SOCIALROBOT: ELDERLY HOME CARE AND SOCIALIZATION

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ABSTRACT/SUMMARY

Most elderly people prefer to live independently, for as long as possible, in their preferred environment. Nowadays, the predominant care model for supporting elders living alone at home is based on informal carers' assistance (i.e., relatives, friends, neighbours, etc.). Considering the shifting demography of the elderly population, this model is expected to pose major challenges both in the economy as well as the society.

The SocialRobot solution, funded under the FP7 Industry-Academia Partnerships and Pathways (IAPP) Marie Curie Programme 2011, is an innovative practice-oriented elderly care robot system that integrates state of the art, standardized and interoperable robotic technologies, ICT-based care services and a virtual social care network[2]. ICT-based services address the categories of Care & Wellness, Guidance and Mobility Monitoring. SocialRobot provides daily care assistance to the elder through close virtual social interaction with their informal and formal carers thus reducing the demand for on site actual care.

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[2] SocialRobot extends the Virtual Social Care Network developed in Co-Living (http://www.project-coliving.eu/).

INDRODUCTION

According to recent demographic studies, by 2050 the elderly population aged 60 and over is predicted to increase in nearly every country in Europe, matched with an increase in the retired population. Insofar as this shift will tend to lower both labour force participation and savings rates, unable to let the health care budgets grow in a proportional way, it raises major challenges about a future slowing of economic growth. In order to address these challenges, there is growing attention for assistive technologies to support seniors to stay independent and active for as long as possible in their preferred home environment. Robotic systems are among those initiatives offering functionality related to the support of independent living, monitoring and maintaining safety or enhancement of health and psychological well-being of elders by providing companionship.

With SocialRobot, technological innovation is provided mainly in the areas of i) human-robot interaction (emotion recognition, intelligent dialogue) and behaviour modelling considering related context of daily routine occurrences of the elderly as they aged; ii) new methods for gesture recognition and tracking; and iii) robot-human learning and understanding.

METHODS

The main SocialRobot's end-user target group consists of people with light physical or cognitive disabilities who can find pleasure and relief in receiving assistance or stimulation to carry out their daily routine at home. SocialRobot considers the elder as an active collaborative agent able to make personal choices and adapt the care model to his/her lifestyle, personalized needs and capabilities changes over the ageing process.

To ensure that the SocialRobot system will meet the standards and interoperability, state of the art, standardized and interoperable robotic technologies, ICT-based care services and a virtual social care network (SoCo-net) will be integrated in the Robotic platform. The SocialRobot components (see Figure 1) will be integrated to provide a set of interoperable services making use of SoCo-net. The SocialRobot platform consists of a 2-wheel robotic base, with a structure body and robotic head while the integrated sensors are mainly cameras, Kinect sensor and laser range finders. The

integrated SocialRobot solution will provide, for an end user, adaptable multi-modal (text, voice, images, video, etc.) interface that will support an affective and empathetic user-robotic interaction, taking into account the capabilities of and acceptance by elderly users and the end-user's application's needs, security and privacy issues.
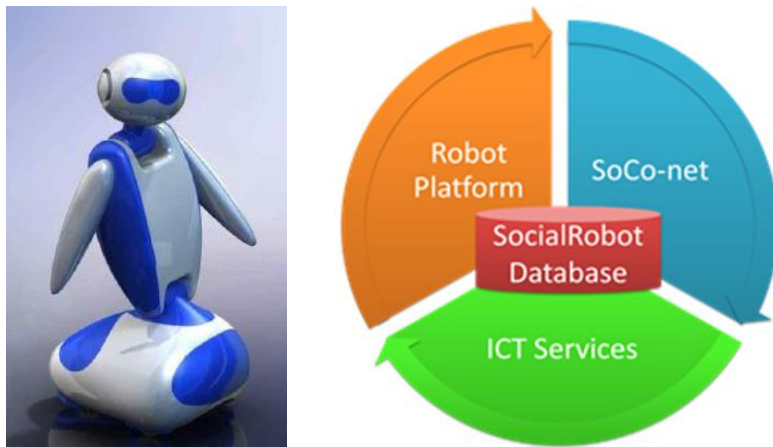

Figure 1: SocialRobot Platform and integrated components

To ensure usefulness and usability of the SocialRobot system, end-users were involved from the beginning of the project in the collection of user requirements and specification of realistic use case scenarios. Different end-user groups were selected representing a diversity of physical and cognitive abilities. SocialRobot emphasizes in supporting the elders to maintain their self-esteem in managing their daily routine at home, by addressing the elder's security, privacy, safety and autonomy; it allows them to decide whether and when they want to have the system on or off.

RESULTS

The project is still in progress and two pilots for testing the technology are scheduled to be carried out in the Netherlands and Cyprus. Up to 50 elderly people and their caregivers will use the SocialRobot system over a six month period where it will be investigated up to which point the SocialRobot services improve the self-management of daily routine at home, and how the services can leverage economic

opportunities. Initial involvement of the selected end-user groups in system development and prototype testing have shown positive end-user acceptance related to the increase of the elders' motivation and reduction of their hesitations in carrying out their daily routine with the support and company of the SocialRobot.

DISCUSSION/CONCLUSIONS

SocialRobot focuses in the growing high potential elderly care market in Europe and beyond, tackling initially the area of preventive care at an early stage of the ageing process. It will provide a care platform that supports carers, both family members and therapists, in their daily tasks. The main ongoing developments are:

1. Recognition of Abnormal Behaviour and Alerting
2. Reminder Service and Assistance
3. Face Recognition, Navigation and Tracking.
4. Suggestions based on Elderly Preferences
5. Fall Detection and Alerting (home use)
6. Registering to Activities and Activity Reminders
7. Creating Activities and Inviting Friends
8. Guidance of Daily Activity Tasks

The system will be introduced early enough in the life of the elderly when the first signs of physical to cognitive disabilities appear, providing thus initially for simple essential personalized functionality covering daily care needs. This will ensure that the elderly will be given enough time to become acquainted and increase acceptance of more complex robot care functionality introduced gradually to address further ageing capabilities degradation.

SocialRobot is expected to launch the final product onto the market two years after the project end; in 2016.