BUET ACM CHAPTER

presents

Using agent-based model to fight the COVID-19 pandemic in Bangladesh

Speaker: **S. M. Niaz Arifin**

Simulation Modeler/Data Scientist, Silicon Valley, CA, USA

Dr. S. M. Niaz Arifin is a Simulation Modeler and Data Scientist working in Silicon Valley, California. He has over a decade of research and professional experience in developing agent-based models for public health, and applying those models in multiple countries (including Kenya, Niger, Indonesia, USA, and Bangladesh). He served as a Research Professor at the University of Notre Dame (Indiana), and as a postdoc in Epidemiology of Microbial Diseases at Yale School of Public Health (Connecticut). He received his PhD from the University of Notre Dame. His research interests include predictive modeling using agent-based modeling and simulation. His modeling research has been published in a book titled "Spatial Agent-Based Simulation Modeling in Public Health". He has authored numerous journal articles, conference papers, and book chapters (`https://campuspress.yale.edu/niazarifin/research/`), and delivered invited talks around the globe. For the COVID-19 pandemic, Dr. Arifin has been selected to be a part of the National Data Analytics Task Force, a group of experts/researchers residing in the USA, Canada, and Bangladesh. He has been designing and implementing an agent-based model for COVID-19 transmission and control in Bangladesh. He formulated the model's inception and design by closely collaborating with other domain experts. Using his decade-rich research expertise, he guided the interventions modeling to provide cases and deaths forecasts. He also delivered on-demand insights to officials from different teams in the Bangladesh Government.

Abstract

In the past 10+ years, I have developed agent-based models (ABMs) for various diseases (such as malaria and meningitis), and applied those models in countries including Kenya, Niger, Indonesia, and Bangladesh. For COVID-19, we have developed an object-oriented, discrete-event, rule-based, and stochastic ABM for its transmission and control in Bangladesh. The core elements of the model include agents (human, virus), their environments (house, school, hospital, etc.), and the interaction rules. It captures important COVID-19 modeling dynamics including infection, transmission, and death, and is able to express and test a variety of hypotheses. It can provide forecasts on number of COVID-19 cases and deaths, and the impact of applying multiple interventions (including lockdown, isolation, and closures). It can also model special events such as garments factories opening or the religious Eid festival, resource allocation and planning forecasts to aid the Government's preparedness in emergency response scenarios, inter-district population movement, impact of zoning, and so on. As such, it can provide valuable insights to policy makers and funding agencies concerning the disease's control and elimination efforts.

Team

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