End-user development for smart environments (EUD4SE)

Software developers cannot easily anticipate future, idiosyncratic needs of end-users that are not always known at the time software is designed and developed, but rather emerge during the use of systems and services. This occurs as real-world use is embedded in practice in a specific context. End-user development is a field that aims to empower end-users who may not be experts in software development, to create their own software to address their specific needs. End-user development is an interdisciplinary field that traditionally relates to areas such as human–computer interaction, psychology of programming, and empirical studies in software engineering. Technological trends like ubiquitous computing, tangible and embodied interaction, and the Internet-of-Things have renewed interest in end-user development for diverse audiences focusing on industrial design, online communities, open innovation, and crowdsourcing.

End-users are called on to become end-user developers of systems that encompass a variety of software and hardware components, such as smart homes, smartphones, smart-watches, interactive displays, as well as any other interactive device available in an Internet of Things setting. One of the main applications of such systems is smart environments. Smart environments are complex, modular systems in which humans are embedded. Technologies such as cloud computing and artificial intelligence (AI) are enabling smart environments, and promise to make them increasingly common in many parts of our lives.

Inspired by the outcome of the last IS-EUD 2019, a biannual event that gathers researchers interested in extending their knowledge about how to design enduser development technologies and to provide scientific accounts of phenomena surrounding end-user development practices, we selected different contributions focused on *applications of EUD in smart environments*. Smart homes, transportation, health care, smart factories, and consumer products are only a few of the most talked about outcomes.

In this special issue, after a rigorous peer review process, we selected research around end-user development through, or towards, methods to empower end-users by allowing them to create rules for programming their homes and gadgets or to make it easier to extend and customize systems while they are in operation. More options are opening up as the Internet-of-Things (IoT) computing paradigm expands within the smart home, including: using Visual Design of dialogue flows for Conversational Interfaces, generating and displaying recommendations in a block-based EUD environment for creating automations for Internet of Things (IoT) contexts, and facilitating Braindraw creative participatory design practices for human-computer interaction professionals.

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