



Hospitality Robots At Your Service

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MOBILE AND HUMANOID ROBOTS INTERACT WITH CUSTOMERS ACROSS THE HOSPITALITY SPACE

Improvements in mobility, autonomy and software drive growth in robots that can provide better service for customers and guests in the hospitality space

By Ed O'Brien

Across the business landscape, robots have entered many different industries, and the service market is no difference. With several applications in the hospitality, restaurant, and healthcare markets, new types of service robots are making life easier for customers and employees.

For example, mobile robots can now make deliveries in a hotel, move materials in a hospital, provide security patrols on large campuses, take inventories or interact with retail customers. They offer expanded capabilities that can largely remove humans from having to perform repetitive, tedious, and often unwanted tasks.

Companies designing and manufacturing such robots are offering unique approaches to customer service, providing systems to help fill in areas where labor shortages are prevalent, and creating increased revenues by offering new delivery channels, literally and figuratively.

However, businesses looking to use these new robots need to be mindful of reviewing the underlying demand to ensure that such investments make sense in the long run.

In this report, we will review the different types of robots aimed at providing hospitality services, their various missions, and expectations for growth in the near-to-immediate future. In addition, we will outline some innovative robots in this area, and observations about lessons learned in some of these markets.

THE SERVICE ROBOT MARKET

With advances in the development of automation and hospitality robots expanding at such a rapid rate, newer variants are often expected to offer some form of autonomous or semi-autonomous intelligent automation. Often this includes automating tasks with the goal of reducing labor needs. However, the focus should be on improving business processes, and not simply on reducing labor. Service robots are expected to continue benefiting from research and development of sensors, artificial intelligence, and augmented and virtual reality for scientific exploration, defense, and industrial applications.

Estimates on the service robotics market vary from different research firm, depending on that company’s categorization of robots within the “service robots” space. For example, Statista estimates the service robotics market to grow from \$8 billion in 2016 to almost \$18 billion by 2021. Research firm Global Market Insights estimated the market would surpass \$22 billion by 2024, with shipments forecast to growth at over 20% annually. However, robot types and companies in this space can include robots aimed at defense, field service, logistics, household robots and even entertainment robots.

In the hospitality and healthcare markets, the numbers are a bit smaller. According to research firm Technavio, the primary drivers for the hospitality and healthcare markets are in the remote controlled and autonomous markets, which are estimated to account for about two-thirds of the mobile robotics market. The firm estimates that the global market growth for mobile robots in hospitality and healthcare to grow from \$445 million in 2016 to \$800 million in 2021, a CAGR of slightly more 12%

EXAMPLES OF SERVICE ROBOTS IN THE HOSPITALITY SPACE

Hotels are the largest use case for robots within the hospitality and customer service space. Savioke makes a mobile

robot called Relay that help deliver items to guests in rooms. Hotels then can rename their robot to fit their own needs. For example, the Aloft chain of international hotels employs a Savioke robot named Botlr that works around the clock, delivering room service to guests while navigating through the hotel’s property with ease.

The Sheraton Los Angeles San Gabriel Hotel is using eight robots from Aethon to provide guest services, including towel delivery.

At Walt Disney World, the Animal Kingdom park is using advanced robots in its Na’vi River Journey attraction. This includes three small, robotic, aliens in a self-contained pod that moves autonomously. The creatures have moods,



Credit: Savioke

The Butlr robot helps hotel guests at the Aloft chain of international hotels.

interact with guests through non-verbal gestures and cues, and are powered by an onboard system.

In the food service area, robots have been seen improving different processes for restaurants. Robots' high levels of efficiency and productivity are making them ideal for companies looking to improve service and operational efficiency, as well as offering entertainment and differentiating themselves as a visionary establishment.

In addition to being used to automate inventory and stock-keeping duties, food robots can be used to help with, or complete, food preparation and other culinary tasks. Robots can be designed for use in confined spaces such as small kitchens. Recent examples of semi- or fully automated restaurants include Spyce, Zuma Pizza, and 6d bytes. Major quick service and fast-food chains are also evaluating options for robotics.

Soft Robotics, which produces robot components for markets in the food and beverage, advanced manufacturing, e-commerce, and retail markets, develops soft-touch technology that's useful when grasping and manipulating objects. Grippers that attach to the end of a robotic arm can manage and handle items that require a delicate touch, such as strawberries and vegetables. Its air-operated, octopus-like "fingers" offer a smooth touch.

The company's vision includes a future that includes flexible automation and adaptable automation that doesn't care what the product or packaging are, as



Credit: Savioke

Savioke's Relay robots can be customized by individual hotel chains looking to brand them.

the robots can still handle manipulate and pack a wide variety of products. The robots are versatile, and can be reprogrammed to handle different products as users' needs change and evolve, and parts can easily be changed and replaced with plug-and-play components. Customers like that the robots allow product assembly to be more accurate and precise, as well as helping to eliminate the ergonomic risks for workers who currently encounter repetitive motion.

Service robots are also being seen increasingly in hospitals and other healthcare facilities, where resources are limited, with deliveries of supplies, lab samples, and medicines must be made quickly and efficiently. The mobile robots are being used here to free up staff to give them more time with patients. In some cases, robots are being used to handle behind-the-scene materials deliveries, such as sheets, laundry, or food service, both to and from hospital rooms.

IN DEPTH WITH SAVIOKE'S HOSPITALITY ROBOTS

Savioke, a Silicon Valley robotics company, provides robots for various industries, including hospitality, healthcare, and logistics firms. The company focuses on such areas as hotels, hospitals, elder care facilities, restaurants, and offices.

The company may be best known for its Relay robot, which is user-friendly and safe around people. Relay gracefully navigates through dynamic environments, avoiding all obstacles and people in its way. It is especially gentle and safe around children who often want to hug him or chase him through the hallways. In fact, the first time Relay installed in a hotel, engineers saw a 3-year-old child's bare feet through the robot's eyes – precisely the safety case Relay was designed for. The company says that it's the combination of award-winning design, proprietary technology, and innovative engineering that makes Relay a reality.

In addition to making organizations more productive, Relay's whimsy, charm, and politeness makes it a beloved servant and teammate rather than just a functional appliance.

Robotics can offer a win-win strategy for many in the hospitality industry. With employee turnover rates in the hospitality industry are far higher than the private sector average, robots can help offer high levels of customer satisfaction – and entertainment – for hospitality organizations and their customers.

Also, these service robots can provide a high return on investment. Within weeks of installation, many robot-enabled hotels see a noticeable uptick in revenue due to increased sales of grab-and-go items, beverages, and incidentals. In fact, one hotel GM recorded nearly \$2,000 per month in incremental sundries sales, because even if a customer doesn't want anything, many will go up to their rooms and order something just to interact with the robot.



Credit: Savioke

*Steve Cousins,
CEO and co-
founder of
Savioke.*

Savioke currently has its Relay robots performing more than 5,000 deliveries per week in about 70 to 80 hotels across the U.S., Europe and Asia, said Steve Cousins, the company's CEO and founder. "We're way beyond pilot programs at this point," Cousins said. "We've got customers who have had the robots for two or three years, and they're renewing."

The company has moved from smaller, boutique hotels and ownership groups into larger properties. For example, during the Consumer Electronics Show in Las Vegas the company deployed two robots, named Elvis and Priscilla, to the Renaissance Hotel, the hotel closest to the Las Vegas Convention Center. "We feel like as we're getting into these larger properties, of course you encounter new technical issues," Cousins said. "There are more robots, more elevator cars, more people, and more alcohol."

The company also recently began deploying robots to a new market – hospitals. With a partnership with hospital logistics firm Swisslog Healthcare, Savioke is in pilot programs with several hospitals to help staff with small

delivery tasks.

“Hospitals are very open and understand what work needs to get done,” Cousins said. “Today you see a nurse walking a 10-minute walk to bring something to the lab because there’s no one else to do that, if you put a robot in that same situation and the nurse gets to stay with the patient – it’s safer for the patient, it’s a better use of the nurse’s time. The nurse is happier, because she’s doing what she was trained for, not walking down the halls.”

While there are other mobile robots in hospitals, most notably Aethon and its TUG robots, Cousins said its Relay robots perform different functions and tasks than a TUG. “If you want to carry 200 lbs. of sheets and towels, you’re better off with a TUG,” said Cousins. “That said, you don’t need TUG to carry a blood sample down the hall to the lab, you wouldn’t use it for that task. We come into a different use case, because [Relay] is small and nimble.” He added that many hospitals are recognizing that different mobile robot systems can be deployed to perform different functions and tasks.

Lauren Schechtman, vice president of marketing and sales at Savioke, said the company is “committed to measurably improve people’s lives by creating and deploying beautifully simple, sophisticated, and friendly service robots that work safely, securely, and reliably in human environments.” The company says it treats all stakeholders, including customers, suppliers, and other partners as a team so all can achieve great things. “We strive to improve workers’ lives by freeing them from mundane, tasks that they would prefer not to do,” Schectman said.

Savioke leverages the power of open source software, namely the Robot Operating System (ROS) that the company’s founders helped to develop at Willow Garage, and is maintained by the Open Source Robotics Foundation and a worldwide community of developers.

In late June 2018, the company raised \$13.4 million in Series B funding, which included Brain Corp as one of its investors. As part of the investment, Savioke will license Brain’s BrainOS for further development of the Relay robots.



PEPPER PROVIDES FRIENDLY, FUN CUSTOMER ASSISTANCE

One of the more familiar examples of robots in the press recently is Pepper, created by SoftBank. Pepper, is a humanoid robot designed to interact with humans in a wide variety of situations. Standing a little over a meter high, and weighing less than 28kg, Pepper rolls around on a wheeled base, has two arms, and has a 10-inch tablet mounted on its chest and multiple audio, visual and tactile sensors. It can work for about 12 hours at a time, thanks to its lithium-ion battery.

The Pepper robot has been designed to act as a companion to humans, so it is able to process information, recognize voices and detect different emotions by analyzing sounds, voice tones and expressions, and learn through repeated interactions with people. Pepper is designed to communicate naturally with people, make jokes, dance and amuse with a variety of entertainment capabilities.

According to the manufacturer, Pepper is pleasant and likable, Pepper is much more than a robot, as it (he) is a humanoid companion created to communicate with people in a natural and intuitive way, through his body movements and his voice.

Pepper loves to interact with people, and wants to learn more about personal tastes, habits and other characteristics. It can recognize faces, speak, listen, and move around autonomously. Users can personalize Pepper by



Pepper can interact with humans in many different scenarios. Here, Pepper greets attendees at the Robotics & AI Summit in Boston.

downloading software applications that can be tailored based on a particular mood or occasion. Pepper can dance, play, learn or chat in another language, as it adapts to its user by gradually memorizes personality traits, user preferences, and adapts to individual tastes and habits.

Since being launched in 2014, Pepper has found itself being used in a variety of jobs and locations, including:

- Greeting travelers at the Pyramid Ale Taproom at the Oakland International Airport
- Interacting with shoppers at two California malls
- Greeting visitors at two Belgian hospitals
- Selling iPhones at SoftBank mobile stores in Tokyo
- Helping mentor ex-cons at a Tokyo halfway house
- Working the concierge desk at the Hilton McLean in Virginia
- Assisting visitors at a variety of Smithsonian museums
- Greeting banking customers at HSBC Bank in New York City



The Sanbot Max robot is the largest service robot offered by China's Qihan Technology Co.

SANBOT'S HOSPITALITY ROBOTS AIM FOR HOTELS, BANKING

China's Qihan Technology Co., through its Sanbot Innovation division, creates and develops three models of the Sanbot line – the Nano, Elf and Max. Its robots integrate robotics, applications and cloud connectivity into a platform to help companies in service industries. For example, Sanbots can greet hotel visitors in a traveler's mother language, helping them feel at home. The Sanbot can help guests queue up, check in or check out, and help them order food or buy tickets to shows.

In a bank setting, Sanbot offers a warm greeting to customers while it helps the bank perform actual work: business and financial products inquiries, and queuing and workflow management. It can instruct customers to fill in application form, use the automatic terminal equipment and direct them to the right window to process their business transactions. Sanbot also offers security guard service for 24/7 for bank and customers' safety. In the near future, Sanbot will help process further transactions if connecting to the bank's system.

The Elf robot can be a virtual companion and greeter in a wide variety of applications. The company says that its Elf robot offers more intelligence, with more solutions, especially for the retail industry. Customers can be greeted by

a Sanbot robot when they arrive at a place of business.

The company offers robotics as a service (RaaS) to allow greater interoperability and utility for users. Sanbot Elf also works with partner applications like IBM Watson to allow greater intelligence and overall value. For example, if a customer is an “acquaintance” (their image is in Sanbot’s memory), the robot will call their name and greet them upon “seeing” them with its 3D camera and facial recognition technology.

EXPECT MORE ROBOTS DOING SERVICE WORK

No matter whether the application is in a hotel or other hospitality setting, restaurant or food services, in logistics, or in a hospital or other healthcare setting, the latest innovations in robotics can – and are – driving great change across industries.

By offering unique and novel robotic solutions, organizations can better serve their customers. They can let robots handle the more mundane tasks, allowing their highly talented professionals and staff to better serve the specific and unique needs and personal preferences of their customers and patients.

The benefits extend beyond efficiencies and ROI, and can include a heightened customer experience that extends far beyond the initial novelty or entertainment factor. These robots are offering expanded capabilities that can largely remove humans from repetitive, tedious, and often unwanted tasks.

The hospitality and healthcare industries in particular will be strong leading indicators for future designs, as they are moving from impersonal taskmasters to human-friendly (and often humanoid) robots that make people feel comfortable – and even amused – when interacting with them. Many will have programs that allow customized interaction and “personalities.” Also, robotics designers and engineers are working hard to tailor robots to meet people’s expectations as to size, shapes, voices, and movements, and even such emotional connections as sympathy and empathy, that are pleasing and non-threatening to them. From there, the sky’s the limit.