Examples of SNAP

Outline:

1. Course project introduction
2. Example of network analysis
3. NodeXL and SocNetV

Yifan Hou

Course Project

- major phases:
  - 1. Specify your analysis task
  - 2. The dataset and software which should be utilized in your project
  - 3. Conduct analysis and finish the final project report

Course Project Phase 1: task

- Task set 1: Study information cascade
  - a) Decision making, private signals.
  - b) Bayes rules and cascading.
  - c) Example cascade of real world events.
  - d) Use simulations to tell why cascade can be wrong and fragile.
- Task set 2: Understand power laws and network generation
  - a) Power law exponents for real world networks.
  - b) Rich-get-richer model and network generation.
  - c) The unpredictability of rich-get-richer model.
  - d) Show the evolving of networks and link creation along time.
- Task set 3: Simulate cascading behaviors in networks
  - a) Payoff (threshold) vs cascading.
  - b) Adopting key nodes vs cascading.
  - c) Complete cascade and clusters.
- Task set 4: Simulate epidemics
  - a) SIR model.
  - b) SIS model.
  - c) SIRS model.
  - d) Epidemics and network structure.
- Task set 5: Study small world phenomenon
  - a) Six degree of separation.
  - b) Watts-Strogatz model.
  - c) Decentralized search.

Marks will be deducted if only part of the tasks is finished within a task set.

Make sure your analysis is thorough with supporting evidences.

Course Project Phase 2: dataset & software

- Dataset: **soc-Slashdot0811** (http://snap.stanford.edu/data/soc-Slashdot0811.html)
  - Slashdot is a technology-related news website know for its specific user community. The website features user-submitted and editor-evaluated current primarily technology oriented news.
- http://snap.stanford.edu/data/#socnets

- Software:
  - SNAP (recommended!)
  - NodeXL
  - SocNetV
  - …

Course Project Phase 3: Project report

- write a final report to analyze the results and summarize your project
  - 1. **Tasks**
    - Which task set you are working on?
    - How you conduct your analysis to finish those tasks?
  - 2. **Results** and **Analysis**
    - Use tables and graphs.
    - Use quantitative values.
    - What conclusions you could make from the results?
  - 3. **Conclusion**
    - Summarize your findings.

All you need is to summarize the works you have done and your results.

Please do not include the introduction of the task sets that have already been covered in the lectures.

Your project score is determined by the content of your report and not the page length.

Course Project: Assessments

- Your project will be evaluated based on the following perspectives and factors.
  - 1. Project Work and Results
    - a) Correctness of methods used
    - b) Amount of work done
    - c) Analysis and interpretation of results
  - 2. Project Report
    - a) Presentation
    - b) Clarity and correctness

Q&A

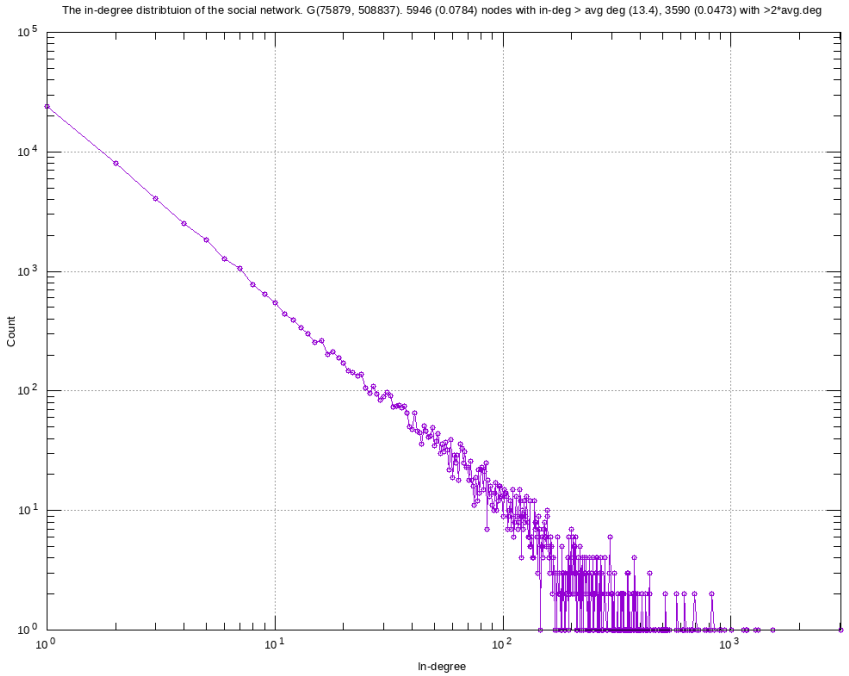
Example

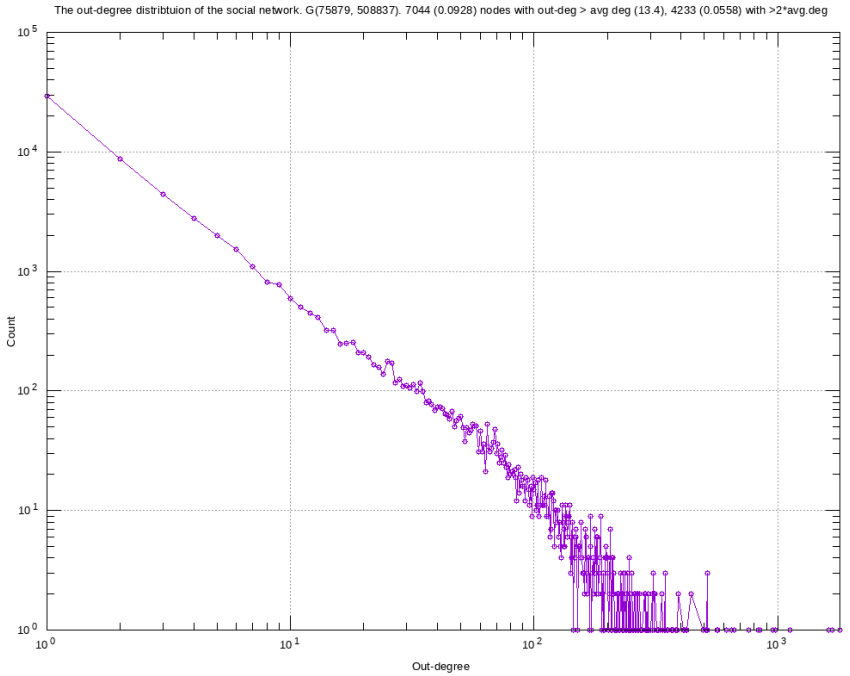
- Task set 2: Understand power laws and network generation
  - a) Power law exponents for real world networks.

```
import snap

# load graph
LoadedGraph = snap.LoadEdgeList(snap.PNGraph, "../data/soc-Epinions1.txt", 0, 1, '\t')

# plot degree distribution
snap.PlotInDegDistr(LoadedGraph, "InDegreeDistr", "The in-degree distribtuion of the social network")
snap.PlotOutDegDistr(LoadedGraph, "OutDegreeDistr", "The out-degree distribtuion of the social network")
```

Example

- Task set 2: Understand power laws and network generation
  - a) Power law exponents for real world networks.





Example

- Task set 2: Understand power laws and network generation
  - a) Power law exponents for real world networks.

- Analyze based on histogram…

```
import snap

Graph = snap.GenRndGnm(snap.PNGraph, 100, 1000)
DegToCntV = snap.TIntPrV()
snap.GetInDegCnt(Graph, DegToCntV)
for item in DegToCntV:
    print("%d nodes with in-degree %d" % (item.GetVal2(), item.GetVal1()))

UGraph = snap.GenRndGnm(snap.PUNGraph, 100, 1000)
DegToCntV = snap.TIntPrV()
snap.GetInDegCnt(UGraph, DegToCntV)
for item in DegToCntV:
    print("%d nodes with in-degree %d" % (item.GetVal2(), item.GetVal1()))

Network = snap.GenRndGnm(snap.PNEANet, 100, 1000)
DegToCntV = snap.TIntPrV()
snap.GetInDegCnt(Network, DegToCntV)
for item in DegToCntV:
    print("%d nodes with in-degree %d" % (item.GetVal2(), item.GetVal1()))
```

http://snap.stanford.edu/snappy/doc/reference/GetInDegCnt.html

NodeXL & SocNetV

- **NodeXL**: users without programming skills can make use of key elements of the SNAP library
  - add-ins for Microsoft® Excel® (2007, 2010, 2013, 2016) that support social network and content analysis
  - https://archive.codeplex.com/?p=nodexl

- **SocNetV**: (Task set 4: Simulate epidemics)
  - Social network analysis and visualization software
  - https://socnetv.org/

SocNetV: Memory!!!