

4 - Improving Neonatal Transportation Process Through Multi-Method Simulation

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Transporting critically ill newborns from one hospital to another with a higher level of care has to be quick and safe. However, this transportation process is complex, risky, resource-constrained, and involves coordination among stakeholders in different hospitals. Using a multi-method simulation approach, we modeled the coordination and transportation process in a regional hospital network in Northwest America. The model was developed by analyzing the current workflow processes and using historical transportation records. The model will be used to redesign the current process with a focus on efficiency and safety, which may be used by similar facilities regionally and globally.

5 - A Hybrid Simulation Study For Assessing Lean Manufacturing Techniques In A Lego Car Manufacturing Facility

Michail Katsigiannis, Auburn University, Auburn, AL, United States, Minas Pantelidakis, Konstantinos Mykoniatis

Modeling and Simulation is primarily used as a decision support tool to analyze, understand, and assess the behavior of complex systems. This work investigates a hybrid simulation approach to model a Lego car automotive assembly line. We developed a hybrid discrete-event and agent-based simulation model of the production line to analyze the system's performance. The simulation experiments involved two scenarios (i.e., Mass Production and Just-in-time with Heijunka) to assess their impact on production line performance metrics. The Just-in-time and Heijunka techniques significantly improved the overall system's performance in terms of throughput and reduced total time in the system.

■ VWC51

Virtual Room 51

Economic Modeling I

Contributed Session

Chair: Gabriel Bahr, Stillwater, 74074, United States

1 - Analysis Of Platformer Economy With Network Externalities - Theoretical Pathway To Sharing Economy

Katsuya Hihara, Tokyo Metropolitan University / University of Tokyo, Tokyo, Japan,

Thanks partly to the network externalities, platformers attract vast amount of users with huge profit, hence causing a number of public policy debates. Despite platformers' high profile, we found very limited number of rigorous researches specifying exact content of externalities and other market elements involving platformers. We use simple Cobb-Douglas type externality model and derive the exact conditions for optima with concrete results about the impact of platformer's capacity or profit level on social welfare. Also, analytical results show concrete linkages to sharing economies, involving Airbnb or Uber, from our platformer externality modelling.

2 - The Causal Impact Of Market Competition On Product Variety: A Deep Neural Network Representation Learning Approach

Ying-Chin Chen, University of Washington-Seattle, Seattle, WA, United States, Qifan Huang, Chen Zhuang

We study the causal effect of dynamic competition on product variety in a live streaming platform, where anchors can sell products to the audience. Our data has about 2 million products. We use a mean-max attention autoencoder neural network to get the embedding of the anchor's daily sales record. Competition index is defined as the summation of inner products of embedding vectors. The attention mechanism allows us to capture (1) implicit substitution or complementary relationship across product categories (2) time dependency of daily sales. We leverage a natural experiment to identify treatment effect: some top anchors with strong market power quit the platform by accident

3 - Establishing Material Recovery Facility: Quantitative Cost-Benefit Analysis

Joon-Yeoul Oh, Texas A&M University-Kingsville, Kingsville, TX, United States, Isaac Teye Nuetey

Recycling retrieves wastes into usable materials and catalyzes economic security by reusing depleted resources and creating jobs. Most small-sized cities have no recycling process facility, hence there is no recycling collection program. This research aims to perform economic analysis for setting up a material recovery facility for small-sized cities. This research, first, estimates the costs associated with building and operating the facility. This research also estimates the generated benefits such as hiring employees, generating products, etc. The results show that building a new recycling facility will add an economic value of more than \$300,000 a year with a recovery rate of 30%.

4 - Optimal Price Subsidy For Plant-based Meat Toward A Differential Game Model

Jie Qu, University of Wisconsin-Milwaukee, Milwaukee, WI, United States

Dealing with environment and food crisis, popularize the fake meat is a possible solution. However, the high production cost made fake meat lack of competitiveness. High cost will be overcome by technology advancement and economics of scale if it, in early market, received subsidy and help from government to become economically competitive. This paper deals with the determination of optimal pricing policy for the firm and optimal subsidy for the government in the monopoly and oligopoly market using differential game.

5 - HIT Spillovers And Sustained Cooperation

Ankita Srivastava, Oklahoma State University, Tulsa, OK, United States, Chenzhang Bao, Dursun Delen

Based on the proposed referral network model we study IT spillover effects from ambulatory facilities to hospitals. Using a panel of 13 years with 2,768 US hospitals matched with approximately 30,000 ambulatory facilities, we find a 1% increase in the average EMR adoption of the regional ambulatory clinics can reduce the inpatient cost of the focal hospital by 0.031% (savings of \$51,000) in one year and by 0.059% (savings of \$98,000) in four years. Our model is robust to endogeneity issues. We also find support for mechanisms where spillover effects are expected to be stronger. The referral network model and empirical evidence can propagate a culture of sustained cooperation among healthcare providers.

6 - Digital Borders, Spatial Trade Spillovers, And Development

Gabriel Bahr, Oklahoma State University, Stillwater, OK, United States, Bryan Hammer, Andy Luse

The purpose of this paper is to expand ICT4D literature by investigating the associations between international trade of technology merchandise and development across countries. Using a spatial autoregression model and data on 45 upper-middle and high income countries from 2009 to 2018, we examine the effects of imports and exports of technology driven trade on two measures of development (GDP and HDI). Additionally, we define spatial borders through a trade partner network and discover spillover effects of trade-development on neighboring countries.

■ VWC52

Virtual Room 52

Novel Behavioral Models in Social Networks

Sponsored: Social Media Analytics

Sponsored Session

Chair: Tauhid Zaman, Yale University, New Haven, CT, United States

1 - The Categorical Imperative in Networked Collective Intelligence

Douglas Guilbeault, University of California-Berkeley, Berkeley, CA, United States

In this talk, I argue that collective intelligence dynamics differ qualitatively based on whether people exchange numeric or categorical information. I discuss two studies which show that the social exchange of binary judgments can amplify the spread of inaccurate views, whereas the social exchange of numeric judgments, in identical task environments, can reliably improve belief accuracy. I conclude by discussing a third study which shows that the social exchange of category systems can promote coherence and consensus in novel task environments that preclude the exchange of numeric judgments. Implications for organizational decision making and cultural evolution are considered.

2 - Social Media Sentiment And Cryptocurrencies

Khizar Qureshi, MIT, Cambridge, MA United States

We conduct a study of social media activity surrounding cryptocurrencies. We collect tweets from Twitter for multiple cryptocurrencies. We also construct measures to quantify the sentiment of the tweets using transformer neural networks. We model social media interactions surrounding tweets of the coin and then fit a Poisson Regression to this data and use the estimated model parameters to construct features that quantify the virality of the coin and its long-term potential for growth. Finally, we attempt to predict which coins have massive future price movements using these virality features.