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RAMCIP Project, a Robotic Assistant to Support AD Patients at Home: A Novel Approach in Caregiving

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Introduction

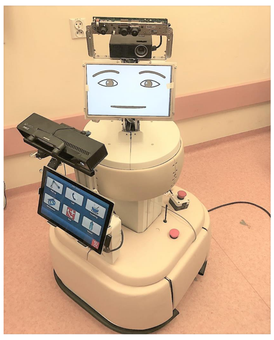
Robotic technologies have potential to support patients with cognitive impairment, given the increased interest in finding solutions for the supervision and help in activities of daily living in Alzheimer´s disease (AD), since caregiving consumes material and human resources.

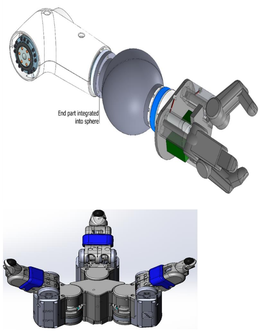
RAMCIP (Robotic Assistant for MCI Patients at home) is a three-year research project within the HORIZON2020 program funded by the European Commission, which started in January 2015 with the aim of developing a novel robot that can provide assistance to elderly people with AD in mild stages (mild cognitive impairment or mild dementia) at their homes, allowing them to maintain an independent living and increase quality of life.

Expected results

RAMCIP robot will be capable of: 1) understanding actions, complex activities and behavior of multiples persons in the user´s home; 2) providing proactive, discreet and optimal assistance to the user; 3) allow communication between user and robot, 4) establishing advanced physical interaction between robot and home environment and 5) establishing assistance activities involving physical interaction between the robot and user.

Finally, a pilot trial in real home environment will be conducted in Barcelona, Spain to test and validate the efficacy of the RAMCIP robot.





Methods

Eight partners will collaborate in the RAMCIP project. This project will comprise the following innovative aspects: 1) cognitive skills based on advanced user and home environment modelling and monitoring, 2) novel adaptive multimodal human robot communication interfaces and 3) advanced, dexterous and safe robotic manipulation capabilities, for the first time applied in service robots for assisted living environments, introducing assistance activities that involve physical contact, all with special emphasis on safety.

To identify the activities in which the robot could give support, we conducted 2 workshops and administrated questionnaires to medical personnel, caregivers and patients simultaneously in Lublin (Poland) and Barcelona (Spain). After analyzing the results it was decided to implement the following functions (Table 1).

Project vision

The RAMCIP project vision is that future service robots can assist in significant aspects of the user's daily life, ranging from food preparation, eating, dressing activities, taking medication, through to managing the home and keeping it secure. Also, the robot should help the user maintain positive outlooks and exercise their cognitive and physical skills. Coverage of these aspects will help to preserve an independent living and quality of life in patients with AD in mild stages. Rigorous evaluation of these novel technologies by using controlled trials is warranted.

TABLE 1: ACTIVITIES SUPPORTED BY RAMCIP

HIGH PRIORITY	MEDIUM PRIORITY
• Fall Detection. • Screening for the user's general condition. • Gas/Smoke detection. • Assist in turning off electric appliances. • Turning on the light. • Detection of improperly placed objects. • Detection of unknown persons/strangers. • Taking medication/food supplements-reminders, bringing and monitoring. • Assistance upon detection of abnormalities related to electric appliances during cooking.	• Proactive/on demand bringing of food ingredient or an utensil. • Proactive bringing of food to user. • Communication with relatives and friends. • Provision of cognitive trainning programs.

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