

Accelerating Graph Layouts Using Graph Neural Networks

Csaba Both, Nima Dehmamy, Rose Yu, Albert-László Barabási*

(*Corresponding author: barabasi@gmail.com)

Data availability

All real-world data that support the plots within this paper and other findings of this study are available at the listed public sources. All real-world data that support the plots within this paper and other findings of this study are available at the listed public sources: The word association graph (WAN) [1]: [<http://w3.usf.edu/FreeAssociation/>], the human protein-protein interaction network (PPI) [2], the Facebook social network data [3]: <http://snap.stanford.edu/index.html>, the Internet at the autonomous system level [4]: <http://www-personal.umich.edu/~mejn/netdata/>, the flavor network [5], boards of directors (public companies in Norway) [6]: https://networks.skewed.de/net/board_directors, US power grid [7]: <http://www-personal.umich.edu/~mejn/netdata/>, and the road network in Oakland [8]: <http://snap.stanford.edu/index.html>.

References

1. Nelson, D. L., McEvoy, C. L. & Schreiber, T. A. The University of South Florida free association, rhyme, and word fragment norms. *Behavior Research Methods, Instruments, & Computers* **36**, 402–407 (2004).
2. Morselli Gysi, D., Do Valle, Í., Zitnik, M., Ameli, A., Gan, X., Varol, O., Ghiassian, S. D., Patten, J., Davey, R. A., Loscalzo, J., *et al.* Network medicine framework for identifying drug-repurposing opportunities for COVID-19. *Proceedings of the National Academy of Sciences* **118**, e2025581118 (2021).
3. Rozemberczki, B., Allen, C. & Sarkar, R. *Multi-scale Attributed Node Embedding* 2019. arXiv: 1909.13021 [cs.LG].

4. Karrer, B., Newman, M. E. & Zdeborová, L. Percolation on sparse networks. *Physical Review Letters* **113**, 208702 (2014).
5. Ahn, Y.-Y., Ahnert, S. E., Bagrow, J. P. & Barabási, A.-L. Flavor network and the principles of food pairing. *Scientific Reports* **1**, 1–7 (2011).
6. Seierstad, C. & Opsahl, T. For the few not the many? The effects of affirmative action on presence, prominence, and social capital of women directors in Norway. *Scandinavian journal of management* **27**, 44–54 (2011).
7. Watts, D. J. & Strogatz, S. H. Collective dynamics of ‘small-world’ networks. *Nature* **393**, 440–442 (1998).
8. Leskovec, J., Lang, K. J., Dasgupta, A. & Mahoney, M. W. Community structure in large networks: Natural cluster sizes and the absence of large well-defined clusters. *Internet Mathematics* **6**, 29–123 (2009).