



- 1 *The intelligent care cart navigates autonomously to the required location, even by using elevators.*
- 2 *The robotic service assistant recognizes persons, positions itself next to them and offers beverages via voice output.*

SERVICE ROBOT TECHNOLOGIES FOR RESIDENTIAL AND IN-PATIENT CARE

Background

The care sector, both nursing homes and hospitals, is especially affected by demographic change. While the number of people in need of care is continuing to grow, ever fewer job starters are wishing to train as carers. At the same time, older members of the care profession are retiring early on account of the high levels of physical and psychological stress. Also, there is a strikingly high sickness rate.

Service robot technologies offer the potential to improve the operation of commercially available care aids with regard to their efficient and ergonomic use, thereby relieving the pressure on carers during their work. (Semi-)autonomous assistance systems can help to reduce the proportion of non-nursing activities, with carers then being left with more time to spend with patients. Also, care aids with suitable assistance features can contribute to avoiding damage to health.

Our solutions

Fraunhofer IPA has for many years been a developer of advanced service robot technologies. These include autonomous navigation as well as sensors for 3D environment sensing and person recognition. Similar technologies are employed, for example, as driver assistance systems in the automotive sector. They can also be integrated into existing or newly developed care aids in order to provide carers with physical or informational support in their day-to-day work. Based on numerous projects as well as various economic feasibility and acceptance studies, the experts from Fraunhofer IPA have extensive experience of the challenges facing those who work in residential and in-patient care. This enables our experts to implement new solutions according to the requirements of care practice.

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Possible areas of application

Equipped with intelligent assistance features, the following care aids are capable of addressing typical day-to-day problems of carers:

- Care staff often lose time because their care cart is not where it is currently needed, or because an important care utensil is missing. An intelligent care cart can solve such problems. It can make its own way to where it is needed and, using the built-in touch screen, the carer can keep a record of which care utensils have been used.
- Assistance features for lifter systems can support carers with the strenuous task of lifting and moving patients. The lifters can also navigate autonomously and help the user to correctly position the patient. Whereas, to date, several individual lifter systems have been required, one multi-functional lifter is capable of performing the various tasks.
- Tasks in logistics and housekeeping can likewise be automated using robot technologies. Utilizing the compact construction and navigational techniques of service robotics, service transport vehicles can make their own way to a specified destination – including in residential areas and on hospital wards – without the need for complex infrastructure or additional changes to the environment.
- New cleaning robots are capable of automatically measuring the germ load and autonomously executing selected/required cleaning tasks.

- Greater independence for residents and patients as well as time savings for care staff are made possible by an autonomous mobile service assistant, which, at the press of a button, can take snacks, drinks, etc. to communal areas or individual rooms.

Examples of implementation

WiMi-Care project

In close cooperation with an elderly care facility, suitable application scenarios have been developed for service robots designed to assist and relieve the pressure on care staff. These include automatic transport of containers, support for the night shift by means of automated patrols, distribution of drinks and the use of a robot as an entertainment platform.

www.uni-due.de/wimi-care

SeRoDi project

This project developed service robot applications for both elderly care facilities and hospitals. Specific developments included an “intelligent care cart” as well as a “robotic service assistant” that offers beverages and snacks to residents of in-patient care facilities. www.serodi.de

Multifunctional lifter “ELEVON”

“ELEVON” is the concept of a multifunctional person lifter. It is able to navigate autonomously, support a person being picked-up via sensors and perform various lifting operations.

What we offer

Fraunhofer IPA offers a variety of services designed to identify the benefits of service robot technologies for your particular application or assist you in all phases of implementation.

For manufacturers of care aids

- Performance of customized market/requirements analyses
- Design and development of new robotic care aids in close coordination with users
- Compliance with regulatory requirements (e.g. German medical products law)
- Integration of robotic assistance features into existing care aids

For users

- Presentations on the latest technology and demonstrations of existing robots at events and panel discussions
- Integration of the technology into existing or new services and processes
- Support with the introduction and evaluation of new robotic care aids in real-world applications, including staff training

- 3 *The intelligent care cart automatically recognizes objects that are being removed and reduces the documentation of used care utensils.*
- 4 *A mechanical prototype of the multifunctional person lifter “ELEVON”.*
- 5 *Up to 28 cups or snacks fit into the robotic service assistant. If everything has been given out, the robot returns to the kitchen where staff can refill it.*