

# Course discussion

Social and Technological Networks

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# Today

- Course and Project: follow up discussion
- Lectures
- What to study for exam
- What to expect in exam

# Projects

- The intention:
  - Learn to initiate and do own projects
- Imagine and try creative ideas
- Build the idea into something workable
  - Through trials and errors
  
- What did you think?

# Projects

- The intention:
- Learn to initiate and do own projects
  
- Find creative ideas
- Try to do the project, and realise there are roadblocks, or the idea does not work as intended
- Find more ideas to overcome problems, and repeat
  - Redo part of the project
  - Sometimes large parts, sometimes the entire thing..
  
- Plan time and work accordingly. Then re-plan, and repeat..

# Projects

- How work happens in real world – everything is a project!
- Usually you are not given complete instructions
  - Thinking out what can be done is part of the job
  - Works better if you do something original instead of the obvious

# Projects and original work

- Clients do not know how to do things, or even what can be done.
- A “good” project can be good in different ways – there is no “formula” for one.
- Companies prefer someone who takes initiative to do something new instead of just follow instructions
- More people are working on startups, own business, consultancy etc.
  - It is useful to always think about what you can do different

# Startups

- Are about starting with a vague idea, and developing into a product.
- Requires coming up with ideas on short notice
  - Repeatedly
- Requires demonstrating that your idea has value
  - Better than baselines
  - Better than existing methods

# Research

- Finding fundamental new ideas
- That are conceptually sound, and can be the basis for new applications
- Like the things we covered in lectures



- If you enjoyed trying your ideas, consider doing a PhD
  - Opportunity and time to learn cutting edge stuff
  - Try your own ideas
  - Develop longer term plans etc
- Many companies (Google, MS) prefer PhD
- A good place to start startups or your own things
  - You have the time to be expert in cutting edge things, perhaps the only real expert in an area
  - Advantage in business and product development
- Applications usually in december/january
- See my web page for the application process at Edinburgh (apply to other places too!)

- But do consider practical issues too
- And more importantly what you prefer
  - Do you feel like there is an area that you want to learn lots more and do something new?
- If you are unsure or have questions, talk to someone!

# Your Feedback

- Whiteboard not visible in videos
  - Will forward this to university
- Tutorials
  - Will consider this. The problem is time for students, give the time demand of project etc
- More coding examples etc
- Real world applications, case studies
  - I will try to provide some references

# Lectures

- The intention
- Give you an overview of topics in Network Science
- Some idea of the types of analysis and techniques used in the field
- How intuitive ideas can be made rigorous and analysed
- To give you enough idea so that now if faced with a networks problem, you know where to look or what may be relevant

# Lectures

- Practical issues
- Some techniques are quite involved and we did not have a lot of time
- You had to spend time on the project
- Advanced material are not good for exams
- The balance between depth and breadth is difficult
- The area is large – it is a developing research area
  - We cannot cover everything as well as we want
  - Therefore, the plan was to give you an overview so that you have a basis to learn more on your own
  - With some examples of deeper analysis

# Slides and reading

- Please always use the latest online version (these may get updates/corrections)
- Let me know any errors/omissions you notice
- Exam material : slides, notes and reading lists (not additional reading)
- Few more notes and solutions to be uploaded
- The piazza will stay up. Feel free to ask questions
- Last office hour next week.

# Exam

- What to expect:
- **New format this year: All questions compulsory**
  - Since we do not have a clear division of topics big choices do not help
  - Questions and marking will be adjusted – fewer marks per question
- Similar to last year's exam, but possibly slightly more mathematical
  - Less involved than exercises
- You are not expected to reproduce entire proofs from class
  - But expected to understand them
  - To answer questions about them
  - Or use some similar techniques in answering different questions

# Topics

- The following topics were new this year
  - Graph kernels
  - Local community detection, conductance
  - Personalised pagerank
  - Spanners



# Visiting students

- Exam in december

# Some typical questions:

- Define property/measure X.
  - For a given graph in Figure, compute X
  - eg. CC/betweenness of each node, of the graph, diameter of the graph, matrix A or L etc..
- For a description of a graph, show that it must have the following property ....
  - Examples in exercises

- Given a problem such as ...
  - How would you solve this? What algorithm will you use? Justify your answer.
  - How would you construct a network?
- What are the advantages/disadvantages of using X in problem setup Y?
- Given a real dataset of type X, how would you approach problem Y? How would you define the network, tie strength? How would you define the problem on the network and how would you solve it?