

PRESS RELEASE

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The Fraunhofer Institute for Manufacturing Engineering and Automation IPA was founded in 1959 and incorporated in the Fraunhofer-Gesellschaft in 1971. Within this research organization, Fraunhofer IPA is one of the largest single institutes, employing around 280 scientists. It has an annual budget of approximately 38.8 million euros, with 40 percent of its revenue coming from industrial projects.

Fraunhofer IPA is composed of 16 individual departments engaged in the fields of Corporate Organization, Surface Engineering and Automation. The Institute's research and development work is focused on organizational and technological challenges, particularly within the production environment of industrial enterprises. Our R&D projects aim to identify and exploit the potential for automation and streamlining at clients' companies in order to improve production processes and make products more cost-effective and environment-friendly. This helps both to maintain international competitiveness and also to make workplaces in industry more attractive.

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Service robots in nursing homes – popular among residents and carers alike

Ease of use, benefits and acceptance of robot assistant »Care-O-bot® 3« tested under real-world conditions

Cleaning, doing the washing, preparing and serving meals – these are tasks that many people either don't like doing or, because of growing physical infirmity, are no longer able to do. It is hoped that, in future, these and similar chores will be carried out by service robots. This will not only enable elderly citizens and those in need of care to live independently in their own homes for longer. The use of service robots in resident care facilities also offers the potential to reduce the workload on carers, thereby allowing them to spend more time with residents. The »WiMi-Care« project has explored ways in which the robot assistant »Care-O-bot®« developed at Fraunhofer IPA can be used to serve drinks to residents at an old people's home and additionally to act as an entertainment platform. Studies under real-world conditions have been able to verify not only the ease of use of the robot by carers, but also the benefits of the robot as well as its acceptance by residents.

Fraunhofer IPA has been engaged for over 10 years in developing a robot assistant »Care-O-bot®« to support people in their day-to-day lives. It is hoped that, in future, the use of such advanced technical assistance systems will enable elderly citizens and those in need of care to live independently in their own homes for longer and thus, despite the anticipated shortage of carers, to maintain a reasonable quality of life. Now in its third generation, the prototype »Care-O-bot®«, in its role as interactive butler, is already capable of carrying out a variety of fetch-and-carry tasks. »Thanks to its near-product design, the robot is especially well suited for evaluation by potential end-users,« explains Dr. Birgit Graf, head of the Domestic Service Robotics and Personal Robotics group at Fraunhofer IPA.

Within the »WiMi-Care« project sponsored by the German Federal Ministry of Education and Research, the Care-O-bot® was for the first time tested for how it interacts with elderly people and those in need of care. A needs assessment was carried out at an old people's residential care home in order to identify two application scenarios for the robot: serving the residents with drinks and use as an entertainment platform. »A key requirement of the scenario selection was to make sure that the robot enables carers to devote more time to residents,« says Graf.

The robot was required to prove its worth in two real-world situations involving carers and senior citizens. »The goal of the second trial was to implement the selected application scenarios on the Care-O-bot® in such a way that the robot could be controlled by the carers and thus used in their day-to-day work,« explains Graf. The trial assessed how easily the robot could be used by carers, what benefits it delivered and how positively it was accepted by all involved person groups.

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To serve residents with drinks, Care-O-bot® is capable of using its robot arm to independently fill cups with water from a water dispenser and serve them to residents on its tray. Being connected to a database of residents allows the robot to identify individual residents at the facility. A record of drinks served, which is also stored in the database, enables the robot, as it moves around the facility, to single out those residents who have not had enough to drink. »Selective targeting of residents, combined with active follow-up, means we are able to make sure not only that residents are served with drinks, but also that they actually drink them,« says Fraunhofer researcher Theo Jacobs, who monitored the trial on site.

For use as an entertainment platform, the touch screen of the robot serves to launch games or memory-training programs, play music or recite poems. The robot is controlled by the carers using a specially developed graphical user interface. »With just a few clicks on the user interface, carers can give the Care-O-bot® its instructions for the day – and then spend more time with residents,« explains Jacobs.

The trial involved the robot being used mornings and afternoons on three consecutive days, for between one and two hours at a time. As was already the case during the initial assessment phase, there was no fear of contact with the robot. »The residents simply observed Care-O-bot® with curiosity and found it fascinating to watch it doing its work. Some of the residents in the dementia unit even developed a real fondness for the robot,« reports Jacobs. The carers, too, were well able to imagine working with a service robot in future.

Development of the Care-O-bot® is continuing at Fraunhofer IPA beyond the end of the WiMi-Care project. More especially, the robot's ability to assist elderly citizens in a domestic setting is being continuously improved and evaluated in the context of a number of research projects. The EU-funded SRS project (Multi-Role Shadow Robotic System for Independent Living) makes use of the possibility whereby the robot can be remotely controlled by relatives, thereby widening its scope of application. To ensure that communication between humans and robot takes place in an intuitive and socially acceptable manner, the aim of an EU project called Accompany (Acceptable robotiCs COMPanions for AgeiNg Years) is to develop new interfaces and components for user interaction. Both of these projects are planned to include extensive trials under real-world conditions to allow the robot to be constantly further developed in line with user requirements.

However, it is not enough to focus just on the robot. »To convert robot technology into real applications, it will be especially important in future to view the robot not as an isolated system, but as part of an integrated whole, embedded in a comprehensive service concept,« explains Ulrich Reiser, who is responsible at Fraunhofer IPA for coordinating development of the Care-O-bot®. With this in mind, the Tech4P project, which is being sponsored by the German Federal Ministry of Education and Research, is aimed at developing strategies for how personal care services can be supported by the use of robot technology. »Such an integrated approach also includes the possibility of the robot being specifically adapted to suit a particular application,« continues Reiser. »Nonetheless, our ultimate development goal remains the everyday all-rounder.«

More information at: www.care-o-bot.de, www.wimi-care.de, www.srs-project.eu

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Care-O-bot fetching a drink from a water dispenser



An inhabitant playing memory on the touch screen of Care-O-bot together with a nurse



Care-O-bot handing a drink to an inhabitant

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