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AUTHOR PRODUCTIVITY DISTRIBUITION IN JOURNAL OF ROBOTICS AND MECHATRONICS: 1999-2013

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Abstract

In the recent years, there has been an explosive growth in human Knowledge. In fact, the nature and tempo of growth has been such as too far outstrip the achievements of the past centuries. As science itself growth in extension and intention, the number of scientists increases. So obviously does the volume of literature generated by the scientific community. The growth o literature itself has caused a fairly widespread alarm and the term that describes explosion also known as information explosion.The Evaluation of the use of library collection is a fundamental tool for the development of a relevant and cost effective collection. Bibliometrics offers several methods to measure the level of use of collections. Bibliometrics is a type of research method used in library and information science. It is a quantitative study of various aspects of literature ona topic and is used to identify the pattern of publication, authorship and secondary journal coverage. This paper presents a Author Productivity distribution of the journal "Journal of Robotics and Mechatronics" for the period of 1999-2013(15 years).

Key Words: *Scientometrics, Robotics and Mechatronics, Authorship pattern, Author Productivity, citations.*

Introduction

Bibliometrics as a technique has extensive applications in identifying the research trends in a subject, trends in a authorship and collaboration in research, core periodicals, obsolescence and dispersion of scientific literature useful in estimating the comprehensiveness of secondary periodicals, studying publications by scientists, citation studies and so on. Further, bibliometrics could be used in the identification of emerging research areas. The popularly in the adoption of bibliometric techniques in various disciplines stimulated stupendous growth of literature on bibliometrics and its related area. The Techniques are now being vigorously pursued and with the result, it has been found that one fourth of all the articles published in a Library and Information Science periodicals also carry a large number of articles on bibliometrics. These techniques are being used for a variety of purpose like determination of various scientific indicators, evaluation of

scientific output, selection of journals for libraries and even forecasting potential Nobel Laureates.

Objectives of the study

The objectives of the present study are to find the following

- Year Wise Distribution of Articles and citations
- Year Wise Distribution of Total Number of Contributions Vs Total Number of Pages
- Authorship Pattern of Contributions & Degree of Collaboration
- Author Productivity on IEEE Transactions on Control System Technology
- Ranked List of most prolific Contributor
- Country -Wise Distribution of authors

Methodology

Data was collected from the Journal of Robotics and Mechatronics from the period 1999-2013. It is a peer reviewed open access journal that publishes research articles in the area of robotics. Generally it consist of articles belong to mechanical Engineering. From each cited reference, the following data like number of authors, type of document, country of origin of the document/ journal, length of the articles, number of citations and other data required for analysis has been noted

Analysis

Year Wise Distribution of Articles and citations

Table: 1 Year wise Distribution of Articles and Citations

Year	Vol. No	Articles	No. of citations	Average citations per article
1999	11	86	49	0.5
2000	12	104	49	0.5
2001	13	84	0	0
2002	14	78	0	0
2003	15	82	0	0
2004	16	81	1001	12
2005	17	85	1094	13
2006	18	102	1340	13
2007	19	88	1484	17
2008	20	101	1505	15
2009	21	89	1348	15
2010	22	89	1441	16
2011	23	112	1843	16
2012	24	108	1816	16
2013	25	122	2369	19
Total		1411	15339	11

The Findings of Year wise distribution of total publication of the journal 'journal of Robotics and Mechatronics" is with a decreasing and increasing trend from the year 1999. The range of articles published per volume during the period under study is between 81 and 122. The study has examined that totally 1411 articles have been published for the span of 15 years.

Year Wise Distribution of Total Number of Contributions Vs Total Number of Pages

Table: 2 Distributions of Contribution Vs Pages

Year	Quantum of Contribution	Quantum of Total Pages	Average number of pages per Contribution
1999	86	556	6
2000	104	756	7
2001	84	626	7
2002	78	631	8
2003	82	634	8
2004	81	631	8
2005	85	696	8
2006	102	814	8
2007	88	698	8
2008	101	872	9
2009	89	750	8
2010	89	752	8
2011	112	1095	10
2012	108	980	9
2013	122	1086	9
Total	1411	11577	8

The findings of year wise distribution of total contribution vs. total volume pages convey the following facts: the growth of total contribution is increasing from 86 to 122. From the year 2011 there is a fluctuation in the number of contributions and total research publication pages. The result reveals that quantum of contribution is 1411 and the quantum of pages is 11577. And the average number of pages is accounted as 8.

Authorship pattern of Contribution

The objective of the study of authorship pattern is to bring out the contribution pattern in a discipline. The extent of research contribution by the authors is explained in the analysis of authorship pattern. It is well known that nowadays research is carried out by group of researchers rather than by a single researcher.

Table: 3 Authorship pattern of Contribution

Pattern	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total	%
Single	10	12	12	4	6	7	4	3	4	6	4	1	5	4	1	83	5.9
Two	21	24	20	17	18	15	24	26	17	20	19	14	17	20	20	292	20.69
Three	33	32	25	22	20	21	21	22	16	39	22	26	23	22	32	376	26.64
Four	12	18	16	13	19	20	15	27	17	18	22	22	24	27	28	298	21.12
Five & above	10	18	11	22	19	18	21	24	34	18	22	26	43	35	41	362	25.65
Total	86	104	84	78	82	81	85	102	88	101	89	89	112	108	122	1411	100

The contribution published by scientists is calculated to 1411 over the study period. It could be noted that the three-authored papers rank first in order sharing 26.64 % of total contribution. The Five and above authored paper follows the second in order taking 25.65% of the total contributions. The year-wise analysis reveals that the three author contributions have shown a considerable trend from 2005.

The four author contributions take the third in order sharing 21.12% of the total publication during the study period. The performance of publication in this case is more than 20 only from 2009 to 2013.all the remaining years have recorded less than 20.This confirms the prediction of de solla price that team research is a common trend in scientific activities. It is interested to note that a single author papers attains last place shares only 5.9 % during the study period.

It could be deducted from the above discussion the scientists intended to take collaborative participation in research activities. It has been proved from the analysis that single author papers have declining trend and there by collective contributions have an increasing performance in scientific research activities.

Author Productivity on Journal of Robotics and Mechatronics

Table: 4 Author productivity in Journal of Robotics & Mechatronics

Number of Contribution	Number of Authors	%	Cumulative %
1	2188	72.81	72.81
2	400	13.31	86.12
3	174	5.79	91.91
4	83	2.76	94.67
5	49	1.63	96.3
6	27	0.89	97.19
7	21	0.69	97.88
8	13	0.5	98.38
9	12	0.4	98.78
10	11	0.37	99.15
11	4	0.13	99.28
12	6	0.2	99.48
13	4	0.13	99.61
14	2	0.06	99.67
15	1	0.03	99.7
16	1	0.03	99.73
17	2	0.06	99.79
18	2	0.06	99.85
23	2	0.06	99.91
34	1	0.03	99.94
51	1	0.03	99.97
54	1	0.03	100
	3005	100	

The study of author productivity is a measure to identify the research performance in any discipline. The author productivity is determined in the present study on the basis of number of papers contributed by scientists.

Generally, the research activity is carried out by a research or group of researcher depending on the nature and aim of research. It also depends on the ability and efficiency of researcher. This is based on the skills and talents. The analysis of author productivity examines the prevailing trend in understanding research process on the field of robotics and Mechatronics. So the analysis of author productivity on scientific research output publication of scientists is the focal point of the present study.

Table: 4 indicate contribution of research papers on the basis of author productivity levels. It is observed that around 72.81 % of the authors have contributed only one paper in the journal during the study period. Hence it ranks first in order with respect to the total number of contribution. The authors contributed 2 papers accounted 13.31% and it is placed to next in the order. The three paper contributors are 5.79% and it is ranked third in the order. The table brings out the fact that when the number of contributions increases, the number of authors decreases. In the light of the above, a greater level of research performance is noted among a few scientists. Out of the various number of contributions, 54 is the highest which is the productivity of an individual scientists.It could be deduced from the above discussion that when the number of published paper increases, the number

of contributed author's decreases. More number of publications by scientists in any field requires high degree of inquisitiveness, efficiency, competencies and exposure to literatures. That is, in the present study only a few authors have contributed more number of papers. The nature of institution in which the authors are working, area of specialization and availability of infrastructural facility influence more over author productivity.

Country -Wise Distribution of Authors

Table: 5 Country -Wise Distribution of Authors

S.No	Country	No. of Authors	%	Cumulative %
1	Brunei	5	0.1	0.1
2	Germany	3	0.1	0.2
3	Italy	19	0.36	0.56
4	Japan	4581	88.1	88.66
5	Korea	7	0.13	88.79
6	Taiwan	12	0.23	89.02
7	Algeria	4	0.1	89.12
8	Australia	3	0.05	89.17
9	Brasil	6	0.11	89.28
10	Bulgaria	2	0.04	89.32
11	Cagliari	4	0.1	89.42
12	Canada	27	0.52	89.94
13	China	82	1.57	91.51
14	Denmark	5	0.1	91.61
15	Egypt	4	0.07	91.68
16	Finland	4	0.07	91.75
17	France	68	1.31	93.06
18	Germany	15	0.28	93.34
19	Hong Kong	9	0.17	93.51
20	Italy	35	0.67	94.18
21	Korea	2	0.03	94.21
22	Malaysia	31	0.59	94.8
23	Nagano	3	0.05	94.85
24	Netherlands	4	0.07	94.92
25	Ookayama	21	0.4	95.32
26	Pittsburgh	4	0.07	95.39
27	Poland	12	0.23	95.62
28	Singapore	8	0.15	95.77
29	South Africa	5	0.1	95.87
30	Spain	22	0.42	96.29
31	Switzerland	32	0.61	96.9
32	Taiwan	18	0.34	94.24
33	Thailand	5	0.1	97.34
34	Tokyo	11	0.21	97.55
35	Tunisie	2	0.03	97.58
36	Turkey	11	0.21	97.79
37	U.K	31	0.59	98.38
38	U.S.A.	79	1.52	99.9
39	UAE	5	0.1	100
	Total	5201	100	

The study of country - wise distribution of scientists in Journal of Robotics and Mechatronics is the other factor to be discussed for bringing out fruitful facts. The table 4 and figure shows that On the whole 5201 authors belonging to 39 countries contributed a total of 1411 articles. The table:5 shows that 4581 (88.1%) of the authors are geographically affiliated to Japan and the remaining 620 (11.9 %) of authors are from 38 countries.

Table: 5 Country wise Distribution of Author

Ranked List of most prolific Contributor

Mr. Toshio Fukuda is with the Department of Micro-Nano Systems Engineering, Nagoya University, Furo-cho, Chikusa-ku, and Nagoya 464-8603, Japan has published 54 different publications in Journal of Robotics and Mechatronics during the study period and attains the first rank.

The second rank goes to Mr. Fumihito Arai.He is also with the Department of Micro-Nano Systems Engineering, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan in the study period.

The third rank goes to Mr. Shigeo Hirose from Department of Mechanical and Aerospace Engineering, Tokyo Institute of Technology, 2-12-1 Ohokayama, Meguro-ku, Tokyo 152-8552, and Japan has published 34 papers. The other ranks have been detailed in table: 5

Table 6 Ranked List of most prolific Contributor

S.No	Author	Number of Contribution	Address
1	Toshio Fukuda	54	Department of Micro-Nano Systems Engineering, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan
2	Fumihito Arai	51	Department of Micro-Nano Systems Engineering, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan
3	Shigeo Hirose	34	Department of Mechanical and Aerospace Engineering, Tokyo Institute of Technology, 2-12-1 Ohokayama, Meguro-ku, Tokyo 152-8552, Japan
4	Hideto Ide	23	Aoyama Gakuin University, 5-10-1 Fuchinobe, Sagamihara, Kanagawa, Japan
5	Tatsuo Arai	23	Department of Systems Innovation, Graduate School of Engineering Science, Osaka University, 1-3 Machikaneyama, Toyonaka, Osaka 560-8531, Japan
6	Kuniaki Kawabata	18	RIKEN (The Institute of Physical and Chemical Research), 2-1 Hirosawa, Wako, Saitama 351-0198, Japan
7	Toshiro Noritsugu	18	Graduate School of Natural Science of Technology, Okayama University, 3-1-1 Tsushimanaka, Kita-ku, Okayama 700-8530, Japan
8	Hajime Asama	17	The University of Tokyo, 7-3-1 Hongo, Bunkyou-ku, Tokyo 113-8656, Japan

9	Toshio Tsuji	17	Graduate School of Engineering, Hiroshima University, 1-4-1 Kagamiyama, Higashi-Hiroshima, Hiroshima 739-8527, Japan
10	Takayuki Tanaka	16	System Sensing Control Laboratory, Graduate School of Information Science and Technology, Hokkaido University, Kita 14, Nishi 9, Kita-ku, Sapporo 060-0814, Japan
11	Yasushi Mae	15	Department of Systems Innovation, Graduate School of Engineering Science, Osaka University, 1-3 Machikaneyama, Toyonaka, Osaka 560-8531, Japan
12	Hironao Yamada	14	*Department of Human and Information Systems, Gifu University, 1-1 Yanagido, Gifu 501-1193, Japan*
13	Tamio Arai	14	The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan
14	Hiroshi Mizoguchi	13	Tokyo University of Science, 2641 Yamazaki, Noda, Chiba 278-8510, Japan
15	Kenichi Ohara	13	Graduate School of Engineering Science, Osaka University, 1-3 Machikaneyama, Toyonaka, Osaka 560-8531, Japan
16	Masahiro Takaiwa	13	The Graduate School of Natural Science and Technology, Okayama University, 3-1-1 Tsushimanaka, Kita-ku, Okayama 700-8530, Japan
17	Masanori Idesawa	13	Graduate school of Information Systems, University of Electro-Communications 1-5-1 Chofugaoka, Chofu-shi, Tokyo 182-8585, Japan
18	6 Author	12	Department of Advanced Systems Control Engineering, Graduate School of Science and Engineering, Saga University, 1-Honjomachi, Saga 840-8502, Japan

Degree of collaboration

Table: 7 Degree of Collaboration

Year	Degree of Collaboration
1999-2005	0.908
2006-2013	0.965
Over all	0.941

The findings of degree of collaboration in paper publications and in citations referred enlighten the following facts: the degree of collaboration has shown an increasing trend from one phase of the period to other phase of the period. This brings out clearly the high level of prevalence of collaborative research in the field of Robotics and Mechatronics.

Findings

This paper presents a Author productivity distribuition in the journal "Journal of Robotics and Mechatronics" for the period of 1999-2013. The study has observed 1141 articles with 15339 citations, 11577 pages during the study period. The range of articles published per volume is between 81 to 122 the average number of references per article is 11; the average length per article is 8 pages. In this analysis that three-authored papers

rank first in order sharing 26.64 % of total contribution. single author papers have declining trend and there by collective contributions have an increasing performance in scientific research activities.88.1% of authors from Japan Country and the Author named
Toshio Fukuda and Fumihito Arai have published highest number of articles as 54 and 51 respectively.

Conclusion

The bibliometric studies are frequently used to assess research publication and to generate information that can be used by policy makers and experts. This study has proven to be useful tool in the assessment of research publication of scientists in Engineering and Technology. Taking into account the Scientist's participation in scientific collaboration, publication and productivity pattern have been calculated. This study mirrors the actual published results of the work of scientist in the journal 'Journal of Robotics and Mechatronics' during the study period.

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