PhD in Information Technology and Electrical Engineering

Università degli Studi di Napoli Federico II

PhD Student: Dario Di Mauro

XXX Cycle

Training and Research Activities Report – Third Year

Tutor: Francesco Cutugno

Section 1: Information

Dario Di Mauro obtained a master degree in Computer Science in July 2013 at University of Naples "Federico II". He is currently a PhD student, XXX cycle in the same University, with a fellowship founded by Fondo Sociale Europeo, P.O. Campania 2007/2013-2014/2020. His tutor is **Francesco Cutugno**.

Section 2: Study and Training activities

His studies are oriented to Human-Computer Interaction and communication in a network of intelligent agents. They constitute an Intelligent Environment. In the last year, Di Mauro focused on research activities. However, he attended the following courses:

1. Le imprese e la Ricerca, Francesco Bellucci
2. Spatial Big Data, Sergio Di Martino

In addition, he attended three seminars:

1. Sound and Music in Human-Computer Interaction, Antonio Rodà
2. Living bots and Alter ego, Marco Gori
3. Deep Learning for Robot Navigation and Perception, Wolfram Burgard

Section 3: Research activity

Di Mauro's research is oriented to Human-Computer Interaction in Intelligent Environments. During these years, Di Mauro proposed a model to represent an entity in the environment: it defines a smart device and a person – referred through a smartphone -. Smart devices interact with each other to support people in the environment. This approach constitutes a ubiquitous infrastructure, where the intelligence is a collection of smart behaviours. Nodes' knowledge is focused on a limited domain. They forward requests that are not able to process adopting a common strategy to route these requests. The algorithm reaches a target without knowing it a priori.

The proposed network is usually designed by professionals that have not always a technical background. A suite of products has been proposed to support experts, interaction designers and architects in simulating and designing an Intelligent Environment.

Section 4: Products

In the third year, Di Mauro produced the following papers:

- K. Nurgaliyev, D. Di Mauro, N. Khan, J. C. Augusto, "*Improved multi-user interaction in a smart environment through a preference-based conflict resolution virtual assistant*", In Proceedings of Intelligent Environments, Seoul, 2017

- D. Di Mauro, J. C. Augusto, A. Origlia, F. Cutugno, "*A framework for distributed interaction in intelligent environments*", In Proceedings of European Conference on Ambient Intelligence, Malaga, 2017
- Origlia, D. Di Mauro, M. L. Chiacchio, F. Cutugno, *"Establishing a theoretical background for a museum-centric entertainment system"*, In Proceedings of GHItaly, Cagliari, 2017 (In press)
- D. Di Mauro, A. Origlia, F. Cutugno, *"Distributed Processes for Spoken Questions and Commands Understanding"*, In Proceedings of Clic-it, Rome, 2017 (Accepted)

Other works are in progress. They concern related studies of Intelligent Environments and Human-Computer Interaction:

- D. Di Mauro, V. N. Vitale, M. Grazioso, A. Origlia, F. Cutugno, S. Rossi, *"Conflicts Resolution in Distributed Intelligent Environments"*, for Journal of Ambient Intelligence and Smart Environments
- D. Di Mauro et al. *"A Graphical Improvement of State-charts to Design Interaction with Physical Devices"*

Section 5: Conferences and Seminars

Di Mauro participated at the European conference on Ambient Intelligence (AmI2017), Malaga, 26-28 April 2017. He presented a paper titled "*A framework for distributed interaction in intelligent environments*".

In addition, he must present another work at the 4th Italian Conference on Computational Linguistics, Rome, 11-13 December 2017. He will talk about his work *"Distributed Processes for Spoken Questions and Commands Understanding"*, with a poster session.

Section 6: Activity abroad

Di Mauro spent 6 months at Middlesex University, London, UK. The considered period was 19/09/16 – 28/02/17. In these months, Di Mauro visited Juan Carlos Augusto, expert of Intelligent Environments, and he applied his methods to a smart house context. Di Mauro tested his system to the Smart Space Living Lab at Middlesex University.

In addition, he investigated multi-user interaction in a shared environment and how generated conflicts can be solved through a preference-based approach. He collaborated with Kenzhegali Nurgaliyev (student from Kazakhstan), Dr. Nawaz Khan (lecturer at Middlesex University), Juan C. Augusto (full professor at Middlesex University). He also investigated the application of his method to the automotive context, collaborating with Dr. Elio Tuci, senior lecturer at Middlesex University.