IEEE Transactions on Automation Science and Engineering: A bibliometric study: 2008-2017

M. Shiva Reddy
Assistant Librarian
Mahatma Gandhi Institute of Technology
Gandipet Main Rd, Kokapet,
Hyderabad, Telangana 500075
e-mail: sivareddy235@gmail.com

***Abstract**- Indexes and Bibliographical databases have been prepared with bibliographic information of published literature to ascertain the original sources of information. Analysis of 1071 research papers published in the Journal "IEEE Transactions on Automation Science and Engineering (T-ASE)" during the period 2008-2017 has been carried out. The data was collected from the archives of the journal available in online form. This paper examines the articles for year wise growth of the articles published, authorship pattern, length of paper etc.*

Keyword: Scientometrics, Bibliometrics, Automation Science, IEEE, Authorshop Pattern

Introduction:

Bibliometrics or Scientometrics is the study and measurement of the publication pattern of all forms of written communication and their author by applying mathematical and statistical methods. The structure of the literature is analyzed by using various tools, counting, rank-frequency distribution, and citation analysis. Bibliometrics studies have a range of applications to such areas a book and journal acquisitions, study of communication patterns, library use analysis, obsolescence of literature, identification of specialties, and identification of influential authors and papers.

Indexes and Bibliographical databases have been prepared with bibliographic information of published literature to ascertain the original sources of information. The bibliographic indexes and databases are known as 'secondary source of information' serves as key the primary information. The number of indexing and abstracting periodicals and databases are available as produced by the publishers and institutions at national level, but not a single index or database has been created to control the complete literature. Hence, an attempt has been made to analyse the journal IEEE Transactions on Automation Science and Engineering and a bibliometric study has been done on the basis of online availability of IEEE journals.

IEEE Transactions on Automation Science and Engineering (T-ASE) publishes fundamental papers on Automation, emphasizing scientific results that advance efficiency, quality, productivity, and reliability. T-ASE encourages interdisciplinary approaches from computer science, control systems, electrical engineering, mathematics, mechanical engineering, operations research, and other fields. T-ASE welcomes results relevant to industries such as agriculture, biotechnology, healthcare, home automation, maintenance, manufacturing, pharmaceuticals, retail, security, service, supply chains, and transportation. T-ASE addresses a research community willing to integrate knowledge across disciplines and industries. For this purpose, each paper includes a Note to Practitioners that summarizes how its results can be applied or how they might be extended to apply in practice. IEEE Transactions on Automation Science and Engineering having ISSN: 1545-5955, it is quarterly publication and

is impact factor of the journals is 3.667. The present study deals the Scientometric analysis of 1071 articles from Automation Science and Engineering for the period of 2008-2017

Review of Literature

Rajednran, and Jeyshankar (2011) Scientometric analysis of 633 research articles published in Journal of Scientific and Industrial Research has been carried out. Five Volumes of the journal containing 60 issues from 2005 –2009 have been taken into consideration for the present study. The number of contributions, authorship pattern & author productivity, average citations, average length of articles, average keywords and collaborative papers has been analyzed. Out of 633 contributions, only 51 are single authored and rest by multi authored with degree of collaboration 0.92 and week collaboration among the authors. Pattern of Co-Authorship revealed that the improving trend of co-authored papers. The study revealed that the author productivity is 0.34 and dominated by the Indian authors.

A Scientimetric Analysis on Indian Journal of Physics was made by Nattar S [8] during 2004-2008 which revealed that the year 2004 records the highest % of contributions regarding single, two and three authored.

Kannappanavar B U, Swamy C & Vijay Kumar M [9] analyzed the publishing trends of Indian Chemical Scientists during 1996–2000, which revealed average number of authors per paper has increased from 7.52 to 8.39.

A bibliometric study has been carried out by Kalyane V L and Sen B K [13] on the Journal of Oilseeds Research published during 1984–1992 which revealed that the keyword "Groundnut" tops the list with 53 records.

OBJECTIVES OF THE STUDY

- To determine the year wise distribution of articles;
- To study the authorship pattern;
- To study the geographical-wise publication pattern;
- To study the length of journal articles;
- To study the most Proliferent authors;

METHODOLOGY

10 volumes containing 40 issues and 1071 papers of IEEE Transactions on Automation Science and Engineering papers published during the year 2008 - 2017 are considered for the study. The data collected has been studied by applying filters on basis of different criterion. Quantitative techniques have been adapted for the study. The journal is analyzed for number of volumes and papers published, number of authors, year wise growth in papers for the period of study.

Year-wise distribution of Papers

Table-1 shows the year-wise distribution paper, a total of 1071 research papers were published by the journal with10 volumes and 40 issues during the period of study (10 years).

Maximum no. of papers published in 2017 with 156(14.57 %) followed by 140 (13.07%) research papers in 2015 & 2016, while lowest in the year 2008 with 64(5.99%). There is increasing trend in publication of articles from the year 2008 to 2017.

Table-1: Year-wise distribution of Papers

Year	Volume	No. of Articles	%
2008	5	64	5.98
2009	6	76	7.10
2010	7	97	9.06
2011	8	83	7.75
2012	9	78	7.28
2013	10	114	10.64
2014	11	123	11.48
2015	12	140	13.07
2016	13	140	13.07
2017	14	156	14.57
Total		1071	100

Figure-1: Year-wise distribution of Papers
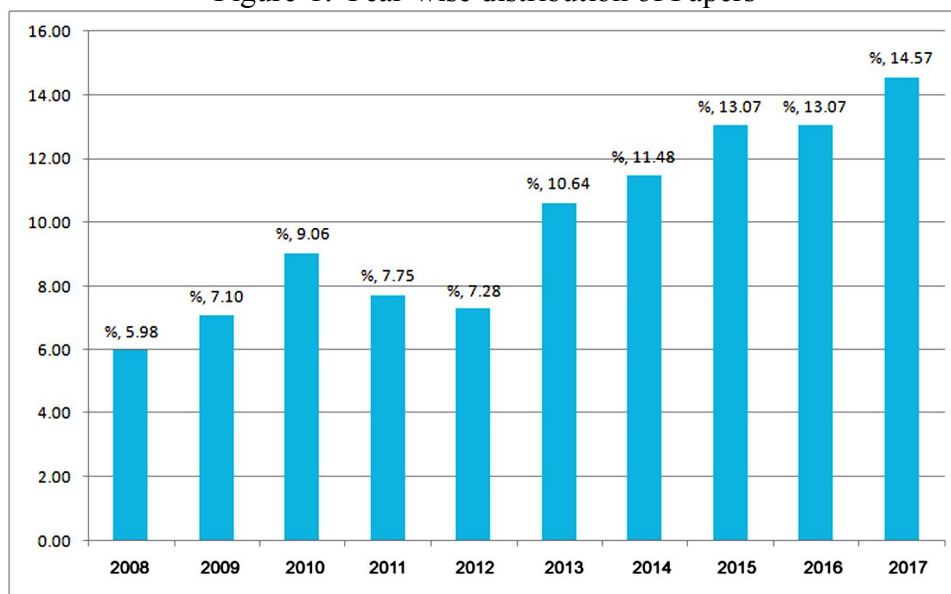
Year-wise Authorship pattern

Table No. 2 reveals that out of 1071 papers single authored contribution are 44(2.35%); two authored contribution were 242(12.92%), three authored contributions were (785(41.91%), Four authors contribution were 452(24.13%), Five authors contribution were 205(10.95%), six Authors contribution were 77(4.11%), seven authors contribution were 41(2.19%), eight authors contribution were 22(1.17%), nine authors contribution were 5(0.27%). Below table-

2 shows the authorship pattern of papers published during the period 2008 to 2017. maximum number of papers i.e. 785 (41.91%) is contributed by three author.

Table-2: Authorship Pattern

S.No.	Authors	No. of Articles	%
1	Single author	44	2.35
2	Two authors	242	12.92
3	Three authors	785	41.91
4	Four authors	452	24.13
5	Five authors	205	10.95
6	Six Authors	77	4.11
7	Seven authors	41	2.19
8	Eight authors	22	1.17
9	Nine authors	5	0.27
Total		**1873**	**100**

Most Proliferant Authors

Table-3 shows the most Proliferant authors in out of 1071 contributions the most Proliferant author is 'M. Zhou' contributed 37 papers, followed by 'J. Li' with 20 papers; 'Z.Li' 15 papers, 'b.Lennartson' and 'R.Kumar' each of 13 papers ' T.E.Lee' and 'W.Tan' each of 12 papers, 'L.Shi; and P B. Luh' each of 11 papers and 'G.Xiao' 10 papers were contributed.

Table-3: Most Proliferant Authors

S. No.	Authors	No. of Articles	Rank
1	M. Zhou	37	1
2	J. Li	20	2
3	Z. Li	15	3
4	B. Lennartson	13	4
5	R. Kumar	13	5
6	T. E. Lee	12	6
7	W. Tan	12	7
8	L. Shi	11	8
9	P. B. Luh	11	9
10	G. Xiao	10	10
11	T. Chai	10	11
12	Y. Li	10	12
13	Y. Zhang	10	13

Length of Articles

Table -4 reveals that the majority of papers 27(0.09%) have the length 27 pages followed by 22(0.09%) with the length 23 pages; 22(0.09%) with 22 pages; and the highest number length of the paper and majority of the papers 149(13.91%) has page length of 11 pages.

Table-4 Length of Articles

S.No.	No. of Pages	No. of Articles	%
1	1	13	1.21
2	2	16	1.49
3	3	9	0.84
4	4	20	1.87
5	5	29	2.71
6	6	50	4.67
7	7	54	5.04
8	8	67	6.26
9	9	95	8.87
10	10	114	10.64
11	11	149	13.91
12	12	138	12.89
13	13	92	8.59
14	14	84	7.84
15	15	68	6.35
16	16	28	2.61
17	17	19	1.77
18	18	15	1.40
19	19	3	0.28
20	20	3	0.28
21	21	2	0.19
22	22	1	0.09
23	23	1	0.09
24	27	1	0.09
		1071	100

Country-wise distribution of papers

Table-5 indicates the country-wise distribution of papers, the highest 340(31.7%) number of publication contributed from USA second place occupies China with 206(19.2%) and third place occupies Hong Kong with 100(9.3%) and least number 1(0.1) of papers contributed from Brunei.

Table-5: Country-wise distribution of papers

S.No.	Country	No. of articles	%
1	USA	340	31.7
2	China	206	19.2
3	Hong Kong	100	9.3
4	Italy	49	4.6
5	France	39	3.6
6	Canada	37	3.5
7	Singapore	34	3.2
8	UK	32	3.0
9	Sweden	25	2.3
10	South Korea	24	2.2
11	Germany	23	2.1
12	Japan	21	2.0

13	Australia	18	1.7
14	India	18	1.7
15	Spain	16	1.5
16	North Korea	12	1.1
17	Netherlands	10	0.9
18	Brazil	9	0.8
19	Israel	9	0.8
20	Switzerland	9	0.8
21	New Zealand	5	0.5
22	Finland	4	0.4
23	Greece	4	0.4
24	Mexico	4	0.4
25	Norway	4	0.4
26	Portugal	4	0.4
27	Austria	3	0.3
28	Croatia	3	0.3
29	Poland	2	0.2
30	Turkey	2	0.2
31	UAE	2	0.2
32	Bangladesh	2	0.2
33	Brunei	1	0.1
	Total	1071	

Conclusion

IEEE Transactions on Automation Science and Engineering is the highly preferred journal in the field of science and engineering. It is observed that the highest number of articles i.e., 156 papers have been appeared in the year 2017.The minimum number of contributions 64 was published in the year 2008. Out of 1071 articles, the majority of the research articles written by Three authors authors i.e.,785.

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