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TITLE

Personal service robot for the elderly in home: a preliminary experiment of human-robot interaction

PURPOSE

Robotics becomes increasingly important as a means of supporting frail older people who need physical and cognitive assistance by providing services such as monitoring, mobility aids, information providing and companionship[1,2]. The “Robadom” project aims to design and develop a personal service robot to support the elderly with cognitive impairment living independently in their homes.

In order to ensure the appropriateness of the design of this kind of robot, a prototype is deployed to the targeted end users, and will be refined by tightly involving the users in the development cycles. This study presents the preliminary experiment in a hospital setting demonstrating and examining some features of the prototype with aged people. In this scenario-based testing, we want to evaluate:

1. The comfortable distance between the user and the robot when the robot moves and when it stops.
2. The acceptance of speech interaction.
3. The desired appearance of a personal service robot.

METHOD

The prototype tested in this experiment is a companion robot named RobuLAB-10 designed by the French company Robosoft[3] for cognitive assistance to elderly people living at home. It’s composed by a mobile platform and an upper module that embeds a tablet PC (used for voice interaction) and an IP camera (used for video-conferencing and the remote control of the robot). It is capable of speech and basic conversation.

Twenty-two subjects (F=14, M=8; MMSE[4]=19-30; age=66-88), were recruited from the Memory Clinic of Broca hospital. After being informed and signing the consent, they were invited to interact individually with the robot. The chosen scenario is as follows: the teleoperated robot came to the user and asked him some questions (about user’s name, his day schedule, the weather …). After this, it asked the user to sit down around a table, to take a glass and to pose it on the robot. Finally, the user and the robot came back together to the starting point.

After the session, the subjects filled in a questionnaire consisted of both open-ended and close-ended questions (4-point Likert scale) concerning 1) desired appearance of the robot, 2) their appreciation of its movement and its language capacity, 3) their level of excitement of this experience and 4) their perception of the robot as companion.

RESULTS AND DISCUSSION

In this experience, most of the subjects were satisfied with the interaction with this prototype. They found it stimulating and were willing to participate in other experiences (see table 1).

As to desired appearance for the robot, our interview data show that eight subjects would like it to resemble to a machine. Two of them said “the robot is a machine; it has to remain like a machine.” On the other hand, six subjects would like it to be humanoid.

Concerning their perception of the robot as companion, most subjects considered that the robot would be useful for the elderly who live alone.

To conclude, the current study explored some features of the prototype as a personal service robot with the elderly. Positive results have emerged, indicating that these features are satisfying.

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KEYWORDS

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Table 1: attitude toward features of the prototype (%)

Question	very bad/ strongly disagree	bad/disagree	Good/agree	very good/strongly agree
How do you find the oral expression of the robot?	0	13.64	15	68.18
Are you satisfied with the oral comprehension of the robot?	4.76	9.52	80.95	4.76
Are you satisfied about the distance between you and the robot?	0	0	86.36	13.64
How do you find the movements of the robot?	0	9.09	86.36	4.55
Do you find the robot stimulating?	9.09	18.18	72.73	0
Are you interested of participating in other experiences with robots?	31.82	9.09	50	9.09