

Encouraging Daily Healthcare Habit with Communication Robots

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Abstract. It is important for elderly people to be involved in local community to reduce the risk of being isolated. The authors are building a framework with communication robots for encouraging elderly people to participate in more social activities by providing local news that may be interesting. Since physical soundness is also essential for people to participate in such activities, self-monitoring of physical conditions are involved into the framework. A robot-guided interaction system is developed based on the framework so that a robot encourages the user to measure weight and blood pressure daily. The efficiency is estimated by an experiment.

1 Introduction

Nowadays, there is a lot of information on the Internet; however, few elderly people can obtain the benefits of this information [1]. It is not easy for elderly people to learn usage of a new ICT system [2,3]. Thus, the authors proposed a Robot-guided Interaction Framework for elderly people [4]. Once the user initiates an interaction, a communication robot initiates the following interaction sequences. The user can simply follow and respond to the guiding robot, and is not required to learn any operational sequence or mental model. An experiment on such guiding robots was performed with ten elderly subjects, and investigated how long they can use the system. As a result of an experiment, all subjects kept using the system almost every day until the end of the experiment period [5]. According to this result, the authors considered that the Robot-guided Interaction Framework has certain efficiency for elderly people. Thus, the authors tried to apply it for motivating daily healthcare activities.

Physical soundness is also essential for people to participate in social activities. It is well-known that weight and blood pressure are typical indices to check possibility of lifestyle disease. However it is not easy for most of people to measure them daily only with his/her own motivation. If a kind assistance is provided by someone who is close to her/him, many people can be encouraged to achieve daily self monitoring with less effort.

2 Motivating People by Communication Robots

The authors are building a framework for encouraging elderly people to participate in more activities triggered by interactions with communication robots. By providing news of local activities by the robots, it is expected that participation of elderly people in the activities will increase. It is also expected that they take actions for healthcare with guidance of the robots.

2.1 Activity and Communication Enhancement

Communication robots are delivered to each elderly person's home and placed at common places where people gather (Fig. 1).

First, the robot at home provides news, and encourages participation in an activity, so that the elderly people have more opportunities to go out and meet others. Then, a robot at a common place proposes topics to enhance conversation among people who meet at that location. Finally, the robot at home also encourages the exchange of on-line messages with people who met at the common place in order to maintain longer and better relationships.

Interactions between the robot and the user are designed based on Robot-guided Interaction Framework which decreases difficulties of using information systems for elderly people. Once the user initiated an interaction, a communication robot takes initiative of the interaction sequences.

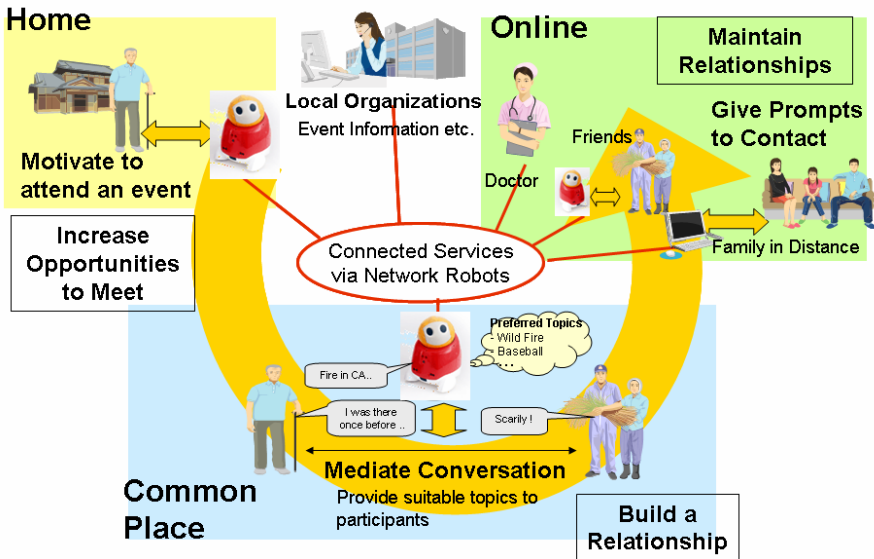


Fig. 1. A Framework for Communication Enhancement for Elderly People

2.2 Encouraging Daily Self Monitoring

Robot-guided Interaction Framework is applied also for encouraging a user to measure weight and blood pressure for daily healthcare. It is well-known that weight and blood pressure are popular index of physical condition of a human. Electric weight scale and electronic sphygmomanometer are popular in the market, and many people own one or more of those. However, it requires some effort to use them continuously for self monitoring in the busy life. It may be simply depends on strength of motivation of people. If a kind assistance is provided by someone else, many people can be encouraged to use those equipments daily with less effort.

Thus, the authors build a communication robot which is connected to weight scale and electronic sphygmomanometer to encourage the user to use those healthcare equipments daily. In addition to a sequence of interactions to obtain news of local activities, the robot guides to measure weight and blood pressure step by step in a natural way [6]. The user can simply respond to the robot without learning any operational sequence to achieve all measurements. This efficiently lowers the barrier to use those healthcare equipments.

3 Experiment and Results

An experiment is performed with 10 subjects (8 males and 2 females) to estimate the efficiency of the system. Ages of the subjects are between 70 and 85. They are mostly in good conditions without major disability. A few of them have hypertension and taking hypotensive drug to lower the blood pressure. A communication robot, a weight scale and an electronic sphygmomanometer are delivered to each subject (Fig.2), and investigated how long and how often s/he uses the system.



Fig. 2. Equipments at home. (Web Terminal, Robot and Sphygmomanometer. Weight scale is not shown here).

As a result of 30 days experiment, all subjects kept using the system almost every day until the end of the experiment period. In average, subjects measured weight and blood pressure 0.7 times a day. According to interviews to the subjects, they had seldom or sometimes measured blood pressure before the experiment unless s/he has hypertension. 3/5 of subjects answered that they became to be more conscious about their physical conditions than they were before the experiment.

Above results may implicate that the encouragement by the communication robot is effective to daily healthcare at a certain level. Further experiment with larger number of subjects is necessary for more accurate quantitative analysis.

4 Summary

An interactive system with communication robots to motivate people for daily healthcare activities is introduced. The system is built based on a framework for encouraging elderly people to participate in more social activities by providing local news that may be interesting. Since physical soundness is also essential for people to participate in such activities, self-monitoring of physical conditions are involved into the framework. The robot encourages the user to measure weight and blood pressure daily. The efficiency is estimated by an experiment of 30 days with 10 subjects. Everyone continued to measure her/his weight and blood pressure until the end at 0.7 times per a day in average.

Acknowledgements. This work was supported in part by the Japan Ministry of Internal Affairs and Communications through the project of “Ubiquitous Network Robots for Elderly and Challenged.” The authors would like to thank all the participants of the experiment, staffs of Uda city and Nara prefecture for kind support throughout the experiment.

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