Edge AI Architectures for a Privacy-Preserving IoT Era

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- Abstract:

The Internet of Things (IoT) has been hailed as the next frontier of innovation where our everyday objects are connected in ways that improve our lives and transform industries, in particular healthcare. In this talk, Prof. Atienza will first discuss the challenges of ultra-low power (ULP) Multi-Processor System-on-Chip (MPSoC) design and communication in edge Artificial Intelligence (AI) nodes for the design of smart devices and wearables in the IoT context. Then, the opportunities for edge AI architectures to conceive the next generation of federated learning systems in healthcare, as challenging use case, will be highlighted as a scalable way to deliver the IoT concept in a privacy-preserving way. This new trend of edge AI-based MPSoC architectures will need to combine new ULP heterogeneous embedded systems, including reconfigurable neural network accelerators, as well as enabling energy-scalable software layers. The final goal is to have edge AI systems that can gracefully adapt the energy consumption and precision of the IoT application outputs according to the quality requirements of our surrounding world. Moreover, they need to be able to personalize their AI algorithms by enabling training on the edge, as living organisms do to operate efficiently in the real world.

- Biography of Prof. David Atienza (EPFL):

David Atienza is Full Professor of Electrical and Computer Engineering and leads the Embedded Systems Laboratory (ESL) at EPFL, Switzerland. He received his MSc and PhD degrees in Computer Science and Engineering from UCM (Spain) and IMEC (Belgium). His research interests focus on system-level design methodologies for energy-efficient multi-processor system-on-chip architectures (MPSoC) and next-generation smart embedded systems (particularly wearables) for the Internet of Things (IoT) era. In these fields, he is co-author of more than 350 publications, 14 patents, and received several best paper awards in top conferences. He also was the Technical Program Chair of DATE 2015 and General Chair of DATE 2017. Dr. Atienza received the DAC Under-40 Innovators Award in 2018, IEEE TCCPS Mid-Career Award in 2018, an ERC Consolidator Grant in 2016, the IEEE CEDA Early Career Award in 2013, the ACM SIGDA Outstanding New Faculty Award in 2012, and a Faculty Award from Sun Labs at Oracle in 2011. He is an IEEE Fellow and an ACM Distinguished Member, as well as Chair of EDAA for the period 2022-2023.