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Citation impact analysis of research papers that appear in oral and poster sessions: A case study of three computer science conferences

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Citation impact analysis of research papers that appear in oral and poster sessions

A case study of three computer science conferences

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Abstract

Purpose – Conference publications are an important aspect of research activities. There are generally both oral presentations and poster sessions at large international conferences. One can hypothesise that, for the same conferences, the papers presented in oral sessions should have a higher research impact than the papers presented in poster sessions. However, there has been no related study examining the validity of this hypothesis. In other words, the difference of research impact between papers presented orally or during poster sessions has not been discussed in literature. Therefore, the purpose of this paper is to conduct a citation analysis to compare the research impact of papers presented in oral and poster sessions.

Design/methodology/approach – In this paper, data from three leading conferences in the field of computer vision are examined, namely CVPR (2011 and 2012), ICCV (2011) and ECCV (2012). Several types of citation-related statistics are collected, including the number of highly cited papers (i.e. high number of citations) presented in oral and poster sessions, the total citations of both types of papers, the average citations of oral and poster papers, and the average citations of each frequently cited paper of both types.

Findings – There are three main findings. First, a larger proportion of highly cited papers are from oral sessions than poster sessions. Second, the average number of citations per paper is larger for those presented in oral sessions than poster sessions. Third, the average number of citations for highly cited papers presented in oral sessions is not necessarily greater than for the ones presented in poster sessions.

Originality/value – The originality of this paper is that it is the first attempt to examine the differences of citation impacts of conference papers presented in oral and poster sessions. The findings of this study will allow future bibliometrics research to further explore this related issue for longer periods and different fields.

Keywords Citation analysis, Bibliometrics, Conference publication, Highly cited papers, Oral sessions, Poster sessions

Paper type Case study

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Introduction

Conference publications are an important aspect of research activities, allowing relevant researchers and scientists to present and share their research findings with their peers around the world. Specifically conference papers tend to contain more up-to-date information than journal papers because of the time delay caused by the reviewing and publication processes. In addition publishing and presenting research results at leading international conferences is an indication that the quality of the research findings has been recognised at the highest level in the world by international scholars and reviewers. Therefore papers published in leading conferences are likely to generate a more significant citation impact in related research fields.

A higher citation impact can be simply regarded as an indication that this specific publication has received more attention from researchers doing similar work. Specifically these works have been cited by relevant conference and journal papers. Currently citation analysis is one of the most popular quantisation methods for evaluating the impact of research papers. In general it is determined by examining the frequency of citations in the related literature (Garfield, 1983; Rubin, 2010). Papers that are cited more frequently in the same subject areas are deemed to have greater impact on research (impact factor) than those with fewer citations.

There have been several related studies in the literature focusing on analysing the citation statistics of conference papers. For example, Rahm and Thor (2005) analysed citation frequencies for two major conferences (SIGMOD and VLDB). In their analysis they considered different comparative metrics, such as the total and average number of citations as well as the impact factor of each publication venue. In another study Haddow (2009) showed that the total number of citations to conference proceedings in natural sciences and engineering (NSE) and social sciences and humanities (SSH) had increased in the period from 1980 to 2005. In particular in the fields of engineering and computer science the proportion of proceedings citations ranged from around 5 per cent (general engineering) to 19.6 per cent (computers). In SSH, however, proceedings citations exceeded 5 per cent in only one field (ergonomics, 7.6 per cent). Lisee *et al.* (2008) found that the relative importance of proceedings had diminished over time, comprising only 1.7 per cent of references in NSE and 2.5 per cent in SSH. Although the scientific impact factor of conference proceedings is shrinking in comparison to other types of scientific literature in nearly all fields, in computer sciences they still play a particularly important role, accounting for close to 20 per cent of all references.

Recently Janakiramaiah and Doraswamy (2011) examined the citation pattern of conference papers published for CALIBER 2005 and 2006, utilising different metrics including the average number of citations per paper, authorship pattern, different web site domains, type of conference proceedings, geographical distribution and a ranked list of cited journals.

Other studies have collected information on multiple types of publications including journals, reviews and conferences for specific citation analyses, for example, Plotnikova and Rake (2014) for pharmaceutical research and Bornmann *et al.* (2014) for ranking and mapping of universities and research-focused institutions.

The types of presentation at many international conferences generally include oral and poster sessions, where the determination of the presentation type for each accepted research paper is based on the quality, contribution and/or potential impact of related fields as judged by reviewers and conference committees. This study investigates the differences in citation impact between the conference papers that are presented in oral

and poster sessions. The objective is to examine whether the papers presented in oral sessions have a higher citation impact than the papers presented in poster sessions.

The rest of this paper is organised as follows. The next section describes the research methodology and data collected for the citation analysis. Then the results of the analysis are presented and discussed, followed by conclusions.

Methodology and data

Data were collected for citation analysis from three leading computer vision conferences in 2011 and 2012: IEEE International Conference on Computer Vision and Pattern Recognition (CVPR 2011, http://cvpr2011.org/ and 2012, www.cvpr2012.org/), IEEE International Conference on Computer Vision (ICCV 2011, www.iccv2011.org/) and European Conference on Computer Vision (ECCV 2012, http://eccv2012.unifi.it/). Note that since ICCV and ECCV are biennial conferences, ICCV 2011 and ECCV 2012 were chosen for consistent comparison with CVPR.

One distinctive characteristic of these conferences is that all the papers presented in the oral and poster sessions are full papers, which differs from other conferences where short papers are presented in the poster sessions. However, the acceptance rates are much lower for oral presentations than those for poster presentations. For example, for ICCV 2011, the acceptance rates for oral and poster presentations are 3.6 and 22.9 per cent, respectively. In other words competition is greater for the papers presented in oral sessions.

We used the Publish or Perish software (www.harzing.com/pop.htm#download – calculation date between 6 and 11 March 2014) to determine the number of citations. The papers that are highly cited are also determined by the software, based on the *h*-index proposed by Hirsch (2005). The *h*-index is defined as follows: a publication with an index of *h* has published *h* papers each of which has been cited in other papers at least *h* times. Therefore a highly cited paper is one whose number of citations is larger than the *h*-index of the publication that publishes the paper. For example, a publication publishes 20 papers in 2010 and its *h*-index is 15: the papers which are cited more than 15 times are regarded as highly cited papers.

Specifically five related statistics were examined, namely the number of oral and poster papers presented, the numbers of frequently cited papers in oral and poster sessions, the total number of citations of both oral and poster papers, the average number of citations of both oral and poster papers, and the average number of citations of each highly cited paper in both oral and poster sessions.

The citation-related statistics compiled by the Publish or Perish software were collected from Google Scholar. Although according to Aguillo (2011) and Jacsó (2010) the quality of metadata and citation data in Google Scholar is insufficient, it is an alternative source of data for citation analysis, since some journal and conference papers are not ISI-indexed (Harzing and Van der Wal, 2008). Despite its limitations, Google Scholar has been used widely for citation analysis in the literature, for AI journal ranking (Serenko, 2010), for marketing journal ranking (Moussa and Touzani, 2010) and by business scholars (Amara and Landry, 2012).

After collection of the relevant data, the main research hypothesis was formulated based on the assumption that the papers presented in oral sessions will have higher research impact than the papers presented in poster sessions. To test this hypothesis three sub-hypotheses are examined, which are described below:

H1. A larger proportion of highly cited papers will be presented in oral sessions than poster sessions.

Since the acceptance rates for oral presentations are much lower than for poster presentations, the proportion of papers in oral sessions which have a higher citation index should be larger than for the papers presented in poster sessions:

H2. The average number of citations per paper presented in oral sessions is larger than those presented in poster sessions.

Similar to *H1* the papers presented in oral sessions are judged to be more important and to make a greater contribution, and thus have a certain research impact factor. As a result on average, papers presented in oral sessions are generally cited more often than papers in poster sessions:

H3. The average number of citations of highly cited papers will be higher for those presented in oral sessions than in poster sessions.

In relation to *H1* and *H2* the citation impact of more frequently cited papers should be higher for those presented in oral sessions than poster sessions. The average number of citations for frequently cited papers will be higher for those presented in oral sessions than poster sessions.

Results and discussion

Statistics and basic information

Table I shows the basic information including the number of papers presented in oral and poster sessions and the acceptance rates for CVPR, ECCV and ICCV. We can see that far fewer papers are presented in oral sessions than poster sessions. In addition the acceptance rates for oral presentations are much lower than for poster presentations. This is because in these leading computer vision conferences, only papers which are recognised by reviewers and programme committees as making an important contribution to research work are allowed to be presented in the oral sessions. In other words, papers accepted for oral presentation are more likely to have a significant impact in the computer vision field.

Note that the total number of papers accepted for oral and poster sessions is 187 and 1,419, respectively, a very large difference. To avoid an imbalance resulting from unfair comparison, the total number of citations is not examined. In particular the proportion of highly cited papers in oral and poster sessions and the average number of citations per (highly cited) papers presented in oral and poster sessions are compared in advance.

Table I. Numbers of papers in oral and poster sessions and their acceptance rates

	Oral	Poster
CVPR		
2012	56 (2.5%)	361 (24.1%)
2011	48 (3.5%)	413 (22.5%)
ECCV		
2012	40 (2.8%)	368 (25.6%)
ICCV		
2011	43 (3.6%)	287 (22.9%)

Citation analysis results

Table II shows the number of highly cited papers presented in oral and poster sessions, with the proportion of the most highly cited papers in each session being listed in brackets. According to Table II the first hypothesis – that a larger proportion of highly cited papers comes from the oral sessions than the poster sessions – is proven. In spite of this fact, there is certainly an increase in the proportion of highly cited papers in the poster sessions published from 2011 to 2012. Specifically there is an approximately twofold increase in the proportion in 2012 over 2011. This raises some questions for continuing investigation and whether this trend can also be seen in different research fields.

Table III shows the average number of citations per paper from oral and poster sessions. The average number of citations for each paper presented in oral sessions is almost twice that of papers presented in poster sessions. This means that on average, the impact factor of papers presented in oral sessions is generally higher. This result proves the second hypothesis that the average number of citations per paper is larger for those presented in oral sessions than for those presented in poster sessions.

For the third hypothesis Table IV shows the average citations per highly cited paper from both oral and poster sessions. Note that the number in brackets indicates the

Table II.
Number of highly cited papers and their proportion in oral and poster sessions

	Oral	Poster
CVPR		
2012	14 (25%)	36 (10%)
2011	12 (25%)	21 (5.1%)
ECCV		
2012	11 (25.6%)	26 (9.1%)
ICCV		
2011	6 (15%)	13 (3.5%)

Table III.
Average number of citations per paper presented in oral and poster sessions

	Oral	Poster
CVPR		
2012	40.1	23.8
2011	26.8	12.3
ECCV		
2012	32	20.5
ICCV		
2011	16.8	7

Table IV.
Average number of citations per highly cited paper in the oral and poster sessions

	Oral	Poster
CVPR		
2012	90.9 (172)	94.6 (143)
2011	71.8 (234)	62.3 (423)
ECCV		
2012	61.5 (77)	103.7 (131)
ICCV		
2011	42.2 (127)	40.2 (426)

paper having the largest number of citations. Interestingly in 2011 the average number of citations per highly cited paper was larger for those presented in oral sessions than in poster sessions. However, the results are opposite in 2012. In addition the highly cited papers with the largest number of citations were not always presented in the oral sessions in these two years. This indicates that papers presented in the poster sessions do not necessarily have a lower impact factor than the papers presented in oral sessions. Therefore this result only partially proves the third hypothesis.

Finally, further comparison is made of some oral and poster sessions from CVPR 2011 to 2012 that have the same topics, as shown in Figures 1 and 2, respectively. As we can see for most topics the average number of citations per paper is much larger for those presented in oral sessions than in poster sessions. The exceptions are "computational photography and video analysis" and "object recognition and image modelling" in 2011. Although the citation impact factor of papers presented in oral sessions is likely to be higher than the papers presented in poster sessions, some papers presented in poster sessions may have an even higher impact in their research fields.

Summary and conclusions

This paper examined the differences in research impact factor between conference papers presented in oral and poster sessions. The impact factor of conference papers is based on related citation statistics, such as total number of citations, average citations per paper, number of highly cited papers, average citations per highly cited paper and so on.

Based on the data collected from three leading international conferences in the computer vision field, namely CVPR (2011 and 2012), ICCV (2011) and ECCV (2012), we found that the acceptance rates for oral sessions are much lower than for poster sessions. This is an indication that the papers presented in oral sessions can be

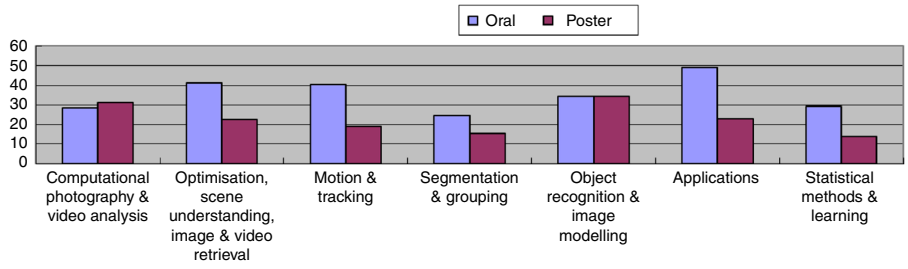

Figure 1.
Average number of citations per paper from oral and poster sessions for CVPR 2011

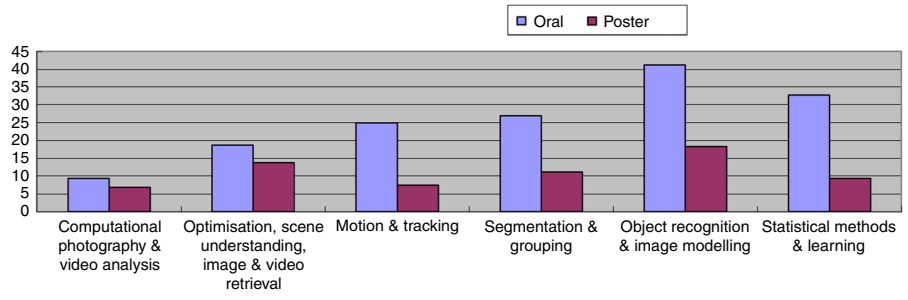

Figure 2.
Average number of citations per paper from oral and poster sessions for CVPR 2012

regarded as making a greater contribution and having a more significant impact than the papers presented in poster sessions. In addition according to the results of citation analysis, a larger proportion of highly cited papers are presented in oral sessions than poster sessions. In addition there was an almost twofold increase in the proportion of highly cited papers in poster sessions from 2011 to 2012. Specifically the proportions of highly cited papers in 2012 are about two times larger than those in 2011.

On the other hand, we observe that the average number of citations per paper presented in oral sessions is nearly two times larger than that of the papers presented in poster sessions. However, the average number of citations for highly cited papers presented in oral sessions is not always larger than for the ones presented in poster sessions. This is an indication that some very significant papers are presented in poster sessions. Therefore depending on the research topic, research content, etc. some papers presented in poster sessions may have a higher research impact than the ones presented in oral sessions.

Several issues remain to be considered in future. First, the computer vision conferences are somewhat different from other international conferences, where the oral and poster sessions are devoted to regular and short papers, respectively. Therefore the impact factor of regular and short papers needs further study. Second, as international conferences in different scientific disciplines may have different levels of importance, the impact of oral and poster-based papers needs to be investigated across different disciplines. Third, given that the acceptance rates are rather low for the conferences examined in this study, it would be better to compare the citation impact for other related conferences having higher acceptance rates. Fourth, data from the same conferences but for longer periods, such as ten years, can be further examined in order to find possible patterns. Finally, the impact of papers presented in oral and poster sessions in different research fields could be further investigated.

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