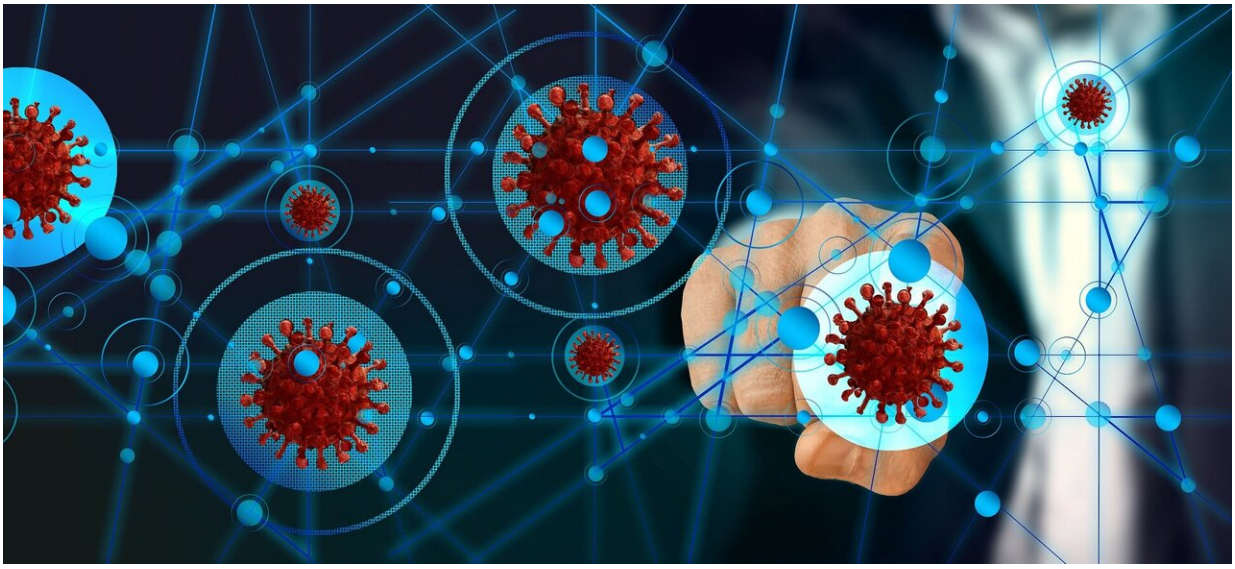
Predicting pandemics with machine learning

July 19 2023, by David Bradley



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Research in the *International Journal of Electronic Security and Digital Forensics*, investigates the potential for machine learning models to predict the occurrence of disease pandemics with greater accuracy than other approaches. The ability to quickly identify the spread of an emergent pathogen and determine whether or not it will lead to a global pandemic could allow policymakers and health care professionals to develop more effective planning, response, and containment strategies during a global health crisis.

Soni Singh, K.R. Ramkumar, and Ashima Kukkar of Chitkara

University in Punjab, India, have taken a novel approach to improving the parameters of existing machine learning models using the Ant Colony Optimization (ACO) algorithm, which they say helped them surpassed the accuracy of previous prediction models.

Pandemic diseases wields a significant impact on societies worldwide, inevitably causing acute and chronic morbidities among those the disease does not kill. There is a pressing need to find ways to forecast the spread, mortality rates, and recovery cases for new pandemics as they arise.

The team tested the performance of their new model using data from the COVID-19 pandemic and Ebola datasets. They were able to replicate the data in simulated predictions particularly in terms of daily projections for the spread of COVID-19 in the U.S. and Ebola outbreaks in Guinea and Liberia. Of the various machine learning approaches tested, the team found that the MLP-ACO algorithm was the most effective, outperforming the others tested.

The team explains that the optimization of machine learning model parameters as demonstrated in their paper offers a promising path forward in pandemic prediction. Fundamentally, the approach significantly improves predictions using time-series-based pandemic datasets. However, the team also recommends that additional studies are now needed to help improve accuracy still further.

More information: Soni Singh et al, Pandemic outbreak prediction with an enhanced parameter optimisation algorithm using machine learning models, *International Journal of Electronic Security and Digital Forensics* (2023). DOI: 10.1504/IJESDF.2023.131960

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