A Scientometric Study on IEEE Transaction on Visualization & Computer Graphics: Published from 2008 to 2012

Library Science

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ABSTRACT

The database of this study comprises 1241 journal articles published in the IEEE Transactions on Visualization and Computer Graphics from the year 2008 to 2012. For each article, names of authors, number of authorship, number of references, author's institutional affiliation and country, type of article, length (pages) of article, existence of acknowledgement & appendix were noted down. All the necessary information were compiled, recorded, tabulated and analyzed for making observations as indicated in the objectives of the study.

INTRODUCTION

The IEEE, a non- profit organization, is the world's leading professional association for the advancement of technology. The full name of the IEEE is the Institute of Electrical and Electronic Engineers, Inc., although the letters.

I-E-E-E refers to the organization and pronounced Eye-triple-E. IEEE has:

➢ More than 365,000 members, including 68,000 students, in over 150 countries.
➢ 311 sections in ten geographic regions worldwide.
➢ About 1570 Chapters that unite local members with similar technical interests.
➢ More than 1430 student branches at colleges and Universities in 80 countries.
➢ 39 Societies and 5 Technical Councils representing the wide range of technical interests.
➢ More than 300 conferences each year.
➢ About 900 active standards and more than 400 in development.

ABOUT IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS

Author(s): IEEE Computer Society
NLM Title Abbreviation: IEEE Trans Vis Comput Graph
ISO Abbreviation: IEEE Trans Vis Comput Graph
Title(s): IEEE transactions on visualization and computer graphics.

Other Title(s): Transactions on and computer graphics TVCG Visualization and computer graphics

Publication Start Year: 1995
Frequency: Six no. a year, 2004
Twelve no. a year 2011
Country of Publication: United States
Publisher: New York,
NY: IEEE Computer Society, c1995-
Description: v.: ill. (some col.) ; 28 cm.
Language: English
ISSN: 1077-2626 (Print)
1941-0506 (Electronic) 1077-2626 (Linking)
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Selectively In: Index medicus v10n1, Jan./Feb. 2004-
MEDLINE v10n1, Jan./Feb. 2004-
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Current Indexing Status: Currently indexed for MEDLINE.
Current Subset: Index Medicus
Version Indexed: Electronic
MeSH: Computer Graphics*
Computer Simulation Image Processing, Computer-Assisted
Publication Type(s): Periodicals

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Other ID: (OCoLC)30748801
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NLM ID: 9891704

SCIENTOMETRICS

Scientometrics is a branch of the science 'Science of Science'. Haitun treats 'Scientometrics', as scientific disciplines, which performs reproducible measurements of scientific activity and reveal its objective quantitative regularities. According to him, Scientometric methods include statistical and thesaurus methods, and indicators as to the number of citations, term etc.

There are two aspects within science of science, viz.,

➢ The analytical aspect which deals with the general laws of the development of science as a knowledge system and a specific social institution; and
➢ The normative aspect that deals with the development of practical recommendations for raising research efficiency.

4. OBJECTIVES

The following are the important objectives of the study:

➢ To find out year-wise publication of articles and references
➢ To determine the times series analysis
➢ To find out Overall Distribution Pattern of Contributions
➢ To find out Growth Rate of Research Literature: Global Output

5. UNIVERSE AND SAMPLE

Collection of journals in engineering subject is taken as Universe and the journal 'IEEE Transactions on Visualization and Computer Graphics' for the period 2008-2012 is taken as samples.

Table – 1
Year wise Distribution of IEEE Transactions on Visualization and Computer Graphics

S.No	Year	Records	Percentage
1	2008	203	16.36
2	2009	196	15.79
3	2010	198	15.95
4	2011	306	24.66
5	2012	338	27.24
Total		1241	100.00
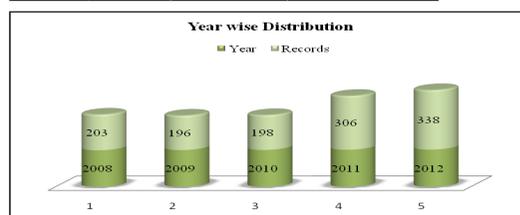
Figure – 1 Year wise Distribution of IEEE Transactions on Visualization and Computer Graphics

The above table displays the year-wise distribution of research productivity in IEEE Transactions on Visualization and Computer Graphics for a period of 5 years from 2008 to 2012. The total publication count is found to be 1241 and the maximum output occurred in the year 2012 numbering 338 and 27.24 percent of the total output. It is inferred that the Research literature output in Thorium registered a gradual increase.

Table – 2
Time Series Analysis

S. No	Year	Count (Y)	X	X^2	XY
1	2008	203	-2	4	-406
2	2009	196	-1	1	-196
3	2010	198	0	0	0
4	2011	306	1	1	306
5	2012	338	2	4	676
Total		1241	0	10	380

Table – 3
Overall Distribution Pattern of Contributions

Year	Vol. No	No. of Issues	Number of the articles/contributions												Total No. of Articles
			Issue No.1	Issue No.2	Issue No.3	Issue No. 4	Issue No. 5	Issue No.6	Issue No.7	Issue No.8	Issue No.9	Issue No.10	Issue No.11	Issue No.12	
2008	14	6	26	26	27	27	17	80							203
2009	15	6	20	20	18	21	20	97							196
2010	16	6	21	20	18	21	20	98							198
2011	17	12	17	18	17	16	20	19	17	20	18	20	21	103	306
2012	18	12	24	17	21	25	19	21	19	20	22	21	21	108	338
															1241

The analysis that investigates starts with the study of the overall distribution pattern of contributions. 1241 contributions have been identified for this research project. The above table shows the overall distribution pattern of contributions and number of contributions for each volume. In the 18 volumes there are 1241 contributions. The average number of contribution per volume is 30. The number of articles is highest in volume 18 accounting 338. The lowest number of articles is published in the volume 15 accounting 196 out of the total contribution during the study period. It can be inferred from the data that most of the volumes have the average number of articles. The number of articles is uniformly increasing.

Table - 4
Growth Rate of IEEE Transactions on Visualization and Computer Graphics Research Literature: Global Output

S. No	Year	Count	Growth rate
1	2008	203	
2	2009	196	-0.03
3	2010	198	0.01
4	2011	306	0.55
5	2012	338	0.10

The above table displays the annual growth rate of global literature output in IEEE Transactions on Visualization and Computer Graphics. It is found that the growth rate was at a maximum in the year 2011 and at its minimum in the year 2009. Further it is found that the growth rate of research in IEEE Transactions on Visualization and Computer Graphics was found to be positive during the years except during 2010 and 2012 and 2009 year indicating negative growth. In an overall view the average annual growth rate of IEEE Transactions on Visualization and Computer Graphics research at the global level was found to be 0.16.

Table - 5
Most Prolific Authors

S.No	Author Name	Count	TLCS	TGCS
1	Ma KL	31	30	349
2	Weiskopf D	27	25	182
3	Pascucci V	25	42	443
4	Ertl T	24	20	165
5	Silva CT	24	35	505
6	Groller ME	23	54	366
7	Lee TY	22	17	189
8	Hamann B	21	39	378
9	Joy KI	20	28	195
10	Laidlaw DH	20	33	252

Straight line equation is applied to arrive at projections for future growth under Time Series analysis. Straight Line equation

$Y_c = a + bX$
Since $\sum x = 0$
$a = \sum Y/N = 1241/5 = 248.20$; $b = \sum XY/\sum x^2 = 380/10 = 38.00$
Estimated literature in 2017 is when X = 2017 – 2010 = 7
= 248.20 + 38.00*7 = 248.20 + 266 = **514.20**
Estimated literature in 2020 is when X = 2020 – 2010 = 10
= 248.20 + 38.00*10 = 248.20 + 380.00 = **628.20**

On the application of the formula of Time Series Analysis and subsequently, from the results obtained separately for the years 2020 and 2017, it is found that the future trend of growth in IEEE Transactions on Visualization and Computer Graphics research output may take an increasing trend during the years to come. The inference is that there is a positive growth at the global level in research literature output in IEEE Transactions on Visualization and Computer Graphics.

The top ranking authors with higher productivity were ranked each according to their publication count. From the above table, it is found that Ma KL is found to be the most prolific author among the contributors. Second in the rank was Weiskopf D, followed by Pascucci V. The author Ma KL had a higher frequency of incidence of his name in the author field of records numbering 31, his Total Local Citation is 30 and the Total Global Citation is 349.

Table - 6
Top 10 Contribution Institutions

Name of the Institution	Count	TLCS	TGCS
Univ Utah	54	122	965
Univ Calif Davis	53	89	888
Purdue Univ	35	47	417
Univ N Carolina	34	33	409
SUNY Stony Brook	33	28	523
Georgia Inst Technol	27	40	499
Stanford Univ	27	41	607
Lawrence Livermore Natl Lab	26	58	588
Hong Kong Univ Sci & Technol	24	24	257
Univ Stuttgart	24	28	246

The above table reveals that the top 10 institution contributions, the University of Utah were contribute 54 counts with the Total Local Citation is 122 and the Total Global Citation is 965. Followed by the university of Calif Davis were contribute 53 counts with the Total Local Citation is 89 and the Total Global Citation is 888.

6. CONCLUSION

This study attempts to identify the Scientometric characteristics of the articles published in the journal IEEE Transactions on Visualization and Computer Graphics during the study period 2008-2012 conclusions drawn from this study are: It should be kept in mind that the data presented in this paper embrace only a part of the scientometric information collected by present.

Surveying the literature of scientometrics one can conclude that there are no ready recipes for scientometric evaluations; each system has its own characteristics. Scientometric researchers are exploring features of information processes in scientific research but are far from finding the solution to all problems. Scientific research is a social organization; therefore the possibility for a description by quantitative methods has more limitations than in the field of natural sciences.

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