Special Session on Intelligent Decentralized Edge Computing for Assisted Smart Cyber-Physical Systems

Description

The recently intelligent decentralized edge computing paradigm is getting attention for emerging CPS applications. The new computing paradigm of CPS includes Intelligent connected devices, vehicles intelligent health care systems, smart farming, and intelligent logistics that constantly generate tons of heterogeneous data and confidential data. These datasets need enormous computing resources with real-time data processing capabilities and privacy preservation. Therefore, the edge computing paradigm provides fast computation with intelligent decentralized computing resources close to the connected end devices or models from the mobile edge network. Thus, the edge computing paradigm is becoming an ideal platform and efficient analysis and processing for CPS. Therefore, many researchers have started implementing intelligent decentralized computing to leverage the next generation of CPS, termed intelligent decentralized computing paradigm using Federated Learning (FL) techniques for smart CPS. The intelligent decentralized computing paradigm comprises FL and Explainable Artificial Intelligence (XAI), distributed and software-intensive systems and models. Learning models may effectively and autonomously solve critical challenges in service latency, energy consumption, security, privacy, and reliability during the integration of smart CPS with edge computing computational intelligence paradigms. The primary objective of intelligent decentralized enabled FL is to leverage fast computations and solve the issues and challenges mentioned above on connected edge devices (smart devices) and other models with edge computing paradigms to assist smart CPS and applications. This revolution will be fuelled and integrated with computation at individual edges or network nodes for better assistance with smart CPS, which are characterized by a deep, complex combining and intertwining computing process among innovative cyber devices and interconnected components for fast computation and extensive control using intelligent techniques and models which includes FL XAI, QML, multimodal Deep Learning (DL), and FL and dynamic physical components that include human activities, mechanical parts, and the surrounding environment.

The primary objective of this special issue is to explore and built models and examine the security, privacy preservation, and trust difficulties of smart CPS using an intelligent decentralized computing paradigm. The role of edge intelligence computing as an integrating and enabling platform for this paradigm. The following are some examples of potential areas of interest:

- Multimodal ML modelling for edge mobile computing
- DL Based security verification and analysis of privacy, security and trustworthiness in intelligent edge intelligence computing for smart CPS and IoT.
- Evaluation, detection and prevention of attacks in edge intelligence for smart CPS and Industry 4.0.
- ML, DL and FL based security solution in edge intelligence for smart CPS and IoT

- Blockchain and FL enabled for fully decentralized collaboration of edge intelligence for smart CPS and IoT

- Human and edge intelligence collaboration and interaction in high-level security for smart CPS and smart manufacturing

- Smart production and trustworthy smart CPS;

- Resource management in edge intelligence-based decentralized smart CPS

- FL based implementation, design, and operation of edge intelligence platforms for intelligent decentralized smart CPS;

- Blockchain enabled FL for big data managing for smart CPS;

- Resilience and reliability in edge intelligence-based smart CPS;

- Self-adaptation and self-configuration in smart CPS;

- Real-time data analytics for smart CPS;

- Digital Twins, Blockchain, FL for smart CPS

Submission:

Interested authors can submit a full technical paper between 4-6 pages. All submissions should follow the IEEE CS format. Accepted and presented papers will be published in the proceedings of CyberSciTech 2022 by IEEE CPS (IEEE Digital Library and EI-indexed). At least one author of each accepted paper is required to register and present their work at CyberSciTech 2022. Otherwise the paper will not be included in the proceedings. Selected excellent papers, after further extension and revision, will be recommended to special issues of prestige international journals (SCI/EI indexed).

Important Dates:

- Submission due: June 15, 2022
- Acceptance notification: July. 1, 2022
- Camera-ready manuscript due: July. 15, 2022

Organizer

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