Introduction and Prospect of Service Robots

Xuning Chen 1811601

1. Introduction of Service Robots

1.1 Brief Introduction

A service robot is a robot which operates semi- or fully autonomously to perform services useful to the well-being of humans and equipment, they exclude manufacturing operations, and they are capable of making decisions and acting autonomously in real and unpredictable environments to accomplish determined tasks. The International Organization for Standardization defines a "service robot" as a robot "that performs useful tasks for humans or equipment excluding industrial automation applications". (ISO 8373) [1]

The professional service robot market has seen modest growth over the past two decades. The last few years, however, have seen rapid growth and technological advancement, and this trend is only expected to continue.

In 2017, sales of professional service robots rose considerably – approximately 85% over 2016, according to the International Federation of Robotics (IFR). Sales value increased by 39% in 2017 to $6.6 billion, up from 2% in 2016, but still a slow rate primarily due to the significant decrease of high value defense robots.

Strong market growth for professional service robots is expected over the next few years. The latest projections from the IFR show an average growth rate of 21% through 2021, ultimately reaching a value of $37 billion.[2]

1.2 Benefits of Service Robots

Service robots automate many different tasks in a diverse set of applications, but the benefits they bring are typically the same. Regardless of industry or application, businesses choose to automate processes for the same reasons: safety, efficiency and productivity.

- **Safety**

Safety is a primary consideration when businesses choose to deploy professional service robots. Rather than replacing human workers, robots can handle dangerous tasks while humans focus on more cognitive-oriented tasks that keep them away from

dangerous situations. For example, demolition robots are used to keep workers away from structural or nuclear dangers during the demolition process. Professional service robots can safely go where human workers cannot.

- **Efficiency**

Efficiency is typically gained through impeccable levels of robot uptime and reduced operating costs. Inspection robots and industrial cleaning robots operate with very little downtime, allowing them to provide more comprehensive coverage of large infrastructures. Logistics robots can transport a high volume of products while lowering labor costs, too.

- **Productivity**

Like all robotic automation, professional service robots often open the door to greater data collection and analysis for ongoing optimization of all operations. Agriculture robots can transmit important visual data to monitor the health of crops and livestock. Customer service robots can even track customer behavior during face-to-face encounters to gain a deeper understanding of consumer motivations and desires. Essential operational data such as this is much more difficult or impossible to collect through manual processes.

1.3 Types and Uses of Service Robots

There are many more uses and forms of these robots. As an exciting new technology with major productivity potential, professional service robots are being developed and deployed in a wide range of industries and applications.

Some of the most common types and uses of professional service robots include: Agriculture Robots, Construction Robots, Customer Service Robots, Defense Robots, Demolition Robots, Exoskeleton Robots, Field Robots, Humanoid Robots, Industrial Cleaning Robots, Inspection Robots, Logistics Robots, Medical Robots and so on.

Figure 1 Pepper [3]

Nestlé has used a humanoid robot, called Pepper, in numerous Japanese department stores to sell coffee makers. Pepper understands about 80% of the conversations and uses the information it learns to help customers.[3] Pepper is the world's first social humanoid robot able to recognize faces and basic human emotions. Pepper was optimized for human interaction and is able to engage with people through conversation and his touch screen. Pepper is available today for businesses and schools. Over 2,000 companies around the world have adopted Pepper as an assistant to welcome, inform and guide visitors in an innovative way.

2. Prospect of Service Robots

Service robots is a popular trend in global filed. In my expectation, service robots will be loyal and helpful friend in our daily life. They can do lots of dirty, dull, and dangerous work which humans are dislike to do. They can also help us in a retail, hospitality, healthcare, warehouse or fulfillment setting.

As the technology expands, professional service robots will be a common occurrence, interacting with customers or dealing with dangerous tasks. They are getting ready to take over an assortment of responsibilities outside of manufacturing.

Reference

[1] Service Robots [Online] Available: https://ifr.org/service-robots
[2] What are Professional Service Robots [Online] Available: https://www.robotics.org/service-robots/what-are-professional-service-robots
[3] Len Calderone - Contributing Author. (2019). What are Service Robots. [Online] Available: https://www.roboticstomorrow.com/article/2019/02/what-are-service-robots/13161(02/21/2019)