

Complex Networks

0-orientation

2011.10.03(Mon)

Complex Networks

- Instructor: T. Murata (room E503, West8 building, murata @ cs.titech.ac.jp)
- Goal: learn knowledge for understanding & analyzing networks
- Score : assignments (2 or 3 times)
- URL: www.ai.cs.titech.ac.jp/lecture/cn
 - schedules & teaching materials will be uploaded
- Caution:
 - This course will be opened every two years (not every year)
 - Some classes are not on Mondays

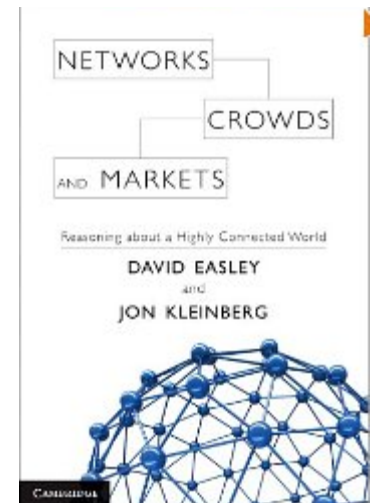
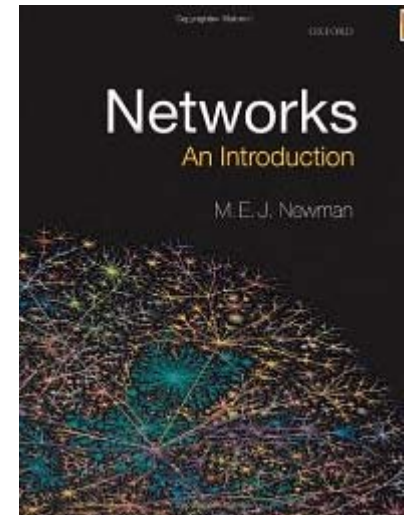
textbook / reference

- Networks: An Introduction, Mark Newman, Oxford University Press, 2010.

<http://www-personal.umich.edu/~mejn/networks-an-introduction/>

- Networks, Crowds, and Markets: Reasoning About a Highly Connected World, David Easley and Jon Kleinberg, Cambridge University Press, 2010.

<http://www.cs.cornell.edu/home/kleinber/networks-book/>



Japanese books

- 「複雑ネットワーク」とは何か, 増田直紀 今野紀雄著, 講談社ブルーバックス, 2006.
- Rで学ぶデータサイエンス 8 ネットワーク分析, 鈴木努著, 共立出版, 2009.



contents of this course

- Basic knowledge for understanding/analyzing networks
 - fundamentals of network
 - network algorithms
 - network models
 - processes on networks
 - tools for analyzing & visualizing networks

topics (1)

- 1. introduction
- 2. tools for analyzing networks
- 3. fundamentals (1) mathematics of networks
- 4. fundamentals (2) measures and metrics
- 5. fundamentals (3) the large-scale structure of networks
- 6. network algorithms (1) representation

topics (2)

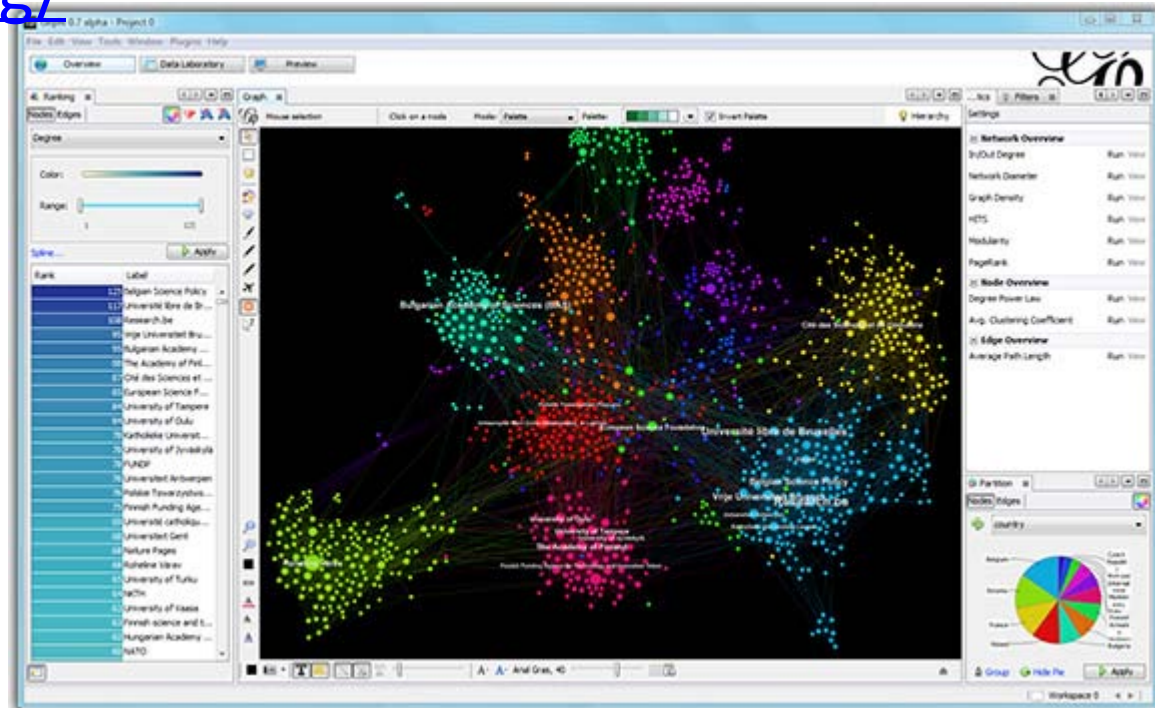
- 7. network algorithms (2) matrix algorithms
- 8. network algorithms (3) graph partitioning
- 9. network models (1) random graphs
- 10. network models (2) network formation
- 11. network models (3) small-world model
- 12. processes on networks (1) percolation
- 13. processes on networks (2) epidemics
- 14. summary

about this course

- All lectures will be in English. I will not accept assignments written in Japanese.
- Non-CS students (undergraduate students, YSEP students ...) are also welcome.
 - same evaluation criteria as CS graduate students
- Copying the assignments of other students is strictly prohibited.
 - “similar” assignments will be rejected

Gephi

- new software for analyzing networks
 - easy to use : interface is cool
 - online tutorials available
 - <http://gephi.org/>



igraph

- Another software for analyzing networks
 - A rich set of functions calculating various structural properties
 - <http://cneurocv.s.rmki.kfki.hu/igraph/>

