Political books: the dynamics that generate the network

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September 18, 2019

Data

Data are about US political books, sold by the online bookseller Amazon.com. Compiled by Valdis Krebs, unpublished, http://www.orgnet.com/.

Data

- Nodes are the political books ($N = 105$)
- Edges represent frequent co-purchasing of books by the same buyers
- Nodes have been given values "l", "n", or "c" to indicate whether they are "liberal", "neutral", or "conservative".

The Network

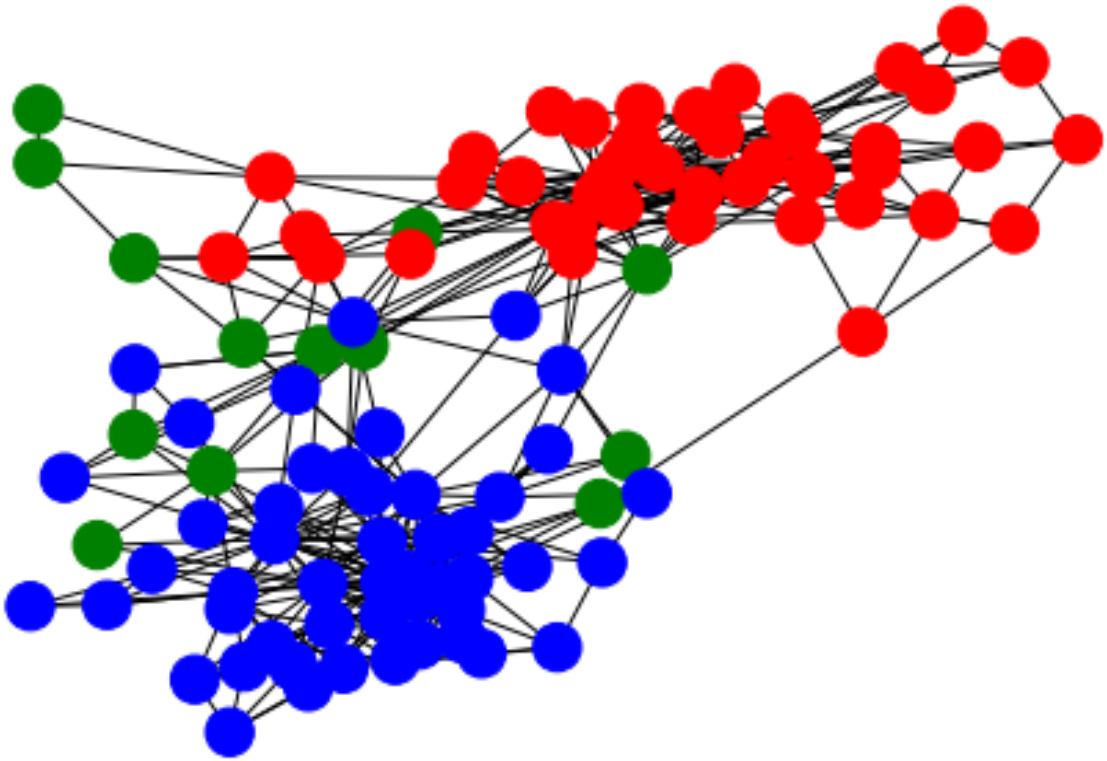


Figure: Network of co-purchasing political US books. Liberals = red, Conservative = blue, Neutral = green

Characteristics of the network

Medium degree

$$< k >= 8.481 \quad (1)$$

Diameter

$$D = 7 \quad (2)$$

Claustering coefficient

$$C = 0.489 \quad (3)$$

Assortativity coefficient

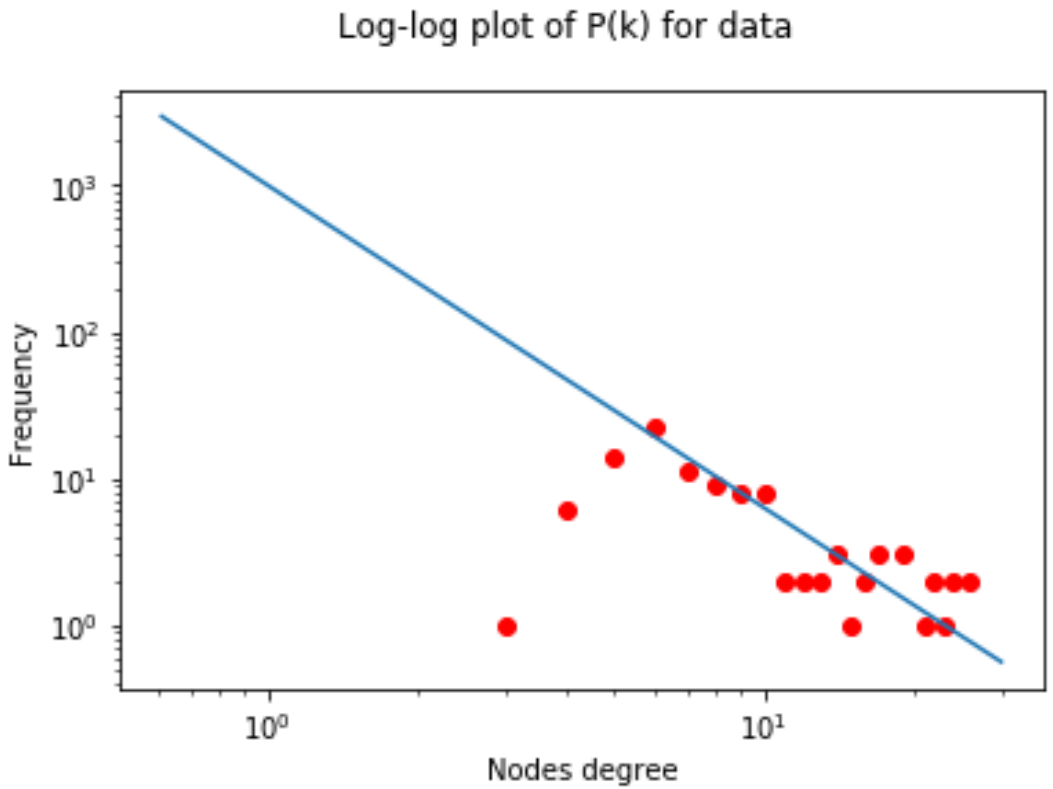
$$Q = 0.723 \quad (4)$$

Degree Distribution

Degree distribution

$$P(k) \ \alpha \ k^{-\gamma} \qquad with \quad \gamma \simeq -2.2 \tag{5}$$

With saturation and cut-off and not well defined trend because of low number of nodes



Division in communities

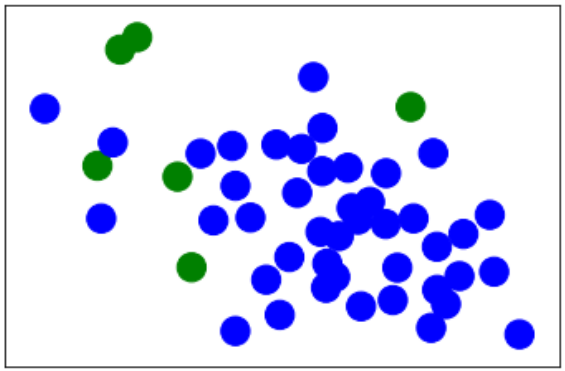


Figure: First community

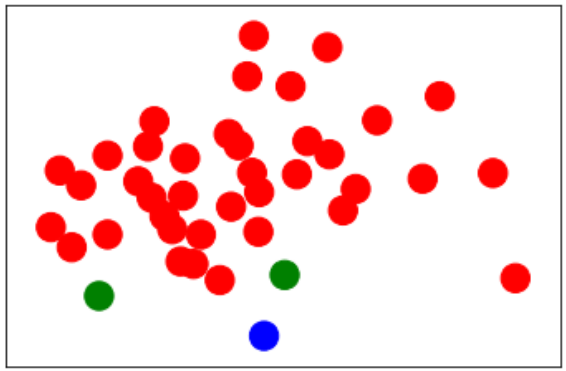


Figure: Second community

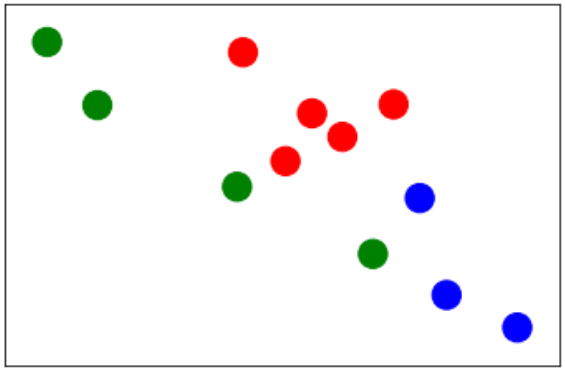


Figure: Third community

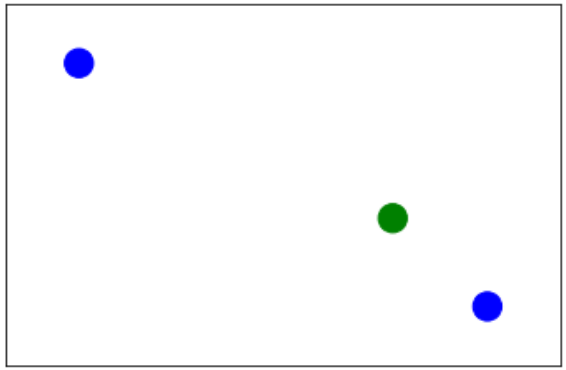


Figure: Fourth community

Recreating the network

Copying model with:

- $\alpha = 0.99$
- Medium number of links for each added node $< m >= 4.5$

adding:

- Fitness, giving a different initial k_i to every added node (randomly, from uniform distribution from 2 to 7)
- different probability of attachment depending on color's node

Preferetial attachment

- j = added node
- i = randomly choosen node
- Preferential attachment $\pi(k_i) = \frac{k_i}{\sum_j k_j} \beta\alpha$

- If j = blue/red and i of the same color $\Rightarrow$ $\beta = 0.99$
- If j = blue/red and i = green $\Rightarrow$ $\beta = 0.009$
- If j = blue/red and i = red/blue $\Rightarrow$ $\beta = 0.001$
- If j = green and i = green $\Rightarrow$ $\beta = 0.6$
- If j = green and i = red/blue $\Rightarrow$ $\beta = 0.4$

Graph image of created and data networks

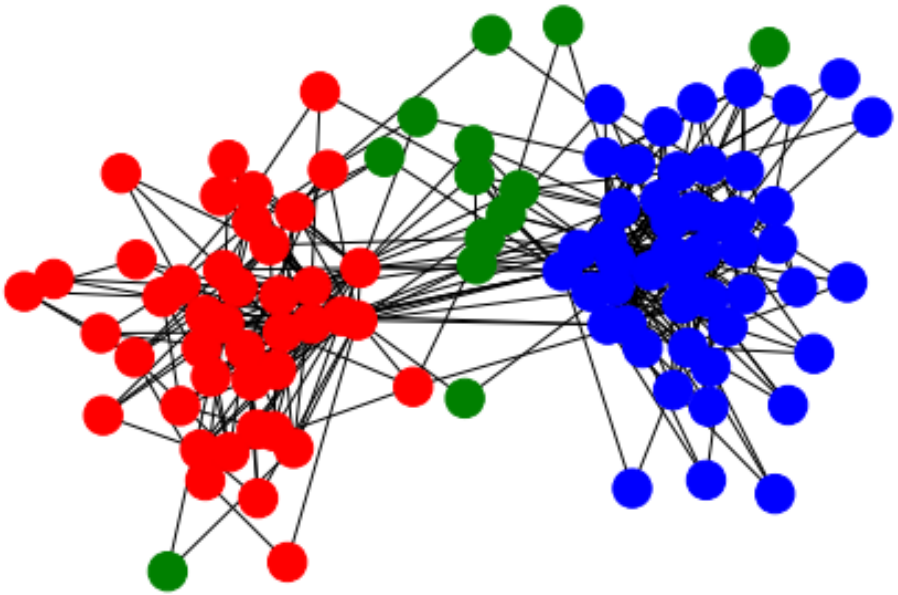


Figure: Network created with copying model

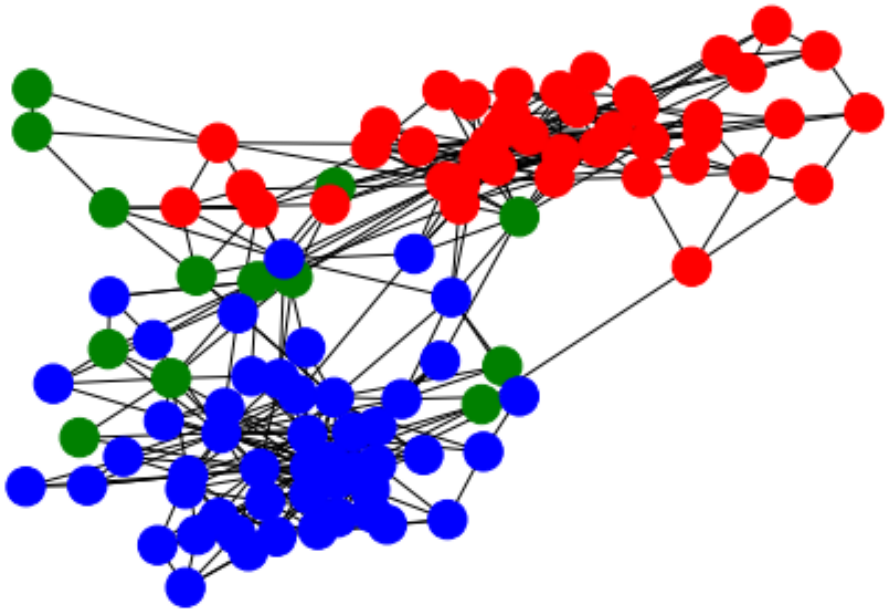


Figure: Network from data

Networks attributes

Characteristics	**Created**	**Data**
Mean degree	8.6 $\pm$0.4	8.5
Diameter	5	7
Claustering Coefficient	0.30 $\pm$0.02	0.49
Assortativity	0.74 $\pm$0.03	0.72
γ	$\simeq$ 2.2	$\simeq$ 2.2

Table: Networks attributes

Degree distribution

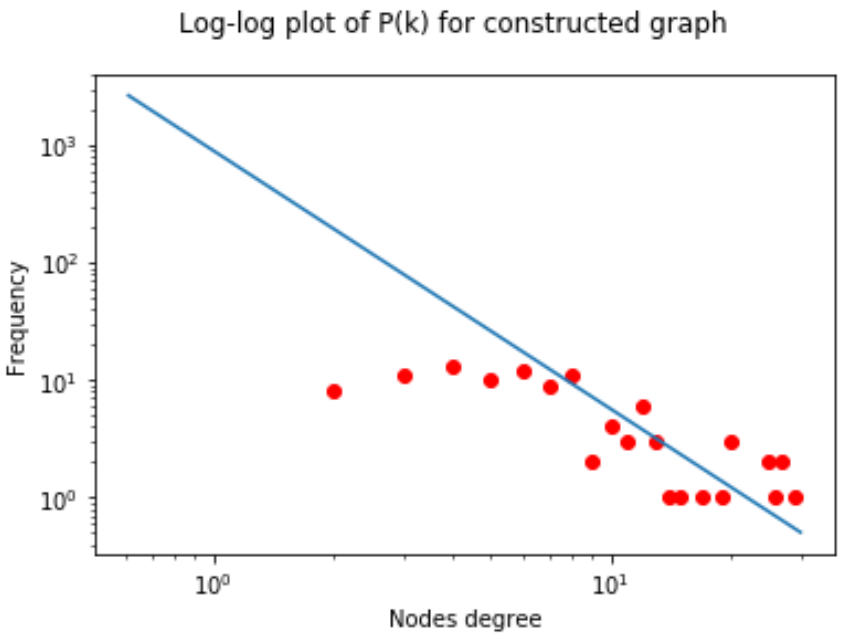


Figure: $P(k)$ created network

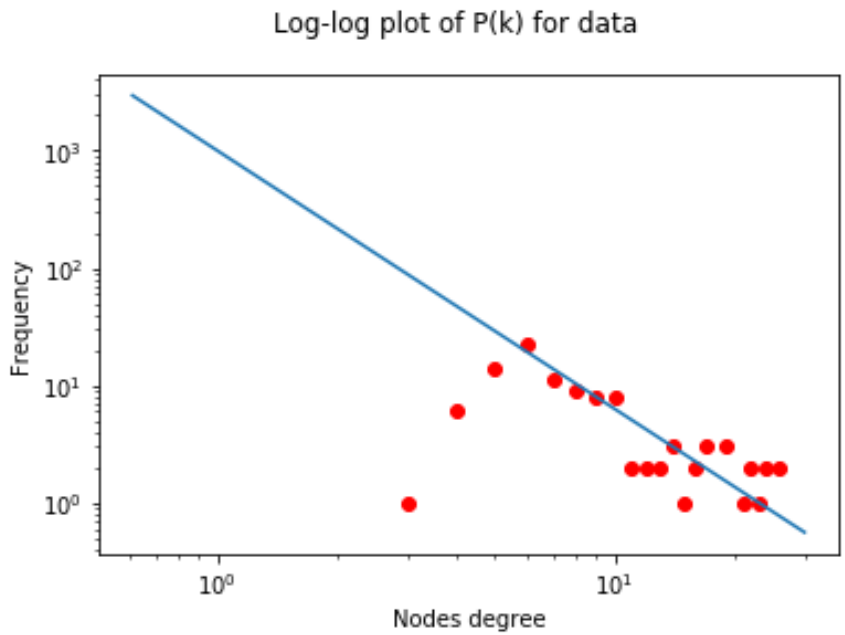


Figure: $P(k)$ network from data

Thank you