

Editorial Preface

Amjad Gawanmeh, Khalifa University, Abu Dhabi, UAE

The new paradigms and recent technologies in computing, communications and control have provided and supported wide range of applications in all domains of life, in particular, bridging the physical components and the cyber space leading to the cyber physical systems (CPS). The notion of CPS is to use recent computing, communication, and control methods to design and implement smart and autonomous systems using cutting edge technologies. This requires the use of computing resources for sensing, processing, analysis, predicting, understanding of data, and then communication resources for interaction, intervention, and interface management, and finally provide control for systems so that they can inter-operate, evolve, and run in a stable evidence-based environment. CPS has extraordinary significance for the future of several industrial domains and hence, it is expected that the complexity in CPS will continue to increase due to the integration of cyber components with physical and industrial systems. This journal is intended to present up to date research work related to the latest challenges, technologies, solutions, techniques and fundamentals pertaining to communication, computing, networking, control. This issue will address recent advances in the area of CPS, in particular, areas new information technology trends that influences daily human society use of technology.

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In this regard, the first article is devoted to the problem of scheduling in IoT which can be applied on home appliances, vehicles and any type of networks of sensors, actuators or embedded computers. The problem is related provide sensing services while maintaining a minimum Quality of Service (QoS) and aiming at minimization of the response time to optimize the scheduling performance of the underlying network and minimize costs.

The second article is intended to analyze My Health Record (MyHR), which is a digital health solution that Australia implemented nationally to facilitate accessibility of health summaries by its citizens data anywhere and anytime. The objective of the paper is to explore the adoption of MyHR in general practices – one of the vital key players – in the state of Victoria and presents the current status of adoption in these general practices, using the lens of a proposed conceptual framework. The presented framework is based on a novel integrated model of user acceptance that merges three well-known user acceptance theories with some contextualisation to MyHR. It enables a comprehensive review of current system adoption, as well as factors such as the organisation, technology, people and perceived task fitness.

The third paper addresses the problem of dynamic data management for multiprocessor systems in the absence of an operating system. OSs are typically used to abstract developers from the process of managing dynamic data at runtime. However, due to the many different types of multiprocessor available, an OS is not always available, making the management of dynamic data a difficult task. Therefore, this paper presents a hardware and software co-design methodology for the management of dynamic data in multiprocessor system on chips (MPSoC) development environments without an OS. The study compares and contrasts the proposed method of sharing dynamic data between cores with standard methods and also to static data management methods.

The fourth article is intended to address the effects of adaptive route planning when real-time online traffic information is exploited. It has been shown that optimization in cyber physical system may be worse off with real-time data than without real-time data. Therefore, this paper proposed to solve this problem using anticipatory techniques, where the future state of the environment is predicted from the intentions of the agents. This article shows that if simultaneous decision-making is prevented, then intention-aware prediction can limit the fluctuation and help the cyber physical system converge to the Nash equilibrium, assuming that the incoming traffic can be predicted.

The fifth article presents a brief overview of the main features of cyber physical systems which could be used as an advantage with children with special educational needs. Based on the specifics of the main types of special educational needs, a list of suggestions about the practical implications of educational robots to the classroom has been generated. A pilot study of the perception and attitude of children and teachers in a local Bulgarian school towards the application of cyber physical systems in education has been conducted. Based on previous research and the findings of the pilot study, a few gaps of knowledge have been identified: the scarce evidence of the long-term effects of interventions with children with special educational needs; the lack of research on the attitudes of teachers with and without special educational needs children in the class towards educational robots. Last but not least, the need for comparison of the perceptions and expectations of users of such technology across cultures.

Amjad Gawanmeh
Khalifa University, UAE