MetaSocieties in Metaverse: MetaEconomics and MetaManagement for MetaEnterprises and MetaCities

WELCOME to the first issue of IEEE TRANSACTIONS ON COMPUTATIONAL SOCIAL SYSTEMS (TCSS) of 2022. We would like to take this opportunity to express our sincere thanks to our associate editors, reviewers, authors, and readers for your great support and effort devoted to IEEE TCSS. Happy New Year to you all, and cheers to health, happiness, and high-producing in 2022!

The past 2021 was a very productive year. We have published 131 papers with 1500 pages in six issues. According to the latest update of CiteScoreTracker from Elsevier Scopus released on December 4, 2021, the CitesSore of TCSS has reached a historical high of 7.9, compared to 6.1 for 2020. In addition, IEEE TCSS was added to the ISI Web of Science Sources Citation Index Expanded (SCIE) database in April 2021, and all articles published by TCSS since 2018 have been indexed by SCIE. We view all these progress as essential steps to our task of improving the impact and reputation of TCSS.

In this issue, we publish four regular papers, and a Special Issue on Collaborative Edge Computing for Social Internet of Things Systems, which includes 24 articles. Moreover, we would like to discuss the topic of MetaSocieties in Metaverse, which runs parallel with real societies, and greatly expands the living and working space for humans. Through the virtual–real interactions and closed-loop feedback with real societies, MetaSocieties can provide description, prediction, and prescription for the real societies.

I. SCANNING THE ISSUE

1. "A Grammar-Based Behavioral Distance Measure Between Ransomware Variants" by *H. Van Dyke Parunak*

This article aims to study the effective attribution of ransomware attacks, which requires a way to characterize different variants and estimate their similarity to one another. Since ransomware deliberately discloses itself and interacts explicitly with the victim, the behavioral trace can offer a richer characterization. Motivated by the insights from behavioral linguistics, the author proposes a measure based on the representation of the attack behavior in a context-free grammar about the ransomware analysis as dialogue for attribution and reconnaissance project. After the summarization of the grammar, the author presents a series of increasingly refined grammatical distance measures and illustrate the performance on actual attacks. The results show that the relative distances among a set of seven representative attacks generated by these measures are in agreement with the general understanding of these attacks as they have been analyzed in the literature, and justify the more sophisticated measures proposed in this article.

2. "An Overview of Correlation-Filter-Based Object Tracking" by *Shide Du and Shiping Wang*

This article provides a comprehensive survey on some representative and latest correlation-filter-based object tracking methods, and compares their respective strengths and weaknesses under the theoretical and experimental analyses. The authors divide these correlation-filter-based object tracking methods into four categories according to the characteristics including categorized features, space weight factors, scale factors, and expert strategies. Extensive experiments on benchmark datasets with 11 tracking challenges are performed and discussed. This article aims to present a detailed framework and some enlightenments of object tracking, and provide some insights for the readers to comprehend and improve the involved tracking algorithms.

3. "Social Phenomena and Fog Computing Networks: A Novel Perspective for Future Networks" by *Shanshan Tu, Muhammad Waqas, Sadaqat Ur Rehman, Talha Mir, Zahid Halim, and Iftekhar Ahmad*

This article presents a novel paradigm that considers the context of social phenomena. The authors categorize the social phenomena into two main groups to integrate with fog computing from social interactions' continuous development. In this regard, the first contribution addresses the social relationship between the end-users and fog nodes based on personal benefits. The social relationship considers trust, reciprocity, incentives, and selfishness mechanisms. The second contribution describes the group-based social behavior, i.e., centrality, community, and colocation in fog computing networks (FCNs). They also discuss the impact of social phenomena on FCNs in network performance, resource allocations, security, and privacy.

4. "Game Starts at GameStop: Characterizing the Collective Behaviors and Social Dynamics in the Short Squeeze Episode" by *Xiaolong Zheng, Hu Tian, Zhe Wan, Xiao Wang, Daniel Dajun Zeng, and Fei-Yue Wang*

This article investigates the characteristics of the collective behaviors and social dynamics from the evolutions of topological structure, discussed topics, and user sentiment polarity (SP) by constructing dynamic interaction networks, modeling the topic, and analyzing the user sentiment. The authors find that the topological structure of the interaction

Digital Object Identifier 10.1109/TCSS.2022.3145165

network evolves toward a more efficient direction, the discussed topics change more centralized, and the user sentiment tends to be more positive and divergent. And they reveal that part of GameStop's stock price is explained by the social media activity, popularity of the dominant topic, topic cohesiveness, SP of users, and sentiment divergence between interacted users on r/wallstreetbets.

II. MetaSocieties in Metaverse: MetaEconomics and MetaManagement for MetaEnterprises and MetaCities

A. MetaEnterprises and MetaCities

The artificial society, computing experiment, parallel execution theory (the ACP theory) [1]–[4] and cyber–physical–social systems (CPSSs) technology [5] provide an important theoretical and technical foundation for the development of MetaEnterprises and MetaCities. MetaEnterprises and MetaCities can be regarded as the mapping of real enterprises and cities in the virtual cyberspace. They are virtual enterprises and cities running parallel to real enterprises and cities, which can realize the description of real enterprises and cities. Corresponding to the human, material, organizations, scenarios, and other elements in real enterprises and cities, there are various virtual elements such as virtual human, virtual objects, virtual organizations, and virtual scenarios in MetaEnterprises and MetaCities. These virtual elements in MetaEnterprises and MetaCities can be used to analyze and evaluate the decision-making scenarios with computational experiments approach so as to realize the prediction of real enterprises and cities [5]. Through the interaction and feedback between MetaEnterprises/MetaCities and real enterprises/cities, we can realize the prescription of decision-making in real enterprises and cities, so as to effectively improve the efficiency and effect of various decisions in real enterprises and cities.

MetaEnterprises and MetaCities can greatly improve the decision and operation efficiency of real enterprises and cities. Since real enterprises and cities are typical complex systems involving societies and humans, it is often difficult to establish a sufficiently accurate mathematical model for them, and even impossible to establish a model that can analytically predict their short-term behavior. As such, it is extremely difficult to analyze their characteristics, predict their behavior, control their development, and conduct experimental research on them. Therefore, when studying such complex systems, the traditional "single world" view that takes real enterprises and cities as the only reference and standard is no longer working, and we should adopt the "multiple worlds" view [1]. With such a view, the degree of approaching the real enterprises and cities is no longer the only standard when modeling real enterprises and cities. The model is regarded as a "reality," which is a possible alternative form and implementation mode of the real enterprises and cities. That is, the complex systems of real enterprises and cities are only one of the possible realities, and their behavior is "different" but "equivalent" to that of the model. MetaEnterprises and MetaCities are consistent with real enterprises and cities in terms of scale, behavior, and system characteristics, and can provide an effective means to realize the above "multiple world" view. Based on MetaEnterprises and MetaCities, we can predict all possible directions for future development of the enterprises and cities, as well as various impacts of any small adjustment of decision-making on enterprises and cities, so as to continuously optimize the decision-making of enterprises and cities and prescribe the future development direction for enterprises and cities. In addition, many different computational experiments can be designed and repeated in MetaEnterprises and MetaCities, and even various accelerated experiments, stressing experiments, and limit experiments can be carried out. As such, solutions with safety, reliability, and robustness can be provided for real enterprises and cities, so as to improve the feasibility, effectiveness, economic performance, and real-time decision-making in real enterprises and cities.

As such, in the near future, any real enterprise or city will have one or even more corresponding MetaEnterprises and MetaCities with different functions in Metaverse, and they are linked through CPSS. Before any major decisions or operations in real enterprises and cities, numerous computational experiments should be first conducted in MetaEnterprises and MetaCities, to analyze, evaluate, and optimize the decision-making processes as well as the master skills and resources required for a successful real execution in the shortest time, with the least energy and cost. This will greatly improve the efficiency and effectiveness of the decisions of real enterprises and cities.

B. MetaEconomics for MetaEnterprises and MetaCities

In MetaEnterprises and MetaCities, the virtual human and organizations will run independently of those in real enterprises and cities and do not need to follow the existing economic models and theories. The behavior and operation mode of these virtual humans and organizations may generate new economic models and theories. We call it MetaEconomic, which can provide a new way for us to think and understand various real economic problems. The MetaEconomic system can be regarded as the virtual economic system corresponding to the real economic system. With the computational economic experiment approach, small economic data in the real economic system can be converted into large virtual economic data in the MetaEconomic system, and then artificial intelligence algorithms such as machine learning, deep learning, and reinforcement learning can be used to transform virtual economy big data into deep intelligence. Through the virtual–real interaction, closed-loop feedback, and parallel execution between the MetaEconomic system and the real economic system, the unification of contradiction between Jean-Baptiste Say's Law (i.e., supply creates its own demand) and John Maynard Keynes' Law (i.e., demand creates its own supply) of markets can be realized. Moreover, a new virtual-real philosophy for supply and demand, i.e., supply creates largely its own demand actually in real markets versus demand creates largely its own supply artificially in virtual markets, will be created [6].

In the MetaEconomic system of MetaEnterprises and MetaCities, there are many software-defined entities and virtual human resources such as knowledge robots or advanced digital assistants, to describe, predict, and prescribe the operation of the real economic system [7]. For example, in the MetaEconomic system of MetaEnterprises, we can create three knowledge robots for one human employee for a particular position in the real enterprise, and the human employee will cooperate with the three knowledge robots to improve his/her knowledge and skills, so as to better meet the requirements of the position. Specifically, the first robot can provide a detailed description of the function and nominal activities for the position. With the description of the job, the second robot will predict possible events and outcomes for the job through computational experiments with artificial intelligence algorithms. According to the results of the computational experiments, the third robot can prescribe the human employee with the best practices and optimal plans or actions for specific situations.

The MetaEconomic system runs parallel with the real economic system, and these virtual and real economic systems can be regarded as a parallel economic system [8]. Through parallel management of the parallel economic system, the optimal economic operations of the real economic system can be achieved. First, the MetaEconomic system can provide a detailed description of the knowledge needed in the real economic system, as well as economic theories, procedures, processes, and related operations. As such, it can be used by managers of real enterprises and cities for the purpose of learning and training. Second, since numerous and repeated computational experiments can be easily conducted in the MetaEconomic system, any real economic decisions or proposals in enterprises and cities can be evaluated and tested in the MetaEconomic system of MetaEnterprises and MetaCities before implementation. Moreover, the results of the computational experiments can also provide predictions for the future economic states of enterprises and cities. Third, the MetaEconomic system of MetaEnterprises and MetaCities will emulate the real economic system of real enterprises and cities and provide prescriptions for the real economic system. Through the parallel execution and closed-loop of the virtual and real economic systems, monitoring and management of the real economic system can be realized.

C. MetaManagement for MetaEnterprises and MetaCities

Since MetaEnterprises and MetaCities run in virtual cyberspace, the existing management mode fails to work. Therefore, for MetaEnterprises and MetaCities, we must adopt the MetaManagement mode. MetaManagement can realize the management of real enterprises and cities through the management of MetaEnterprises and MetaCities.

In MetaEnterprises and MetaCities, the organizational structure is no longer the centralized hierarchical structure widely used in real enterprises and cities, and they are organized with the form of blockchain-based distributed autonomous organization (DAO), which has the characteristics of distributed and decentralized, autonomous and automated, and organized and ordered [9], [10]. Therefore, the MetaManagement for MetaEnterprises and MetaCities is mainly the management of DAOs corresponding to MetaEnterprises and MetaCities. The smart contract based on blockchain has the characteristics of automatic execution and nontampering [11], [12], and can provide an intelligent and efficient solution for MetaManagement. In the MetaManagement mode based on smart contract, the management system, management mode, management rules, and incentive mechanism design for MetaEnterprises and MetaCities are stored on the blockchain in the form of smart contract. When the execution conditions of these smart contracts are met, they will automatically execute without manual intervention, which greatly improves the real time, automation, and intelligence level of MetaManagement.

In addition, the MetaManagement for MetaEnterprises and MetaCities runs in parallel with the real management for real enterprises and cities, and through their closed-loop feedback, the evaluation and optimization of real management decisions can be realized. First, according to the management decisions of real enterprises and cities, the corresponding MetaManagement rules of MetaEnterprises and MetaCities are constructed. Second, the MetaManagement rules are automatically implemented through smart contracts in MetaEnterprises and MetaCities, and according to the operation results, the MetaManagement rules are continuously adjusted, so as to achieve the expected MetaManagement effect. Finally, the adjusted MetaManagement rules are used to optimize the real management decisions, so as to realize the parallel management for real enterprises and cities, as well as MetaEnterprises and MetaCities, through the closed-loop feedback of MetaManagement and real management.

D. MetaSocieties in Metaverse: Toward Parallel Societies

With the development and successful applications of ACP and CPSS theories and methods, as well as the rise of emerging technologies such as blockchain [13], [14], artificial intelligence, the Internet of Things, virtual reality, and augmented reality, MetaSocieties in Metaverse has become an extremely important and indispensable part of human's work and life. The MetaSocieties running in the virtual cyberspace can effectively break the space, time, and economic restrictions of humans, and create a new way of life, work, and communication for humans in real societies. Furthermore, as the mapping of real societies in virtual space, MetaSocieties can verify and evaluate the decisions in real societies using computational experimental approaches in MetaSocieties, and prescribe various decision-making in real societies through virtual-real interaction, closed-loop feedback, and parallel implementation of the two societies. In addition, nonfungible tokens (NFTs) [15], [16] breaks the value gap between MetaSocieties and real societies, and provides an effective way for the value interaction and transmission between these two societies.

MetaSocieties greatly expands the living and working space for humans, and humans can interact with each other not only in real societies but also in MetaSocieties, or even virtual–real interactions. In the future parallel societies, the MetaSocieties and the real societies will run in parallel [17], [18]. That is, any human, enterprise, and city in the real societies will have corresponding virtual human, virtual enterprise, and virtual city, respectively, in the MetaSocieties. The changes of the real societies will affect the MetaSocieties, and the changes of the MetaSocieties will also bring the changes to the real societies.

FEI-YUE WANG
The State Key Laboratory for Management and Control of Complex Systems
Institute of Automation
Chinese Academy of Sciences
Beijing 100190, China
e-mail: feiyue.trans@gmail.com

RUI QIN
The State Key Laboratory for Management and Control of Complex Systems
Institute of Automation
Chinese Academy of Sciences
Beijing 100190, China

XIAO WANG
The State Key Laboratory for Management and Control of Complex Systems
Institute of Automation
Chinese Academy of Sciences
Beijing 100190, China
Qingdao Academy of Intelligent Industries
Qingdao 266109, China

BIN HU, *Editor-in-Chief*
Gansu Provincial Key Laboratory of Wearable Computing
School of Information Science and Engineering
Lanzhou University
Gansu 730000, China
e-mail: tcss.ieee@gmail.com

REFERENCES

[1] F. Fei-Yue, "Parallel system methods for management and control of complex systems," *Control Decis.*, vol. 19, no. 5, pp. 485–489, 2004.
[2] F.-Y. Wang and J. S. Lansing, "From artificial life to artificial societies: New methods for studies of complex social systems," *Complex Syst. Complex. Sci.*, vol. 1, no. 1, pp. 33–41, 2004.
[3] F.-Y. Wang, "Computational experiments for behavior analysis and decision evaluation of complex systems," *J. Syst. Simul.*, vol. 16, no. 5, pp. 893–987, 2004.
[4] F.-Y. Wang, "Computational theory and method on complex system," *China Basic Sci.*, vol. 6, no. 5, pp. 5–12, 2004.
[5] F. Y. Wang, "The emergence of intelligent enterprises: From CPS to CPSS," *IEEE Intell. Syst.*, vol. 25, no. 4, pp. 85–88, Jul./Aug. 2010.
[6] F.-Y. Wang, "Parallel economics: A new supply–demand philosophy via parallel organizations and parallel management," *IEEE Trans. Computat. Social Syst.*, vol. 7, no. 4, pp. 840–848, Aug. 2020.
[7] F.-Y. Wang, "Artificial societies, computational experiments, and parallel systems: A discussion on computational theory of complex social-economic systems," *Complex Syst. Complex. Sci.*, vol. 1, no. 4, pp. 25–35, 2004.
[8] D. Wen, Y. Yuan, and Y. X. Li, "Artificial societies, computational experiments, and parallel systems: An investigation on a computational theory for complex socioeconomic systems," *IEEE Trans. Services Comput.*, vol. 6, no. 2, pp. 177–185, Dec. 2013.
[9] S. Wang, W. Ding, J. Li, Y. Yuan, L. Ouyang, and F.-Y. Wang, "Decentralized autonomous organizations: Concept, model, and applications," *IEEE Trans. Computat. Social Syst.*, vol. 6, no. 5, pp. 870–878, Oct. 2019.
[10] W. Ding, S. Wang, J. Li, Y. Yuan, L. Ouyang, and F.-Y. Wang, "Decentralized autonomous organizations: The state of the art, analysis framework and future trends," *Chin. J. Intell. Sci. Technol.*, vol. 1, no. 2, pp. 202–213, Jun. 2019.
[11] L. Ouyang, S. Wang, Y. Yuan, X. Ni, and F. Y. Wang, "Smart contracts: Architecture and research progresses," *Acta Autom. Sin.*, vol. 45, no. 3, pp. 445–457, 2019.
[12] S. Wang, L. Ouyang, Y. Yuan, X. Ni, X. Han, and F.-Y. Wang, "Blockchain-enabled smart contracts: Architecture, applications, and future trends," *IEEE Trans. Syst., Man, Cybern. Syst.*, vol. 49, no. 11, pp. 2266–2277, Nov. 2019.
[13] Y. Yuan and F.-Y. Wang, "Blockchain: The state of the art and future trends," *Acta Autom. Sin.*, vol. 42, no. 4, pp. 481–494, 2016.
[14] Y. Yuan and F.-Y. Wang, "Parallel blockchain: Concept, methods and issues," (in Chinese), *Acta Autom. Sin.*, vol. 43, no. 10, pp. 1703–1712, Oct. 2017.
[15] R. Qin, J. Li, J. Zhu, Y. Yuan, X. Wang, and F.-Y. Wang, "NFT: Blockchain-based non-fungible token and applications," *Chin. J. Intell. Sci. Technol.*, vol. 3, no. 2, pp. 110–118, Jun. 2021.
[16] F.-Y. Wang, R. Qin, Y. Yuan, and B. Hu, "Nonfungible tokens: Constructing value systems in parallel societies," *IEEE Trans. Computat. Social Syst.*, vol. 8, no. 5, pp. 1062–1067, Oct. 2021.
[17] F.-Y. Wang, R. Qin, J. Li, Y. Yuan, and X. Wang, "Parallel societies: A computing perspective of social digital twins and virtual–real interactions," *IEEE Trans. Computat. Social Syst.*, vol. 7, no. 1, pp. 2–7, Feb. 2020.
[18] F.-Y. Wang, Y. Yuan, X. Wang, and R. Qin, "Societies 5.0: A new paradigm for computational social systems research," *IEEE Trans. Computat. Social Syst.*, vol. 5, no. 1, pp. 2–8, Mar. 2018.

Fei-Yue Wang (Fellow, IEEE) received the Ph.D. degree in computer and systems engineering from Rensselaer Polytechnic Institute, Troy, NY, USA, in 1990.

He joined the University of Arizona, Tucson, AZ, USA, in 1990, and became a Professor and the Director of the Robotics and Automation Laboratory and the Program in Advanced Research for Complex Systems. In 1999, he founded the Intelligent Control and Systems Engineering Center, Institute of Automation, Chinese Academy of Sciences (CAS), Beijing, China. In 2002, he participated in the development of the Key Laboratory of Complex Systems and Intelligence Science, CAS, as the Director, where he was also the Vice President for Research, Education, and Academic Exchanges at the Institute of Automation from 2006 to 2010. In 2011, he was named as the Director of the State Key Laboratory for Management and Control of Complex Systems, Beijing. His current research interests include methods and applications for intelligent and parallel systems, social computing, parallel intelligence, and knowledge automation.

Dr. Wang was elected Fellow of the International Council on Systems Engineering (INCOSE), the International Federation of Automatic Control (IFAC), the American Society of Mechanical Engineers (ASME), and the American Association for the Advancement of Science (AAAS). He received the Best Paper Awards for his work from the IEEE Intelligent Transportation Systems Society (ITSS) in 2012, the IEEE Computational Intelligence Society in 2017, as well as the Franklin V. Taylor Memorial Award and the Andrew P. Sage Award from the IEEE Systems, Man, and Cybernetics Society (SMCS) in 2002 and 2019, respectively. In 2007, he was a recipient of the National Prize in Natural Sciences of China and was awarded the Outstanding Scientist by Association for Computing Machinery (ACM) for his research contributions in intelligent control and social computing. He was a recipient of the IEEE ITS Outstanding Application and Research Awards in 2009, 2011, and 2015; and the IEEE SMC Norbert Wiener Award in 2014. He has been the General or Program Chair of more than 50 IEEE, Institute for Operations Research and the Management Sciences (INFORMS), IFAC, INCOSE, ACM, ASME, and other professional conferences. He was the President of the IEEE Intelligent Transportation Systems (ITS) Society from 2005 to 2007; the Chinese Association for Science and Technology, USA, in 2005; and the American Zhu Kezhen Education Foundation from 2007 to 2008. He was the Vice President of the ACM China Council from 2010 to 2011 and the Chair of the IFAC Technical Committee (IFAC TC) on Economic and Social Systems from 2008 to 2014 and 2017 to 2023. He is the President of the IEEE Council on Radio Frequency Identification (RFID) and Vice President of the IEEE SMC Society. He was the Vice President and the Secretary General of the Chinese Association of Automation from 2008 to 2018, and its President of Supervision Council since 2018. He was the Founding Editor-in-Chief (EiC) of the International Journal of Intelligent Control and Systems from 1995 to 2000, IEEE INTELLIGENT TRANSPORTATION SYSTEMS MAGAZINE from 2006 to 2007, and IEEE/CAA JOURNAL OF AUTOMATICA SINICA from 2014 to 2017. He was the EiC of IEEE INTELLIGENT SYSTEMS from 2009 to 2012, IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS from 2009 to 2016, and IEEE TRANSACTIONS ON COMPUTATIONAL SOCIAL SYSTEMS from 2017 to 2020, and the Founding EiC of the *Chinese Journal of Command and Control* as well as the *Chinese Journal of Intelligent Science and Technology*.

Rui Qin (Member, IEEE) received the B.S. degree in mathematics and applied mathematics and the M.S. degree in operational research and cybernetics from Hebei University in 2007 and 2010, respectively, and the Ph.D. degree in computer application technology from the University of Chinese Academy of Sciences in 2016.

She is currently an Associate Professor with the State Key Laboratory for Management and Control of Complex Systems, Institute of Automation, Chinese Academy of Sciences, Beijing, China. Her research interests include blockchain, social computing, computational advertising, and parallel management.

Xiao Wang (Member, IEEE) received the B.E degree in network engineering from the Dalian University of Technology, Dalian, China, in 2011, the M.E and Ph.D. degrees in social computing from the University of Chinese Academy of Sciences, Beijing, China, in 2016.

She is currently an Associate Professor with the State Key Laboratory for Management and Control of Complex Systems, Institute of Automation, Chinese Academy of Sciences, and the President of the Qingdao Academy of Intelligent Industries. Her research interests include social network analysis, social transportation, cybermovement organizations, and multi-agent modeling.

Dr. Wang is an Associate Editor of IEEE TRANSACTIONS ON COMPUTATIONAL SOCIAL SYSTEMS and the *Chinese Journal of Intelligent Science and Technology*.

Bin Hu (Senior Member, IEEE) is currently a Professor and the former Dean of the School of Information Science and Engineering, Lanzhou University, Lanzhou, China, and an Adjunct Professor with the Computing Department, Open University, Milton Keynes, U.K. His research areas focus on affective computing, pervasive computing, and computational behavior modeling.

Dr. Hu was elected Fellow of the Institution of Engineering and Technology (IET). He was a recipient of many research awards, including the 2014 China Overseas Innovation Talent Award, the 2016 Chinese Ministry of Education Technology Invention Award, the 2018 Chinese National Technology Invention Award, and the 2019 WIPO-CNIPA Award for Chinese Outstanding Patented Invention. He is also the TC Co-Chair of computational psychophysiology in the IEEE Systems, Man, and Cybernetics Society (SMC); the TC Co-Chair of cognitive computing in IEEE SMC; and the Vice-Chair of the TC 9.1. Economic, Business, and Financial Systems on Social Media at the International Federation of Automatic Control (IFAC). He is a Member-at-Large of the Association for Computing Machinery (ACM) China Council and the Vice-Chair of the China Committee of the International Society for Social Neuroscience. He serves as the Editor-in-Chief for IEEE TRANSACTIONS ON COMPUTATIONAL SOCIAL SYSTEMS and an Associate Editor for IEEE TRANSACTIONS ON AFFECTIVE COMPUTING.