EDITORIAL

Algorithms and models for decision making in advanced technology systems

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This issue of *Environment Systems and Decisions* is focused on the topic of managing technology through the use of innovative algorithms and modeling techniques. Several of the articles in this issue develop advanced techniques such as ant colony optimization and genetic algorithms. Furthermore, multiple advanced technologies are discussed as case studies, including autonomous vehicles, Internet of things (IoT) systems, and the telecommunication grid.

The first two perspectives articles in the issue discuss aids for medical decision making. First, Cummings and Miller (2021) described a self-monitoring tool for COVID-19 infection which, in combination with physician-directed early medical interventions, has the goal of slowing disease progression. Next, Godiwala et al. (2021) described the efficacy of the use of clinical pathways, which are evidence-based algorithms that guide the management and care of patients. The authors documented how the implementation of clinical pathways resulted in increased consistency in the care of hysterectomy patients.

The next group of papers describes modeling approaches related to transportation technologies and systems. David-Spickermann et al. (2021) described automated vehicles, which represent a class of emerging technologies with the potential for great risk. The authors specifically focused on the risks related to the insurance and reinsurance sectors, and described the role of insurance products in reducing risks as automated vehicles continue to penetrate the market. Continuing the theme of transportation, Abolhoseini and Alesheikh (2021) developed a vehicle routing algorithm based on ant colony optimization. They tested their algorithm on real transportation networks with simulated traffic conditions. Next, Huang et al. (2021) developed a systems dynamics model for container seaport operations, including ship, train, and truck transportation. Their model considered various scenarios with the goal of minimizing greenhouse gas emissions.

The final articles in the issue explore infrastructure and other technological systems, again with a focus on advanced modeling techniques. Baucum et al. (2021) deployed a survey about the cognitive responses to terrorist attacks over time, especially memorable events taking place at locations such as outdoor public gatherings. Using an autoregressive latent variable model, they found that the emotional responses to attack evolved independently over time. Next, Randanliev et al. (2021) compared 12 cyber risk assessment techniques applied to IoT systems. Based on their findings, they described a goal-oriented dependency modeling approach for assessing risk states in IoT systems. Lewin et al. (2021) modeled the cost and schedule performance associated with ten satellite programs. Using statistical modeling, the authors found that joint cost and schedule risk predictions could be made which have utility for programmatic risk analysis. Tanyimboh and Czajkowska (2021) developed and demonstrated a genetic algorithm applied to water distribution networks. The algorithm was designed to maximize flow entropy and minimize construction costs. Häring et al. (2021) modeled the risk and resilience for telecommunication, gas network, and ultrasound localization systems. The authors used a tabular methodology to manage the risks and resilience of critical functions for complex infrastructure systems.

Upcoming special issues of *Environment Systems and Decisions* include topics of Organizational Resilience, as well as proceedings from the ESREL2020 PSAM15 Conference.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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