PROJECT PROGRESS REPORT – ADVANCED PANDEMIC FLU SPREAD – TEAM 124

TEAM MEMBERS

* Gauri R Kapse (Assigned PM)
* Shilpi Jain,
* Lu Shan,
* Muthu Reshmaa Ganapathy Kalyana Sundaram

TOPIC AND GOAL:

We have chosen to work on Problem 15, Advanced Pandemic Flu Spread. The goal is to create simulations in order to determine which of the two vaccination strategies proposed in the brief is better.

APPROACH:

We began with reading about the different mathematical models used in studying the spread of an infectious disease. The most basic model is SIR – individuals move from the S (susceptible) to the I (infected) to the R (removed) compartments as the pandemic spreads. A modified version of this is the SEIR model, where infected individuals who are not yet infectious themselves get assigned to the E (exposed) compartment.

So far, [Gauri] has built a basic SEIR simulation model in *Arena*. This model simulates how a disease would spread if there were no preventative measures taken.

Within the next two weeks, we plan to modify this model to create three more. We have assigned the tasks as follows:

* One model with masking and social distancing measures introduced [Shilpi]
* One model with masking and social distancing measures, and vaccination strategy A: give everyone the first dose, then give everyone the second dose [Reshmaa]
* One model with masking and social distancing measures, and vaccination strategy B: give first and after “d” days give second dose [Lisa]

Once the models have been completed, we will use data on number of deaths, number of individuals infected, length of pandemic, etc to determine which is the best vaccination strategy. We are considering an ANOVA for the hypothesis testing.

The path to project completion has been broken down into further tasks including hypothesis testing, creating data visualizations, literature reviews and citations, writing, proofreading etc. The tasks will be assigned after the modelling is complete.

REFERENCES:

1. [This Wikipedia page](https://en.wikipedia.org/wiki/Compartmental_models_in_epidemiology#The_SIR_model)
2. [Mathematical Models in Infectious Disease Epidemiology](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7178885/)
3. [SEIR model for COVID-19 dynamics incorporating the environment and social distancing](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7270519/)