Network Science

Complex Network Analysis (CNA)

Lab 01

Lecture 03

Book

"Complex Network Analysis in Python"

Dmitry Zinoview

the Pragmatic Programmer

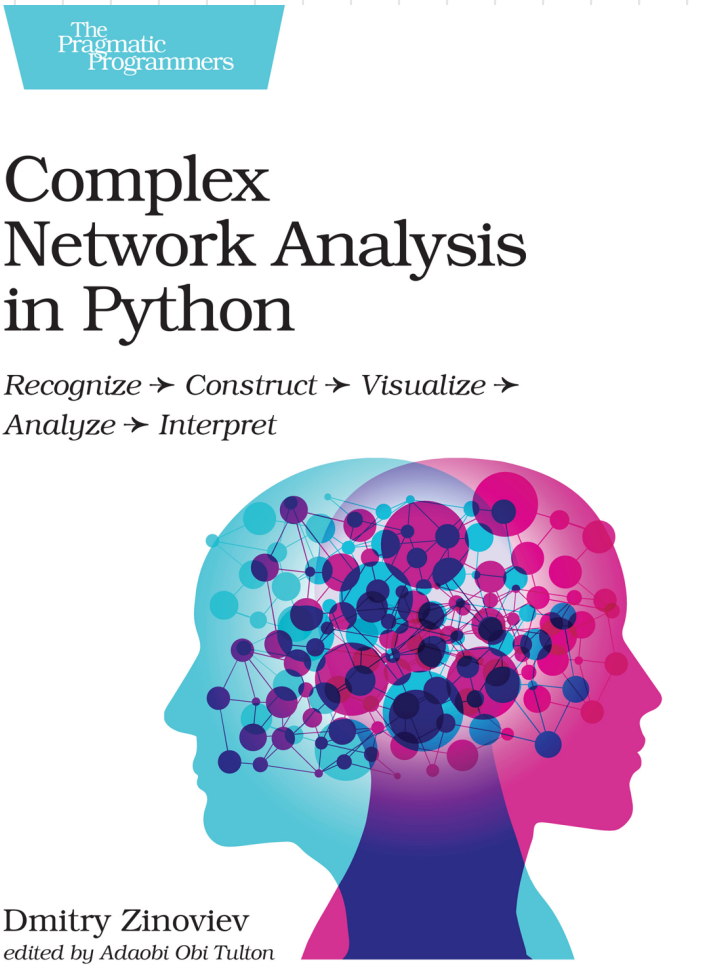
2017

https://pragprog.com/book/dzcnapy/complex-network-analysis-in-python

Get the source code here

... you can also buy the book here

networkX 1.0



Tools

- python 3.0 (or greater)
- networkx 2.0 (or greater)

Instructor's distribution:

Anaconda on MacOS

Jupyter 5.0.0

- Gephi (Java)

...

R + igraph (available also for python)

Pajek

many others

Other libraries (Python)

igraph
graph tool
networkit (← for large scale graphs)
...

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you need to install also these:

community
matplotlib
pandas
wikipedia
toposort

within Anaconda
you get almost
everything, but:

pip install topsort
" " wikipedia
" " python-louvain

then install

Graphviz
(including the devlopers
add-on
graphviz-dev)

then you can:

pip install pygraphviz

Finally:
download book's author
package clrc nepy_plotlib.py

1. Fill out the second form (link on moodle)

2. Draw your epo network with paper and pencil

3. appreciate computational tools !

NetworkX

easy to install
easy to understand and use
fully implemented in Python
(so it inefficient with large datasets)

no built in
+ community Detection
+ advanced layouts

You have to install other packages or Gephi

Introduction to Python

download and execute step by step these notebooks (on moodle):

01_Python_introduction.ipynb

02_Glob_Pickle.ipynb

03_Pandas_intro.ipynb

(data from: DataSets.txt)

Author: Dr. Flavio Lisdero

this is on your OWN.

Introducing NetworkX

(Chapter 3)

1. Learn how to manually create a network

01_ Network Creation.ipynb

2. Learn how to read a network from a CSV file
3. Learn how To visualize a network with Matplotlib
4. Learn how To save your graph to a format readable from Gephi

02_ Nutrients.ipynb

Introducing Gephi

(Chapter 4)

1. import existing network data
2. modify the network
3. change size and color of nodes, text, and edges

Constructing a network of Wikipedia Pages

(chapter 5)

1. start from a SEED page
2. run a simple snowballing process
3. Create a directed Graph
4. Perform some cleaning
5. Perform basic analysis
6. Save data for Gephi to create better visualization

03_Wikipedia.ipynb

It's your turn!

1. Execute your notebooks to replicate results

2. Download the class social network csv file

classmates_AdjMatrix.csv

(find it on moodle at the end of this lecture)

3. Create the entire class network with python

4. Visualize and try to understand it with Gephi