Co-word를 이용한 알트메트리얼 필리트의 지적 구조 연구

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Intellectual Structure of the Altmetrics field： A Co-Word Analysis

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ABSTRACT

In recent years, “altmetrics”, given birth by social media and the academic community, have become a metric source for measuring the academic impact of scientific literature. This study has undertaken a co-word analysis of author keywords in "Altmetrics" articles from the WebofScience database from 2012 to 2017 and used a co-occurrence matrix to create a clustering of the words. "Altmetrics" co-occurrence network map was derived and the research hotspots was analyzed.

Keywords

co-word analysis, altmetrics, co-occurrence matrix

Ⅰ. Introduction

With the advent of the Web 2.0 and the Big Data, online forums, blogs, Twitter, Facebook and other social media services have developed rapidly. Researchers begin to conduct their work flow on social media tools. “Altmetrics” are based on these activities and interactions on social media relating to research output. In 2010, Priem first proposed “altmetrics” in “Altmetrics: A Manifesto” as a new source of metrics for measuring scholarly impact. Impact metrics among traditional bibliometrics generally calculate a certain number of publications, citations and peer reviews to assess researchers, journals or institutions. As more and more publications and other research output are used online, “use metrics” and webometrics have come into being. In particular, in recent years, research findings have appeared in various forms, including not just books, papers and reports, but also blogs, videos, datasets and software codes, etc. They are being discussed and spread on social media and altmetrics are used to record their related activities and interaction on social media.

This study examined altmetrics related research areas and trends through co-word analysis. Also, the intellectual structure of the altmetrics was examined as forming a cluster through clustering techniques and multidimensional scaling and schematizing correlations. It is anticipated that this work will be helpful in setting the research direction and subjects by researchers in this field as well as developing various supporting policies for vitalization of the institutional repository in the future.

Ⅱ. Research method

Co-word analysis is generally a method of extracting words from the articles of

corresponding subject fields, calculating the co-occurrence frequency of each word pair and obtaining correlations between words, for example, using various indexes and mapping subdomains. That is, if two keywords simultaneously appear in the same paper, the two subjects mentioned in the paper are correlated with each other. When measuring the intensity of correlation between the words, the research patterns and trends of corresponding fields can be examined. Thus, if using this analysis method, the strucure of the particular subject field can be analysed without a data classification system.

Generally, the correlation between words is obtained using various indices after extracting words from the literature in corresponding subject fields and calculating the co-occurrence frequency of each word pair. Next the subdomain can be understood as mapping the correlation on the multidimensional scaling (MDS). Although when directly performing multidimensional scaling without clustering, the group of words is also formed, a more easily under- standable domain map can be formed if expressing clusters on the map as clustering words.

III. Analysis result

In this paper, we retrieved the keywords "altmetrics+altmetric" in the WebofScience database, limiting the year from 2012 to 2017. The 192 references was download. The result of the co-occurrence matrix calculated through SATI3.2 and Pearson's correlation analysis was performed for measuring similarity as table 1 shown.

Table.1 Part of the similarity matrix using correlation coefficients

	altmetrics	social media	Bibliometrics	Twitter	impact factor	Scientometrics
altmetrics	1	0.1446	0.1204	0.1465	0.0703	0.0606
social media	0.1446	1	0.0554	0.1538	0.0513	0.014
Bibliometrics	0.1204	0.0554	1	0.01	0.0033	0.0582
Twitter	0.1465	0.1538	0.01	1	0.0052	0
impact factor	0.0703	0.0513	0.0033	0.0052	1	0
Scientometrics	0.0606	0.014	0.0582	0	0	1

Co-word map is a commonly used social network analysis method, which can explore a subject of the research structures. The constructed high frequency word matrix was imported to UCINET6,.

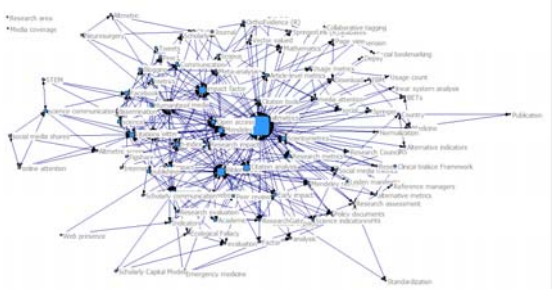

Fig 1. Keywords co-occurrence network map

And then we used Netdraw2.119 to drew the co-word map and derived the keywords co-occurrence of network map. As Fig 1 shown. there were 710 nodes each of which represented high-frequency keywords. A dense line between nodes represented the correlation between keywords. There are interlaced networks between many high-frequency keywords, which indicated that there were some core hot issues in Altmetrics research field. The size of the node represented the center size of the keyword, and the thickness of the connection between nodes indicated the frequency of the occurrence of the two groups of keywords. The closer a node was, the more central it was. It could be seen that high-frequency keyword "altmetrics", "social media", "impact factor", "bibliometrics", "open access","citation analysis" were located in the center of the node graph. The closer the node was, the closer the relationship became. Thus the main structure of the research network of "Altmetrics" was presented.

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