

Cyber physical systems in service industry: models, design and cases

With the advanced development of cloud computing and Internet of Things (IoT), the industrial sector has undertaken the new paradigm shift from the traditional manufacturing information system to the contemporary cyber physical system (CPS). Nowadays, enterprises are not only providing quality products but also value-added services for the customers. There is increasing enthusiasm for exploring the latest information and production technologies for the CPS so as to enhance the productivity of both the production and service industry. Researchers have begun to propose a variety of conceptual ideas for Industry 4.0, while the value-added service before and after production cannot be ignored. Further, some researchers have also initiated the concept of manufacturing as a service due to the emergence of cloud manufacturing, which is a new manufacturing paradigm supported by the latest core technology such as cloud computing and IoT. However, not many studies have been conducted for incorporating IoT into the CPS to realize the vision of the service industry. Therefore, the main purpose of this special issue is to explore how to leverage the emerging technologies such as IoT, wireless sensor network, cloud computing for service industry through a scientific research approach, and disseminate the newly acquired knowledge to researchers and industry. The architecture of CPSs is of high importance as it helps to transform a production plant into an intelligent environment. CPSs should possess autonomous, adaption and reconfiguration properties so as to achieve smart operations. With the IoT, high volume, variety and velocity of data can be captured and Big Data analytics enable intelligent operation in response to the environment and feedback of the connected objects, such as equipment and facilities.

This special issue aims to raise the awareness of research on CPS, IoT and the Fourth Industrial Revolution to the current *Industrial Management & Data Systems* readership. More specifically, this special issue focuses on the state-of-art of CPS, IoT for the service industry and explores how the emerging technologies realize the concept of CPS in the service industry. The research studies in this special issue include:

- Digital design and manufacturing of a wooden head golf club in a cyber physical environment (Chang and Chen, 2017).
- Analyzing competitiveness through comparative relation mining (Wang *et al.*, 2017).
- Aligning a real-time supply chain decision with the IoT-based framework (Rezaei *et al.*, 2017).
- Designing a degradation condition monitoring system scheme for rolling bearings (Wu *et al.*, 2017).
- Optimization approach for increasing the revenue of a perishable product supply chain with the Internet of Things (Yan, 2017).
- Designing an intelligent real-time operation planning system in a distributed manufacturing network (Lv and Lin, 2017).
- Smart spare parts management systems in the semiconductor manufacturing (Wu and Zheng, 2017).

The special issue has a wide coverage from product design, production, distribution and transportation to spare parts management with CPS. The objectives are to arouse



researchers' awareness on the application of CPSs and are not limited to production, but also the service provision in the value chain. CPS is essentially for enabling smart manufacturing and production to cope with the trends of industrial evolution. Realizing the potential of CPS, the causality of failures and unexpected conditions in the physical processes can be determined by the employment of wireless sensing and actuator network. In addition, the technically feasible of the CPS network fosters research in Industry 4.0. There are still a lot of challenges in CPS implementation such as dependability, sustainability, security, reliability, interoperability and predictability (Gunes *et al.*, 2014). The development of effective modes and methods in CPS networks plays a critical role for the transformation in future manufacturing technologies. It is expected that the sustainable research work on CPS can pave the path for realizing the concept of the seamless integration of the physical world and the cyber system with computational reasoning. We hope that this special issue can serve as a bridge between traditional production and Industry 4.0, and provide new directions for contemporary CPS researchers.

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