Seminar Talk: “Impact of Transportation Networks, Vaccines, ...” (Speaker: Dr. Philip Pare)

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Abstract

In today’s presentation, Dr. Philip Pare and the team take on one of the biggest challenges of our point in history, modeling and controlling how the COVID-19 virus spreads. Dr. Pare focuses on a few key areas, extending the SEIR model to transportation networks across the northeast of the United States, evaluating travel ban mitigation strategies, and modeling vaccine hesitancy vs. the spread.

I. Introduction and Background

COMPARTMENTAL models is a general modeling technique often applied to the mathematical modeling of infectious diseases. Specifically, a Susceptible, Exposed, Infectious, Recovered (SEIR) model creates a deterministic model that can simulate an infection throughout the spread phases. Mainly includes parameters for diseases with a latent phase during which the individual is infected but not yet infectious. Dr. Philip Pare and his team have extended a networked SEIR model on the COVID-19 disease to include transportation network data, specifical data for air travel across the United States. Using this model, we will better predict the spread and estimate infection levels of COVID-19 across urban countries.

II. Research Contributions

A. Transportation Network Model

Transportation network analysis provide new methods to analyze evolution of the population flow and understand its influence on COVID-19 transmission.

B. Vaccine Hesitancy Model

III. Results

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IV. Lessons Learned

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V. Conclusion

The recent COVID-19 outbreak has spawned a massive surge in research into understanding the spread of infectious diseases. Understanding the reach and creating mathematical models to predict the future spread and better ways of controlling spread will be vital to bring the current pandemics to an end and any future ones we may encounter. Dr. Pare and his team continue to aid in this ongoing research with his contributions in modeling transportation networks and vaccine hesitancy against the spread of the COVID-19 disease.

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