of Science. They include the citations from the most authoritative international journals only. It does not contain citations from books, manuals, monographies and tutorials.

In the other hand, the Journal Citation Reports annually ranks journals based on such measures as journal impact factor, cited half-life and others. In volumes Source of this journal there are full citation data – names of quoted authors, article titles, time and place of publishing. The journal CDs are distributed and utilized by payment.

Other newer citation indexes are Google Scholar and Elsevier's Scopus. Since 2005 starts multidisciplinary online index CiteSeer [5], joint product of NEC and Thomson Corporation.

There are numerous specialized thematic indexes in different scientific and practical areas, for example:

- Energy Citations Database – in energy technologies.
- Citation index in the area of e-commerce of Lee Giles (http://www.ebizsearch.org) from eBusiness Research Center of the University of Pennsilvania. It uses CiteSeer technology and citation databases have their value in modifying the publication behavior of scholars. Once initiated, a semi-universal citation database would have the same effect as a fully universal database in assuring scholars that their works - and the citation credits their works receive - are visible independent of the publication venue chosen.
- AGRICOLA, CABDirect, Canadian Forest Management Database, FS Database, Applied Science & Technology Abstracts, Bibliography on Cold Regions Science and Technology, Biological & Agricultural Index, Forestry On-line Bibliographies of University of Minnesota etc – in area of agriculture and forestry (http://www.library.ualberta.ca/subject/ forestry/index.cfm).

Unfortunately, the available indexes (principally the Science Citation Index and the Social Sciences and Humanities Citation Index) tend to be quite limited in their coverage, indexing only selected sets of academic journals [7]. The journal selection also tends to change slowly over time, often failing to keep place with the development of new journals. Furthermore, the delays of archival journal publication and post-publication indexing mean that, in some cases, papers may only be found in an index several years after they have been written. As the pace of change in scholarly communication continues to increase, citation searching using the existing indexes tends to become less and less useful.

In the other hand, a project about a universal bibliographic and citation database exists [5] linking every scholarly work ever written - no matter how published - to every work that it cites and every work that cites it. The intention is this citation database to be freely available over the Internet and to be updated every day with all the new works published that day, including papers in traditional and electronic journals, conference papers, theses, technical reports, working papers, and preprints. Such a database would fundamentally change how scholars locate and keep current with the works of others. In turn, this would also affect how scholars publish their own works, in light of the increased visibility of research regardless of publication venue and the increased potential to demonstrate the value of works through citation analysis [6].

The survey of bibliographic sources points the lack of Bulgarian citation indexes and in the current time – the lack of international impact factors (excluding 2) of Bulgarian scientific issues [9]. The availability of citation indexes is important not only for Bulgarian but also for foreign scientists who publish in Bulgarian issues.

2. METHOD FOR BUILDING OF CITATION INDEX

Generally, such a method must to give the variability of publication types and the necessity of maximal unification of the publication and citation data as well as the means and tools for the index design and development. Because of that the first steps of the method are:

- studying and selection of the range and type the scientific publication data for the citation index;
- selection of metadata standard for the publication data description of publications.

The next steps include database and user interface design and development in considerations with contemporary requirements about fast, reliable and easy multiuser access and data support, namely:

- selection of network and relational database management system (RDBMS) resources for realization of citation database and user interface;
- design and realization of the citation database structure;
- design and development of software applications about user interface – bibliometric references and statistics;
- design and development of administrator services – data introduction and updating, software and standards support etc.

3. CITATION INDEX DESIGN AND DEVELOPMENT

3.1. Data range and type

Concerning the above a specialized citation index of the University of Forestry, Sofia, is developed containing data about journal and conference papers, dissertation theses, technical and research reports, books, dictionaries, working papers, and preprints published by the university publishing house after a given point in time. The initiation data of the publications is 1985.

3.2. Metadata standard

The selected metadata standard is part of the Dublin Core (DC) metadata standard which is a simple but effective element set for describing a wide range of (possibly networked) resources. The DC standard comprises fifteen elements, the semantics of which have been established through consensus by an international, cross-disciplinary group of professionals from librarianship, computer science, text encoding, and other related fields of scholarship [8]. Each of the 15 high-level elements of the DC is optional and may be repeated. Each element also has a limited set of qualifiers, attributes that may be used to further refine (but not extend) the meaning of the element.

Description of the publication data includes the following eight elements:

- *title* – title of publication (article, journal or conference paper, book etc.);
- *creator* (or author with qualifiers creator.name, creator.affiliation and creator.email),
- *subject* (with qualifiers subject.term and subject.scheme denoting keyword(s) or domain describing the subject of a publication);
- *publisher* (with qualifiers publisher.name, publisher.town, publisher.city, publisher.country);
- *event* (with qualifiers event.date) containing temporal information relating to creation and management of the publication;
- *identifier* (with qualifier identifier.scheme, for example ISBN, ISSN, and identifier.value – for the type of resource);

- *language* (with qualifiers language.scheme, for example, concerning with ISO639 - the international standard for naming human languages);
- *copyright* – information relating to dissemination and reuse of the resource.

3.3. Network and RDBMS resources

The resources for realization of the citation index depend of the data type, quantity and attribute size. In relatively small specialized indexes (no more of 100 000 records) MS Access + ASP or MySQL + PHP technologies are convenient.

3.4. Citation database structure

The database just contains the citation links involving requests about bibliometric references and statistics.

On Fig. 1 the structure of citation database is showed.

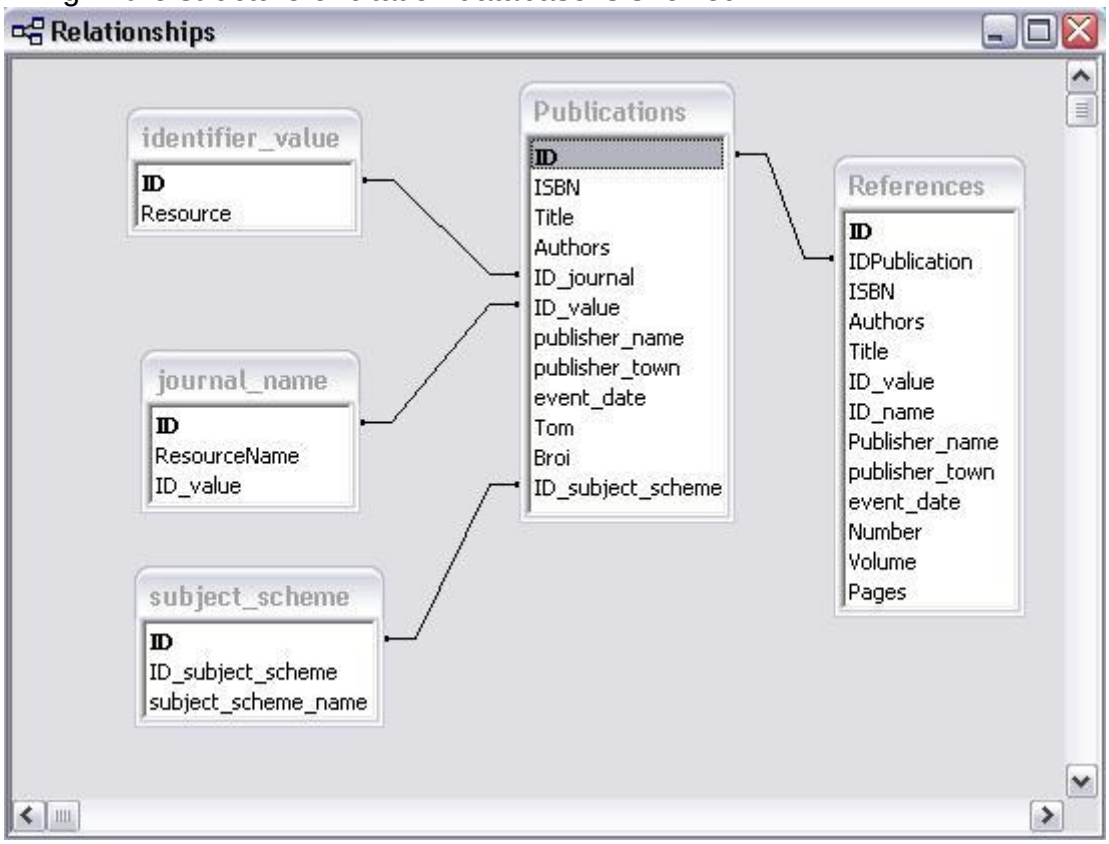

Fig. 1: Citation database structure and relationships

The table *Publications* contains data about author's publications. The table *References* includes bibliographies of the publications. The classifiers *Identifier_value*, *Journal_name* and *Subject_scheme* contain data of the issue types, issue names and scientific branches, respectively.

3.5. User interface

The user has unlimited web-based access to the citation index by the following page (Fig. 2). The page proposes two possible references designed for an author: a list of his publications and a list of the citations of his publications. Example of the reference on Fig. 3 is shown:

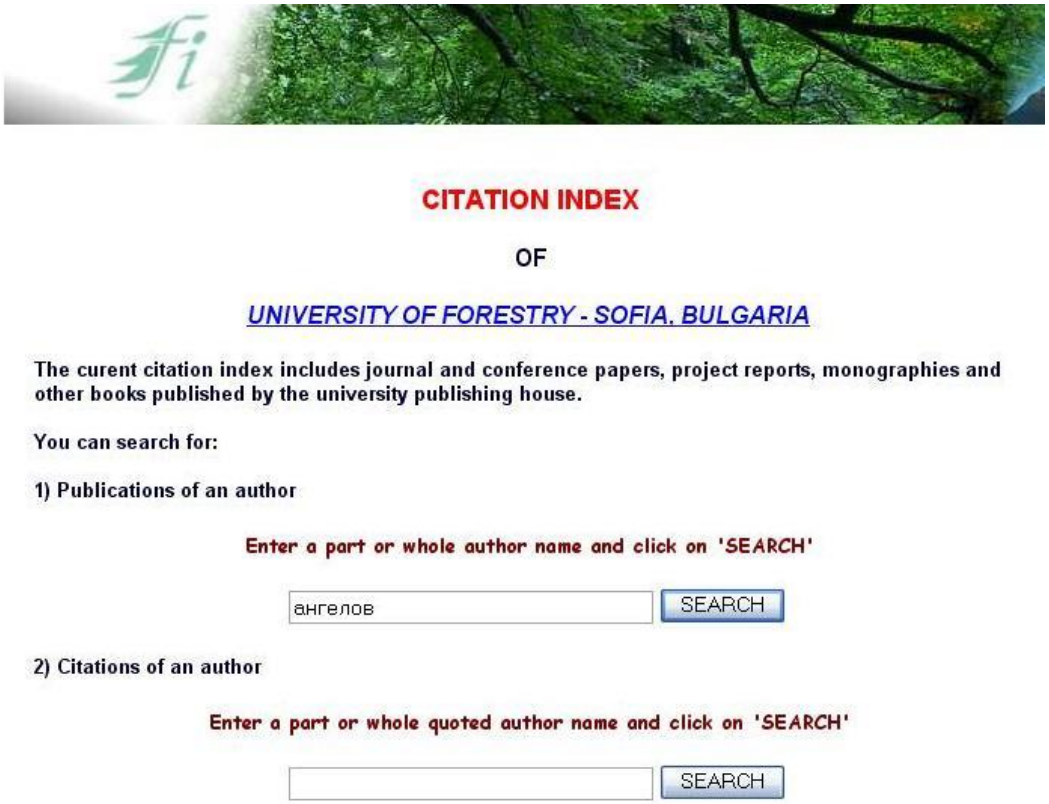

Fig. 2: User interface of the citation index

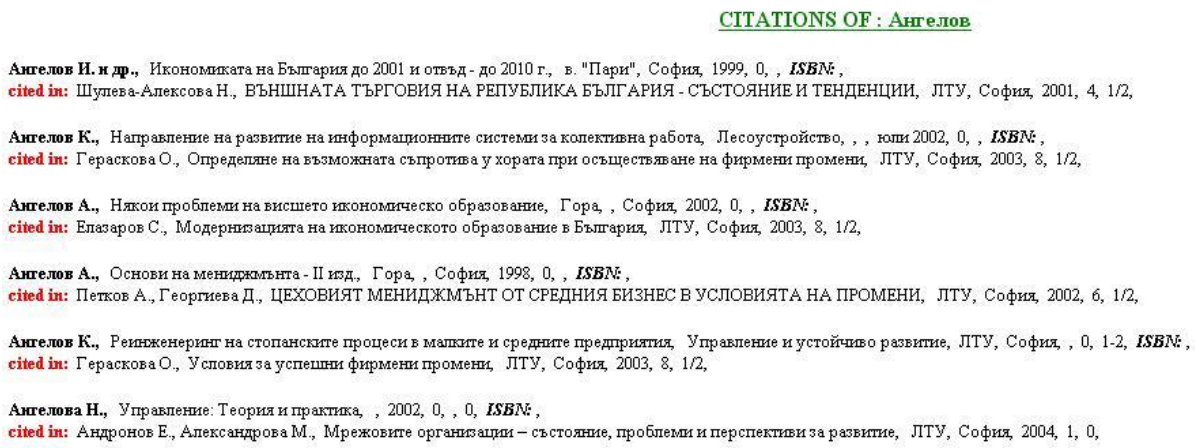

Figure 3: List of citations

3.6. Administrator interface

The administrator maintains the citation index in local mode. The interface for introduction and actualization of the publication and citation data is shown on Fig. 4.

4. EXPERIMENTAL RESULTS

Now the experimental version of the index is published on web site http://forestinformatics.org/projects/CitationIndexHome.html. It comprises about 500 records.

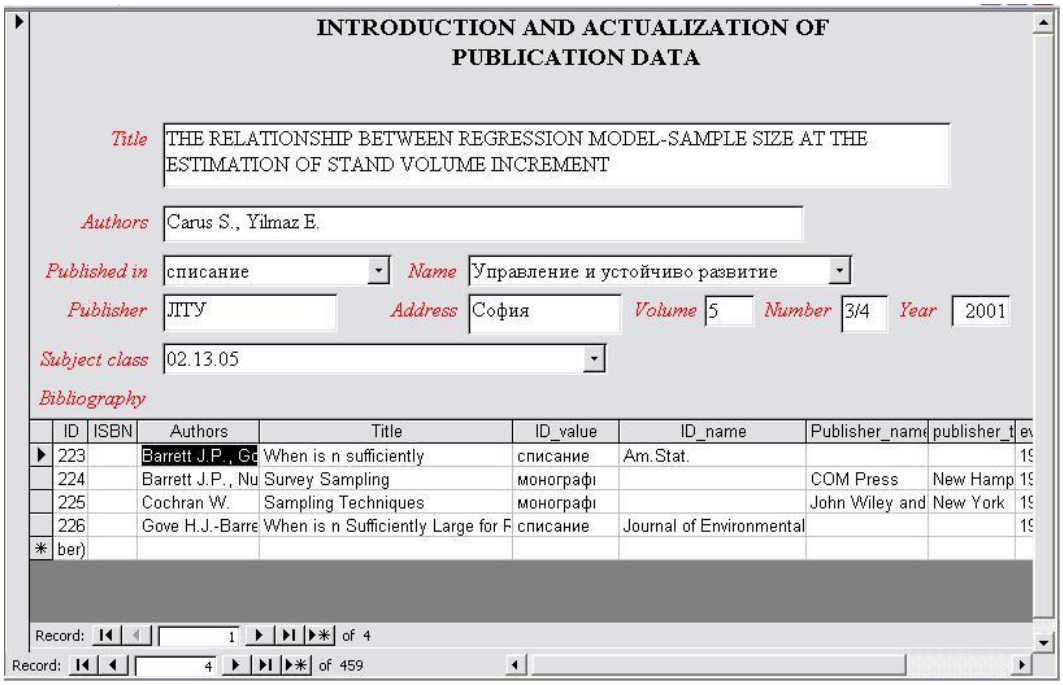

Fig. 4: Administrator interface

5. CONCLUSIONS AND FUTURE WORK

The current citation index offers free and convenient manner of user references. The author has intentions to supplement the citation index with full data about above publications and to realize association with the universal bibliographic and citation database [5].

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