CSSS 567 Homework 3

Jess Kunke, due 11/12/2021

Instructions (new)

Let's use this assignment as practice for future work:

- First do your own exploration and analysis, which will likely include code that won't end up in your final Rmd file.
- As you work, clean up your Rmd file to include only the code that's relevant for what you want to present in your report. Don't include things like `?lazega` which is a call to a help file, and leave out code that doesn't lead to results you present in your report. Frequently knit your file/run your code so that your errors don't accumulate and become more difficult to debug. Your final code in the Rmd file should be neatly organized and commented, and I should be able to run it from start to finish to reproduce your results.
- Your knitted file should look polished and presentable. It doesn't have to be fancy or have references, but don't print package-loading messages or model-fitting messages, and don't show your code or raw output. Don't include the instructions or number your answers; instead, incorporate your responses into a cohesive and concise report. If you want to present model estimates or other results, do so in sentences in the body of your text or in organized tables. Only include results that you comment on in the body of your text.

Please submit both your knitted html or pdf document and your Rmd file, just as you would provide both to a colleague or client if you wanted to allow them to reproduce your report/results. If you prefer to write your report in a text editor instead of in your Rmd file, that's fine; in that case, please submit the report as a pdf and also submit an R script or Rmd file that meets the requirements above and reproduces your model results and any other results you refer to in the report. As before, please title all files you submit with "HW1_" and your last name. For example, I would submit my homework as HW1_Kunke.pdf (and HW1_Kunke.R if I had a separate R file with my code).

I will grade generously/leniently especially on your model choices and interpretations and try to provide useful, constructive feedback, so hopefully this will free you to focus on practicing!

Specifying, fitting, and interpreting ERGMs

For this homework, we will use the `faux.mesa.high` data set from the **ergm** package:

```
library(ergm)
data(faux.mesa.high)
```

First explore this data set and its documentation to familiarize yourself with where the data come from and what they represent. Then write a short report (probably 3-4 short paragraphs, 1-2 pages with your results and model equation) to address the following:

- In just 2-3 sentences, describe this network and this data set.
- Propose an exponential random graph model (ERGM) with at least three features (geometric statistics and/or nodal covariates) that you think might make sense for this data set. Describe in words what is in the model and why you are choosing to include these variables. Include the equation for the model you are proposing. (You can draw from the lab for examples of how to format these equations.) This can be a simple model as long as it seems generally plausible and uses the appropriate functions to represent the effects you want to include.
- Fit the model and report the estimates you obtained in a simple table. (Don't just print the raw output from `summary()`.)
- Briefly interpret your results as we discussed in lab.
- Briefly conclude—what if anything did you learn, and what would you consider trying next?