Network Software Modelling Assignment 2

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Questions:
How quickly should a given country stop letting flights in to avoid the disease reaching it? when is too late? Different results for iceland and uk for example?... Centrality of country: how quick does it get disease
simulation property: screening for disease - catch given percentage - effect on spread
simulation property - chance of receiving - centrality probability of country with disease of spreading to other countries weighted on population of that country probability increases at each timestep to account for fact that disease spreading within the country

1 Read world phenomenon : Spread of disease through airport networks

In this simulation we will model the spread of disease through a network of airports. This topic is
This simulation is inspired by the work of Nichola Yager which models the spread of pathogens through airports using a directed graph. We extend his work by simulating disease spread

2 Describe briefly your choice of graph model and how it corresponds to the real-world phenomenon, e.g. your choice of directed versus undirected edges, edge weights, allowing or disallowing self-loops, etc.

Edge weights - average of two nodes(airports)
Multiple routes between any two nodes are removed.
Airports with no flights are removed.
Only airports within USA are used.

3 With the aid of a diagram, describe the simulation rules, e.g. how agents change state and what causes them to send messages.

Write about SIR model - Susceptible, Infected, Recovered and Dead.
How the first node/nodes are infected - initialised with probability
Time Steps
Node Colour - green : Susceptible, yellow: infected, white: recovered, red: dead
Edges with higher weight have higher probability of spreading the disease.
Recovered from Infection are not susceptible again

4 Program your simulation in Python.

5 State one or more simulation properties which you wish to investigate and which graph properties you hypothesize they may depend on.

radius
diameter
centrality
order

6 Carry out experiments to measure these properties in different types and sizes of graph (at least one real-world graph, and at least one scalable graph model such as the Erdos-Renyi random graph model, at multiple sizes). Present a table of data showing your results.

Graph property tests - Tables of results
Results Diagrams/figures from Python code
Scalability test results along with tables and figures

7 State your conclusions, based on your data.

Discuss the results
Statistics