Five Challenges in Cloud-enabled Intelligence and Control

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The proliferation of connected embedded devices, or *the Internet of Things* (IoT), together with recent advances in machine intelligence, will change the profile of future cloud services and introduce a variety of new research problems, both in cloud applications and infrastructure layers. These problems are centered around empowering individually resource-limited devices to exhibit intelligent behavior, both in sensing and control, thanks to a judicious utilization of cloud resources. Cloud services will enable learning from data, perform inference, and execute control, all with assurances on outcomes. This article discusses such emerging services and outlines five resulting new research directions towards enabling and optimizing intelligent, cloud-assisted sensing and control in the age of the Internet of Things.

CCS Concepts: • **Networks → Network services**; **Cloud computing**; • **Computing methodologies → Machine learning**; • **Information systems → Information systems applications**; **Mobile information processing systems**; **Process control systems**;

Additional Key Words and Phrases: Internet of things, deep learning, edge intelligence, intelligent control

ACM Reference format:
Tarek Abdelzaher, Yifan Hao, Kasthuri Jayarajah, Archan Misra, Per Skarin, Shuochao Yao, Dulanga Weerakoon, and Karl-Erik Årzén. 2020. Five Challenges in Cloud-enabled Intelligence and Control. *ACM Trans. Internet Technol.* 20, 1, Article 3 (February 2020), 19 pages.
https://doi.org/10.1145/3366021

Authors listed alphabetically. Per Skarin and Karl-Erik Årzén contributed the most to the journal revision.
This material is supported partially by the National Research Foundation, Prime Minister's Office, Singapore, under its International Research Centers in Singapore Funding Initiative. It was also partially supported by the Nordforsk University Network HI2OT, Sweden. The research was also sponsored in part by NSF under grants CNS 16-18627 and CNS 13-20209, in part by the U.S. Army Research Laboratory under Cooperative Agreements W911NF-09-2-0053 and W911NF-17-2-0196, and in part by WASP (Wallenberg AI, Autonomous Systems and Software Program) funded by the Knut and Alice Wallenberg foundation. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies, either expressed or implied, of the sponsors, the Army Research Laboratory, NSF, or the U.S. Government. The U.S. Government is authorized to reproduce and distribute reprints for government purposes notwithstanding any copyright notation here on.
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1533-5399/2020/02-ART3 $15.00
https://doi.org/10.1145/3366021