A Call for CPSI: Building Up Foundation Intelligence for CPSS

Since its inception in the late 1990s, the intuitive idea and academic concept of Cyber Physical Social Systems (CPSS) have been disseminated widely and developed by many scholars and researchers in various disciplinaries with real-world applications. Clearly, CPSS has now emerged as a key approach and critical technology in the emerging field of Intelligent Science and Technology. To promote research and development in CPSS world widely and integrate Artificial Intelligence and Intelligent Technology deeply into CPSS, the Association for Global Intelligent Science and Technology (AGIST), along with the Institute of Electrical and Electronics Engineers (IEEE) and Chinese Association of Automation (CAA), has organized the first International Conference on Cyber-physical Social Intelligence (ICCSI) in 2021, and this new academic Journal of Cyber Physical Social Intelligence (CPSI) is one of the lasting impacts from this milestone academic event.

Welcome to the inaugural issue of CPSI!

I. SCANNING THE ISSUE

This inaugural issue of CPSI contains a collection of the extended version of the best papers and student papers in ICCSI 2021 and 2022.

CGAN-DA: A Cross-Modality Domain Adaptation Model for Hand-Vein Biometric-based Authentication by SHUQIANG YANG, YIQUAN WU, MOUNIM A. EL-YACOUBI, XIN JING, HUAFENG QIN

This paper proposes a new unsupervised domain adaptation model, called CycleGAN-based domain adaptation (CGAN-DA), that can learn robust feature representations from palm-vein images without requiring any image labeling. The model is then tested on the public CASIA palm-vein dataset with superior accuracy in comparison to the state-of-the-art methods.

Discrete Bat Optimizer for Disassembly Line Balancing Problem by QI ZHANG, FUGUANG HUANG, JIACUN WANG, XIWANG GUO, SHUJIN QIN AND LIANG QI

This paper addresses disassembly line balancing problem by considering precedence relations, cycle time restriction, failure risk, and time uncertainty. A multi-objective discrete bat optimizer based on Pareto rules is then proposed to solve the problem effectively.

Designing a Resilient Supply Chain Through a Robust Adaptive Model Predictive Control Policy under Perishable Goods and Uncertain Forecast Information by BEATRICE IETTO, VALENTINA ORSINI

This paper proposes a resilient replenishment policy to address two types of uncertainty for inventory level control of supply chain: perishable goods with uncertain deterioration rates and uncertain future customer demand. The method is proved to be effective in balancing the opposite needs of low-cost inventory holding and low percentage of lost sales, and quickly recovering from unexpected changes of customer demand.

Research on Aircraft Image Recognition Based on Transfer Learning and Improved YOLOv5 Model by HUANYU YANG, JUN WANG, AND YUMING BO

This paper proposes an improved YOLOv5 model for the recognition of aircraft images that successfully addresses the challenges raised by large variations of target scale, complex backgrounds, and difficult data set acquisition. The experimental results show that the improved YOLOv5 model has significantly enhanced feature extraction ability for small targets with better accuracy and generalization.

An Improved Adaptive Genetic Algorithm for U-shaped Disassembly Line Balancing Problem Subject to Area Resource Constraint by QI ZHANG, WEISHUANG BAI, JIACUN WANG, XIWANG GUO, SHUJIN QIN, AND LIANG QI

Disassembly is an important process in resource conservation and environment protection. This paper focuses on a U-shaped disassembly line that takes good uses of limited space to accommodate workstations for disassembly processes. An optimization model with space constraints is then formulated and solved via CPLEX.

A Diffusion Model with A FFT for Image Inpainting by YUXUAN HU, HANTING WANG, CONG JIN, BO LI, CHUNWEI TIAN

This paper proposes a diffusion model with an FFT (FFT-DM) to generate content that matches not only missing region texture but also semantics to inpaint damaged images. Extensive experiments demonstrate that FFT-DM

outperforms current state-of-the-art inpainting approaches in terms of qualitative and quantitative analysis.

II. A CALL FOR CPSI

The current and emerging scientific methods and technologies, such as parallel systems, digital twins, AlphaGo, metaverses, foundation models, etc., have offered a unique window of opportunity to launch this new CPSI journal, which would speed up the process of building up intelligent systems for advancing our human values and benefits in a safe, secure, and sustainable way. To ensure this journal's healthy and academic development, and make its publication be free, fair, and responsibility sensitive, suitable mechanisms and methods from blockchain, smart contracts, decentralized autonomous organizations and operations (DAO) will be implemented for CPSI in its future governance and management, along with good practices of decentralized autonomous sciences (DeSci) and new sciences (NewSci).

The goal of CPSI is to provide an effective and efficient platform for scholars and researchers around the world to exchange and discuss important issues in CPSS and related methods and applications in intelligent science and technology.

The CPSI would not exist without the moral, financial and operational support of the Association for Global Intelligent Science and Technology, and many volunteer leaderships and staffs. We are proud to participate in the founding of this new journal and will do our best to fulfill its objectives with the support of our authors, readers, reviewers, and the Editorial Board.

Looking forward to your participation, help, and contribution.

Fei-Yue Wang and Robert Kozma, Co-Editor-in-Chief
Ying (Gina) Tang, Executive Editor-in-Chief
Luobin Cui, Yuetong Wang, and Qinghua Nie, Assistant Editor