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HOTEL SERVICE ROBOT APPLICATION STATUS AND FUTURE PROSPECTS

Zhao Liang David Yu
Faculty of International Tourism and Management, City University of Macau

Summary: the hotel industry as a service labor -intensive areas, along with robot technology progress and wider application, as a service robot into key industries. However, in specific work situations, hotel robots also face technical, cultural, ethical, legal, and operational issues. Vision should be development of a comprehensive and objective view of the hotel robot 's use, and full of irreplaceable human beings have intelligence and spirituality, to provide high-quality hotel services.
Keywords: hotel staff service robot human-machine collaboration

With the advancement of robot technology and the popularization of applications, the hotel industry, as a service labor- intensive field, has become a key industry for service robots to enter. Hotel service robot hand to add highlights for the hotel, guests bring fresh experience, on the other hand changes the way of communication with hotel guests, changing the in-house work mode, but also inevitably some problems. This article of the robot application carried out and analyzed the hotel robot application of the status quo and put forward relevant suggestions.

1. Literature analysis

(1) Review of Robot Application

In 1920, the Czechoslovak writer Karel Chapeck coined the word "robot" based on Robota and Robotnik. 1939 years, the US Westinghouse Electric Company in New York Expo showcased domestic robot Elektro, by a cable control, you can walk, say 77 words, but really have not been able to do chores. In 1942, American science fiction master Asimov proposed the " three rules of robots", which became the default research and development principle. In 1954, George De Wall created the world's first programmable robot with versatility and flexibility. In 1959, Dvor and Joseph Ingleberger jointly produced the first industrial robot, which was a relatively simple programmable robot and was called the first generation of simple individual robots. 20 century 60 mid-decade, the United States a number of colleges

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and universities have set up a laboratory robot, the rise of the second generation with a sensor, a feeling of ability of the robot wave. 1968 Nian, Stanford Research Institute developed a with a vision sensor that can discover and crawl building blocks according to human instruction of the third generation of intelligent robots. At present, robots have been widely used in the field of production and life, as shown in Table 1.

Table 1: List of application fields of robots

field	industry	Robot type	Features
agriculture	crop farming	Nursery robot, harvesting robot, etc.	It has the functions of "feeling" and "judgment", and has the characteristics of procedural, adaptive, and universal.
	Lin Wood	Cone collection robot, cutting root robot	Efficiently collect pine seeds to improve production efficiency during the short period of tree cones maturity; protect forest ecology, regeneration and sustainable development.
industry	Foundry industry	Die casting robot, assembly robot	Fast speed, high productivity, high precision, high efficiency, flexible production, and good economic benefits. However, because there is no standardized product line, preparation is complicated and expensive, and it is difficult for small manufacturers to bear.
	Assembly industry	Assembly line robot	Vision system and force control software are used to continuously push the parts gently with appropriate force to slide them into position with a small contact force to keep the workpiece from being damaged.
	Textile industry	Warping robot, warping robot	Reduce labor intensity and improve production efficiency. From the beginning of warping, the coordination and connection of robots need to be enhanced through sizing, warping, weaving, and falling.
	military	Unmanned ground vehicles, unmanned submersibles	The advantages of low logistics support dependency and strong continuous combat capability effectively improve the flexibility, effectiveness and sustainability of combat operations.

	Aerospace	Space station core cabin robotic arm, lunar rover	The space environment has strong adaptability, long life and high reliability, strong multi-tasking adaptability, more complicated working conditions, and difficult ground verification.
service industry	Logistics	Palletizing robot, loading robot, storage robot	High precision, good flexibility and high efficiency avoid the problems of large labor, many working hours, and inability to guarantee packaging quality caused by the use of manual packaging.
	Medical industry	Surgical robot	Improve the accuracy, quality, efficiency and stability of the operation, achieve minimal injury to the operation, improve safety, shorten time and reduce costs.
	Pension industry	Companion robot, nursing robot	Non-emotional, on-call, but lacking emotion, no temperature, facing human-machine safety issues; human-machine interface design experience issues.

The robot application field covers the three major industrial sectors of agriculture, industry, and service. From the first generation of industrial robots, the second generation of robots with " feel " to the third generation of intelligent robots, robots are increasingly integrated with life.

(2) Status of hotel service robots

2015 Nian 7 months, Nagasaki, Japan Henn-na robots hotel official opening welcome, opening a new chapter in the service robot industry. Unlike traditional hotels, hotel services in robot hotels are basically completed by "humanoid robot" service teams. 2017 years, the cloud motion technology's service robots " Run " has more than 300 as the home of the hotel and the institutions ' hotel robot " work, a total service Chaoguo 19 million people in this trend, many hotels a lot of the introduction of service robots work they gradually become closer to the employees and customers of partner, stay in convenient , reassuring experience, create a happy living environment and many other aspects play a role, the specific application areas, play a role and job content , as shown in table 2 shown.

Table 2: Application fields, roles and work contents of hotel robots

Application area	Roles	For example
hotel lobby	Reception robot	Say hello to guests, answer simple inquiries from guests
	Autonomous dwelling robot	Proficient in multiple languages to help guests check in smoothly
	Robot	Baggage handling, handling and care
Guest room	Leading Robot	Lead guests to the room
	Robots in the room	Communicate with guests, play songs, tell stories, read news, wake up reminders, etc.; create birthday surprises, etc.
account Serive	Leading the robot	Conference reception, and guide guests to where they need to be; voice function can introduce and promote the conference
	Delivery robot	Delivery of microphones (when speaking off stage), delivery of trophy prizes (when awarding)
Public area	Cleaning robot	Cleaning and vacuuming in public areas, scrubbing and polishing, exterior wall cleaning
	Environmental monitoring robot	Real-time monitoring of temperature, humidity, smog, PM2.5, PM10 and other environmental parameters
Business center	Shopping robot	Meet guests and conduct shopping guides
	Translation robot	Realize audio and video communication, ensure smooth human-computer interaction, and realize intelligent and humanized professional services
Food, drink	Welcome robot	He said the basic terms of the welcoming, remind the customer in accordance with Menus numbers point to meal
	Cooking robot	Cooking noodles, simple cooking dishes, etc.
	Teleport robot	Smart meal delivery, recycling tableware
Camp pins	Marketing robot	Interactive answering, with double-sided large-size high-definition advertising screens, comprehensive presentation of videos and advertisements
Security protection	Security inspection robot	Autonomous perception, autonomous walking, interactive communication, engaging in basic, repetitive, and dangerous work
	Monitoring robot	Equipped with four HD video surveillance cameras to achieve 360- degree mobile video surveillance

From the table you can see the hotel service robots can be described as a full -faceted enter into the work of various departments to the hotel , the hotel staff in many ways with the service to help the robot , customers stay Hotels can personally intuitively feel the hotel robot service.

2. The use of hotel service robots

Although the hotel service robots become increasingly intelligent technology, but more to do is engaged in goods delivery, simple guidelines routine work and so on. The hotel is not a factory assembly line work, in the face of have their own ideas of customers, faced with the specific situation of various of things, many of them unexpected events and emergency incidents. There are inevitably some problems in the use of hotel service robots. (1) Hardware problems. The hardware problem is discussed from two aspects of hotel and service robot. First, in the hotel, because the robot requires interaction with the environment when working, for example, the robot that transports items needs to install corresponding modules in the elevator due to the need to go up and down the stairs. Therefore, hotel buildings and facilities need to be retrofitted simultaneously when applying robots. The second is the hotel robot itself. Because in the early stages of industrial development, product research and development platform or in the prototype stage, not yet formed a fully functional service robots series products; and because of the lack of basic auxiliary facilities for display or promotion has been constrained.

(2) Software problems. Hotel service robots are programmed set of thinking, only comparable in terms of emotional thinking 2-3 children years of age, adults have not reach a level of thinking; but an important dimension of hotel work is emotional communication, although the service robot technology in the visual and aural aspects of the constantly updated, but is only able to complete the welcome, service, billing and other procedural acts, but also during a customer self-involved. At present, robots are mainly engaged in some physical work, which cannot provide personalized and 'temperature' usage scenarios.

(3) Cultural issues. When hotel employees work with robots, employees have concerns about the extent to which robots crowd out their job opportunities. After all, there is

a phenomenon of "machine substitution" in many fields: machines are competent for many tasks that humans do, and in some respects they even exceed human tasks, because machine learning and performing tasks are far faster than humans can learn. This will inevitably cause employees to panic and worry, and treat robots as competitors, and hinder their corresponding functions.

(4) Operation problems. The hotel robot motion accuracy issues , operational stability issues and other issues; the hotel each service robots interoperability between, the collaboration of the problem; technology enterprise maintenance, maintenance , upgrades and other issues ; hotel services machine is man procurement costs, the use of service The cost of retrofitting the robot's front facilities and equipment . These have become the problems and resistances that hotels face when using robots.

3.use of hotel service robot future

In the face of the above problems, hotels have different attitudes towards robot applications. However, as in the outside the Ministry of Environment of significant changes, the most obvious is the hotel staff, and consumers are becoming younger, younger hotel staff will bring challenges to managers on labor management. First of all, services are increasingly difficult to recruit and more difficult to retain, manage, more and more difficult to guarantee service quality, labor costs higher and higher; secondly, younger consumer segments are more willing to experience the convenient, efficient and privacy of Services, unwilling to deal with or be disturbed by others. In addition, in the face of public emergencies, such as the new type of coronavirus pneumonia that broke out during the Spring Festival in 2020, in order to minimize human-to-human contact, service robots can take advantage of their unique advantages. Therefore, we should look forward to the future of hotel robots with a positive attitude.

Because robots replace a large number of repetitive tasks, labor costs are saved, while employees are freed from complex and repetitive tasks, and they can engage in more valuable labor. Therefore, on the whole, the introduction of robots can greatly increase the hotel's operating profit, and the long-term economic benefits have increased significantly. As robot software and hardware technology matures, the presence of service robots will surely lead the

hotel industry to a new spring. Because the service is also a combination of various links, data is collected and analyzed through technical means to optimize the operating process, and then provide better services to guests. In the future, hotel robots can play a role in the following areas, as shown in Table 3.

Table 3: Application of future hotel robots

Application category	feature
Personal service	All mechanical contractor heavy complex work, hotel staff have more energy services to customers, the personalized service to achieve the ultimate, when faced with the different needs of different types of guests, selective arrangements robot and staff to deal with. In the room, it can be applied to smart home control such as air conditioning, lighting, curtains and TV, and can also accompany guests for entertainment and chat.
Intelligent simulation	The development of artificial intelligence and Internet technology will provide robots with a powerful " back brain " and improve their intelligence level. With the development of materials science, the so-called " soft robot " made of artificial muscles will revolutionize the appearance of robots.
Precision service	The robot is actually a computer, so it is easier to master the languages of countries than human employees, and it can process data anytime, anywhere, which will enhance the guest's experience. From the perspective of user experience and convenience, it satisfies the needs of users. Impress guests with details, move guests in small places, and enhance brand reputation.
Human-machine collaboration	The hotel's image and consumer loyalty will be improved in an all-round way, and the privacy of guests' consumption will be better protected; the system of the reservation center can perform speech recognition, semantic analysis and process guest reservations. Robots with artificial intelligence can properly handle guest complaints and take appropriate comforting measures, or they can completely replace people for revenue management and pricing decisions.

With the improvement of technology, the function, performance and reliability of robots are constantly enhanced, with higher flexibility and intelligence, capable of completing complex tasks and delicate tasks. The foreseeable future hotel service robots and employees within a certain range of the work area , cooperation to achieve the mission objectives carried out, because the robot can engage in high accuracy, high repeatability work, employee time to liberate the potential to be released, may Provide more energy to provide quality services.

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