Preface

EMPATHY: First International Workshop on Empowering People in Dealing with Internet of Things Ecosystems

In the last decade, the spreading of low-cost technologies integrating sensors and actuators has favoured the development of the so-called smart objects. This trend has been fostered by the Internet of Things (IoT), which creates a bridge between the physical and the digital world thanks to ubiquitous, connected sensors and actuators. In parallel, we have seen the fast evolution of artificial intelligence, which has been used to obtain automations in several fields.

Such technological trends have created great new opportunities but also new issues and risks: often users do not understand the behaviour of connected objects, and the automations that are proposed do not meet their dynamic needs.

In this perspective, End User Development (EUD), which concerns methods, techniques, and tools that allow users of software systems, who are acting as non-professional software developers, to create, modify, or extend their applications can play an important role in empowering people.

Different aspects of EUD have already been investigated in recent years. However, up to a few years ago, EUD has considered desktop-based applications, such as spreadsheets, unable to adapt to the changing context of use. IoT introduces further issues such as the need to design automations indicating how to react to events that can be generated through dynamic combinations of a variety of sensors, objects, services, devices, and people. Social and humanoid robots raise similar issues as they can be seen as integrated sets of sensors and actuators in human-like forms.

Solutions based on the visual creation of trigger-action rules have been considered in the EUD area. These approaches are receiving increasing interest since end users can easily reason about contextual events and the corresponding behaviour of their applications. However, such approaches can become difficult for non-programmer users when complex rules must be expressed, for example, the correct formulation of logical expressions may not always be intuitive for them. Some approaches do not even support event composition at all (as it happens with IFTTT). Therefore, further effort in enabling end users to specify rules combining multiple triggers and actions should be pursued because this would provide them with the possibility to indicate more flexible behaviours, going beyond the trivial synchronization of multiple smart objects and defining the behaviour of complex smart environments. In addition, trigger-action rules could raise some ambiguity in their interpretation due to potential discrepancies in end users' mental models. This is especially relevant in IoT domains where

incorrect behaviour of applications or actuators can eventually have safety critical consequences.

The EMPATHY project, funded by the Italian MIUR, aims to investigate how to provide users with control of the automations in their everyday life. The discussion within the groups of this project stimulated the organization of this workshop, which aims to broaden the discussion to all research groups interested in such issues.

The workshop has been well attended and eleven contributions have been presented and discussed. They are reported in the proceedings. We found the discussion very interesting and stimulating. It is clear that further research efforts should be dedicated to addressing the various issues identified, such as support for debugging and explanation, introducing more intelligence in supporting end user development activities, exploiting various interaction modalities, dynamic creation of personalization rules while interacting with the objects of interest.

We hope to have new editions of the international EMPATHY workshop in the near future to discuss novel solutions for such important issues !

The workshop organizers
Giuseppe Desolda, University of Bari "Aldo Moro"
Vincenzo Deufemia, University of Salerno
Cristina Gena, University of Turin.
Maristella Matera, Politecnico di Milano
Fabio Paternò, CNR-ISTI
Barbara Treccani, University of Trento