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A context-aware social robot to improve the quality of life of people with dementia

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Purpose With lifestyle monitoring, carers gain insight in daily activity patterns of people with dementia, living alone at home, thereby enhancing their information of the person with dementia (PwD) and the communication between (in)formal carers, and reducing the caregiver strain (Zwierenberg et al., 2018). Social robots can complement lifestyle monitoring by providing a non-invasive interface between the PwD and carers. Moreover, lifestyle monitoring sensors can also enhance social robots by adding context awareness. The European eWare project (AAL-2016-071) provides an innovative smart architecture integrating the Sensara lifestyle sensor network (PIR and door sensors) and the Tessa social robot of Tinybots, to support PwD to be independent, improving their wellbeing and reducing subjective stress of their caregivers. The main aspect of the system is the setting of personalized goals for the PwD through a dedicated web-app used by caregivers. Goals are the combination of ADL (Activities of Daily Living), events (sensor events of the life-style monitoring system), and reminder messages from the social robot. For example, the goal to have breakfast in the morning between 6:30 and 9:30 hours. **Method** In the Alpha pilot tests, the eWare system was evaluated for 5 months in 4 countries and with 18 end-users (6 triads of PwD and formal and informal caregiver) per country (N=72). The Alpha pilots were valuable to improve the eWare architecture and the interaction and acceptability of the PwD with the eWare eco-system (Suijkerbuijk et al., 2019). After the Alpha pilots, the eWare was enhanced and tested with 300 end-users (PwD and their caregivers) for a period of 12 months in four countries (the Netherlands, Italy, Switzerland and Norway) to be iteratively improved and evaluated. **Results and Discussion** The effect of technology in improving the quality of life of PwD and reducing the stress of their caregivers is measured using the data from the Cloud of eWare and questionnaires. The data, ADLs and interaction between the PwD and the robot, provided information regarding the lifestyle of the users, and these outputs can be used to improve the suggestions that the robot provides to the PwD to remind him/her of activities and so, to increase the quality of life of PwD and reduce the care burden for the (in)formal caregivers (Monterjù et al., 2018). The results coming from the data analysis demonstrate the impact of the eWare eco-system on the PwD and their (in)formal caregivers.

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Figure 1. a) Tessa Social Robot; b) sensor network.