CS595 Intro to Web Science, Assignment #6

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Question 1

We know the result of the Karate Club (Zachary, 1977) split. Prove or disprove that the result of split could have been predicted by the weighted graph of social interactions. How well does the mathematical model represent reality?

Generously support your answer with all supporting equations, code, graphs, arguments, etc.

Useful sources include:

- Original paper
  - `http://aris.ss.uci.edu/~lin/76.pdf`
- Slides
  - `http://www-personal.umich.edu/~ladamic/courses/networks/si614w06/ppt/lecture18.ppt`
  - `http://clair.si.umich.edu/si767/papers/Week03/Community/CommunityDetection.pptx`
- Code and data
  - `http://networkx.github.io/documentation/latest/examples/graph/karate_club.html`
  - `http://nbviewer.ipython.org/url/courses.cit.cornell.edu/info6010/resources/11notes.ipynb`
  - `http://stackoverflow.com/questions/9471906/what-are-the-differences-between-community-detection-algorithms-in-igraph/9478989#9478989`
  - `http://stackoverflow.com/questions/5822265/are-there-implementations-of-algorithms-for-community-detection-in-graphs`
  - `http://konect.uni-koblenz.de/networks/ucidata-zachary`
  - `http://vlado.fmf.uni-lj.si/pub/networks/data/ucinet/ucidata.htm#zachary`

Answer to Question 1

Table 1: Results of Model vs. Actual

Identifier	Model	Actual	Hit/Miss
1	Mr. Hi	Mr. Hi	Hit
2	Mr. Hi	Mr. Hi	Hit
3	Mr. Hi	Mr. Hi	Hit
4	Mr. Hi	Mr. Hi	Hit
5	Mr. Hi	Mr. Hi	Hit
6	Mr. Hi	Mr. Hi	Hit
7	Mr. Hi	Mr. Hi	Hit
8	Mr. Hi	Mr. Hi	Hit
9	Mr. Hi	Mr. Hi	Hit
10	Mr. Hi	John	Miss
11	Mr. Hi	Mr. Hi	Hit
12	Mr. Hi	Mr. Hi	Hit
13	Mr. Hi	Mr. Hi	Hit
14	Mr. Hi	Mr. Hi	Hit
15	John	Mr. Hi	Hit
16	John	Mr. Hi	Hit
17	John	Mr. Hi	Hit
18	John	Mr. Hi	Hit
19	John	Mr. Hi	Hit
20	John	Mr. Hi	Hit
21	John	Mr. Hi	Hit
22	John	Mr. Hi	Hit
23	John	Mr. Hi	Hit
24	John	Mr. Hi	Hit
25	John	Mr. Hi	Hit
26	John	Mr. Hi	Hit
27	John	Mr. Hi	Hit
28	John	Mr. Hi	Hit
29	John	Mr. Hi	Hit
30	John	Mr. Hi	Hit
31	John	Mr. Hi	Hit
32	John	Mr. Hi	Miss
33	John	Mr. Hi	Hit
34	John	Mr. Hi	Hit

Extra Credit, 3 Points

We know the group split into two different groups. Suppose the disagreements in the group were more nuanced – what would the clubs look like if they split into groups of 3, 4, and 5?

Answer to Extra Credit

Resources

- Csardi, Gabor. Network Analysis with igraph. http://igraph.sourceforge.net/igraphbook/index.html
- Poulson, Barton. R Statistics Essential Training. http://www.lynda.com/course20/R-tutorials/R-Statistics-Essential-Training/142447-2.html
- Rice, Ken & Lumley Thomas. Writing Loops. http://faculty.washington.edu/kenrice/sisg/SISG-08-05.pdf
- Sourceforge.net. Network Analysis and Visualization. http://igraph.sourceforge.net/doc/R/00Index.html
- Stack Overflow. Are there implentations of algorithms for community detection in graphs? http://stackoverflow.com/questions/5822265/are-there-implementations-of-algorithms-for-community-detection-in-graphs
- Stack Overflow. What are the differences between community detection algorithms in igraph? http://stackoverflow.com/questions/9471906/what-are-the-differences-between-community-detection-algorithms-in-igraph/9478989#9478989
- Zachary, Wayne. An Information Flow Model for Conflict and Fission in Small Groups. http://aris.ss.uci.edu/~lin/76.pdf