Network of Cyber-Social Networks: Modeling, Analysis, and Control Guest Editorial

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NETWORK of cyber-social networks (NCSN) is a promising new area that has recently attracted significant interests. Its core differentiator is the tight conjoining among heterogeneous cyber-social networks or between cyber networks and physical networks. The focus of this special section is to address the interdependence of NCSN components that facilitates its modeling, analysis, and control.

The special section on "Network of Cyber-Social Networks" brings a timely research topic. The design of mobile networks and social networks is still in a preliminary stage. Research progress on understanding NCSNs has potential to enhance the integration of cyber networks that may lead to better content delivery and quality of service. Guiding the design of cyber-social networks to cater to the needs of physical networks is of great importance. NCSN incubates a rich domain of novel and open theoretical and practical problems that are pertinent to the *IEEE Transactions on Network Science and Engineering.*

We appreciate contributions to this special section and the valuable and extensive efforts of the reviewers.

The topics of this special section include modeling, analysis, and control of various networks with cyber-social interacted dependence or influence [1]-[6]. A brief review follows:

Mao et al. [1] address the impact of confirmation bias on belief/opinion formation over cyber-social networks, where both dynamic evolution and static connectivity are mixed in various cyber and social networks, respectively. To mimic complexity of online social networks such as Facebook, Yang et al. [2] explain that the Henneberg growth mechanism helps form more triangles in Facebook compared to the routine preferential mechanism. More interestingly, the physical elements may play a significant role to bridge the interdependence of cyber and social interactions, while their adjacent framework can be represented as an adjacency tensor where several novel tensor decomposition methods are proposed to improve the performance of knowledge discovery over such cyber-physical-social networks [3]. Klickstein and Sorrentino [4] devoted their efforts on control distance and energy scaling over a general complex network and find the new contribution of intertwined drive-response path lengths as well as their redundancy. To measure the heterogeneous influence of various nodes in social networks, Deng et al. [5] newly define the measuring influence and try to maximize the marginal influence of preferred seeds. Finally, Eshghi et al. [6] explore and analyze optimal strategies to allocate a finite budget invested in various advertising channels to influence social opinions within a network of individuals where both exogenous and endogenous social influence mechanisms are modelled with diffusion dynamics over such cyber-social networks.

We believe this special section is timely and important in enhancing and advancing research in the area of cyber-oriented interdependent networks. The collected papers are evidence of the innovative research in the area of network science and a wide range of practical applications in deployed networks. We hope that this special section will impact and contribute to diverse communities in academia and industry interested in cyber-social networks.

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