UNIVERSITÀ DI PISA

DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

Dottorato di Ricerca in Ingegneria dell'Informazione

Doctoral Course

"End-User Creation and Control of Daily Automations in Intelligent Environments"

Prof. Fabio Paternò

CNR-ISTI – Italy

E-mail address: fabio.paterno@isti.cnr.it

Short Abstract: The combination of the Internet of Things and Artificial Intelligence has made it possible to introduce numerous automations in our daily environments. Many new interesting possibilities and opportunities have been enabled, but there are also risks and problems. Often these problems are originated from approaches that have not been able to consider the users' viewpoint sufficiently. We need to empower people in order to actually understand the automations in their surroundings environments, modify them, and create new ones, even if they have no programming knowledge.

The course discusses these problems and some possible solutions to provide people with the possibility to control and create their daily automations. It aims to allow attendees to gain knowledge and skills in addressing problems and solutions enabling end-user understanding, creation, control, monitoring, and debugging automations that can be deployed in their daily environments (home, office, shops, industry, …). It will provide a discussion of the possible solutions in terms of concepts, techniques, and tools, with particular attention to those supporting the trigger-action paradigm.

Course Contents in brief:

- Introduction Course
- The technological trends (IoT + AI)
- The dark side of intelligent automations
- Design criteria for transparency of intelligent environments
- Trigger-action programming
- Environments for end user creation of automations (Wizards, Block-based, Conversational Agents)
- Augmented reality-based support for automation control
- Real world deployment, execution, monitoring
- Intelligent automation recommendations

- Explainable end-user automation debugging
- Usability and Accessibility Evaluation (Guidelines, methods, and how to design a user test and analyse its data)
- Final Discussion

Total # of hours of lecture: 16

References:

[1] Justin Huang, and Maya Cakmak. 2015. Supporting mental model accuracy in trigger-action programming. In Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp '15). ACM, New York, NY, USA, 215-225. DOI=http://dx.doi.org/10.1145/2750858.2805830

[2] Marco Manca, Fabio Paternò, Carmen Santoro, Remote Monitoring of End-User Created Automations in Field Trials, Journal of Ambient Intelligence and Humanized Computing, 2021, https://doi.org/10.1007/s12652-021-03239-0

[3] Marco Manca, Fabio Paternò, Carmen Santoro, Luca Corcella, Supporting end-user debugging of trigger-action rules for IoT applications, International Journal of Human-Computer Studies, 2019, Vol.123, 56-69

[4] Ben Shneiderman (2020) Human-Centered Artificial Intelligence: Reliable, Safe & Trustworthy, International Journal of Human–Computer Interaction, 36:6, 495-504

CV of the Teacher

Fabio Paternò is Research Director at CNR-ISTI, where he founded and leads the Laboratory on Human Interfaces in Information Systems. He has been author or co-author of 300+ publications in peer-reviewed conferences or journals. He has been co-editor of books and journal special issues relevant for the topics addressed in the course. He is an ACM Distinguished Scientist and a SIGCHI Academy Member. He has already given courses or tutorials at several international conferences. For several years he has been the scientific coordinator of various projects related to the course topics such as the AAL PETAL project and the PRIN EMPATHY project

Final Exam: Exercises during the course and final discussion

Room and Schedule

Room: *Aula Riunioni del Dipartimento di Ingegneria dell'Informazione, Via G. Caruso 16, Pisa – Ground Floor*

Schedule:

Day1 – time 9.00 – 13.00

Day2 – time 9.00 – 13.00

Day3 – time 9.00 – 13.00

Day4 – time 9.00 – 13.00