

Complex Networks Orientation

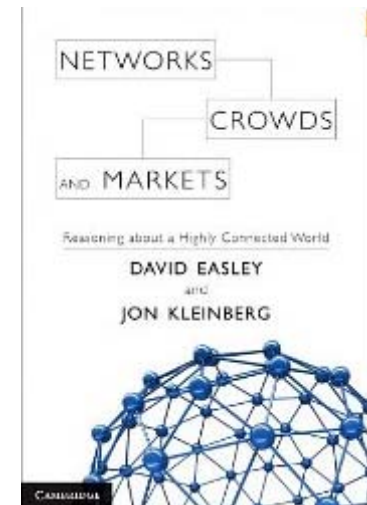
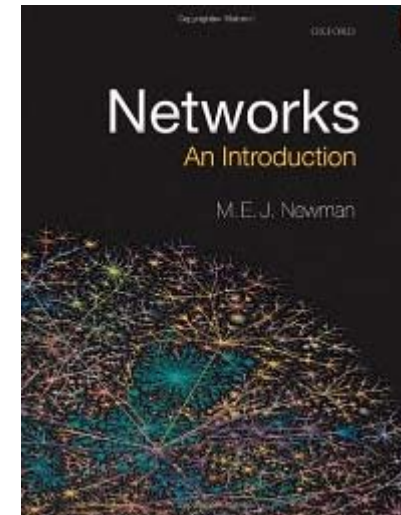
2013.10.07(Mon)

Complex Networks

- Instructor: T. Murata (room E503, West8 building, murata@cs.titech.ac.jp)
- Goal: learn knowledge for understanding and analyzing networks
- Score : quizzes (every week), assignments (2 or 3 times)
- URL: www.ai.cs.titech.ac.jp/lecture/cn and Tokyo Tech OCW
 - schedules & teaching materials will be uploaded
- Caution:
 - This course will be opened every two years (not every year)
 - Some classes are not on Mondays
 - Lectures on Oct. 21(Mon) and Oct. 28(Mon) will be canceled

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 and visualizing networks

topics (1)

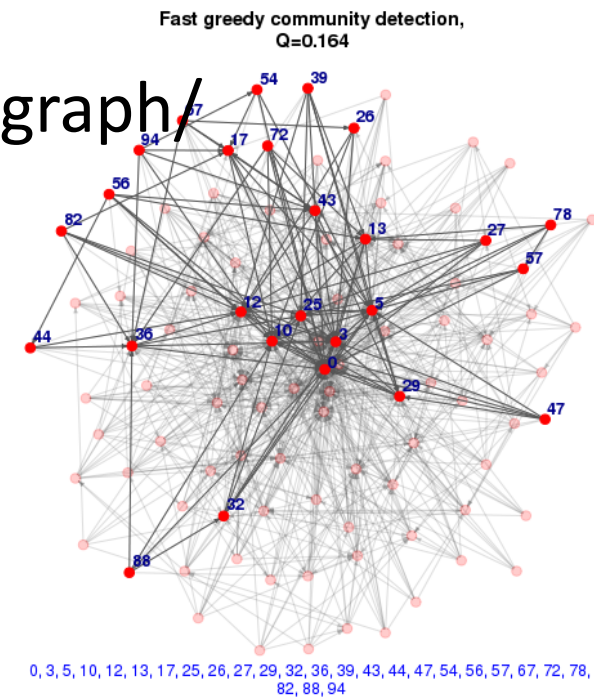
- 1. introduction
- 2. tools for analyzing networks
- 3. fundamentals (1) mathematics of networks
- 4. fundamentals (2) measures and metrics
- 5. fundamentals (3) the large-scale structure of networks
- 6. network algorithms (1) representation

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

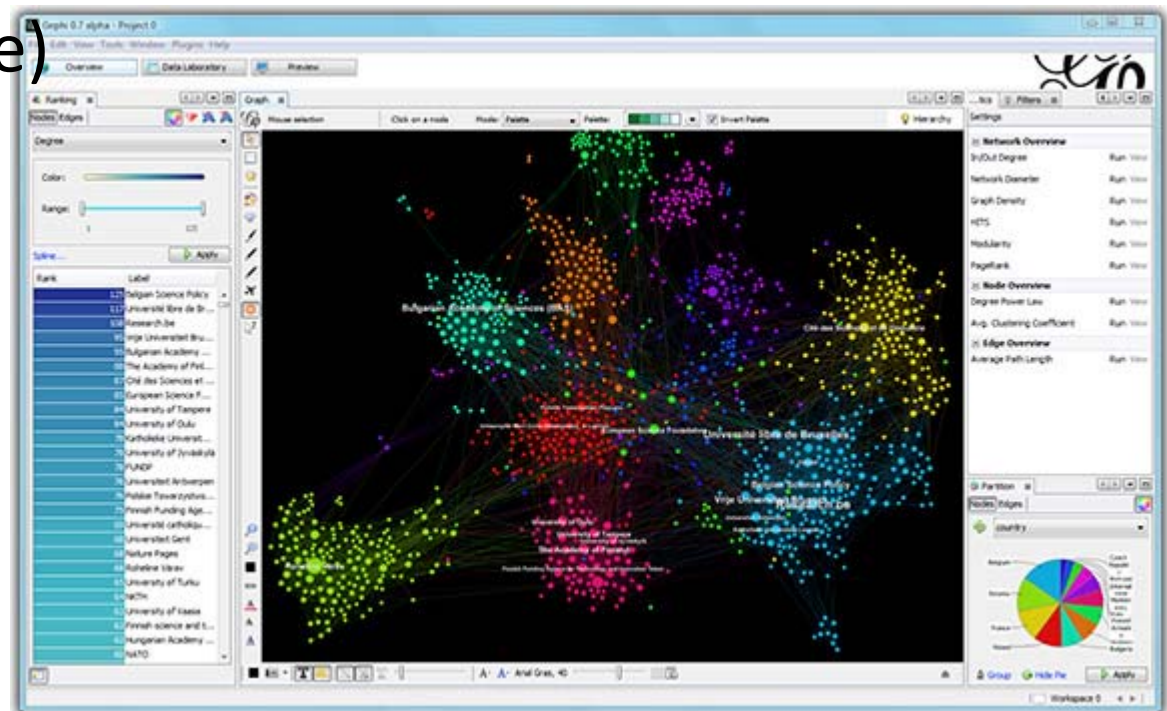
tools : igraph

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



tools : Gephi

- new software for analyzing networks
 - easy to use, online tutorials available
 - <http://gephi.org/> (English)
 - <http://oss.infoscience.co.jp/gephi/gephi.org/index.html> (Japanese)



about this course

- All lectures, quizzes, assignments will be in English. I will not accept quizzes/assignments written in Japanese.
- Non-CS students (undergraduate students, YSEP, ACAP, TiROP, ...) are also welcome. All students are graded based on a same evaluation criteria.
- Copying the assignments of other students is strictly prohibited.
 - “similar” assignments will be rejected

Schedule: October

10

If you need my seal/signature,
please come this week.

OCTOBER 2013
平成 25 年

日	月	火	水	木	金	土
29	30	1	2	3	4	5
6	7 Complex Networks #1	8	9 Friday lectures	10	11 Wednesday lectures	12 Kodaisai Festival
13 Kodaisai Festival	14 体育の日	15	16	17	18	19
20	21 canceled Complex Networks	22	23	24	25	26
27	28 canceled Complex Networks	29	30	31	1	2
3	4	5	6	7	<div> <div>1 2 3 4 5 6 7</div> <div>8 9 10 11 12 13 14</div> <div>15 16 17 18 19 20 21</div> <div>22 23 24 25 26 27 28</div> <div>29 30</div> </div>	<div> <div>1 2</div> <div>3 4 5 6 7 8 9</div> <div>10 11 12 13 14 15 16</div> <div>17 18 19 20 21 22 23</div> <div>24 25 26 27 28 29 30</div> </div>

Schedule: November

11

日

月

火

水

木

金

土

Monday
lectures

I will send an email to
registered students if I
cancel this lecture.

NOVEMBER 2013

平成 25 年

27	28	29	30	31	1	2
3 文化の日	4 振替休日	5	6 Complex Networks #2	7	8	9
10	11 Complex Networks #3	12	13	14	15	16
17	18 Complex Networks #4	19	20	21	22	23 勤労感謝の日
24	25 Complex Networks #5	26	27	28	29	30
1	2	3	4	5	<div>10</div> <div>6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</div>	<div>12</div> <div>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</div>