The Rise of Robotics in Hospitality

Increased functionality and declining costs raise the appeal for service-oriented robots

Some may think the title of this article is an oxymoron. How could robots replace the warmth and personal attention from well-trained employees? And why would hospitality businesses even contemplate pursuing this course of action? Because robots have the capability of performing basic, repetitive tasks unsupervised 24 hours per day in a world with an inadequate workforce. A 2015 World Travel & Tourism Report predicts a decade-long global shortage of “the right people, in the right place, with the right skills” to meet the growth of the global travel and tourism industry, which roughly employs 266 million workers. Perhaps robots could be part of the solution in filling the workforce gap.

Robots have come a long way since the first digitally operated and programmable robot, invented by George Devol in 1954, was installed in 1961 in an auto plant in Trenton, N.J. to lift hot pieces of metal from a die casting machine and stack them. Robots can now take inputs from on-board sensors (e.g., camera, sound, proximity, biometric, contact, light, temperature, navigation, etc.) and send outputs to the their effectors (e.g., wheels, speech, legs, arms, fingers, propellers, etc.), enabling them to perform behaviors or tasks with a high degree of autonomy. They can move and work for an extended period without human intervention and assistance. They can also gain information about the environment,
interact with people and systems, manipulate objects and tools, and locate and connect to charging stations.

One way of characterizing robot design is by appearance: human-oriented or product-oriented. A human-oriented robot resembles a human’s appearance or behavior, whereas a product-oriented robot appearance maximizes the robot’s dedicated functions (e.g., Roomba vacuum cleaner). Several studies have shown that the human-oriented robot is more effective in social interactions with customers. However, a 2014 study conducted by Korean university researchers found that product-oriented robots were accepted more than the human-oriented robots. Customers may initially perceive robots as an impersonal technocratic intrusion, much like they did when wireless handhelds were first introduced in restaurants during the ’70s and ’80s. The public did not accept them. At some restaurants, servers were instructed to step away because of customer complaints.

Robots in the Field

Huis Ten Bosch, a theme park in Japan, will open a hotel in 2017 employing three human-oriented receptionist robots, called actroids, that will have the appearance and mannerisms (e.g., blinking) of a young Japanese woman. They will be multilingual with the ability to make eye contact and respond to body language and tone as they engage in intelligent conversations with customers. The hotel will also use other human-oriented robots for other tasks, such as cleaning rooms and carrying luggage.

Two product-oriented, headless industrial robots, originally developed for manufacturing cars, are now used as bartenders at the Bionic Bar on Royal Caribbean’s Quantum of the Seas ship. Together, they can make two drinks per minute, delivered in plastic cups via four conveyor belts, but cannot yet handle garnishes. Passengers input drink orders via smart tablets. The robot arm movements, which are based on the gestures of Roberto Bolle, principal dancer with the American Ballet Theater, periodically go into dance mode when not making drinks.

At Starwood’s Aloft hotel in Cupertino, Calif., a product-oriented robot resembling R2-D2 delivers items to rooms (e.g., snacks), aids the check-in process during rush periods, and moves towels and linens from the laundry room to guest-rooms. The robot, called Botlr, uses navigation technology to find its way throughout the property and cameras to avoid people and other obstacles. The manufacturer of Botlr, Savioke, will offer it as a service and charge a monthly fee that includes maintenance of the devices.

In most industries, robots are being recruited for applications that have generally been performed by humans because of their increased functionality and the declining cost of making and supporting them. A 2015 study by the Boston Consulting Group predicts that over the next decade robots will become more prominent in the U.S. labor market as they improve productivity and cut costs. The Asian hospitality industry is already taking advantage of this trend. Thousands of noodle-making robots have been purchased by restaurants in China. A number of restaurants in Singapore use drones, pilotless flying robots, to ferry food from the kitchen to serving stations. Robot servers, costing under $10,000, can be found waiting tables at restaurants in China, Japan, South Korea and Thailand. A restaurant located in Ninbo, a city in China’s northeastern Zhejiang province, is staffed with two robot servers that can take orders, serve food, and speak to customers with a 40-phrase Mandarin Chinese vocabulary (e.g., “enjoy your meal,” “I’m blocked, please give way to me, thank you”). They travel through the restaurant using an optical sensing system and can work for eight hours at a time. Their expected life span is five years.

The hospitality and travel industry may eventually find the deployment of robots a competitive necessity. In the increasingly competitive healthcare environment, hundreds of hospitals are using robots to deliver linens and medications to patients’ rooms. Thoughtfully designed robot systems, however, will be required for service environments where customers may not even know what robots are and what they are trying to do, says Chris Jones, director of strategic development at iRobot.

Robot Challenges

Challenging problems in human-robot interaction (HRI) exist, both technically and socially. The goal of HRI research is to define models of humans’ expectations regarding robot interaction to guide robot design and algorithmic development that would allow more natural and effective interaction between humans and robots. Socially interactive human-oriented robots, for example, must be proficient in areas such as perceiving and interpreting human activity and behavior, regulating social interactions using dialogue and action at human interaction rates, and providing informationally and emotionally responsive feedback.

It is clear that robots are about to do much more than pickup dust and dirt particles. Hospitality businesses around the world are beginning to dip their toes in new robotic technologies, which might not make sense for those positions that deliver highly personalized services.

Many believe that affordable robots will soon be able tackle an array of tasks with greater degrees of autonomy and intelligence. This trend is obvious to Google who bought eight robotics companies in 2013. While there have been significant advances in robotic technologies, there is still much work ahead. Experts agree that we have a long way to go before robots are omnipresent in service establishments. But I can imagine the possibilities, such as robotic drones taking orders and delivering food and drinks beachside or roving security robots taking lost guests to their rooms, detecting and reporting intruders, and saving lives.