

## Engineering Smart Cyber-Physical Systems

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### Abstract

IoT paradigm has revolutionized our daily routine life, connecting a plethora of smart devices, sensors, frameworks, intelligent systems and humans, to provide innovative solutions to everyday problems. With the advent of emerging technologies, Cyber-Physical Systems (CPSs) have shown great potential in recent years in various application areas, such as healthcare, urban environments, agriculture, transportation, environment monitoring, home automation etc. As they comprise parts interacting with the physical environment and others having computing and communication capabilities, they constitute a prominent example of systems-of-systems, while the autonomous operation of their components should be ensured. Autonomous components should be smart enough to adjust to the environment where they operate while learning from their peers. The presentation targets open issues in CPS engineering to promote their autonomy utilizing AI tools, and methods and discusses ongoing projects on smart CPS in three different levels: 1) Smart aggregators to manage sensors and actuators and collaborate within each at the edge with no central control. The principles of developing a self-control management middleware for this purpose along with implementation results will be explored; 2) Service integration in a smart CPS environment ensuring the quality of complex services provided to users. A quality-aware event-based platform for the coordination of micro-services aiming at the development of CPS applications and the notion of event fabrication to manage missing events from sensors will be presented; 3) The integration of humans into smart CPS and their wiliness to become part of them. A multi-view design approach focusing on human concerns towards smart systems and the concept of human criticality will be discussed. These efforts are presented in the context of specific case studies from prominent CPS domains, targeting smart building management, smart farm management and remote patient monitoring.

### Biography

Mara Nikolaidou is a Professor in the Department of Informatics and Telematics at Harokopio University of Athens, since 2007. Prior to her appointment, she worked as a computer engineer in the private sector and as an IT consultant for the government. She currently serves as the Rector of the University (since 2016). She is appointed as the representative of Greek Universities in the European University Association (EUA) for 2023-2024. Her research focuses on distributed systems and complex system design. Over the last few years, she actively participated in numerous research projects funded by national, European and international agencies on system engineering, the Internet of Things, Cloud and Edge computing, Cyber-physical Systems and Smart Cities, emphasizing human-in-the-loop and autonomous systems. Recently, she has explored responsible computing and ethical requirements in system design. She has published more than 200 papers in international journals and conferences, and actively participates in the organization of international conferences in software and systems engineering. She is a member of IEEE (SMC society) and Systems Council. She also participates in OMG, in the working groups for SysML and in responsible computing.

## AI for Service Computing: Research and Application

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### Abstract

In the era of interconnected networks, digitization and big data, Artificial Intelligence (AI) technology is developing rapidly and has been widely applied in various research and application fields through innovative patterns. First, the correlative research background, various service models, and key research issues in service computing will be introduced. Then, we will discuss the latest research advancements and challenges of predicting Quality of Service (QoS) by deep learning techniques in different computing paradigms. Furthermore, we will provide the construction and application effectiveness of a Smart Recycling Collection Service Platform. Finally, we summarize the future research hotspots and application trends in AI for service computing.

### Biography

Guobing Zou is a full professor and vice dean of the School of Computer Engineering and Science at Shanghai University, China. He received his PhD in Computer Science in 2012 from Tongji University, Shanghai, China. He has been a Research Associate in the Department of Computer Science and Engineering at Washington University in St. Louis from 2009 to 2011, USA. His research interests mainly focus on services computing, edge computing, data mining and intelligent algorithms, and recommender systems. He has published more than 110 papers in premier international journals and conferences, including IEEE Transactions on Services Computing, IEEE Transactions on Network and Service Management, IEEE ICWS, ICSOC, AAI, Information Sciences, Expert Systems with Applications, Knowledge-Based Systems, etc. He served as organization chair of the International Conference on Service Science (ICSS 2018), vice chair of the IEEE International Conference on Big Data (IEEE BigData 2021), PC chair of the CCF National Conference on Services Computing (NCSC 2023), chair of "Service Computing Top Conference Top Journal Forum" of China Digital Service Conference 2021 to 2023, and guest editor of International Journal of Services Technology and Management.