

# Can Academic Conferences Promote Research Collaboration?

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## ABSTRACT

This work proposes to investigate the question of whether attending conference will breed new scientific collaboration based on the focal closure theory. Through the analysis of conference closure on individual and community level, we show that attending conference can promote new scientific collaborations, and conferences with more attendees and higher field ratings bring more new scientific collaborations.

## Keywords

Academic social networks; Research collaboration; Focal closure

## 1. INTRODUCTION

Collaboration is playing an increasingly important role in scientific research because an individual scholar may not possess all the expertise and knowledge to address complex research issues. Consequently, tremendous efforts have been done to analyze the patterns and laws of coauthor behavior in order to enhance scientific collaboration. A scientific collaboration network extracted from coauthorships is usually static. However, it is of great importance in investigating how the network evolves over time, for example, the mechanisms of link formation and link extinction. One of the basic principles of dynamic network analysis is the triadic closure theory [2] which indicates that if two people have a common friend, they have a great chance to be friends in the future. However, in academia, new connection may happen between two unclosed scholars who may not share common collaborators. Unfortunately, no previous work has been done on explaining this phenomenon.

In this work, we try to investigate this problem based on conference closure extended from focal closure [1]. Focal closure theory means that new connections may emerge between people who have joined in the same community. The basic idea of triadic closure and focal closure can be seen from Figure 1. To be specific, we calculate the probabilities of conference closure at individual and community

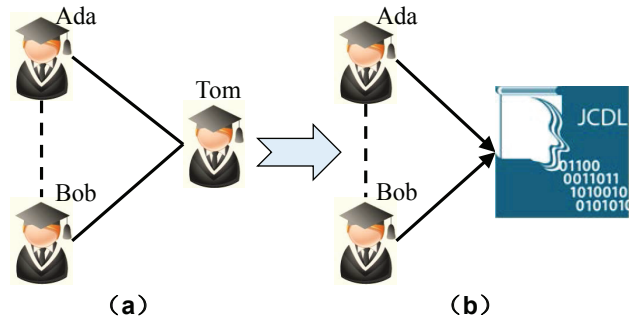


Figure 1: (a) Triadic closure; (b) Focal closure based on conference

level based on the cooperative behaviors of scholars who have published papers in the same conference in the field of Data Mining. Experimental results show that academic conference does bring new collaborations and conferences with more attendees and higher field rating are more able to promote scientific collaborations.

## 2. METHODS

### 2.1 Data Sets

Our study utilizes 12 influential conferences in Data Mining field from the computer science bibliography DBLP. We first extracted all the authors who have published papers in these conferences in 2010. The basic features of selected conferences are presented in Table 1. Then we gain their publications in the next five years to get their collaboration information.

### 2.2 Conference Closure

Conference closure means that two academic strangers who have not coauthored before are possibly to collaborate after attending a same conference. The conference closure can be studied at two different levels: (i) individual level and (ii) community level.

(i) **Individual Level** The ratio of conference closure at individual level can be calculated as:

$$CC_{\text{indiv}} = \sum_{i=1}^n \frac{N_i^c}{nN_i} \quad (1)$$

where,  $N_i$  is the total number of new collaborators of scholar

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Table 1: Statistics of selected conferences in 2010.

Conference	Founded time	Field rating <sup>1</sup>	No. of authors	No. of papers
FSKD	2002	11	1703	635
CIKM	1992	67	1103	374
ICDM	2001	56	960	353
ICDE	1984	104	660	217
KDD	1995	122	414	125
ICETET	2008	7	403	166
ADMA	2005	10	336	118
PAKDD	1998	33	292	100
SDM	2001	45	243	82
InCDM	2001	9	207	73
ICWSM	2007	19	197	72
DMIN	2005	7	165	62

<sup>1</sup> Field rating is got from Microsoft Academic Search.

Table 2: The ratios of conference closure at individual level in next 5 years.

Conference	2011	2012	2013	2014	2015
FSKD	<b>0.061</b>	0.052	0.039	0.041	0.032
CIKM	<b>0.077</b>	0.063	0.053	0.029	0.032
ICDM	<b>0.061</b>	<b>0.061</b>	0.045	0.023	0.023
ICDE	<b>0.059</b>	0.052	0.052	0.035	0.021
KDD	0.048	<b>0.055</b>	0.044	0.021	0.017
ICETET	<b>0.029</b>	0.006	0.010	0.013	0.000
ADMA	<b>0.038</b>	0.019	0.009	0.005	0.009
PAKDD	<b>0.032</b>	0.022	0.012	0.020	0.007
SDM	<b>0.035</b>	0.023	0.020	0.010	0.012
InCDM	<b>0.028</b>	0.019	0.023	0.021	0.009
ICWSM	<b>0.071</b>	0.049	0.025	0.031	0.013
DMIN	<b>0.018</b>	<b>0.018</b>	0.009	0.013	0.004

$i$  after attending conference  $C$ ,  $N_i^c$  is the number of scholar  $i$ 's new collaborators who simultaneously attend  $C$ , and  $n$  is the total number of attendees of  $C$ .  $CC_{\text{indiv}}$  can reflect how attending a conference affects scholar's decision on choosing new collaborators.

(ii) **Community Level** The ratio of conference closure at community level can be calculated as:

$$CC_{\text{com}} = \frac{N^c}{n} \quad (2)$$

where  $N^c$  is the number of scholars who cooperate with other unfamiliar attendees of  $C$ .  $CC_{\text{com}}$  can better reflect how likely is it that the conference will promote new scientific collaborations.

### 3. RESULTS AND DISCUSSION

The ratios of conference closure at individual level in different years are shown in Table 2. We can see that there is an ascending trend for all conferences. This implies that most of the new cooperations happen in the first year after the conference, and the influence of conference closure gradually decreases over time. Meanwhile, the conferences with large scale also enjoy higher ratio of conference closure at individual level. Similar with conference scale, the ratio of

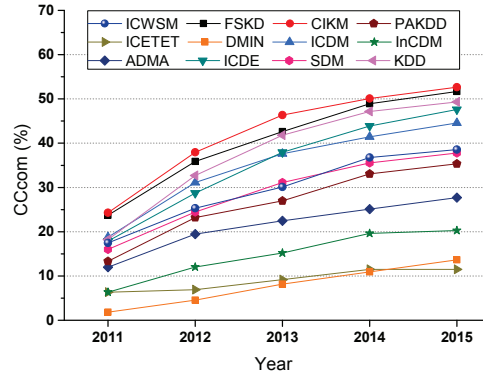


Figure 2: The ratios of conference closure at community level in next 5 years

conference closure at individual level is also positive related with field rating. In addition, the ratio of conference closure with low field rating (ICETET, ADMA, InCDM, DMIN) is very small (less than 0.010) in 2015.

Figure 2 shows the cumulative ratios of conference closure at community level in different years. We can find that there is a continuous growth for all conferences and the growth rate is relatively high from 2011 to 2013 and slightly goes down at the last two year. It indicates that attending a conference does promote new collaboration for many years. Meanwhile, the conferences with high field rating and more attendees enjoy higher ratio of conference closure at community level. Moreover, the probability reaches more than 50% for some large scale conferences (FSKD & CIKM).

Based on the analysis above, we can infer that the academic conference has a positive effect on promoting academic strangers to collaborate with each other, and conferences with more attendees and higher field ratings are more able to promote new scientific collaborations.

### 4. CONCLUSION

The theory behind our analysis is that new links may emerge between people who have joined in the same community. We verified this phenomenon based on the behavior of co-attending a conference. In future work, we will propose new mechanisms to promote scientific collaboration based on this verified theory.

### 5. REFERENCES

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