CSC591 Virus Propagation Model

This project implementation is done towards fulfillment of Project 5 of CSC 591 Graph Data Mining

Research Paper

The implementation is inspired by the paper given in the ***research_paper*** folder. The paper is Got the Flu? (or Mumps) Check the Eigenvalue!

Goal

To implement the given problem and objectives stated here. Analyze the propagation of a virus in a network and prevent a network wide epidemic. In order to do that, your team will need to:

- Analyze and understand a virus propagation model.
- Calculate the effective strength of a virus.
- Simulate the propagation of a virus in a network.
- Implement immunization policies to prevent a virus from spreading across a network.

Data

You will be provided with the following materials in advance:

- Supplementary material on virus propagation.
- Parameter values for experiments:
    - Transmission probabilities β 1 = 0.20 and β 2 = 0.01.
    - Healing probabilities δ 1 =0.70 and δ 2 = 0.60.
    - Number of available vaccines k 1 = 200.
- Static contact network (i.e., one undirected unweighted graph) for Option 1:
    - static.network

Getting Started

Installation

- Install Python3 from here and finish the required setup in the executable file.

Install pip package manager for future downloads-

```
$ python -m ensurepip --upgrade
```

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Upgrade the version of pip-

```
$ python -m pip install --upgrade pip
```

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Install NetworkX for graph processing-

```
$ pip install networkx
```

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Upgrade the version of networkx-

```
$ pip install --upgrade networkx
```

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Create working directory named `Virus_propagation_P5` and go inside it

```
$ mkdir Virus_propagation_P5
$ cd Virus_propagation_P5
```

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Clone this repository from here or use the following in GitBash

```
$ git clone https://github.com/tusharkini/Virus_propogation_model
```

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Running the Algorithm Code

Run the algorithm code using-

```
$ python main.py
```

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  This will create a series of images in the `results` folder. These plot names are self explanatory in nature.

Authors

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