Organisational Life Assistant – How gaming logics can raise the Environmental Analysis module acceptance

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1. Overview

Organisational Life Assistant (OLA) is an European AAL project that is developing technological solutions to allow seniors to be more independent, self-assured and to have a healthier and safer life in close communication with their caretakers. This paper focuses on a specific feature of our solution, namely, the OLA-Environment Analysis (OLA-EA) that provides the technological means to prevent hazard daily situations at home, based on space geometry or other indoor obstacles such as furniture.

This solution addresses the problem of aging population that today developing countries have, a phenomena especially predominant in Europe and Japan where, additionally, more seniors are living alone. Moreover, there's an increasing tendency of migration from rural to urban areas, difficulting a close contact between seniors and their informal caregivers (family, friends), thus creating a high-demand for formal care systems on an unsustainable level. To face this OLA proposes a virtual presence, by means of natural interaction with a mobility app, specially designed for supporting seniors in their daily activities, while preventing hazard situations. This solution aims at allowing seniors to live more independently and self-assured, thus promoting active ageing. OLA also helps caretakers to provide higher quality assistance and raise awareness about their patients' condition by giving them instant access over their health data and life-style status. An important challenge that comes up is the low level of expertise seniors have in using ICT. OLA tries to overcome this barrier by integrating natural, adaptive and friendly multimodal human-computer interaction (HCI), leveraging Automatic Speech Recognition and Gaze, in addition to the more conventional HCI modalities.

2. OLA-EA

On the topic of OLA-EA, we reconstruct the indoor environment using RGB-D devices (e.g. Microsoft Kinect One or Intel Real Sense), introduce machine learning-based classification techniques to interpret the same, and adopt augmented reality (AR) to output feedback that is computed based on architectural rules. For a deeper understanding we will break the process down to 4 steps: 1) retrieve a 3D point cloud reconstruction of the space and send that data to our back-end service to, 2) compute a consolidated 3D mesh reconstruction from the point cloud, perform a 3D geometrical object segmentation and classification to then 3) run an analysis based on architectural rules and 4) display notifications, alarms or suggestions about the environment, resorting to AR.

OLA is designed for mobile scenarios and, particularly, OLA-EA requires the user to move around scanning the environment. In turn, the back-end service processes the retrieved data and, after receiving the analysis report, the user moves around looking for the abovementioned feedback. Although the pipeline can meet its goals, this workflow suggests rather tedious tasks that aren't motivating. This can rise a barrier to the success of this service. Game mechanics such as house scanning percentage of completeness or constant feedback while scanning could help in engaging users and, because it's a lone process, it could also benefit from multiplayer mechanics where the users could raise awareness about their own identified hazard situations by sharing them with others and thus increasing the acceptance of our service.

Acknowledgments: This research is supported by OLA, a project co-financed by the AAL Joint Programme (AAL JP) and FCT (in Portugal).