

Title: Internet-of-Things (IoT) for the best and the worst

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Abstract:

Electronics is increasingly introduced in our society and the Internet-of-Things (IoT) contribute extensively to this trend. Although this could enable positive effects both on our society and our environment through optimization and monitoring, the massive deployment of IoT will come together with an undeniable environmental burden which is often overlooked.

In this talk, we first present a macroscopic analysis focusing mainly on the energy and carbon footprint of ICT sub-sectors. It shows that the following of exponential trends such as Moore's law will very unlikely lead to an absolute decrease of GHG emissions if sobriety is not considered together with efficiency improvements. Then, we propose a framework based on hardware profiles to explore the environmental impacts of the production of IoT edge devices and discuss the coherence of the expected massive IoT deployment with respect to the Paris Agreement objectives. We also present eco-design use cases for IoT devices that are being developed in our labs, focusing on the environmental impacts of microelectronics pressure sensors and water quality monitoring applications. In order to showcase how LCA can be used to support the development of new eco-design guidelines in the electronics sector, we study the interest of new design paradigms such as hybrid electronics. Finally, we call engineers to integrate systemic considerations when developing technologies, and we offer some concrete perspectives and tools that can be applied by engineers to support the dissemination of more sustainable and appropriate electronics.