

Preface to JAISE 13(2)

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1. This issue

This issue of JAISE is composed of five regular articles. The review process for the articles in this issue was supervised by our editors Chen Chen, Paulo Novais, and Vincent Tam, whom we thank for their service.

Recent advancement in computing, communication and sensing technologies have empowered many Cyber-Physical System (CPS) and Internet of Things (IoT) platforms for assisted living, Industry 4.0, intelligent buildings, smart healthcare, and robotics. Most of the real-world CPS and IoT platforms typically involve a vast amount of sensory data stored in a diversity of formats with different data annotation or models. Therefore, to build a reliable computational model for recognising human activities accurately, the continuous, detailed and high-quality annotation of sensory data is a very important yet challenging task. The article “**Shared learning activity labels across heterogeneous datasets**” by Ye explores the solution space of sharing annotated activities across different datasets in order to enhance the accuracies of human activity recognition methods. A major difficulty in performing such tasks lies in resolving heterogeneity in the feature and activity spaces between these diverse datasets. For example, each dataset may have a different number of sensors with heterogeneous sensing technologies which may be deployed in a diversity of environments with various activities to be recorded for different users. To address the challenge, data sharing as well as classification algorithm sharing approaches have been developed that feature the knowledge model to enable computationally-efficient feature space remapping and uncertainty reasoning for effective classifier fusion.

Besides recording and recognising human activities with accuracy and timeliness, smart environments such as intelligent buildings are tasked to provide comfort to end users while saving energy through intelligent control systems. Intelligent systems have been reported to offer comfort to a single user or averaging the comfort of multiple users without considering their individual needs. The article “**A novel model for optimization of intelligent multi-user visual comfort system based on soft-computing algorithms**” by Romero-Rodríguez *et al.* proposes a versatile model for a multi-user intelligent system that coordinates the resources of the environment to offer visual comfort to multiple users with different user profiles, activities and priorities utilizing soft-computing algorithms. In addition, this model makes use of external lighting to provide the recommended level of illumination for each individual user without having to solely rely on artificial lighting in order to also save energy.

In addition to various intelligent control systems, ubiquitous monitoring devices such as video cameras have been redesigned into smaller and smarter forms for integration into numerous smart environments to enable the provision of innovative applications and services which support the well-being of end-users in healthcare or other sectors. To fully realise the potential benefits associated with ubiquitous monitoring, it is important to understand the role of user perception. The article “**Factors that influence user perception of ubiquitous monitoring environments: An empirical study in a developing country**” by Wiafe *et al.* investigates the factors that influence user perceptions of ubiquitous monitoring devices by carefully extracting and examining samples from a groups of participants.

User responses on seven recurring ubiquitous monitoring perceptions were collected using a survey questionnaire. The relationship between these factors were critically analysed using the method of partial least-square structural equation modelling. The findings reveal that more emphasis should be placed on educating and familiarizing users with ubiquitous monitoring devices.

Other than user perception, security is another key concern with a large number of IoT devices or nodes deployed in healthcare and other relevant applications. The article “**Black hole and selective forwarding attack detection and prevention in IoT in the health care sector: Hybrid meta-heuristic-based shortest path routing**” by Srinivas and Manivannan develops a 5-stage security mechanism to detect and prevent attacks in wireless sensor networks for medical IoT applications. After finding the cluster heads and the optimal route in the initial network topology, black hole attacks are detected and prevented by a bait process. For the detection of selective forwarding attacks, the validation mechanism is conducted by comparing the transmitted data packets with the received data packets.

Smart manufacturing is significant subject of investigation in the Industry 4.0 paradigm. In numerous smart manufacturing systems, increasing the confidence levels in the trustworthiness of Cyber-Physical Production Systems (CPPS) based on multi-agent systems (MAS) remains a key challenge. Manufacturing services must comply with demanding requirements in terms of reliability, robustness, and latency for which solution providers are expected to ensure that multiple agents will operate within specific boundaries of production while mitigating unattended behaviours during the execution of manufacturing activities. The article “**Towards trustworthy Cyber-Physical Production Systems: A dynamic agent accountability approach**” by Beregi *et al.* proposes a manufacturing agent accountability framework in which a dynamic authorization process vigorously defines and enforces boundaries in which agents are freely permitted to exploit their intelligence so as to achieve both individual and collective objectives. The expected behaviour of agents is to adhere to the workflows of the underlying CPPS that implicitly define acceptable regions of the specified behaviours and production feasibility. Furthermore, the potential application of the enhanced trustworthiness framework to an agent-based manufacturing use-case is outlined for the production of a diversity of hand tools.

2. Upcoming issues

The following is a list of upcoming issues of JAISE:

- May 2021: Thematic Issue on Trustworthy Computing for Secure Smart Cities.
- July 2021: Regular Issue.
- September 2021: Thematic Issue on Deep Learning-based Real-time Visual Analytics in a Smart City.
- November 2021: Regular Issue.
- January 2022: Thematic Issue on Sensing and Computing for Smart Healthcare.

More information on the call for papers to the future issues is available on the webpage of JAISE at: <http://www.iospress.nl/journal/journalof-ambient-intelligence-and-smart-environments/>.