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Special Issue
Recent Advances in Fuzzy-based Intelligent IoT and Cyber-physical Systems

Submission Deadline: 31 October 2021

1. AIMS & SCOPE

The rapid development of real-time Internet of Things (IoT) applications including smart grids, smart city, intelligent transport networks, etc. generates a tremendous amount of data from massively distributed sources, which require high computing and communication demand that frequently exceeds the users' requirements. Further, many emerging IoT applications including remote surgery, machine monitoring and control, fault detection, and healthcare generate delay-sensitive tasks, which require timely processing with minimum delay. Besides that, Cyber-Physical Systems (CPS) integrate computing and communication capabilities with monitoring and control of entities in the physical world. These systems are usually composed of a set of networked agents, including sensors, actuators, control processing units, and communication devices. All the critical infrastructures are also a part of the cyber-physical ecosystem to enable smart and connected environments. CPS, including mobile CPS and IoT, embed software into the physical world. They can be used for numerous critical applications in a wide spectrum of fields, such as aerospace, automotive, consumer appliances, energy, entertainment, healthcare, manufacturing, transportation, and so forth, have become a core transdisciplinary area of research, both in industry and academia.

In recent times, fuzzy logic and fuzzy inference system are required to analyze the IoT applications and CPS by monitoring the real-time information and sensed data. Despite the various advantages of the integration of fuzzy logic and fuzzy inference system with the different intelligent frameworks for various IoT applications, the appropriate application of the fuzzy logic and fuzzy inference system poses several challenges including data volume and quality, integration, and accuracy of the inferences drawn from the collected data. Besides that, fuzzy logic and fuzzy inference system are selected to train the local edge/fog devices locally and produce a global model under the coordination of a central edge/fog/cloud server. Therefore, the collaboration of fuzzy systems with intelligent IoT and CPS has proved to present new challenges to modeling and networking due to their intrinsic complexity arising from the tight coupling of computation, communication, and control with physical systems.

This special issue aims to gather the recent advances and novel contributions from academic researchers and industry practitioners in the area of fuzzy-based intelligent IoT systems and CPS to fully leverage the potential capabilities and opportunities brought by this area. In this issue, we mainly devise four main technical directions for research to provide contributions for developing sustainable services in IoT and CPS, namely Fuzzy logic and fuzzy inference system; Fog/Edge/Cloud Computing; Intelligent computation and communication; and Smart Infrastructure Deployment.

2. TOPICS COVERED

The topics of interest for this special issue include, but are not limited to:

- Ultra-reliable and low latency communication protocol for fuzzy-based IoT Applications
- Collaborative fuzzy-based IoT Applications or CPS
- Fog/Edge Platform and Caching techniques for fuzzy-based IoT Application/CPS
- Fuzzy-based scheduling and resource management for CPS
- D2D/M2M Communications for fuzzy-based CPS
- Novel collaborative frameworks/algorithms/protocol for fuzzy-based IoT Applications
- Collaborative fuzzy-based approaches for intelligent transportation systems
- Advanced fuzzy-based models for intelligent IoT applications & predictive analysis
- CPS-oriented fault-tolerant control using fuzzy logic

- Applications of fuzzy systems in CPS and intelligent IoT applications
- Data science-based solutions for CPS using fuzzy logic
- Advanced fuzzy-based for real/industry applications and systems for IoT
- Smart threat models and risk management for fuzzy-based IoT Applications/CPS
- Fuzzy-based intelligent framework for IoT applications at Edge/Fog networks
- Real-time fuzzy-based IoT applications/CPS
- Fuzzy-based scalable hybrid systems for IoT applications
- Fuzzy-based decision-making schemes for CPS
- Fuzzy logic for efficient integration with CPS networks
- Distributed processing for sensor data using fuzzy logic in CPS networks
- Advanced Fuzzy-based model for future generation IoT Applications/CPS
- Advanced collaborative Fuzzy-based techniques for smart home/city/healthcare/grid

3. SUBMISSION GUIDELINES

All authors should read 'Information for Authors' before submitting https://cis.ieee.org/publications/t-fuzzy-systems/tfs-information-for-authors Submissions should be through the IEEE TFS journal website and must be in the correct format.

- It is essential you choose 'Special Issue' when submitting.
- A separate cover letter must be included which includes the title 'Recent Advances in Fuzzy-based Intelligent IoT and Cyber-physical Systems'

4. IMPORTANT DATES

31 October 2021: Submission Deadline
February 2022: notification of first round of reviews (for guidance only)
June 2022: revised submissions due (for guidance only)
October 2022: Final notice of acceptance/rejection (for guidance only)

5. GUEST EDITORS

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Completed a Bachelors of Technology (B.Tech) and Master of Technology (M.Tech.) in Computer Science and Engineering from West Bengal University and Technology and the University of Kalyani, West Bengal, respectively. He has completed a Doctor of Philosophy (Ph.D.) from the Indian Institute of Technology Dhanbad, India. Currently, he works as a Postdoctoral Research Fellow of Mobile & Cloud Lab, Institute of Computer Science, University of Tartu, Tartu, Estonia. He is a member of the Institute of Electrical and Electronics Engineers (IEEE), Association of Computing Machinery (ACM), and the International Society for Research and Development. He serves as an Associate Editor of Cluster Computing (Springer), Physical Communication (Elsevier) and IEEE Internet of Things Magazine, and the Technical Committee member of Computer Communication journal. He is awarded as an Outstanding Reviewer of the Journal of Network and Computer Applications (Elsevier) in 2019. His area of research includes Distributed Computing (Serverless Computing, Fog Computing, Cloud Computing), Wearable Sensors for Healthcare, Internet-of-Things, and data analysis with AI approaches. He has contributed to numerous research articles/papers in various national and International Journals (IEEE, ACM, Elsevier, Springer) and Conferences (IEEE and Springer).

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Currently Associate Professor in Computer Science and Engineering, International Collaborations and Corporate Relations in charge at SCMS School of Engineering and Technology, SCMS Group of Educational Institutions, India. He is a Senior Member of IEEE and a Distinguished Speaker of ACM. He is currently an Associate Editor of Physical Communications Journal Elsevier, Alexandria Engineering Journal Elsevier, and IET Quantum Communications. He is also a Technical Committee member of Computer Communications Journal Elsevier and an Editorial Board Member of IEEE Future Directions: Technology Policy and Ethics. He is also a Guest Editor for Physical Communications Journal, Multimedia Systems Journal, and IEEE Communications Standards Magazine. Previously he was guest editor in IEEE Transactions on Industrial Informatics, IEEE Sensors Journal, IEEE Internet of Things Magazine, and Journal of Supercomputing. He is an Associate Editor of IET Quantum Communications and also an Editorial Board Member of IEEE Future Directions: Technology Policy and Ethics. He is serving in the Editorial Review Boards of many journals including the Journal of Organizational and Ends User Computing, International Journal of E-Health and Medical Communications, International Journal of Disaster Response and Emergency

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Received a Ph.D. degree in electronics and electrical engineering from POSTECH, Pohang, South Korea, in 1997. From May 1997 to February 2000, he was a Research Associate in ERC-ARC with POSTECH. He joined Yeungnam University, Kyongsan, South Korea, in March 2000, where he is currently a Chuma Chair Professor. From 2006 to 2007, he was a Visiting Professor with the Department of Mechanical Engineering, Georgia Institute of Technology. He has published a number of articles in his research areas. His research interests include robust control and filtering, neural/complex networks, fuzzy systems, multi-agent systems, and chaotic systems. He is a fellow of the Korean Academy of Science and Technology (KAST). He serves as an Editor for the International Journal of Control, Automation, and Systems. He is also a Subject Editor/Advisory Editor/Associate Editor/Editorial Board Member of several international journals, including IET Control Theory and Applications, Applied Mathematics and Computation, the Journal of The Franklin Institute, Nonlinear Dynamics, the Journal of Engineering Reports, Cogent Engineering, the IEEE Transactions on Neural Networks and Learning Systems, the IEEE Transactions on Cybernetics, and the IEEE Transactions on Fuzzy Systems. He has been a recipient of the Highly Cited Researcher Award listed by Clarivate Analytics (formerly, Thomson Reuters) since 2015, and listed in three fields, engineering, computer sciences, and mathematics, in 2019 and 2020.

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A Professor in the Department of Electrical Engineering & Computer Science (EECS), Founding Director of the Data Science and Cybersecurity Center (DSC2), Graduate Program Director of Howard-CS Graduate Programs, Director of Graduate Cybersecurity Certificate Program, and Founding Director of Cyber-security and Wireless Networking Innovations (CWiNs) Research Lab at Howard University, Washington, DC, USA. Dr. Rawat is engaged in research and teaching in the areas of cybersecurity, machine learning, and wireless networking for emerging networked systems including cyber-physical systems, Internet of Things, smart cities, software-defined systems, and vehicular networks. His professional career comprises more than 15 years in academia, government, and industry. He has secured over $3 million in research funding from the US National Science Foundation, US Department of Homeland Security, DoD Research Labs, Industry (Microsoft, Intel, etc.), and private Foundations. Dr. Rawat is the recipient of the NSF Faculty Early Career Development (CAREER) Award in 2016, the US Air Force Research Laboratory (AFRL) Summer Faculty Visiting Fellowship in 2017, Outstanding Research Faculty Award (Award for Excellence in Scholarly Activity) at GSU in 2015, the Best Paper Awards and Outstanding Ph.D. Researcher Award in 2009. He has delivered over 15 Keynotes and invited speeches at international conferences and workshops. Dr. Rawat has published over 200 scientific/technical articles and 9 books. He has been serving as an Editor/Guest Editor for over 30 international journals. He has been in Organizing Committees for several IEEE flagship conferences such as IEEE INFOCOM, IEEE CNS, IEEE ICC, IEEE GLOBECOM, IEEE CCNC, IEEE ICNC, IEEE AINA, and so on. He served as a technical program committee (TPC) member for several international conferences including IEEE INFOCOM, IEEE GLOBECOM, IEEE CCNC, IEEE GreenCom, IEEE AINA, IEEE ICC, IEEE WCNC, and IEEE VTC conferences. He served as a Vice-Chair of the Executive Committee of the IEEE Savannah Section from 2013 to 2017. Dr. Rawat received a Ph.D. degree from Old Dominion University, Norfolk, Virginia. Dr. Rawat is a Senior Member of IEEE and ACM, a member of ASEE. and a Fellow of the Institution of Engineering and Technology (IET).