Infectious Disease Spread

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Complex Networks 2017/2018

**The Dataset**

The dataset analysed in this work consists of high-resolution temporal contact network related to the spread of infectious diseases via droplet transmission.

It represents the recording of single day of individual contacts in an American high school.

For the official project’s webpage, see <http://sing.stanford.edu/flu/>.

**Data Collection Procedure**

The data was collected using a wireless sensor network (TelosB motes), that detected when two individuals were within range of one another.

A contact was recorded if the distance between two individuals was less than or equal to 3 meters.

The duration of the contact was also recorded. Each time an individual is within range (3m) of another, the motes would send beacons every 20 seconds. As an example, if student A and student B were talking within 3 meters of one another, for one minute (60 seconds = 2 x 20 seconds), the motes would register 3 beacons.

There was 94% coverage of the total school population's contacts.

**The Network**

The aggregate network for the entire day can be represented by a weighted undirected network.

The nodes represent individuals wearing mote sensors (students, teachers, staff and other).

The edges represent the contacts between the individuals. The edge weight represents the duration of the contact (in minutes). There are four different types of edge/contact representation, explained in the next session.

N = 788 (655 students, 73 teachers, 55 staff, and 5 other persons)

E = 762,868 (total number of contacts, 94% coverage)

**Edge/Contact Representations**

ToDo

**Network Metrics**

[RR] Degree Study

ToDo

[RR] Average Path Length

ToDo

[JR] Clustering Coefficient

Average Clustering Coefficient: 0.005622395491693588

Node with lowest Clustering Coefficient 374(Role Here) -> ( 0.0013795108060206942 )

Node with highest Clustering Coefficient 25(Role Here) -> ( 0.04722572403965249 )

[RC] Diameter

ToDo

**Node Metrics**

[RC] Degree Centrality

ToDo

[RC] Eigenvector Centrality

ToDo

[JR] Closeness Centrality

Average Closeness Centrality: 0.6207525375025098

Node with lowest Closeness Centrality 375(Role Here) -> ( 0.3705273069679849 )

Node with highest Closeness Centrality 170(Role Here) -> ( 0.7509541984732825 )

[JR] Betweeness Centrality

Average Betweeness Centrality: 0.0011027788727294

Node with lowest Betweeness Centrality 266(Role Here) -> ( 0.0 )

Node with highest Betweeness Centrality 15(Role Here) -> ( 0.006957799391153176 )

**Conclusion**

ToDo