Advanced design, analysis, and implementation of pervasive and smart collaborative systems enabled with knowledge modelling and big data analytics

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Advanced Design, Analysis, and Implementation of Pervasive and Smart Collaborative Systems Enabled with Knowledge Modelling and Big Data Analytics

Continuing on the efforts of the Journal publications in advanced knowledge engineering for product lifecycle development from design, manufacturing, supply chain management, to maintenance and services [1] [2], this special issue intends to feature papers in enabling knowledge-intensive pervasive and smart collaborative systems for tangible product and intangible service designs [3] [4], and production/provision [5]. The design, analysis, and implementation of pervasive and smart collaborative systems have drawn high interests in both theoretical and practical studies in recent years. All objects in the collaborative systems (e.g., physical components, works-in-progresses, products, machineries, and supporting devices) are interconnected through ubiquitous sensor networks with Internet connectivity (commonly called Internet of Things, IoTs) [6]. This special issue includes a series of review and research articles focusing on presenting the smart/pervasive collaborative systems' frameworks, key enabling technologies and methods, and implementation for specific applications [7]. Further, the concept of collaborative systems is not just a collection of enabling technologies but also a fundamental business philosophy requiring strategic thinking for a variety of applications. Smart and pervasive collaborative systems are demonstrated for a wide range of applications for both tangible and intangible product and service provisions.

In summary, the special issue provides a tool set of state-of-the-art solutions to support the stages of collaborative co-creation, management, dissemination, and use of data, information, and knowledge throughout the entire lifecycle of product development, production supply chain management, and innovative service enabling. These stages must engage and integrate knowledge models and systems, as well as manage and analyse big data generated during the processes across organizations, people, and smart devices effectively and autonomously. We have received, peer-reviewed, and accepted manuscripts focusing on researches, applications, and reviews, which address the challenges and issues of designing, analysing, and implementing pervasive and smart collaborative systems. The updated collection of the published articles (in this VSI) are highlighted in the following five categories.

Review papers:

1. A review of essential standards and patent landscapes for the Internet of Things: A key enabler for Industry 4.0 (by Trappey, et al.)

2. Leveraging existing occupancy-related data for optimal control for commercial office building: A review (by Shen, et al.)

Cloud and fog computing considering high quality service provision

3. Platform as a service gateway for the Fog of Things (by Verba, et al.)

4. Evaluation of quality of service provisioning in large-scale pervasive and smart collaborative wireless sensor and actor networks (by Horvat, et al.)

5. Metamodeling of smart environments: from design to implementation (by Guerrieri, et al.)

Knowledge-based collaborative frameworks and systems supporting smart product or service creation

6. Knowledge-based design for assembly in agile manufacturing by using data mining methods (by Stjepandic, et al.)

7. Modularized design-oriented systematic inventive thinking approach supporting collaborative service innovations (by Wang, et al.)

8. A collaborative system for capturing and reusing in-context design knowledge with an integrated model (by Pen, et al.)

Smart collaborative systems for product design, manufacturing, and maintenance

9. Integrating affective features with engineering features to seek the optimal product varieties with respect to the niche segments of smart cameras (by Wang and Chi)

10. A collaborative web-based platform for the prescription of custom-made insoles (by Mandolini, et al.)

11. An encryption approach for product assembly models (Li

12. Extracting failure time data from industrial maintenance records using text mining (by Arif-Uz-Zaman, et al.)

Smart collaborative systems applying in novel service provisions

13. A string-wise CRDT algorithm for smart and large-scale collaborative editing systems (by Lv, He, et al.)

14. Are you a human or a humanoid: Predictive user modelling through behavioural analysis of online gameplay data (by Gao, et al.)

References

[1] Trappey, A.J.C., and Wognum, P.M., 2012, "Network and supply chain system integration for mass customization and sustainable behavior," *Advanced Engineering Informatics,* 26(1), 3-4.

[2] Trappey, A.J.C., and Wognum, P.M., 2013, "Advanced knowledge engineering related to innovation, intellectual property and patent analysis," *Advanced Engineering Informatics,* 27(3), 315-316

[3] Chang, D., Chen, C.-H., Lee, K.M., 2014, A crowdsourcing development approach based on a neuro-fuzzy network for creating innovative product concepts, Neurocomputing, 142, 60–72.

[4] Lee, C.-H., Wang, Y.-H., Trappey, A.J.C., 2015, Service design for intelligent parking based on theory of inventive problem solving and service blueprint. Advanced Engineering Informatics, 29(3), 295-306.

[5] Galambos P., Csapo A., Zentay P., Fülöp I.M., 2015, Haidegger T., Baranyi P., Rudas I.P., 2015, "Design, programming and orchestration of heterogeneous manufacturing systems through VR-powered remote collaboration", *Robotics and Computer-Integrated Manufacturing*, 33, 68–77.

[6] James, A., Cooper, J., Jeffery, K. and Saake, G., 2009, July. Research directions in database architectures for the internet of things: a communication of the first international workshop on database architectures for the internet of things (DAIT 2009). In *British National Conference on Databases*, Springer Berlin Heidelberg, 225-233

[7] James, A., and Chung, J. Y., 2015, Business and Industry Specific Cloud: Challenges and opportunities. *Future Generation Computer Systems*, *48*, 39-45.

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