Team develops COVID-19 forecast hub

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Nicholas Reich is head of the UMass Amherst Influenza Forecasting Center of Excellence. Credit: UMass Amherst

The Influenza Forecasting Center of Excellence team at the University of Massachusetts Amherst is developing a COVID-19 forecast hub by unifying multiple models in an effort to produce a more accurate picture of the potential impacts of the novel coronavirus.

This "ensemble approach," which has created some of the most accurate forecasts for seasonal influenza, will give the general public, as well as policy makers and scientists at the Centers for Disease Control and Prevention and the White House Coronavirus Task Force, access to a centralized data repository and forecasts representing nine models and five teams of highly respected infectious-disease forecasters.

"None of these models on their own are adequate to drive policy decisions," says Nicholas Reich, director of the UMass Influenza Forecasting Center of Excellence, one of two in the nation designated and funded by the CDC. "We've created a simple ensemble model to try to unify all these forecasts of COVID-19 together. Some models are overly optimistic, and others may be overly pessimistic. The reality is likely in the middle. We need the diversity of these modeling teams to understand the full range of future possibilities."

The COVID-19 forecast hub includes forecast data from modeling teams from Seattle-based Institute for Health Metrics and Evaluation (IHME), Columbia University, Northeastern University, Imperial College London and Los Alamos National Laboratory in New Mexico. Reich says he has had such positive collegial outreach with each of the teams whose data has been added so far that other teams have reached out to him and plan to add forecasts to the hub in the coming days and weeks.

On Friday, Reich announced the collaboration on Twitter, sharing the link to the group's first ensemble models. These models rely on standardized forecast data from the different groups making forecasts. Over the last week, Reich has coordinated the curation of these forecasts from teams across the world into a common format. Both Katie House, a recent UMass Amherst computer science master's program graduate, and Nutcha Wattanachit, a biostatistics Ph.D. student, contributed to this effort.

The ensemble models include interactive visualizations of four-week-ahead forecasts for COVID-19 cumulative deaths by state and for the entire U.S. Reich also will be preparing ensemble models for hospitalizations and total number of cases.

"This is replicating the system we have built before for flu forecasting," explains Reich, an associate professor of biostatistics in the School of Public Health and Health Sciences. "All this data is public. We're just putting it all together."

"Modeling has been such a central part of the COVID-19 discussion," Reich says. "This is really a massively important resource. We are looking forward to working with these teams, many of whom we already have extensive track-records of collaboration with, to showcase the power of having a diversity of modeling approaches."

He notes that this work is much more challenging than creating models to forecast the flu. "Forecasting COVID-19 is a completely different ballgame because we can't rely on 20 years of public health surveillance data like we have for flu," Reich says.

Provided by University of Massachusetts Amherst

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