Automatic graph visualization service

Summer internship project 2019

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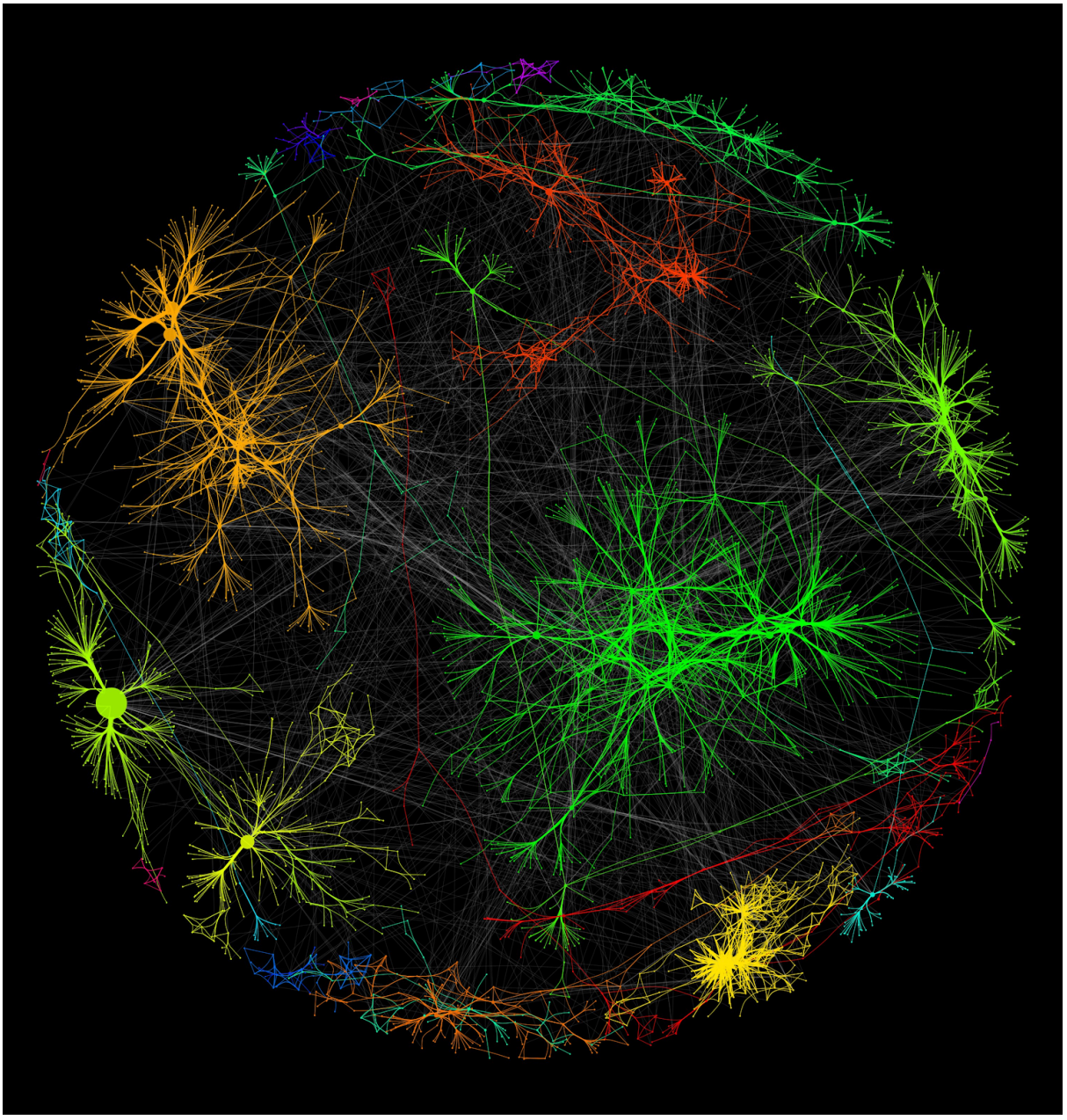
Goal

Create an automatic network visualizer service for any network. In short, generate visualization like the following without any scripting/tweaking, just passing network data:



This is a supplement for the community detection project Akshat and Song are working on now.

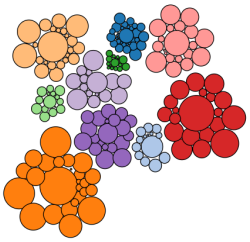
Requirements

Input

- An undirected network
    - Relatively large (thousand ~ million edges)
    - with/without edge weights
    - In CX format
        - (optional) In DataFrame / sparse matrix

Output

- Layout - node positions (x, y)
    - Emphasize the community structures, i.e.,



- Clusters/community membership as node attributes
- Stye
    - Communities colored by membership
        - Both nodes and edges
    - (Optional) Node size based on useful statistics
        - Betweenness / transitive centrarity
        - Degree
    - Edge visibility based on random sampling or filtering
- In CX format

Other requirements

- Should be callable as a RESTful API
    - returns a JOB ID
    - Result will be returned by using that job ID
    - (example: The API will be similar to this http://diseasescope.ucsd.edu/netant/)
- Also works from command line
    - Deploy to pypi repository
    - Target version - python 3
- Preferably implemented in Python 3.x

- Should be deployed as a (docker) container
- (Optional) gRPC for huge networks??

Non-technical requirements

- Write documentation
- Create example notebook to run a workflow
- Should be installable with one pip command
- Present the result on September 10 meeting

(TBD)

Data Sets
Design
Implementation
Schedule

Tools and libraries

Layouts

- https://github.com/bhargavchippada/forceatlas2
- https://bl.ocks.org/shancarter/f621ac5d93498aa1223d8d20e5d3a0f4

Community Detection

- TBD

Network Stats

- Graph-tool https://graph-tool.skewed.de/
- Igraph python
- NetworkX

Sample script Kei wrote in R:

https://github.com/idekerlab/cy-rest-R/blob/develop/workflow1_structure_based_visualization.R

Sample Data Sets:

(TBD)