

Journal Evaluation Using the Importance of Authors in Co-authorship Network

Xuefeng Wu, Wei Lu
Center for Studies of Information Resources,
School of Information Management,
Wuhan University
{wuxuefengcnu, reedwhu}@gmail.com

Jiepu Jiang
Library and Information Science Department,
School of Information Sciences,
University of Pittsburgh
jjj29@pitt.edu

ABSTRACT

In this poster, we propose to evaluate journal influence based on journal authors' importance in co-authorship network. Preliminary results of evaluating Chinese LIS journals are presented.

Categories and Subject Descriptors

H.1.2 [MODELS AND PRINCIPLES]: User/Machine Systems
-Human information processing.

General Terms

Measurement, Experimentation

Keywords

Journal evaluation, pagerank, co-authorship network

1. INTRODUCTION

We put forward a new perspective to journal evaluation based on journal authors' importance in co-authorship network. Our method is based on the assumption that Matthew Effect [1] exists between journals and authors during the academic publishing process: famous scholars tend to publish their papers in influential journals and thus the influences of these journals would be improved; and vice versa, the influence of an author will be enhanced because the author publishes in influential journals.

We assume that the more important authors in the co-authorship network have greater influences and also papers written by such authors are more likely to be high-caliber. Further, journal influence can be evaluated based on journal authors' influences in co-authorship network.

2. EXPERIENMENT

We collected data of each paper published in 37 Chinese journals in the field of Library and Information Science during 1999 to 2008 from CNKI (Chinese National Knowledge Infrastructure) available at <http://www.cnki.com.cn/>.

We suppose the influence of authors can be reflected by the

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

iConference 2011, February 8-11, 2011, Seattle, WA, USA
Copyright © 2011 ACM 978-1-4503-0121-3/11/02...\$10.00

importance of individuals in co-authorship network, and we constructed a weighted directed co-authorship network in which every edge representing co-authorship is presented by two symmetrical directed edges [2].

Let the set of n authors be denoted as $V = \{v_1, v_2, \dots, v_n\}$. Let the set of m articles be denoted as $A = \{a_1, a_2, \dots, a_m\}$, and $f(a_k)$ be the number of authors of article a_k . $g_{i,j,k}$ represents the degree to which author v_i and v_j have an exclusive co-authorship relation for a particular article. $C_{i,j}$ consists of the sum of all $g_{i,j,k}$ values for all articles co-authored by v_i and v_j . $W_{i,j}$ is the proportion of co-authorship shared by v_i and v_j to total relationships owned by v_i .

$$g_{i,j,k} = 1/(f(a_k) - 1)$$

$$C_{i,j} = \sum_{k=1}^m g_{i,j,k}$$

$$W_{i,j} = C_{i,j} / \sum_{k=1}^n C_{i,k}$$

Then we used AuthorRank, a modification of PageRank [3], to calculate the importance of each author.

$$AuthorRank(i) = (1 - q) + q \sum_{j=0}^n AuthorRank(j) \times W_{j,i}$$

Where $AuthorRank(i)$ represents the value of the importance of author i ; q is a fixed parameter chosen in advance and $0 < q < 1$, and author i writes a paper by himself with probability $1 - q$ and co-authors with author j with probability q ; $W_{j,i}$ represents the strength of co-authorship from author j to author i .

In the section of journal evaluation, we assigned each author weight according to one's influence and applied the weight to calculate the score each journal gained as follows:

$$JournalRank(i) = \frac{\sum_{j=0}^m AuthorWeight(j)}{AuthorSize(j)}$$

Where $AuthorWeight(j)$ is a relative value of $AuthorRank(j)$ to the maximum value; $JournalRank(i)$ is the score of journal i and $AuthorSize(i)$ is the number of authors that publish in journal i .

As the number of authors in each article is variable and the publish volumn is different for different journals, we divide the score by AuthorSize to put journals on a comparable level.

The result of our experiment is seen in Table 1 and we only list the top 20 of our result as the space is limited. (Journals are ordered by the value of JournalRank(i))

Table 1. Result of journal rank

Journal Rank	JournalRank(i)	Impact Factor
Journal of Library Science In China	0.234145481	1.2353452
Journal of The China Society For Scientific and Technical Information	0.210146877	0.94119513
Information Studies: Theory & Application	0.19494001	0.5422002
Information Science	0.176316697	0.36403215
Library and Information Service	0.175937216	0.5422002
Document; Information & Knowledge	0.172294114	0.5950935
New Technology of Library and Information Service	0.166382511	0.56562805
Journal of Academic Libraries	0.164908524	0.80757284
Information and Documentation Services	0.160337052	0.42511863
Library and Information	0.151656488	0.3456527
Journal of Information	0.143348977	0.26927903
Library Journal	0.137379075	0.32298446
Chinese Journal of Medical Library and Information Science	0.136581134	0.034874797
Library	0.136279097	0.4529836
Library Theory and Practice	0.134805922	0.2607338
Library Development	0.129155815	0.31680006
Journal of The National Library of China	0.128874426	0.29513285
Researches In Library Science	0.124909977	0.18594918
Library Work in Colleges and Universities	0.124832721	0.13161814
Modern Information	0.122032234	0.10703485

We compared the result with the average journal rank measured by two-phase 5-year Impact Factor (the time span is 1999-2003 and 2004-2008), using CSSCI (Chinese Social Sciences Citation Index) available at <http://202.119.47.137/infobin/select.dll>. The reslut of p@20 is 0.9 and the Kendall rank correlation is 0.6877 and it proved that the effect of our work can be well applied to identify journals in the core area, but the rank is not perfect.

Our research has identified that we did the research from a new viewpoint, that is, a journals impact can be determined by the influence of the authors that publish in them to some extent.

Future work for the research is as follows: (1) To further investigate on the relationship between authors and journals. (2) To explore the applicability of our idea to evaluate journals in other languages.

3. REFERENCES

- [1] Robert K. Merton 1968. *The Matthew Effect in Science: The reward and communication systems of science are considered*. Science, 159(3810).
- [2] X. M. Liu, J. Bollen etc ..2005. *Co-authorship networks in the digital library research community*. Information Processing and Management, 41, 1462-1480.
- [3] Page L, Brin S, Motwani R, Winograd T. 1999. *The PageRank citation ranking: Bringing order to the web*. Technical Report, Stanford Digital Library Technologies Project.