# Performance Analysis of IES Journals using Internet and Text Processing Robots

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*Abstract*— The quality of journals is primarily related to the number of citation of published papers. Various measures of evaluating the quality of journals are being discussed and compared here. Unfortunately the citation analysis is almost impossible using manual examination of references. This must be done by developing special computer tools for extracting data from various locations. Also, if only journal citations are of the interest then this information is already preprocessed on different web sites such as GoogleScholar, PublishOrPerish, or WebOfKnowlege. However, if for example someone wants to analyze performance of editors, associate editors, and reviewers, then the problem is much more complicated. These would require development of specialized computer tools for automatic data processing. The presented paper is a description of such approach

*Index Terms*—Internet robots, Text processing, PERL, Impact Factor.

#### I. INTRODUCTION

Journal performances are measured by well established matrices described in section II. It is, however, much more difficult to evaluate the performance of individual Associate Editors or how successful were, for example, Special Sections organized on selected topics. It is possible to extract such information from editorial office data and from citation analysis provided by Google Scholar or by Thomson Reuters. Such a task is very time consuming, therefore, it is done very seldom. This task however can be done, automatically by writing text processing scripts in PERL [52-58], PHP, or Python. Such analysis was done for journals published by IEEE Industrial Electronics Society: *IEEE Trans. on Industrial Electronics* (TIE), *IEEE Trans. on Industrial Informatics* (TII), and *IEEE Industrial Electronics Magazine* (IEM). This analysis can be very helpful adjusting journal policies which may lead to improvement of journal ranking.

#### II. MEASURES OF JOURNAL QUALITY

A journal's ranking is based on its citations. The most popular is the 2-years Impact Factor. For example the 2010 IF is calculated as the ratio of the number of citations in 2010 to the number of articles published in 2 year window (2008 and 2009) to the number of articles published in 2008 and 2009. Table 1 shows data for IF calculations for three IES journals.

In some cases instead of 2-years IF calculation, the 5-years IF is calculated, where a 5 year window is used. Obviously the 5 year IF changes much slower, so it is more difficult to predict trends. One may notice that citations to papers published in the same calendar year are not being used in IF calculations. These citations to recent papers are being measured by JII (Journal Immediacy Index), which is the ratio of number of citations to number of

analyzing the one year IF trends, which are shown in Fig. 1 for TII, TII, and IEM.

Table I	I IMPACT F	ACTOR CALCUL	ATIONS FOR	IES JOURNALS
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	TIE	TII	IEM
Number of citations to 2008 papers	2121	62	31
Number of citations to 2009 papers	1220	48	29
Number of citations to 2008&2009 papers	3341	110	60
Number of papers published in 2008	454	28	15
Number of papers published in 2009	505	39	17
Number of papers published in 2008& 2009	959	67	32
IF Impact Factor	3.48	1.64	1.87



Fig. 1. One Year Impact Factors Trends for IES journals

The one year IF is usually smaller than 2 years IF, because there are always more citations in the second year after publication. Also, 5 years IF usually is larger than 2 years IF.

More recently another measure ES (Eigenfactor Score) was developed in order to incorporate information not only about number of citations but how highly ranked are the journals where citations are coming from. The computation of the ES requires an iterative approach because during computation journal rankings are changing, and this is affecting the score. The ES often gives misleading information because journals with a larger number of published papers automatically are receiving a higher ES. This problem was corrected by the introduction of AIS (Article Influence Score) where the ES is normalized by number of papers published.

#### III. INTERNET AND TEXT PROCESSING ROBOTS

PERL is short for "Practical Extraction and Report Language", created by Larry Wall in the mid-1980s to make report processing easier. Since then, continuous changes and revisions have been made to improve it. PERL is an efficient language related to string

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a CGI scripting language. Other than CGI, PERL is also a useful tool for graphics programming, system administration, network programming, and other applications.

One main feature of PERL is its well-known regular expression support, which is so powerful and versatile that it has actually set a new standard for the regular expressions and is now emulated in many other programs and languages. The other important advantage of PERL is its huge resource of free modules which are written by many different contributors and can be found at cpan.org. The installation of modules can be managed by PPM (Perl Package Manager), and the use of modules requires as simply as only one declaration "use ModuleName" at the beginning of the Perl code.

The PERL language is a very efficient platform to develop software run over the internet [8][44]: such as the internet SPICE [9] or online neural network trainer [40,43]. These attempts were precursors of the recently grown trend of the cloud computing. PERL can be also very useful for data mining [41,50] and for development of internet robots [42,5].

### IV. TIMELY PERFORMANCE OF THE REVIEW PROCESS

The MC (MauscriptCentral) system for paper collection and review can keep relatively good track of the submission and review process. There is information for each article, how many days have passed since the first decision, how long was the manuscript in revision with authors, and when the final decision was made. However, MC is completely disconnected from the production process, and there is no information there about electronic or hard copy publication dates. This information can be extracted from the IEEE Xplore system by finding which issue the paper was eventually published. Internet robots for extraction of such information were already developed [5,42]. The extended versions of these scripts written in PERL helped us to develop the Society web page: http://tii.ieee-ies.org/IESpub.htm where there is easy access to titles and abstracts of three IES journals: TIE, TII, IEM, and to 11 major conferences of the Society. This web page also allows an easy search for keywords in titles and abstract. If this paper is accessed from the domain with paid subscriptions then visitors may also download the full text of documents. Obviously this web page is also very useful to find information about date of publication, length of papers, etc.

In order to find, for example, information about average time between acceptance date and the publications dates then a robot has to be written to extract information from ManuscriptCentral data and from the web page *http://tii.ieee-ies.org/IESpub.htm*.

Fig. 2 shows average time between manuscript submission and the first decision for TIE and TII. One may notice that this time in TIE was significantly shorter in 2008, and it is staying in the range of 10 to 11 weeks. In TII this time oscillates about 11 weeks. Fig. 3 shows average time from submission to the final decisions. Fig 4 shows average time between acceptance and the publication and Fig. 5. Shows average times between submissions to the publication date. Figs 4 and 5 shows a significant delay in publications in TIE because relatively large backlog of accepted papers. On other hand in TII (see Fig.4) the time between acceptance and printing was below 50 days in 2008. This means that there were not enough accepted manuscripts to submit them on time for printing because IEEE usually needs final manuscripts about 90 days before publication date.



Fig.2 Average time between submission and the first decision for TIE and TII.



Fig.3 Average time between submission and the final decision for TIE and TII.



Fig.4 Average time between acceptance and the publication for TIE and TII.



Fig.5 Average time between submission and the publication for TIE and TII.

#### V. QUALITY OF THE REVIEW PROCESS

There is an indirect measure of Associate Editor performance by analyzing the acceptance rate for each AE. This information can be extracted from MC data, but the results could be misleading. For example, one AE may receive only very good manuscripts so his acceptance rate is very high, and another AE may receive for processing lower quality manuscripts, so naturally his acceptance rate would be low. Therefore the acceptance rate may not be the only measure to evaluate performance of AEs.

The more objective measure of AE quality work would be to link papers which she/he has accepted to the citations of these papers. In other words, apply the same measure which is being used to evaluate journal ranking. Unfortunately this information is not easily accessible. Part of the information about who has processed the manuscript is in the MC database, and other information about citations of manuscripts can be found in Google Scholar, "Publish or Perish", or in the data generated by Thomson Reuters. It was a challenge to extract and to combine this information.

Tables II and III presents normalized citations of papers processed by Associate Editors in TIE and TII. Data in these tables excluded Associate Editors which accepted less than 3 manuscripts. Column 2 shows number of accepted papers by given Associate Editor, column 3 shows number of citations of these papers, column 4 lists number of citations per quarter (since the publication date), and the last column shows the average number of citations per paper and per year. The data in these tables are sorted by the last column.

Table II presents data for the top 40 Associate Editors of the IEEE Trans. on Industrial Electronics, while, Table III presents the top 20 Associate Editors of the IEEE Trans. on Industrial Informatics. Because the TIE is about 7 times as large as TII, each Associate Editor is processing a larger number of papers than their partners in TII. Also, TIE has a larger Impact Factor and a larger number of Associate Editors which can be ranked.

The information provided in Tables II and III is definitely a better measure of the Associate Editor performance than commonly used measures such as the acceptance rate, review time, etc. Of course the review time is also important, but it is not as important as a proper evaluation of chances of manuscript citations.

Table	Π	CITATION	ANALYSIS	FOR	PAPER	PROCESSED	BY
Differi	ENT	ASSOCIATE	EDITORS IN	TIE			

AE numb	#of	#of	citations	citations
	papers	cit.	/quarter	/pap/year
AE# 009	24	1709	104.21	17.37
AE# 029	8	378	31.78	15.89
AE# 054	34	1701	121.33	14.27
AE# 024	8	309	28.05	14.02
AE# 001	11	312	36.77	13.37
AE# 037	11	433	34.12	12.41
AE# 041	5	205	15.32	12.26
AE# 088	28	762	85.38	12.20
AE# 043	5	152	14.51	11.61
AE# 076	16	470	45.22	11.30
AE# 008	7	224	19.35	11.06
AE# 063	27	541	72.60	10.76
AE# 086	7	121	18.63	10.65
AE# 061	21	423	53.77	10.24
AE# 010	15	292	37.63	10.04
AE# 057	7	129	17.46	9.98
AE# 051	25	567	61.85	9.90
AE# 044	7	97	17.25	9.85
AE# 052	4	95	9.73	9.73
AE# 002	16	361	38.30	9.58
AE# 012	20	680	45.33	9.07
AE# 084	19	314	39.93	8.41
AE# 046	8	137	16.71	8.36
AE# 073	11	285	22.79	8.29
AE# 064	9	139	18.50	8.22
AE# 027	31	627	59.67	7.70
AE# 090	9	204	17.18	7.64
AE# 096	11	118	20.40	7.42
AE# 055	14	228	25.94	7.41
AE# 058	5	45	9.20	7.36
AE# 070	13	254	23.68	7.29
AE# 095	16	279	28.71	7.18
AE# 062	23	318	40.89	7.11
AE# 033	20	318	35.10	7.02
AE# 066	17	284	29.67	6.98
AE# 038	31	445	53.31	6.88
AE# 087	13	283	22.13	6.81
AE# 018	3	65	5.07	6.76
AE# 078	15	303	25.24	6.73
AE# 007	13	288	21.85	6.72
AE# 019	13	280	21.76	6.70

TABLE III CITATION ANALYSIS FOR PAPER PROCESSED BY DIFFERENT ASSOCIATE EDITORS IN TII

AE numb	#of	# of	citations	citations
	papers	cit.	/quarter	/pap/year
AE #07	3	253	14.32	19.09
AE #50	6	168	16.84	11.23
AE #15	3	101	6.86	9.14
AE #55	5	143	10.69	8.55
AE #58	6	201	10.64	7.04
AE #31	2	55	3.44	6.88
AE #43	7	164	10.21	5.83
AE #49	2	37	2.33	4.65
AE #53	2	32	2.29	4.57
AE #37	6	45	6.81	4.54
AE #35	3	58	3.26	4.34
AE #52	2	28	1.87	3.73
AE #57	2	5	1.75	3.50
AE #05	11	75	9.06	3.30
AE #23	4	23	3.28	3.28
AE #18	13	92	10.42	3.21
AE #24	2	8	1.50	3.00
AE #02	5	24	3.69	2.95
AE #03	8	41	5.62	2.81
AE #34	2	7	1.40	2.80

TABLE IV CITATION OF ALL PAPERS PUBLISHED IN TIE

	# of	# of	citations	citations
year	pap.	cit.	/quarter	/pap/year
2006	70	3641	28.66	12.53
2007	200	6109	10.04	8.67
2008	299	6573	6.72	7.69
2009	380	4751	7.57	1.65
2010	311	2046	4.45	1.48
2011	169	456	2.42	1.12

As one can see from Tables IV and V, the number of citations is growing monotonically with time. Therefore, the earlier the publication time the larger number of citations could be expected. Also, for a larger journal with more papers one may expect more citations. A better comparative measure is to calculate the average number of citations per paper and per year (last columns in Tables IV and V). Even with this type of normalization, one may notice that chances of citations are increasing with time.

TABLE  $\,\,V$  Citation of Regular and SS papers published in TII

		# of	# of	citations	citations
year	type	pap.	cit.	/quarter	/pap/year
2006	regular	26	667	39.93	6.14
2006	SS	6	158	8.41	5.61
2007	regular	26	267	20.79	3.20
2007	SS	6	194	11.4	7.60
2008	regular	25	320	29.98	4.80
2008	SS	7	36	3.51	2.01
2009	regular	15	69	10.29	2.74
2009	SS	31	196	24.95	3.22
2010	regular	20	41	10.03	2.01
2010	SS	45	85	19.35	1.72

Please notice that the number of papers listed in tables IV and V are representing only papers which actually were cited. The number of published papers is always larger because many papers are never cited. Notice that if the IF of the journal is around 3 then every paper which receives less than 3 citations per year is hurting the journal ranking.

## VI. CITATION ANALYSIS FOR SPECIAL SECTIONS

There is also a significant citations difference depending on the topic of Special Sections. In the case of most Special Sections, citations are slightly higher than citations to regular papers. However there are some cases where citations to SS papers are significantly lower, and this may provide a valuable feedback to the editorial board.

TABLE IV CITATION ANALYSIS FOR SPECIAL SECTION PAPERS PUBLISHED IN TII

SS Name	printed	citations
		/pap/year
SS on Wireless Technologies in Facto	2007/2	7.99
SS on Wireless Technologies in Facto	2007/3	6.99
SS on Factory Communication System	2005/3	5.79
SS on Communication in Automation	2006/2	4.87
SS on Real-Time Systems part 2	2009/1	3.96
SS on Real-Time and (Networked) En	2009/3	3.18
SS on Communication in Automation	2008/2	2.35
SS on In-Vehicle Embedded Systems	2009/4	2.11
SS on Industrial Control	2010/1	2.09
SS on Communication in Automation	2009/2	1.97
SS on Industrial Communication Syst	2010/3	1.88
SS on Real-Time Applications and To	2010/4	1.85
SS on Formal Methods in Manufactur	2010/2	1.70
SS on Real-Time and (Networked) En	2010/4	1.21
SS on Real-Time Systems Part 1	2008/4	1.03
SS on Power-Aware Computing	2010/3	0.68

TABLE V CITATION ANALYSIS FOR SPECIAL SECTION PAPERS PUBLISHED IN TIE

SS Name	printed	citations
		/pap/year
SS on Automotive	2008/6	23.64
SS on Digital Ecosystems and Cyber I	2011/6	15.82
SS on Predictive Control of Power El	2009/6	11.74
SS on Photovoltaic Power Processin	2008/7	11.63
SS on Industrial Wireless Sensor Net	2009/10	10.77
SS on FPGA	2007/4	10.02
SS on Advances in Electrical Machine	2008/12	9.70
SS on FPGA	2008/4	9.60
SS on Voltage and Current Control o	2009/2	9.41
SS on Application and Control of Do	2009/10	9.20
SS on Multilevel Inverters	2010/8	9.03
SS on Active and Hybrid Filters to En	2009/8	8.27
SS on Efficient and reliable photovo	2009/11	6.84
SS on Renewable Energy Systems	2011/1	6.68
SS on Education	2007/6	6.45
SS on Energy Harvesting	2010/3	6.37
SS on Predictive Control of Power El	2008/12	6.25
SS on Hardawre-in-the-loop	2010/4	6.17
SS on Advances in Electrical Machine	2010/1	6.12
SS on Fuel cells power	2010/6	5.89
SS on Applications of Embedded Sys	2011/3	5.88
SS on Plug-in hybrid electric vehicle	2010/2	5.86
SS on Sliding Mode Control in Indus	2008/11	5.70
SS on Radio Frequency Identification	2009/7	5.23
SS on Thermal Issues in Electrical Ma	2008/10	5.15
SS on Education	2008/6	4.79
SS on Advances in Motion Control	2009/10	4.63
SS on Automotive Power and Energy	2010/3	4.59
SS on Education	2009/12	4.58
SS on Advances in Electrical Machine	2009/11	4.15
SS on Sliding Mode Control in Indus	2009/9	4.11
SS on Diagnostics of EMPED	2011/5	3.66
SS on Energy Storage System	2010/12	3.44
SS on Electronic Devices and System	2011/7	3.33
SS on Building Automation, Control	2010/11	3.17
SS on Switched Reluctance Machine	2010/9	2.80
SS on Wireless Technology	2010/5	2.55
SS on Advances in Microelectromec	2009/4	2.54
SS on Education	2010/10	2.42

### VII. BEST CITED PAPERS

## TABLE VI BEST CITED PAPERS IN TIE

Citations of the TIE Papers							
2004 citations	354	174	165	163	131		
citations/year	47.73	22.95	22.50	22.23	17.47		
2005 citations	207	116	103	101	90		
citations/year	31.05	18.08	16.26	15.95	13.85		
2006 citations	567 [29]	461 [14]	183	174	170		
citations/year	104.68	86.44	32.78	30.71	30.45		
2007 citations	281	225	223	128	126		
citations/year	66.12	55.10	47.79	28.98	28.00		
2008 citations	157 [13]	145 [35]	141 [2]	131 [1]	124 [51]		
citations/year	47.10	44.62	43.38	47.64	38.15		
2009 citations	93 [23]	87 [56]	83 [48]	71 [25]	67 [54]		
citations/year	37.20	45.39	36.89	28.40	29.78		
2010 citations	62 [39]	57 [47]	51 [26]	45 [20]	43 [4]		
citations/year	53.14	52.62	43.71	28.42	25.80		

## TABLE VII BEST CITED PAPERS IN TII

Citations of the TII Papers							
2005 citations	218 [15]	89	70	50	46		
citations/year	33.11	13.52	11.51	7.89	6.99		
2006 citations	89	88	79	73	54		
citations/year	16.69	15.76	16.34	13.69	10.62		
2007 citations	50	48	38	38	34		
citations/year	11.54	12.52	8.77	9.31	8.33		
2008 citations	167 [3]	26 [33]	25 [16]	17 [55]	16 [10]		
citations/year	50.10	8.43	8.82	4.74	5.19		
2009 citations	26 [53]	25 [22]	24 [28]	17 [37]	16 [24]		
citations/year	12.48	12.00	9.29	9.27	6.86		
2010 citations	9 [57]	7 [59]	7 [12]	7 [18]	6 [11]		
citations/year	5.68	4.42	5.25	6.46	3.79		

TABLE VIII BEST CITED PAPERS IN IEM

Citations of the IEM Papers							
2007 citations	65	34	26	20	14		
citations/year	14.44	8.00	6.12	5.00	3.73		
2008 citations	152 [36]	18 [17]	17 [21]	16 [49]	7 [46]		
citations/year	46.77	5.14	5.67	5.82	2.33		
2009 citations	36 [7]	32 [45]	23 [31]	22 [32]	14 [34]		
citations/year	20.57	12.80	10.22	9.78	8.00		
2010 citations	30 [38]	23 [30]	16 [6]	8 [27]	7 [19]		
citations/year	45.00	34.50	24.00	6.00	10.50		

# VIII. CONCLUSION

It is obvious that good papers have a good chance for citations, but there are other things that can also affect citations. For example, a paper with very good ideas will not be cited if it is not found and read. Therefore there are several other elements that can be considered in writing the manuscript to increase chances of citations:

(1) The title must include as many keywords as possible so search engines are able to find the paper.

(2) The abstract should be very well written with a good sell of ideas, so the paper will actually be downloaded and read.

(3) The text must be well written, so many people may follow and understand it. This is often not just a matter of using proper English, but also it pertains to the way the message is organized. It is always a good idea to ask someone outside of the area to read it and check it to see if he/she understands the paper. If people have difficulties in understanding your written delivery, there is a very slim chance that it will be cited.

(4) The manuscript must be within the scope of the journal. It is important because papers out of the journal scope have reduced chances to be found and cited. One way to verify the scope is to check if the manuscript is linked with previously published papers in the journal.

(5) A comparison of existing techniques with some comments about their efficiencies are always interesting to readers.

(6) Written recipes for specific solutions are also in high demand.

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