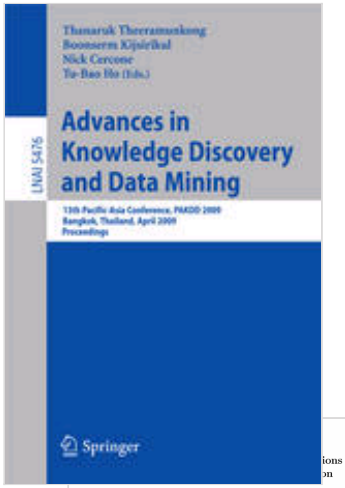
Chapter

Advances in Knowledge Discovery and Data Mining

Volume 5476 of the series Lecture Notes in Computer Science pp 254-265

Quantifying Asymmetric Semantic Relations from Query Logs by Resource Allocation

Zhiyuan Liu, Yabin Zheng, Maosong Sun



Abstract

In this paper we present a bipartite-network-based resource allocation(BNRA) method to extract and quantify semantic relations from large scale query logs of search engine. Firstly, we construct a query-URL bipartite network from query logs of search engine. By BNRA, we extract asymmetric semantic relations between queries from the bipartite network. Asymmetric relation indicates that two related queries could be assigned different semantic relevance strength against each other, which is more conforming to reality. We verify the validity of the method with query logs from Chinese search engine Sogou. It demonstrates BNRA could effectively quantify semantic relations from We further construct query semantic networks, and introduce several measures to analyze the networks. BNRA is not only 'language oblivious' and 'content oblivious', but could also be easily implemented in a paralleled manner, which provides commercial search

engines a feasible solution to handle large scale query logs.

Keywords

Semantic relations query log resource allocation asymmetric

Supplementary Material (0)

References (24)

References

1. *Beeferman, D., Berger, A.: Agglomerative clustering of a search engine query log. In: Proceedings of the sixth ACM SIGKDD international conference on knowledge discovery and data mining (2000)*

2. *Baeza-Yates, R., Tiberi, A.: Extracting semantic relations from query logs. In: Proceedings of the 13th ACM SIGKDD international conference on knowledge discovery and data mining (2007)*

3. *Wen, J.R., Jian-Yun, N., Hong-Jiang, Z.: Query clustering using user logs. ACM Transactions on Information Systems 20(1) (2002)*

4. *Shen, D., Pan, R., Sun, J.T., Pan, J.J., Wu, K., Yin, J., Yang, Q.: Query enrichment for web-query classification. ACM Transactions on Information Systems 24(3), 320–352 (2006)*
CrossRef

5. *Beitzel, S.M., Jensen, E.C., Lewis, D.D., Chowdhury, A., Frieder, O.: Automatic classification of web queries using very large unlabeled query logs. ACM Transactions on Information Systems 25(2), 9 (2007)*
CrossRef

6. *Baeza-Yates, R., Hurtado, C., Mendoza, M.: Query recommendation using query logs in search engines. In: Workshops on current trends in database technology of 9th international conference on extending database technology (2004)*

7. *Chirita, P.A., Firan, C.S., Nejdl, W.: Personalized query expansion for the web. In: Proceedings of the 30th annual international ACM SIGIR conference on research and development in information retrieval, pp. 7–14 (2007)*

8. *He, X.F., Yan, J., Ma, J.W., Liu, N., Chen, Z.: Query topic detection for reformulation. In: Proceedings of the 16th international conference on World Wide Web, pp. 1187–1188 (2007)*

9. *Zhou, T., Ren, J., Medo, M., Zhang, Y.C.: Bipartite network projection and personal recommendation. Physical Review E 76(4) (2007)*

10. *Deshpande, M., Karypis, G.: Item-based top-n recommendation algorithms. ACM Transactions on Information Systems 22(1) (2004)*

11. *Liu, Z.Y., Sun, M.S.: Asymmetrical query recommendation method based on bipartite network resource allocation. In: Proceedings of the 17th international conference on World Wide Web, Beijing (2008)*

12. *Raghavan, V.V., Sever, H.: On the reuse of past optimal queries. In: Proceedings of the 18th annual international ACM SIGIR conference on research and development in information retrieval, pp. 344–350 (1995)*

13. *Fitzpatrick, L., Dent, M.: Automatic feedback using past queries: social searching? In: Proceedings of the 20th annual international ACM SIGIR conference on research and development in information retrieval, pp. 306–313 (1997)*

14. *Baeza-Yates, R., Hurtado, C., Mendoza, M.: Query clustering for boosting web page ranking. In: Advances in Web Intelligence, pp. 164–175 (2004)*

15. *Sahami, M., Heilman, T.D.: A web-based kernel function for measuring the similarity of short text snippets. In: Proceedings of the 15th international conference on World Wide Web, pp. 377–386 (2006)*

16. *Fonseca, B.M., Golgher, P.B., de Moura, E.S., Ziviani, N.: Using association rules to discover search engines related queries. In: Proceedings of the first conference on Latin American Web Congress, pp. 66–71 (2003)*

17. *Broder, A.: A taxonomy of web search. ACM SIGIR Forum 36(2), 3–10 (2002)*
CrossRef

18. *Kang, I.H., Kim, G.C.: Query type classification for web document retrieval. In: Proceedings of the 26th annual international ACM SIGIR conference on research and development in informaion retrieval, pp. 64–71 (2003)*

19. *Gravano, L., Hatzivassiloglou, V., Lichtenstein, R.: Categorizing web queries according to geographical locality. In: Proceedings of the 12th international conference on information and knowledge management, pp. 325–333 (2003)*

20. *Baeza-Yates, R.: Graphs from search engine queries. In: van Leeuwen, J., Italiano, G.F., van der Hoek, W., Meinel, C., Sack, H., Plá šl, F. (eds.) SOFSEM 2007. LNCS, vol. 4362, pp. 1–8. Springer, Heidelberg (2007)*
CrossRef

21. *Zhou, T., Jiang, L.L., Su, R.Q., Zhang, Y.C.: Effect of initial configuration on network-based recommendation. Europhysics Letters 81(5), 58004 (2008)*
CrossRef

22. *Ross, S.M.: Introduction to Probability Models, 9th edn. Academic Press, Inc., Orlando (2006)*
MATH

23. *Kapp, A.V., Tibshirani, R.: Are clusters found in one dataset present in another dataset? Biostatistics 8(1), 9–31 (2007)*
MATH CrossRef

24. *Newman, M.E.J.: The structure and function of complex networks. SIAM Review 45(2), 167–256 (2003)*
MATH CrossRef MathSciNet

About this Chapter

Title
Quantifying Asymmetric Semantic Relations from Query Logs by Resource Allocation

Book Title
Advances in Knowledge Discovery and Data Mining

Book Subtitle
13th Pacific-Asia Conference, PAKDD 2009 Bangkok, Thailand, April 27-30, 2009 Proceedings

Pages
pp 254-265

Copyright
2009

DOI
10.1007/978-3-642-01307-2_25

Print ISBN

Topics
Artificial Intelligence (incl. Robotics)
Data Mining and Knowledge Discovery
Information Storage and Retrieval
Probability and Statistics in Computer Science
Multimedia Information Systems
Computer Appl. in Administrative Data Processing

Keywords
Semantic relations
query log
resource allocation
asymmetric

Industry Sectors
Electronics
Telecommunications
IT & Software

eBook Packages

Editors
Thanaruk Theeramunkong (19)
Boonserm Kijsirikul (20)
Nick Cercone (21)
Tu-Bao Ho (22)

Editor Affiliations
19. Sirindhorn International Institute of Technology, Thammasat University
20. Dept. of Computer Engineering, Faculty of Engineering, Chulalongkorn University
21. Faculty of Science & Engineering, York University
22. School of Knowledge Science, Japan Advanced Institute of Science and Technology

Authors
Zhiyuan Liu (23)
Yabin Zheng (23)
Maosong Sun (23)

978-3-642-01306-5

Online ISBN
978-3-642-01307-2

Series Title
Lecture Notes in Computer Science

Series Volume
5476

Series ISSN
0302-9743

Publisher
Springer Berlin Heidelberg

Copyright Holder
Springer Berlin Heidelberg

Additional Links
About this Book

Computer Science
eBook Package english full Collection

Author Affiliations
23. Department of Computer Science and Technology, State Key Lab on Intelligent Technology and Systems, National Lab for Information Science and Technology, Tsinghua University, Beijing, China, 100084