

Service robot

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1. The introduction of the existing service robot

The International Organization for Standardization defines a “service robot” as a robot “that performs useful tasks for humans or equipment excluding industrial automation applications. It can provide services that are beneficial for humanity. Service robots are intelligent machines with sensory, thinking, decision-making, and action functions. They can be divided into two categories: professional service robots and personal service robots.

1.1. professional service robots

Autonomous guided vehicles (AGVs) represent the largest fraction in the professional service robot market. They are established in non-manufacturing environments, mainly logistics, and have lots of potential in manufacturing. The second largest category, inspection and maintenance robots, covers a wide range of robots from rather low-priced standard units to expensive custom solutions. Service robots for defense applications accounted for 5% of the total number of service robots for professional use sold in 2018. Thereof, unmanned aerial vehicles seem to be the application with the highest share. Among medical robots, the most important medical applications are robot assisted surgery or therapy and rehabilitation systems. Medical robots are among the most expensive service robots. powered human exoskeletons support ergonomic working by reducing loads on the worker. There is a high growth potential for this kind of robot. [1]

It can help facilitate a healthier and less-restricted life for the elderly as well as people with movement disabilities. Assisting humans as they perform repetitive tasks

is a reasonable solution for increasing productivity while improving quality and protecting human subjects from performing strenuous repetitive movements. It also delivers the added benefit of reducing work-related musculoskeletal diseases. Yet due to their complexity, which creates challenges in terms of device acceptability, compliance with safety regulations and cost effectiveness. Several passive and spring-based exoskeletons have now been developed to support workers during manual and repetitive tasks including overhead manipulation, lifting and moving objects, using heavy tools and bending/squatting.

1.2. personal service robots

Service robots for personal and domestic use are produced for a mass market, which is different from professional service robots. So far, service robots for personal and domestic use are mainly in the areas of domestic (household) robots (vacuuming and floor cleaning, lawn-mowing, pool-cleaning) and entertainment robots (toys, hobby systems, education and research). [1]

Cleaning robots are equipped with sensors and intelligent processing algorithms to implement route planning and obstacle avoidance. With its mechanical system and control system, the function of cleaning can be well realized. At present, the cleaning robots sold in the domestic market include kv8 cleaning robots from Shenzhen Yinxing Intelligent Technology Company, HAC-2 cleaning robots from Zhejiang Haixing Electronic Technology Company and so on. At the same time, cleaning robots of world-renowned brands are produced in China. For example, the iRobot vacuum cleaning robot Roomba is produced in Shenzhen, and the Electrolux vacuum cleaning robot "Trilobite" is produced in Suzhou.[1]

Entertainment robots have a wide range of application prospects. The typical entertainment robots are competition robots and bionic entertainment robots. QRIO, a humanoid entertainment robot launched by Sony in 2004, will not only run, but also jump. It can do a lot of movements like still, walking, running, jumping. It has a

strong ability to balance. As long as you push it from the front, it will look backwards and find the balance point, and at the same time resolve the external forces.

In terms of educational robot research and promotion, Beijing Bochuang Xingsheng Technology Company successfully developed the "Future Star" mobile robot platform for robotics education in universities in 2007, and the "Creative Star" modular robot teaching kit in 2009.

In addition, assistive robots designed for disabled or elderly people have been very successful. In 2010, the French company Kompai released CareBot, a robot with navigation and dialogue capabilities. It uses a combination of sensors to monitor the surrounding environment, sense body heat and identify colors with the robot's GeckoTrak software, and monitor people's movements at home with sonar and infrared rangefinders. In 2013, NEC in Japan released Pape RoPetit, a robot has the ability of home assistant NEC, who can implement remote health consultation and shopping assistance services, as well as to protect the elderly and monitor intrusion issues. In 2014, France's Aldebaran SAS and Softbank Mobile announced the joint development of the world's first home-based, life-size, autonomous social robot Pepper. It is the first personalized service robot in the world that can read emotions, judge emotions, communicate with humans with expressions, actions, sounds and intonation. [2]

Due to the complexity of technology and the limitations of R & D philosophy, there are fewer types of elderly care robots applied, and the functions they implement are limited.

2. My ideal service robot

My ideal service robot is a multi-functional elderly robot, which can not only give the elderly the physical care, but also the spiritual care. The functions it can achieve include cleaning, home monitoring, danger alerts, simple medical examinations, calling doctors and ambulances, assisting up and down, cooking, purchasing necessities,

learning and applying new skills, playing chess, taking care of the emotions of the elderly, chatting.

And its significance, as far as the social level is concerned, the development of elderly care robots can effectively reduce the burden on families and society, alleviate the pressure of a serious shortage of elderly care workers, and ensure social stability and development also play an important role. At the personal level, it can improve the quality of life of the elderly and give them physical and spiritual care at the same time, but also mentally, so that children can work at ease and worry about their parents less.

Reference

- [1] Song Zhangjun. Research Status and Development Trend of Service Robot [J]. Integrated Technology, 2012, 1 (03): 1-9.
- [2] Zhao Yating, Zhao Han, Liang Changyong, Sun Hao, Wu Qilin. The Status Quo and Suggestions for the Development of Aged Care Robots [J]. Chinese Journal of Mechanical Engineering, 2019, 55 (23): 13-24.