



جلسه ارائه علمی دانشکده مهندسی صنایع

Quantitative Aggregation of Prior Statistical Findings



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Abstract

Synthesis of prior research requires the combination of previous findings, yet current meta-analysis methods limit quantitative aggregation to studies with similar designs. We introduce Generalized Model Aggregation (GMA), which allows researchers to combine prior estimated models regarding a phenomenon into a quantitative meta-model, while imposing few restrictions on the structure of prior models or on the meta-model. Numerical examples demonstrate the ability of GMA to obtain unbiased estimates from potentially miss-specified prior studies. As an example, using only published results, GMA provides a predictive equation for Basal Metabolic Rate that outperforms existing models, identifies novel nonlinearities, and estimates errors in various measurement methods. By enabling more complex meta-analyses, GMA can leverage previous findings to compare alternative theories and advance new models in diverse domains.

Biography

Dr. Hazhir Rahmandad is an Associate Professor of Industrial and Systems Engineering at Virginia Tech and joining MIT Sloan School of management from this fall. His research applies dynamic modeling to complex organizational problems. He has analyzed how organizations learn in the presence of delays between taking action and observing the results and has shown through empirical data and simulations the learning challenges in such contexts. His strategy research has explored capability development tradeoffs under competition and erosion of organizational capabilities through adaptation traps. In another stream of work he has studied public health problems, including obesity dynamics, comparing different modeling methodologies in application to epidemics, and agent-based modeling of polio transmission dynamics. Dr. Rahmandad also contributes to expanding the system dynamics modeling toolbox through advancing parameter estimation and validation methods for dynamic models. Hazhir has published in diverse journals including Management Science, Organization Science, Epidemiology and Infection, International Journal of Obesity, and System Dynamics Review among others.