

Visualization tools for network science

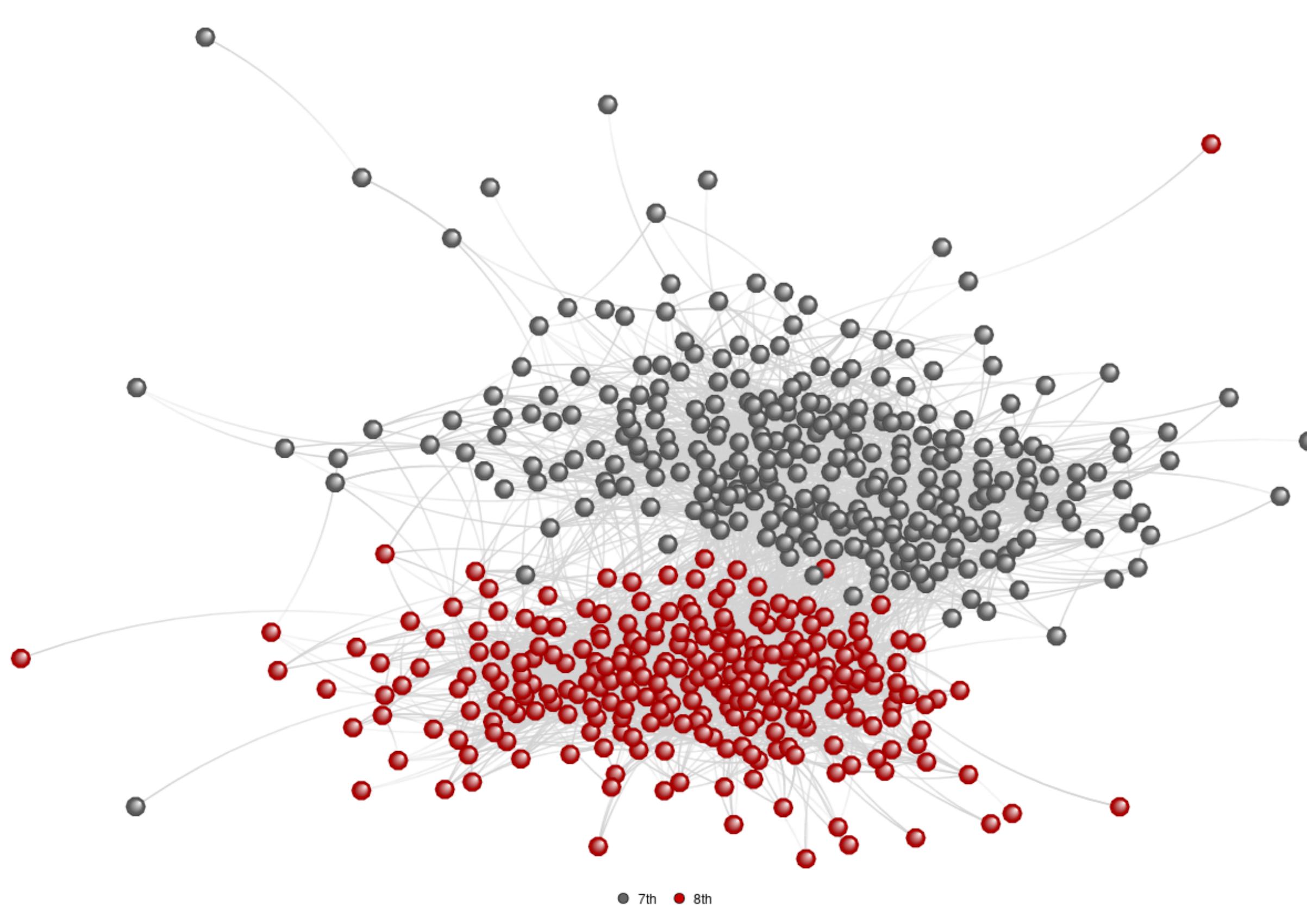
Building beautiful graphs with *netplot*

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Example 1: Network of middle school students

The data

- Influenza Spread in Middle School
- Split according to Gender, Grade, and Lunch Period
- Isolates were removed, ~5500 vertices



How we drew it

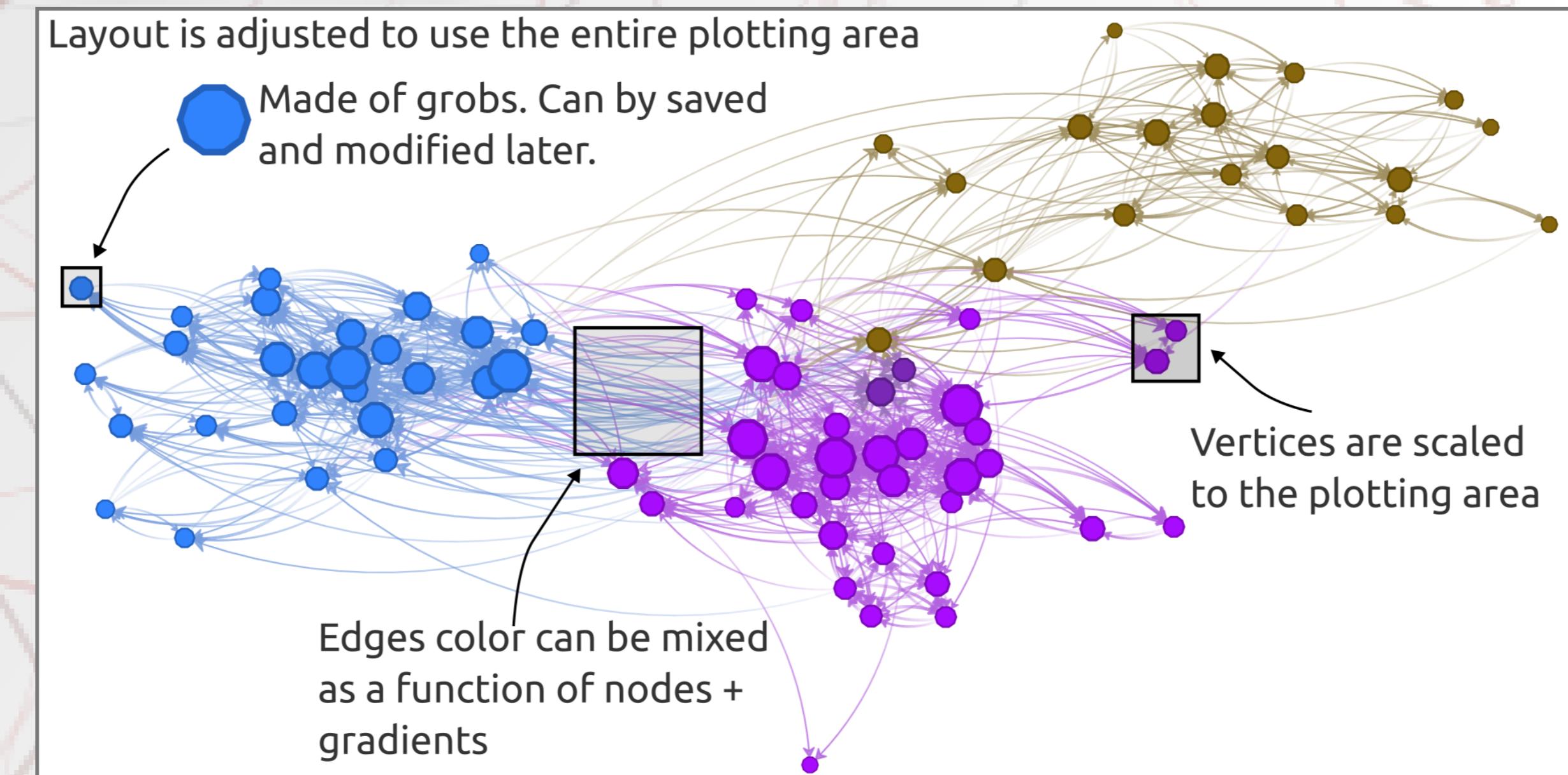
- Vertices are colored by grade (7th = Gray, 8th = Red)
- The Fruchterman-Reingold Algorithm layout was used
- Gradients (new feature in R) are used to color vertices.

Source

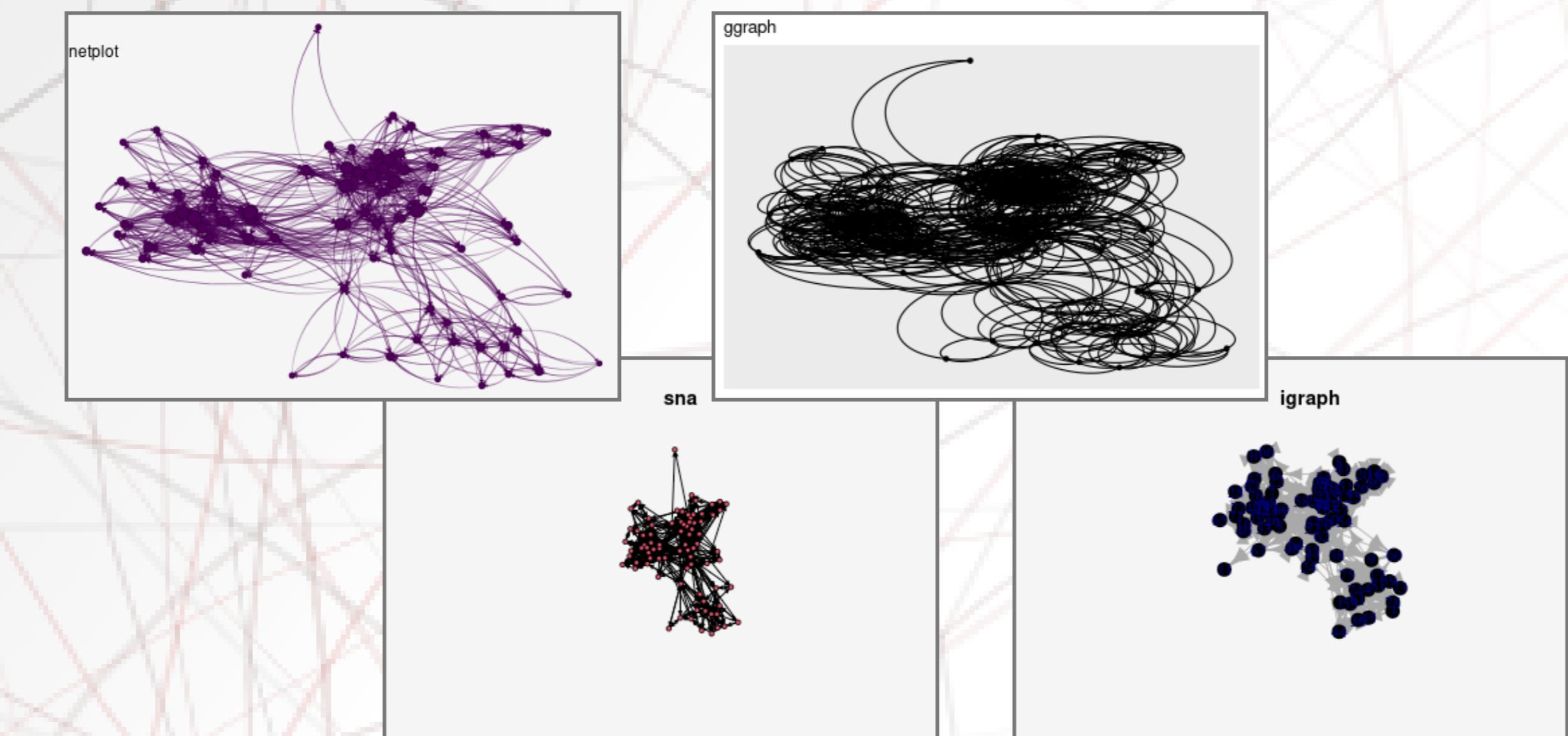
Leecaster, M., Toth, D. J. A., Pettey, W. B. P., Rainey, J. J., Gao, H., Uzicanin, A., & Samore, M. (2016). Estimates of Social Contact in a Middle School Based on Self-Report and Wireless Sensor Data. *PLOS ONE*, 11(4), e0153690. <https://doi.org/10.1371/journal.pone.0153690>

Beautiful graph drawing in R

- 6899 downloads (as of June 21, 2023)
- Built on grid plotting system (as *ggplot2*).
- Provides out-of-the-box pretty figures.
- Key Features:

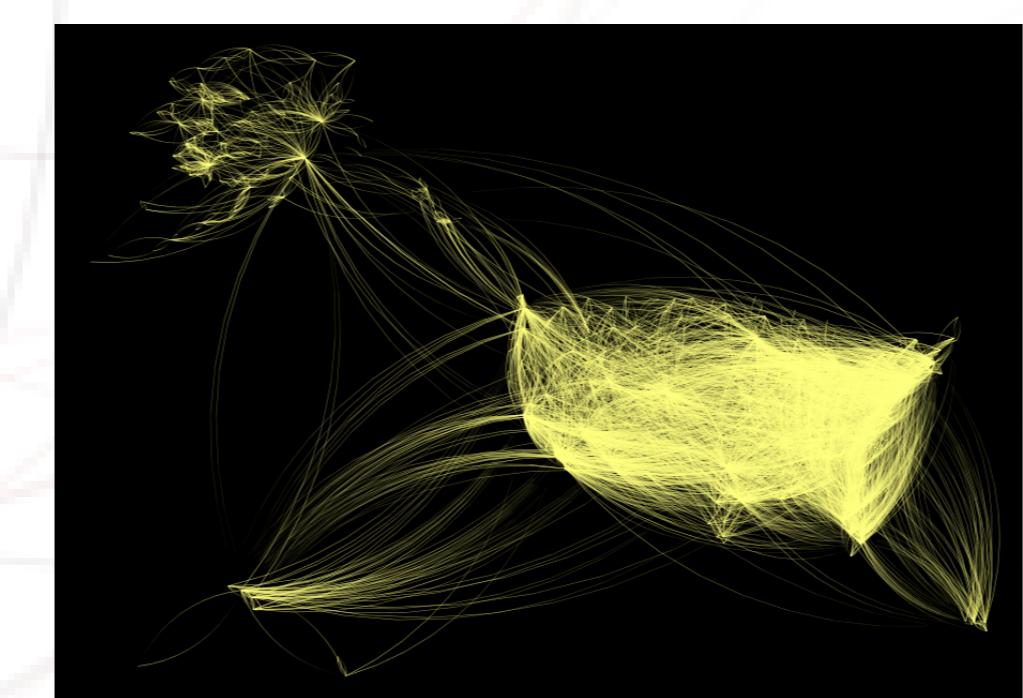


Out of the box nice

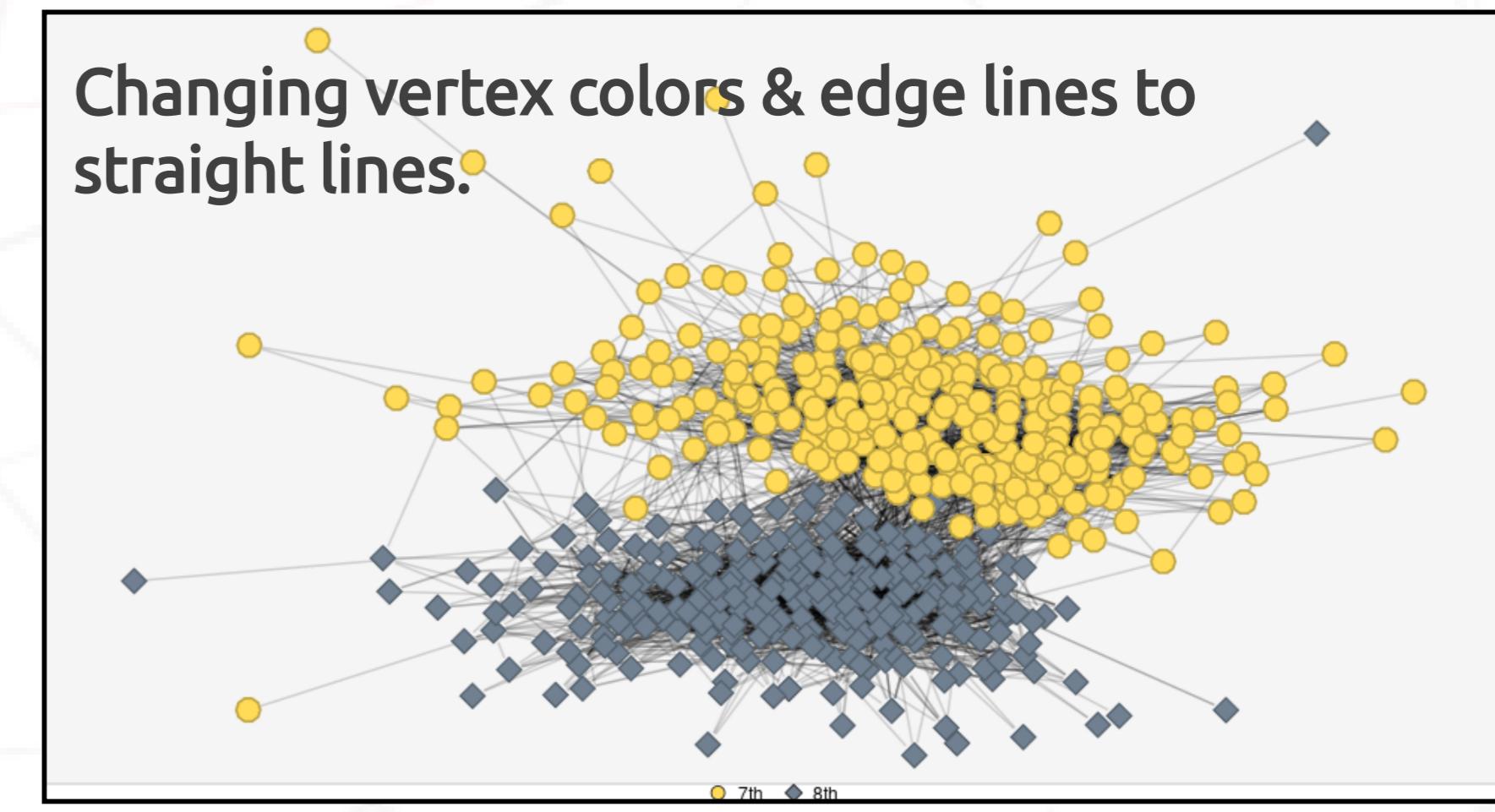
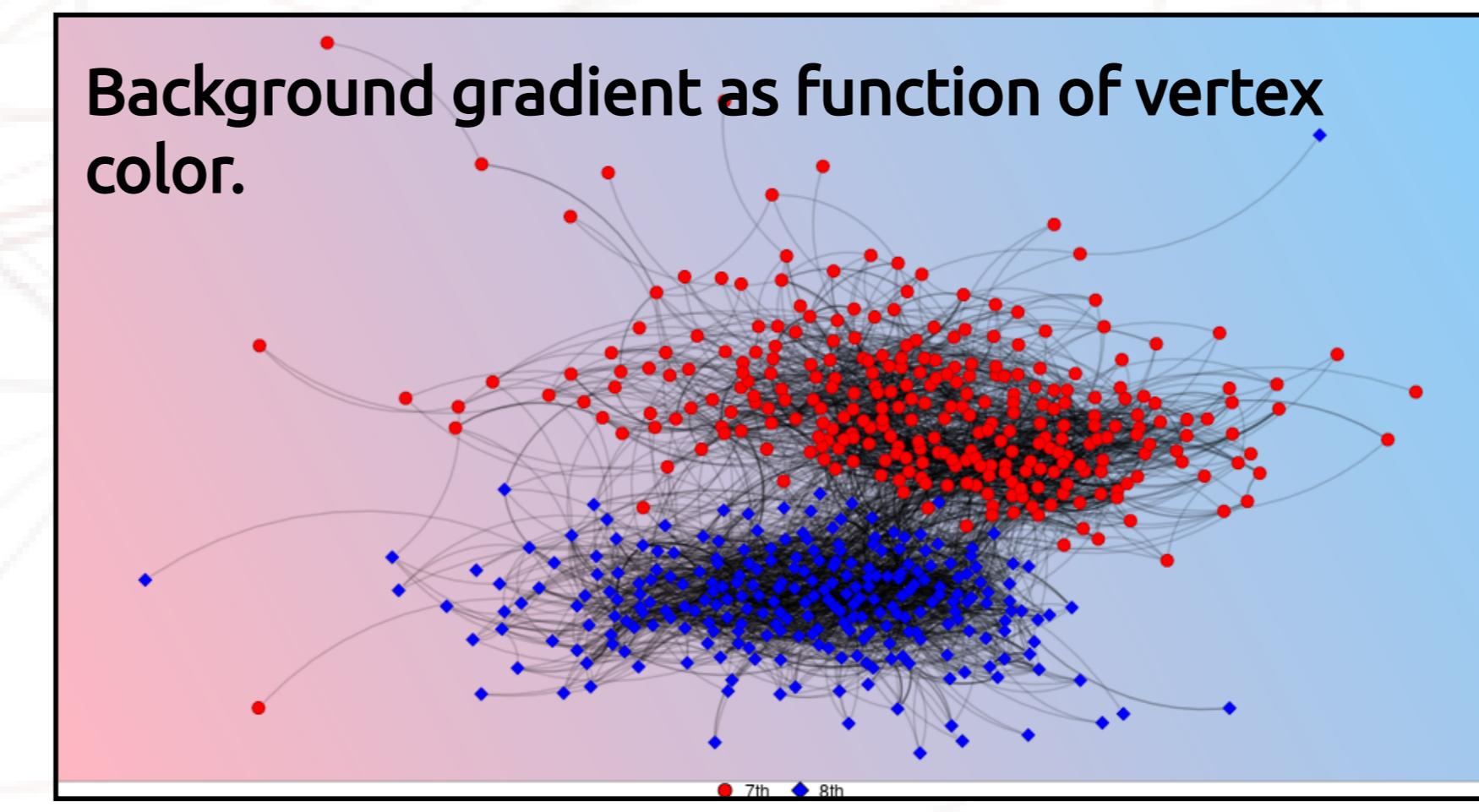
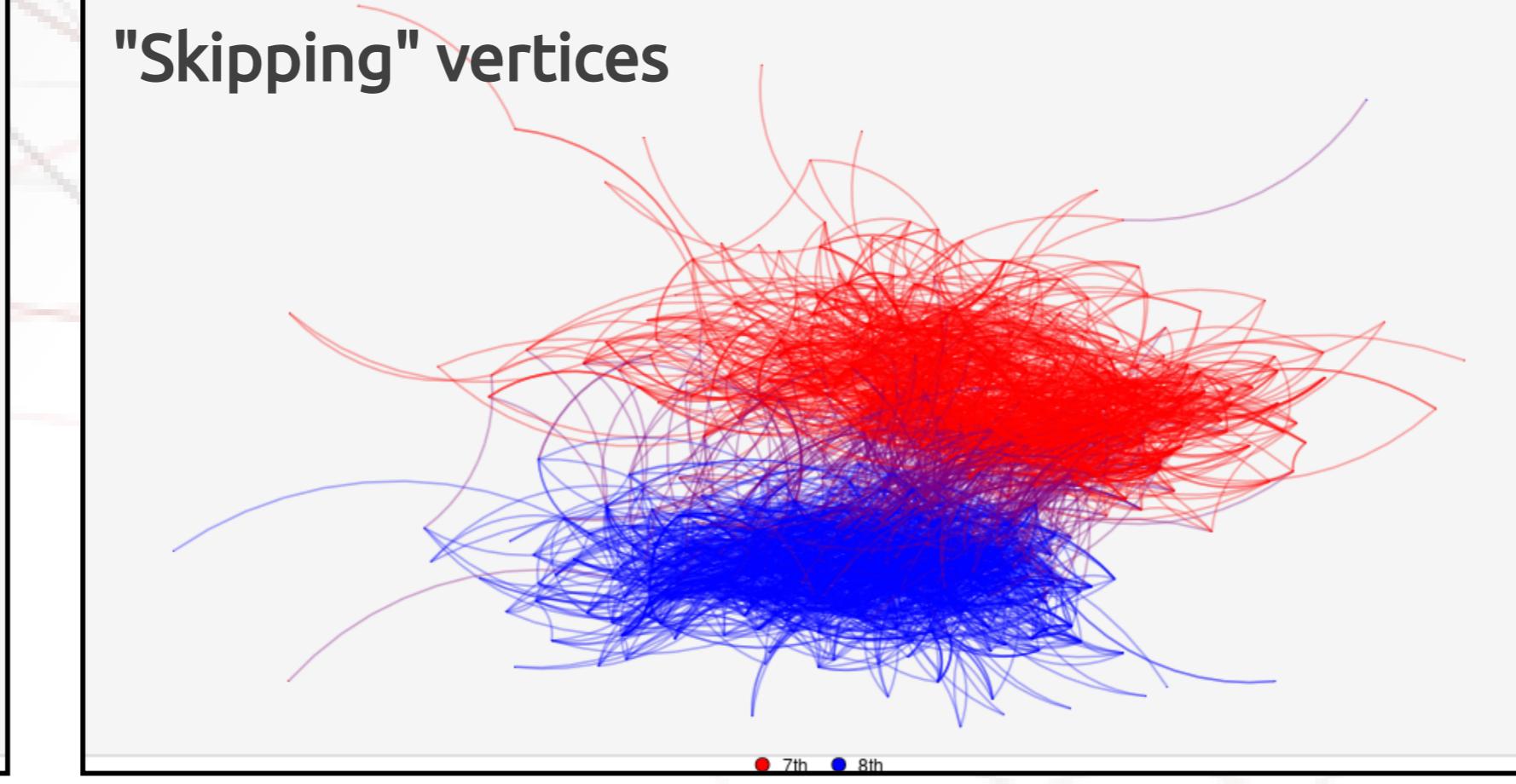
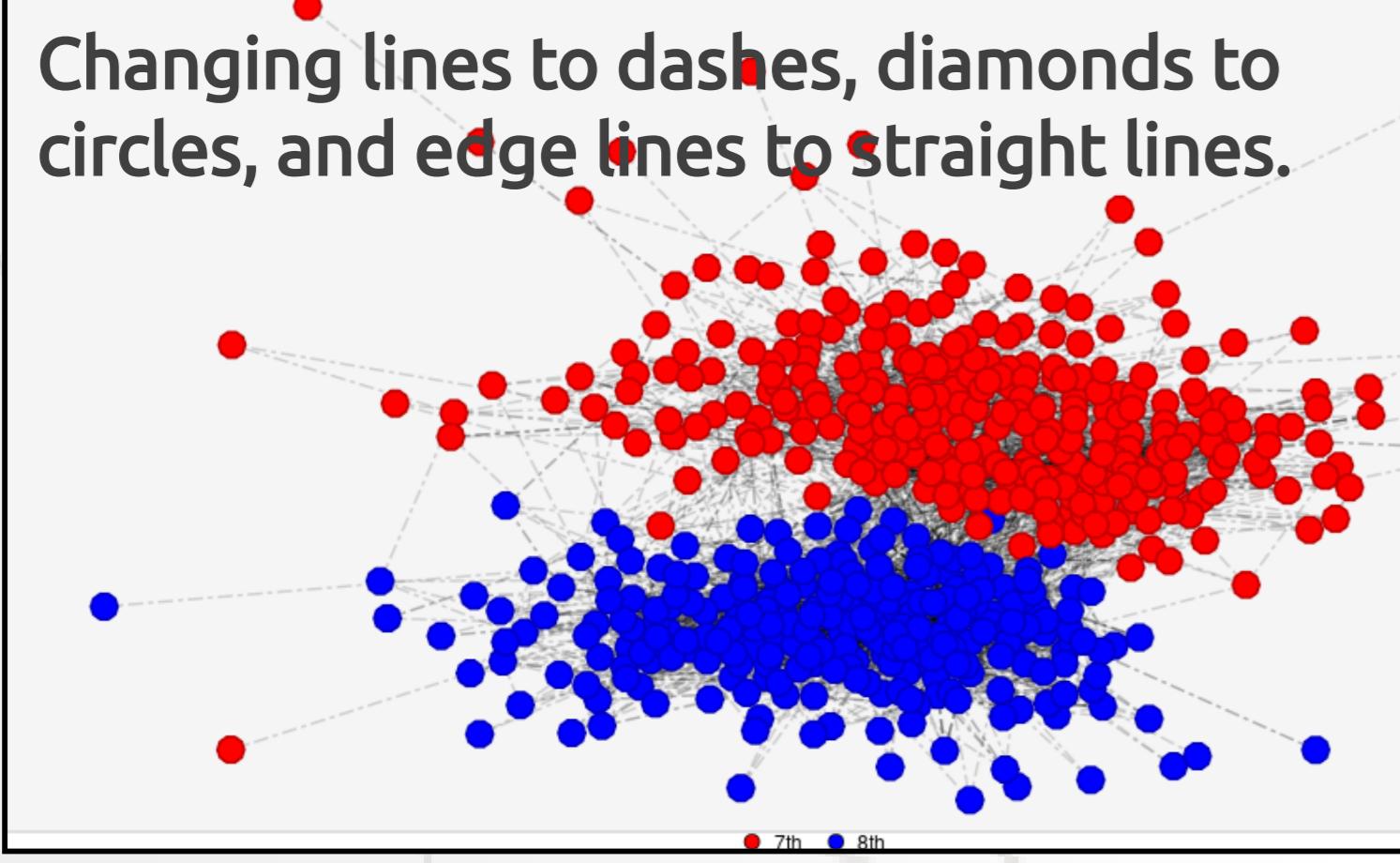


Future Plans

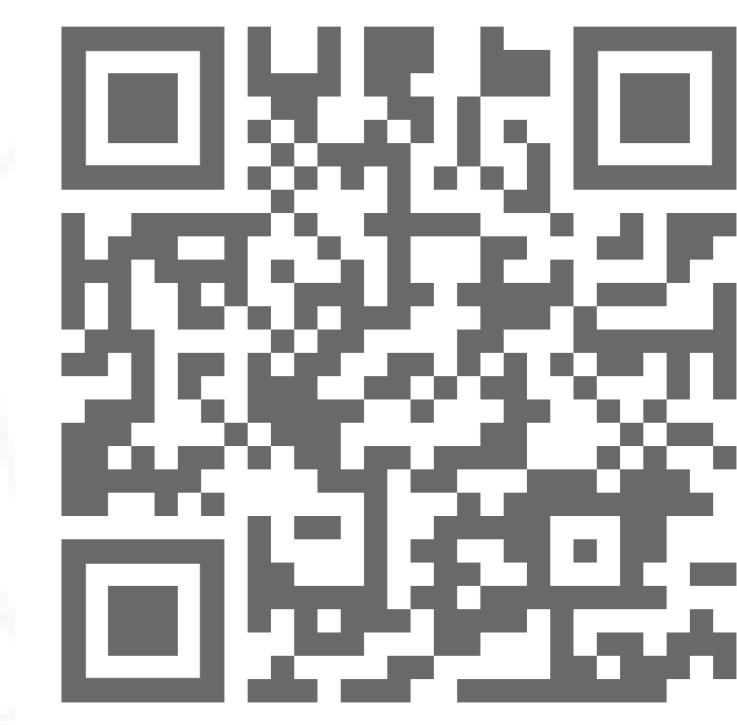
- Automatic coloring based on vertex features.
- User-friendly annotations
- Speed up with C++
- Interactive plots (with *rgexf* + others)



Online version



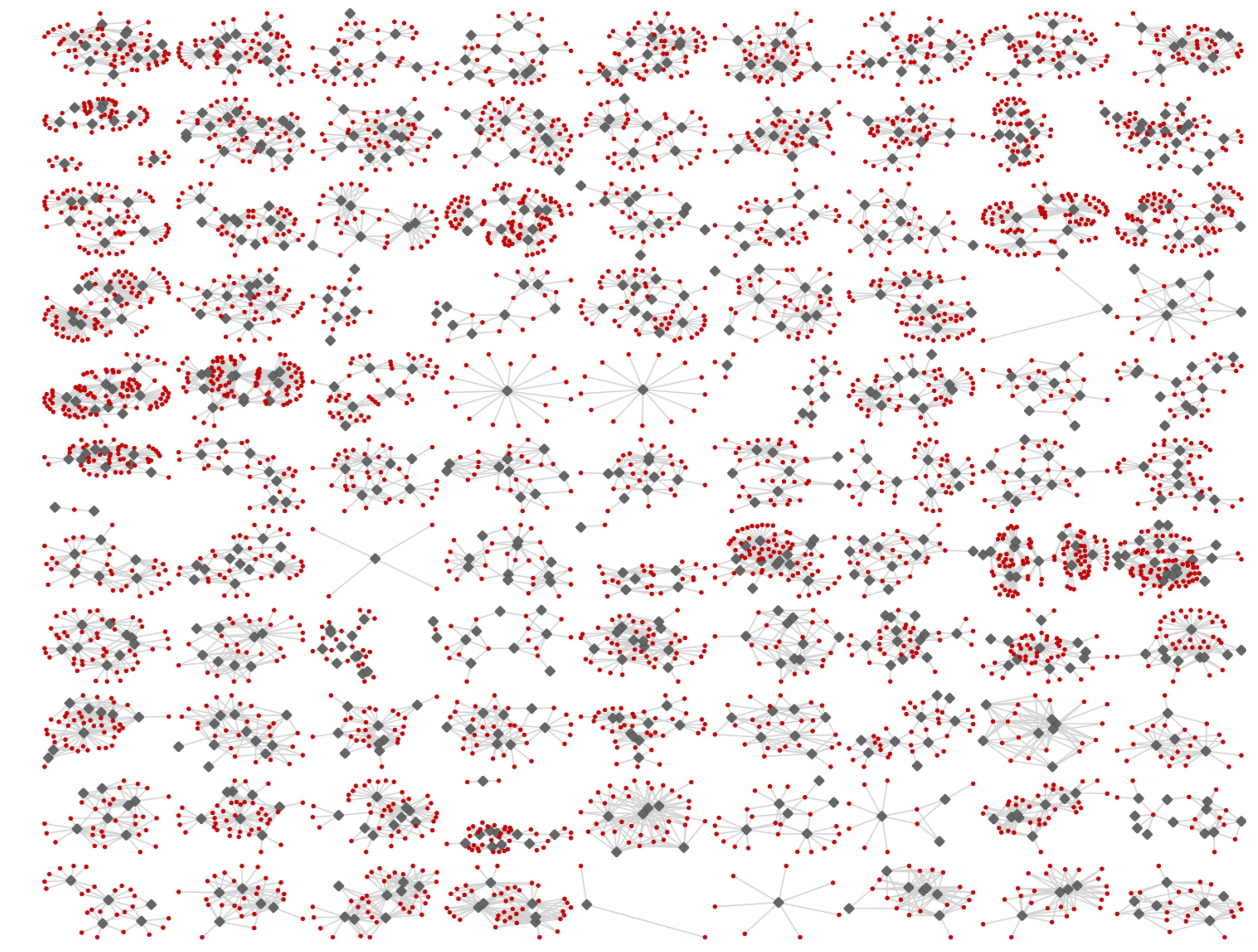
About



Example 2: Network of patients in nursing homes

The data

- Connections of health care providers and patients in nursing homes
- Purpose was to explore the spread of multidrug-resistant organisms
- 25 nursing homes, with each health care provider seeing 2.5 - 3.4 patients per hour



How we drew it

- Colored according to role (Healthcare Worker = Gray, Patient = Red)
- The Fruchterman-Reingold Algorithm layout was used
- 99 graphs for comparison

Source

Nelson Chang, N.-C., Leecaster, M., Fridkin, S., Dube, W., Katz, M., Polgreen, P., Roghmann, M.-C., Khader, K., Li, L., Dumyat, G., Tsay, R., Lynfield, R., Mahoehey, J. P., Nadle, J., Hutson, J., Pierce, R., Zhang, A., Wilson, C., Haroldsen, C., ... Visnovsky, L. D. (2023). Assessing pathogen transmission opportunities: Variation in nursing home staff-resident interactions. *Journal of the American Medical Directors Association*, 24(5). <https://doi.org/10.1016/j.jamda.2023.02.018>