Human Behavior Modeling

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Complex Adaptive Systems are very difficult to predict, control, and understand. They often have little or no centralized control, lack a single governing equation, contain feedbacks and other non-linear relationships, and exhibit behaviors such as lock-in, tipping points, and path dependence. Dynamic simulation techniques, such as agent-based models, system dynamics, and discrete-event simulation, are very well suited to exploring such systems.

However, learning in some systems, such as population health, epidemiology and public policy, is limited by the presence of numerous latent dynamics related to human behavior. The information we do not know is often significant enough to make prediction difficult to impossible. The outcomes of a policy to reduce obesity, texting and driving, or tobacco consumption depend largely on aspects of human behavior that are not quantitively known. For example, a public media message intending to reduce obesity might increase obesity stigmatization, hands-free laws might encourage behavior that is riskier but harder to detect, or a tax on tobacco might unduly harm individuals with mental health issues.

This talk will cover several techniques that can be used when modeling human behavior in systems of population health or public policy. The first is an example of using data from Discrete Choice Theory studies to parameterize a model of human behavior. The second presents a modular design pattern to help in quantifying current human behavior models.