Can Predictive Agent-Based Models Offer a Glimpse into the Long-Term Pandemic-Infodemic Co-evolution?

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Background: During the COVID-19 pandemic, the concerns regarding the diffusion of untrue or malicious information spiked, as a co-evolution effect has been observed with the spread of the virus. Analyzing and predicting effects of infodemics is of high interest, and efforts have been focused on associating epidemiological models of viral spread to information diffusion.

Objective: Determine if agent-based models can provide insights into the co-evolution between the spread of viral infection and the spread of mis- and disinformation.

Method: We designed an agent-based simulation model to visualize and analyze a population of agent categorized as susceptible, exposed, infected and recovered (SEIRS), while simultaneously modeling the diffusion of true or false information on social media. The model is predictive, with customizable features (e.g., infection and recovery rates, number of agents, etc.) and designed in a bottom-up approach (modeling individuals to obtain population trends). The modeling framework is NetLogo, a multi-agent programmable modeling environment with easy-to-use syntax. The model provides both a visualization of the population and social media network, as well as exportable graphs and variable data.

Results: The model shows a clear co-evolution between the pandemic-affected population and the spread of mis- and disinformation in the simulated world. The model allows different time scales and different population sizes, offering simulated predictions on various combinations of epidemiological parameters (e.g., immunity loss rate). We are able to simulate a wide range of scenarios and different configurations of the SEIRS model: SI, SIS, SIR, SIRS, SEIR or SEIRS. Moreover, the model is able to generate simulated data for further analysis, statistical or dynamic.

Conclusion: Predictive agent-based models can simulate the long-term co-evolution of pandemics and infodemics by modeling the local behaviors of individuals in a population.

--- we hear back 15 september

--- conference is 27 october