

## Track B: Projects

# **MOSI-AGIL & ColosAAL projects: combining tools for enabling complex systems simulation development**

**Rafael Pax, Marlon Cárdenas, Jorge J. Gómez Sanz, Juan Pavón**

## **UCM-GRASIA**

This work is being done within the MOSI-AGIL project that aims to produce tools and methods for conceiving large deployments of ambient intelligence solutions to large facilities, such as mall centers or university buildings. The simulations aims to capture the particularities of crowd behavior in a particular context using mass psychology concepts.

Testing the control and deployment of large networks of sensors and actuators in this setup is a complex and expensive task. So far, simulations have been used to capture the essential aspects of the facilities and develop laboratory solutions to the sensor/actuator deployment problem. However, the cost of producing such simulations is too high. Experts who evaluate the simulations cannot be expected to install software in their computers. They need ways to inspect the simulation without installing software. And simulation developers cannot be preparing videos each time. Besides, feedback through email or face to face meetings are troublesome and increase the effort.

The solutions comes from another project, ColosAAL, which is devising web-based tools for people with basic internet browsing knowledge that allows to capture feedback and analyse the solution properly. The method being applied is called online focus groups. It is a method known in human sciences, but it is very limited to small groups. Within ColosAAL, tools are being revisited to massively gather feedback from experts or citizens willing to contribute through the Hack With People initiative (<http://grasia.fdi.ucm.es/hackwithpeople>). It is an effort to promote citizenship involvement, and needs to be essentially easy to handle.

Though this tool can be used to handle end-user feedback, simulations still are expensive to be run. A crowd simulation with thousands of actors running in a 3D environment needs a professional equipment. To alleviate this problem, within the project the Simulation As a Service concept is being used. Simulations become a server that can be accessed anytime. Developers create simulations of the devices to be deployed and connect such simulations of the devices with simulations of the facilities. This provides the greatest flexibility and enables the deployment of multiples solutions over the same simulation in a transparent way.

This talk will introduce a proof of concept of how a presence detection system can be designed to monitor the behavior of a crowd under different stimulus. The simulation does not only involve the devices, but provide input data so that they can be decoupled and analyzed separately. This decoupling allows to experiment with different deployments of sensors while the simulation is still working and evaluate their performance in real time.

To know more: Jorge J. Gómez-Sanz, Rafael Pax, Millán Arroyo, Marlon Cárdenas-Bonett: Requirement engineering activities in smart environments for large facilities. *Comput. Sci. Inf. Syst.* 14(1): 239-255 (2017)