

MAPPING COLLABORATIVE: CO-AUTHORSHIP NETWORK ANALYSIS IN THE JOURNAL OF GRAPH THEORY (2001-2015)

(Memetakan Kolaboratif: Analisis Rangkaian Penulisan Bersama dalam
Journal of Graph Theory (2001-2015))

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ABSTRACT

The co-authorship of articles in peer-reviewed journals contributes to knowledge based on the research community. Co-authorship can be termed as a collaboration between two or more authors if they publish a scientific work together. The main goal of this study is to analyse the co-authorship network of scientists who published their articles in the Journal of Graph Theory. The co-authorship data of 810 articles published in the journal from 2001 until 2015 was collected. We used the principle of network sciences in which the network nodes represent authors who are connected with the edges if they co-authored papers. The analysis was conducted using the network science indicators and visualisations of the co-authorship network and thereafter centrality measures such as degree centrality, betweenness centrality, and closeness centrality are used to identify the authors' connectedness and influence in the network. The study identifies key influential authors based on centrality measures, demonstrating their pivotal roles in the network. Furthermore, the prevalence of multi-author collaborations underscores the collaborative nature of research in this domain.

Keywords: social network analysis; co-authorship analysis; network science; centrality

ABSTRAK

Penulisan bersama dalam artikel-artikel yang diterbitkan dalam jurnal berwasit menyumbang kepada perkembangan ilmu pengetahuan dalam kalangan komuniti penyelidikan. Penulisan bersama boleh ditakrifkan sebagai kolaborasi antara dua atau lebih pengarang apabila mereka menerbitkan hasil karya saintifik secara bersama. Matlamat utama kajian ini adalah untuk menganalisis rangkaian penulisan bersama dalam kalangan saintis yang menerbitkan artikel mereka dalam *Journal of Graph Theory*. Data penulisan bersama daripada 810 artikel yang diterbitkan dalam jurnal tersebut dari tahun 2001 hingga 2015 telah dikumpul. Kami menggunakan prinsip sains rangkaian di mana nod dalam rangkaian mewakili pengarang yang dihubungkan dengan sisi jika mereka menulis bersama artikel. Analisis dijalankan menggunakan indikator sains rangkaian dan visualisasi rangkaian penulisan bersama, diikuti dengan ukuran keterhubungan seperti *degree centrality*, *betweenness centrality*, dan *closeness centrality* bagi mengenal pasti keterhubungan dan pengaruh pengarang dalam rangkaian tersebut. Kajian ini mengenal pasti penulis berpengaruh utama berdasarkan ukuran keutamaan (*centrality measures*), yang menunjukkan peranan penting mereka dalam rangkaian tersebut. Selain itu, prevalensi kerjasama pelbagai penulis menekankan sifat kolaboratif penyelidikan dalam bidang ini.

Kata kunci: analisis rangkaian social; analisis penulisan bersama; sains rangkaian; keterhubungan

References

- Carchiolo V., Grassia M., Malgeri M. & Mangioni G. 2022. Co-authorship networks analysis to discover collaboration patterns among Italian researchers. *Future Internet* **14**(6): 187.

- Coleman J.S. 1994. *Foundations of Social Theory*. United States of America: Harvard University Press.
- Di Bella E., Gandullia L. & Preti S. 2021. Analysis of scientific collaboration network of Italian Institute of Technology. *Scientometrics* **126**(10): 8517-8539.
- Englebrecht T.D., Hanke S.A. & Kuang Y. 2008. An assessment of patterns of co-authorship for academic accountants within premier journals: Evidence from 1979–2004. *Advances in Accounting* **24**(2): 172-181.
- Fleischman R.K. & Schuele K. 2009. Co-authorship in accounting history: Advantages and pitfalls. *Accounting, Business and Financial History* **19**(3): 287–303.
- Freeman L.C. 1978. Centrality in social networks conceptual clarification. *Social Networks* **1**: 215–239.
- Hasni R., Yusoff N.I., Movahedi F., Rudrusamy G. & Bakar S.A. 2023. The co-authorship network analysis of research papers in The Malaysian Journal of Mathematical Sciences in 2019. *Journal of Mathematical Sciences and Informatics* **3**(1): 25-41.
- Kılıç M., Uyar A. & Koseoglu M.A. 2019. Co-authorship network analysis in the accounting discipline. *Australian Accounting Review* **29**(1): 235-251.
- King A.E.H. & Settle Q. 2019. Coauthor network analysis of Journal of Applied Communications articles from 2008-2017. *Journal of Applied Communications* **103**(4): 5.
- Knoke D. & Yang S. 2008. *Social Network Analysis*. 2nd Ed. United States of America: Sage Publication, Inc.
- Kumar S. & Markscheffel B. 2016. Bonded-communities in HantaVirus research: a research collaboration network (RCN) analysis. *Scientometrics* **109**: 533-550.
- Li E.Y., Liao C.H. & Yen H.R. 2013. Co-authorship networks and research impact: A social capital perspective. *Research Policy* **42**(9): 1515-1530.
- Melin G. & Persson O. 1996. Studying research collaboration using co-authorships. *Scientometrics* **36**(3): 363–377.
- Mohammadamin E., Ali R.V. & Abrizah A. 2012. Co-authorship network of scientometrics research collaboration. *Malaysian Journal of Library and Information Science* **17**(3): 73-93.
- Mohd Zu U.S. & Yow K.S. 2024. An analysis on research collaboration between Mathematicians in Universiti Putra Malaysia. *ASM Science Journal* **19**: 1-8.
- Newman M.E.J. 2001. The structure of scientific collaboration networks. *Proceedings of The National Academy of Sciences* **98**(2): 404-409.
- Razak F.A., Shahabuddin F.A. & Zamri N.S.N. 2019. Analyzing research collaborations within the School of Mathematical Sciences, UKM using graph theory. *Journal of Physics: Conference Series* **1212**(1): 012033.
- Sapini M.L., Noorani M.S.M., Razak F.A., Alias M.A. & Yusof N.M. 2022. Understanding published literatures on persistent homology using social network analysis. *Malaysian Journal of Fundamental and Applied Sciences* **18**(4): 413-429.
- Scott J. 2017. *Social Network Analysis*. 4th Ed. Thousand Oaks, CA: SAGE Publications, Inc.
- Yang S., Keller F.B. & Zheng L. 2017. *Social Network Analysis: Methods and Examples*. Thousand Oaks, CA: Sage Publications, Inc.

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