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Prof. Antonio Capella Kort
Instituto de Matemáticas
Universidad Nacional Autónoma de México

Bayesian Inference Models for Healthcare Resilience: Insights and Lessons from Mexico's COVID-19 Response

Navigating the challenges of the global COVID-19 pandemic required strategic decisions tailored to each country's unique circumstances. In less developed nations, the threat of overwhelming hospital capacity was especially severe. Rather than building scenarios based on mathematical models, our team used a dynamic forecasting approach. We developed a series of models that provided 4-week probabilistic forecasts, complete with uncertainty quantification. These forecasts, crucially informed by real-time data, predicted the demand for hospital beds and ventilators, which served as the backbone for decisions and public policies adopted by federal health authorities in Mexico from April 2020 to January 2022. The journey was a challenging one. An incompletely characterized virus and the unpredictable dynamics of societal behavior made crafting a useful model difficult.

In this talk, I will present a retrospective of these models and critically review their objectives, successes, and limitations. Our methodology and modeling decisions will be presented, from the intricacies of data used for model fitting to the balance between model complexity and parameter identifiability. The predictive power and performance of our models will also be reviewed. Beyond the algorithms and forecasts, I'll share our experiences collaborating with health authorities and communicating with the general public. Discover the highs and lows, the challenges faced, and the insights we gained.

Also streamed via Zoom

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