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MAKING VIDEO COMMUNICATION MOBILE BY USING A SMALL HUMANOID SOCIAL ASSISTIVE ROBOT

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Abstract

There is a high need among older persons to maintain their social contacts and to stay involved in the social life. In this area of social communication ICT and assistive technology can bring a significant support provided that the actual needs and preferences of the user groups are actually met. The paper describes an innovative solution consisting of a mobile video communication facility using a LED projector which is integrated in a social assistive robot system developed in the framework of the KSERA project.

1. Introduction

There is a significant need for social inclusion and for supporting social connectedness of older persons and their care persons. The BRAID report outlines the need for staying connected with people, in particular (a) friends & family (b) care givers and (c) peer professionals [3]. There are already several projects [7] and products on the market providing ICT support via large phones, smart phones, touch screens [5]. The research project KSERA ("*Knowledgeable SErvice Robots for Aging*") develops a SAR that supports older persons, especially those with Chronic Obstructive Pulmonary Disease (COPD), in their daily activities and care needs. By provision of the means for effective self-management of their disease the independent and self-determined way of life and the overall quality of life can be enhanced [4]. As robotic platform the small NAO humanoid from [1] is used. It serves as an interface between the user and the system which is embedded in a smart home environment which enables ubiquitous monitoring of the users' activities and health status and of the environmental conditions. A small LED projector unit was developed to be carried on the back of this small humanoid social assistive robot [6]. This projector unit on the robot's back allows to project video information towards a wall next to the user. A camera in the robot's head is used to transmit the older person's video stream towards the communication partner.

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The main innovation is considered to be the mobility of the solution, as the assistive robot with its video communication equipment can come to the user in his or her flat wherever she or he is. This is an added value compared to the state of the art solutions where the user has to move to a stationary device or where the equipment has to be carried around by the user (e.g. a smart phone).

2. Methods

The prototype system is expected to bring added value by the mobility aspects. It is able to approach the user wherever the user is in the flat. This is considered to be a logical evolution from current technology. The main application areas are: (a) social communication (friends, family members, informal carers) (b) video communication to e.g. medical services and (c) video communication in case of emergency. For designing the concept as well as for concept validation experts from the care domain and older persons were presented with early prototypes and took part in "Wizard of Oz" tests in order to explore the potential of the solution from point of view of primary and secondary users of the system [11]. The levels of user acceptance, user interest and user engagement were high regarding the mobility of the video communication.

Figure 1. Prototype of LED projector unit (left) mounted on the humanoid NAO robot (right)

The open standard SIP is used for video communication. Additionally, the proprietary Skype protocol is supported. This enables openness to the industry standards and connectivity to wide spread proprietary protocols as e.g. Skype.

3. Results

An ethical sound involvement of the users during the laboratory tests was ensured, an ethical expert supported and monitored all trials [13] [14]. Data protection is

considered by offering possibility to use secure SIP server and by ensuring the identity of the calling parties before accepting a call in a future product system.

A workshop with experts from the care domain was organised in the laboratory setting. The experts rated the quality of audio and video connection good and sufficient for emergency scenario and for social communication. Added value of the KSERA mobile video communication was clearly stated, especially since the video channel provides information regarding the actual state and emotional situation of the user in a better way than an audio connection only. Particularly in emergency scenarios, when the operator of the emergency centre needs to explore the severity of the situation quickly, the video connection is able to provide this information.
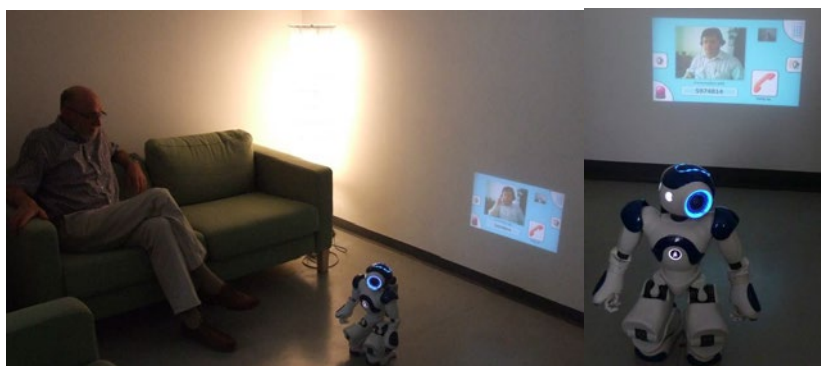
Figure 2. Setting for mobile video communication in the laboratory: NAO robot with a LED projector unit on its back using its integrated head camera for video communication between KSERA user (sitting on a couch) and a call centre operator.

Interestingly, all the experts assume that the relatives would be willing to pay for the video communication feature as it offers added value for their own communication with their parents even over great geographical distances and it provides means to improve the older person's integration into a social network.

4. Discussion/conclusions

Despite the promising findings up to now, several imitations of the current prototype system have to be considered, e.g. the low brightness of the used LED projector (30 ANSI lumen). By using blinds at the windows and artificial light in the test room a realistic environment could be set up but it was at the lower limit of ambient brightness recommended for living areas. Based on the technological improvements it is expected that brighter projectors will be available in near future. Further work will be done in the framework of the KSERA project by carrying out a validation of the integrated KSERA prototype in near to real life settings with older users in Austria and Israel in fall 2012.

Acknowledgements

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