Service robots assisting care workers and persons in need of care – application areas and criteria for user acceptance

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As a consequence of the demographic development, the number of people in need of care will increase drastically whereas only a constant (or even slightly decreasing) number of people will be working in healthcare and welfare services. Service robots can help to tackle this situation by

- assisting elderly in their daily lives, thus enhancing their independence
- supporting the personnel of hospitals and residential care facilities in their work, thus giving them more time to actually care for their patients.

Whereas simple assistive robots, e.g. mobile communication or transport robots have already been commercialized successfully, a new generation of more sophisticated robots, e.g. with manipulation abilities, are about to leave the laboratories.

Care-O-bot® is the product vision of a mobile robot assistant to actively support humans in their day-to-day lives. Now in its third generation, the robot features a product-oriented system design and is the first to offer the potential for the real-world application of manipulating mobile service robots in everyday environments. Care-O-bot® 3 is able to independently execute fetch and carry tasks, to support communication or to provide assistance in emergencies.

The novel design of Care-O-bot® 3 represents an intentional move away from existing humanoid service robots. Instead, the robot has been given a functional design, outlining its abilities as a butler. This helps for the user to align his expectations with the actual capabilities of the robot and thus increases the acceptance of the robot. Furthermore, the role of Care-O-bot as a tool that is controlled by the human user at any time is underlined instead of presenting the robot as a technical or even equal version of the human.

Based on different user studies, the demand for support of elderly people as well as of care workers and possible application areas for service robots were identified. Within several research projects, associated application scenarios were implemented on Care-O-bot and other task specific robots. Care-O-bot was already evaluated successfully in different elderly care institutions and elderly persons' homes.

Bio

Birgit Graf is manager of the Domestic and Personal Robots Group at Fraunhofer IPA. She received her degree in Computer Science from Stuttgart University in 1999 and completed her PhD on a

guidance system for robotic walking aids in 2008. Birgit Graf was involved in the development of the latest generations of the robotic home assistants Care-O-bot and has successfully been leading several service robot developments for industrial clients. She is coordinating a German network on welfare robotics.

Selected publications

B. Graf, T. Heyer, B. Klein, F. Wallhoff: Servicerobotik für den demografischen Wandel. Mögliche Einsatzfelder und aktueller Entwicklungsstand. In: Bundesgesundheitsbl 2013 • 56:1145–1152, DOI 10.1007/s00103-013-1755-9, Online publiziert: 18. Juli 2013, © Springer-Verlag Berlin Heidelberg 2013

Birgit Graf, Theo Jacobs, Jochen Luz, Diego Compagna, Stefan Derpmann, Karen Shire: Einsatz und Pilotierung mobiler Serviceroboter zur Unterstützung von Dienstleistungen in der stationären Altenpflege. In: Herausgeber: Karen A. Shire, Jan Marco Leimeister (Hrsg.): Technologiegestützte Dienstleistungsinnovation in der Gesundheitswirtschaft. Wiesbaden : Springer, 2012, S. 265-288

Graf, Birgit: Serviceroboter. In: Hesse, Stefan (Hrsg.) u.a.: Taschenbuch Robotik - Montage - Handhabung. München : Hanser, 2010, Kap. 3.4 (S. 289-311)

Graf, Birgit; Reiser, Ulrich; Hägele, Martin; Mauz, Kathrin; Klein, Peter: Robotic Home Assistant Care-O-bot® 3 - Product Vision and Innovation Platform. In: IEEE / Robotics and Automation Society: IEEE Workshop on Advanced Robotics and its Social Impacts - ARSO 2009: Workshop Proceedings, Tokyo, Japan, November 23-25, 2009. Piscataway, NJ : IEEE, 2009, S. 139-144

Graf, Birgit: An Adaptive Guidance System for Robotic Walking Aids. Journal of Computing and Information Technology (CIT): Special Issue on Advanced Mobile Robotics. CIT 17 (2009), Nr. 1, S. 109-120.

Graf, Birgit; Staab, Harald: Service Robots and Automation for the Disabled / Limited. In: Nof, Shimon Y. (Hrsg.): Springer Handbook of Automation. Berlin u.a.: Springer, 2009, S. 1485-1502