

Beyond Forecasting: Using Today's Model(s) to Forewarn Decision Makers

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Abstract

Simulation models lie at the heart of many modern forecast systems used for decision support; while weather forecasting has long been the poster child for simulation-based probability forecasting, these methods are now used in many other applications from business and financial forecasting to ecological impact assessment and traffic management. It appears almost certain that model inadequacy (in particular the loss of topological conjugacy between very similar high-dimensional mathematical systems) will prevent the provision of probability forecasts which a rational decision maker can reasonably interpret as reflecting the probability of future outcomes. Other more viable uses of these same models are introduced, include a design to provide forewarning of very low frequency but high impact events. Here, sculpted ensembles are used to identify the possibility of the event (in model-land) and determine when it appears no longer plausible. Implications of this approach in design, logistics, regulation and disaster risk reduction are shown.