Author's response to reviews

Title: Deployment of Assistive Living Technology in a Nursing Home Environment: Methods and Lessons Learned

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Author's response to reviews: see over
Dear reviewers,

Thank you for your positive feedback. We have made the needed changes to the manuscript. Please find below our point-by-point responses to the concerns as requested.

**Paul McCullagh’s Comments**

Figure 2 should be reduced/eliminated. It adds little and could easily be reformed into a short table (time, location, shower time, ...)

We have reformatted figure 2 into a short table (table 4) which represents the information to be logged and the frequency of manual logging.

**errors in grammar etc.**

All the raised points were taken into account.

**any feedback from caregivers on their commitment to data logging - this gives them extra work**

This was somehow hidden in the System Performance and Discussion & Lessons Learned sessions where we mention that we have noticed an imprecision in the logged data sheets and that providing a more automated, electronic and pervasive manner to gather this data from nurses on the field will help to improve the logging.

We have presented this idea more clearly in the Qualitative Feedback session: "Though the staff complied with the completion of the manual log sheets, which was crucial as it was the only form of ground truth available in the absence of video camera based logs, they admitted having difficulties to cope systematically with the extra work it represented. We discussed simplifying the logging process by providing a more automated logging media through tablets embedded in the environment and bringing logging down to a few clicks on touch-screens."

**some indication of sensitivity of AAL e.g. "wandering at night" would improve**

We have added a sentence just after describing the deployed services (Deployed Services section) to give this information. "The sensitivity of our AAL solution for the detection of these situations correspond to the ground truth data analysis with 71% of confidence during the first phase of the deployment and has reached 83% at the end of the deployment as will be explained later in the System Performance section."

**We are also working on improving the reasoning engine performance with the use of formal methods [35] for rules verification - What are you doing?**

We have introduced more information concerning the rules verification with a reference to one of our group’s papers dedicated to this aspect: "We are also working on improving the reasoning engine performance through formal verification of defined rules using model checking techniques. This allows to detect some unwanted situations such as non-reachable rules which does not affect the system precision but increase the complexity and reasoning time, redundant rules causing multiple decisions about the same situation and logically conflicting rules which can lead to conflicting and non logical decisions [35]."

**Doctors were positive about the deployment and felt that it would go a long way to improve resident safety and add to the well-being and comfort of the residents //**
evidence for this

This affirmation was based on a *Personal Communication* with one of our collaborating doctors. After consulting Dr. Philip Yap on how to prove this affirmation, he proposed to add a personal communication reference (Page 19) based on this link:

"http://nova.campusguides.com/content.php?pid=114919&sid=1225475"

Sabine Kokh’s Comments

The last sentence of the objective, "In fact, our deployment has exposed more concrete requirements and problems that need to be addressed, and which cannot be identified in laboratory testing. Issues that were neither forecasted during the design phase nor during the laboratory testing surfaced during deployment, thus affecting the effectiveness of proposed solutions.", is not an objective but a result of the study.

This sentence was moved to the *Results & Discussions* part of the abstract.

"An ethics approval process to select suitable end-users..." I would propose to rephrase this sentence e.g. "Ethical approval was obtained prior to real-life deployment of our solution."

The sentence was rephrased as requested.

**Results & Discussions** of the abstract are still a mixture of methods and results

Some sentences of the *Results & Discussions* part of the abstract were moved to the *Methods* part: "A technical ambient assistive living solution, consisting of a set of sensors and devices controlled by a software platform, was deployed in the collaborating nursing home.", "A system performance evaluation was realised during the deployment period with the help of caregivers." In the *Results & Discussions* part, we explain more the results of the system performance evaluation and data analysis: "Results of the system performance evaluation show the evolution of system precision and uptime over the deployment phases, while data analysis demonstrates the ability to provide early detection of the degradation of patients’ conditions."

**Conclusion is lacking**

We have added the conclusion to the abstract.

**Pre-deployment observations and discussions. How was the data in the focus groups captured and analysed?**

We have introduced more information about how data was captured and analysed: "Discussions were tape-recorded and started with a reporting of main needs based on a live questionnaire with questions collected from the field or previous meetings, a session last for around 2 hours and is dedicated for updates, exchange and interaction, or for the definition and validation of the assistive services to be provided. Collected information were analysed and processed to produce meeting reports."

**Ethical Approval Process:** I think there is no need to describe the process. It’s a standard process and enough to just state the first sentence and to move it at the end of the methods section.
The Ethical Approval Process section was removed as requested. In the Participants’ Characteristics and Selection Process section, we provide the number of the approval and the institution from which it was approved: "To proceed with the deployment in real settings, the study was ethically approved by the Institutional Review Board (IRB) of the National University of Singapore (NUS) under the number 11-222."