



## Robotics in Tourism and Hospitality

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**Received :** 30 March 2025 • **Revised :** 25 April 2025;

**Accepted :** 19 May 2025 • **Published :** 30 December 2025

**Abstract:** The aim is to provide a complete overview of robotic research in tourism and hospitality. The paper updates briefly. The textbook *Robots*, which describes the three types of robots — personal service, industry and professional service — highlights the value of human robots' independence and cooperation, and includes examples from the hospitality and tourism industries. It analyzes 10 published publications between 2017-2022 identified by Scopus, Google Scholar, Web of Science, Research Gate, Academia.edu and IEEE. Only English literature was considered. Increasing opportunities for those who desire to print in the field are available. This paper has identified a number of robotic applications in various aspects of tourism and hospitality. Service providers should consider how robots affect the service scope and whether or not they need to be mended or changed so that robots and staff can better the service information (co-) generated inside it.

**Keywords:** Robotics; Service robots; Artificial intelligence; Human- Robot interaction; Tourism Industry; Hospitality Industry.

### Introduction

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For a long time, tourism and tourists have served as robots. Scharft and Winner produced the first book on the subject in 1993, which featured aircraft-cleaning robot. A lot of study was done by engineers at first, but tourism / tourist researchers have recently entered the field and brought a touch of social science to tourism / hospitality in robotic research<sup>1</sup>. The growing interest in robots in tourism, tourism, hospitality needs a thorough examination of current research and the identification of future research approaches in this field. There are no such meta-analyses in the literature at the moment. As a result, the focus of this review study is on robotic textbooks and their relationships with the tourist, tourism, and tourism industries<sup>2</sup>.

This study investigates the origins of textbooks on robotics and tourism. The worth of the paper comes from its description of review of related literature, exposure

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#### TO CITE THIS ARTICLE

Malreddy Nag Arun (2025). Robotics in Tourism and Hospitality, *Anthropo-Indialogs*, 5: 1-2, pp. 21-31. DOI:10.47509/AI.2025.v05i1-2.02

to the state of art in this field, and identifying of study spaces that could benefit future studies. A thorough analysis of the literature can provide insightful information on robot's design, use, as well as application because machines will be employed in a wide range of industries<sup>3</sup>.

This research has two objectives. The study's main purpose is to provide a thorough overview of robotics research in the tourist and hospitality industries. Secondly, focusing on a literature review, this study will look into research gaps and future study aims<sup>4</sup>. The literature has been thoroughly evaluated in this review article to explore the current status and use of robot facilities in the tourism sector and hospitality sector. In additional, the paper looks at the effect and upcoming use of robot capabilities in the tourism and hospitality industries to evaluate what benefits can be gained. Various study articles, online websites, and news items were used to compile the literature and facts.

### **Objectives of the Study**

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The employment of robots and robotics in the tourism and hospitality industries is discussed in this article. To be precise, in the following phases, the research will concentrate on robotic applications.

1. To analyzing the current scenario, as well as the robot's current and future use in the Tourism and Hospitality industries.
2. To determine the influence of robots and automated operations on job as well as job prospects, clients as well as businesses, and communities.
3. To investigate the future potential of robotic services in Tourism and Hospitality, as well as the benefits and hazards that can be generated from their utilization.

### **Related Work**

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#### ***Obtaining Data***

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The goal was to assemble as much information as possible about English educational research on robotic learning, tourism, and tourism. The data was gathered in April and May of 2022. Clarivate's Web of Science and Elsevier's Scopus, two of the world's largest scientific journals, were used as a key data source. The authors conducted a thorough search in data sets using a combination of title search phrases, ambiguous and important published words:

Search for word: robots, tourism, travelers, leisure, entertainment, hotel, accommodation, restaurant, hostel, bar, tour company, travel agency, airline, aircraft,

port, ship, bus service, buses, railway station, rail, conference, vehicle, car rental, car rental, exhibition, casino, carnival, adventure park, travel agency.

The author reads the heading and content of all published articles that are listed in the search results. If found to be suitable for study, the complete text of the paper was retrieved. Five more books were acquired in this way. A total of 20 related publications were obtained from the six source (Scopus, Academia. edu, Web of Science, Google's Scholar, and Researchgate.net). After removing all duplicates, the final database contained 10 posts <sup>5</sup>.

### *Analyze the Data*

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The following features were identified for each publication in the database: publication type (conference paper, journal article), published year, and complete citation. I read each article in its entirety and shared my work under the following conditions:

- (a) Focus of study - if the paper was given a supply-side view (ie, company view), a demand-side view (ie, customer view), or both views of the topic discussion, which may be more effective maybe [5].
- (b) The tourism / hospitality industry, which includes, restaurants, hotels, bars, museums, airports, and other broad areas, is the subject of the article.
- (c) Survey method, paper survey method - engineering, testing (Field, and Laboratory), survey (Questionnaire, and Interview), customer review content review, surveillance, biometrics (Eye tracking, and Skin response, etc.), Mathematical modeling / practice well, even if the paper was objective / explanatory. The engineering team included all the technologies related to actual design, planning, and robot manufacturing<sup>6</sup>.
- (d) Target countries, the countries for which the data was collected at the time of survey.
- (e) Research areas - Based on character focus/behavior, there are seven broad research areas:
  1. Robot – design, movement, data processing, connection, performance, appearances, independence, etc.
  2. Individual (consumer and worker) - thoughts and ideas, approval of robots, behaviors used, robot interactions, personalized robots, and so on.
  3. Travel agencies: robots' impact on human resources, marketing, and finance, among other things.

4. Robotics development agenda, robot costs, resources spent, cooperation with other companies, and so forth.
5. Service scope - changes in the service scope as a result of robot use, functional adjustments to the services cape / workflow, robot ease of use in tourism / hospitality facilities, and so forth.
6. The external environment - ethical and legal difficulties emerging from the usage of robots, as well as the effect of robots on the labour pool, etc.
7. Robotics for travel, tourism sector, and hotel education, training, and study.

It should be noted that this paper may cover multiple tourism sectors, operating methods, priority countries and / or research environments. Therefore, collection of works according to these assessment methods is inseparable.

This work examines both published and unpublished studies on robots in travel, tourism, and hospitality. The frequency and various tables are used in quantitative analysis. as well as statistics from subsequent tests (chi - square test) [7].

### **Conceptual Framework of the Study**

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Based on the study's objectives, the discussion section was separated into four key pieces. The first phase discussed the use of robots and commercial use. The second phase is types of robots. The third phase of the analysis is to assess the current position and use of robots in all Travel and Tourist Categories. In the final phase, the study anticipates the accidents caused by the development of the Robot.

### ***Use of Robots and Commercial Use***

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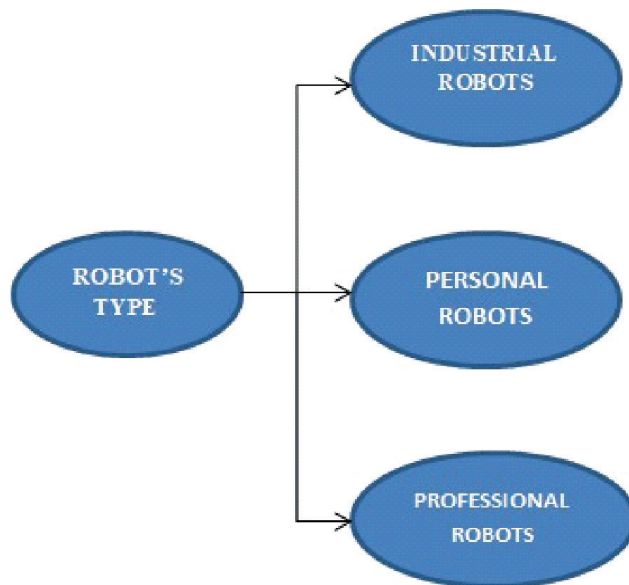
According to the (RIA) Robot Institute of America, the RIA describes robots as well-organized multi-taskers who are intended to move goods, materials, and construction materials in a variety of organized movements to create a range of tasks. The International Federation of Robotics estimates that 13, 50000 industrial robots will be operational globally by 2018 <sup>8</sup>.

The robotics industry has grown to become a major force in the technological world in recent years. Robots are now referred to as "intelligent objects" because they possess the movement, and sensory abilities required to perform their intended functions. Robotic research is changing people's lifestyles and work cultures all over the world. Robots are increasingly being seen in places other than manufacturing plants, such as institutes, resorts, hospitals, hotels, supermarkets, airlines, and our homes <sup>9</sup>. In addition to being automated machines, robots are also marketed as consumer

goods <sup>10</sup>. Surgical techniques, rehabilitation, treatment, physician friendships, and routine activities may alter the development of robots <sup>11</sup>. The agricultural business has vigorously pursued various forms of robotic technology to help increase productivity while reducing costs <sup>12</sup>. At that time, many applications for automated technology were available in the public safety sectors and military. Drones, an unstoppable aircraft, are some of the most prominent <sup>13</sup>.

### *Type of Robots*

Based on their functions, the International Organization for Standardization categorized robots as either industrial or service. This International Standard defines the terminologies used in reference to robots and robotic devices that operate in industrial and service environments. Personal and professional service robots, according to some academics, are the two main types of robots for personal service.



**Figure 1: Type of Robots**

**Industrial Robots:** Industrial robots are utilized often in practice. They can transport things and execute many coordinated activities in industrial contexts. When it comes to dangerous or repetitive duties that could lead to injury, robots are often more cost-effective than humans. Articulated is a word that can be used to describe something that has been articulated.

Personal Robots: Humans employ human robots at home and in other private settings for non-commercial purposes. There are two types of personal robots. One example is cleaning a robot that cuts the lawn and cleans the floor <sup>14</sup>. In order to communicate with humans, fixed robots, including deadly robots, are often associated with non-motorized riding, and, touch screens as well as speech recognition and, biometrics. They may assist or entertain visitors to public places or bring products and services through these various technologies.

Professional Robots: By their name, professional organizations and businesses are using them. According to these figures, professional service robots have a far larger market than personal robots. Defense, industrial, transportation, and medical medical robots are among the professional robots <sup>15</sup>.

### *Current Position and Use of Robots in All Travel and Tourist Categories*

Robots have also made an appearance in the tourist and tourism sector, drawing a lot of client interest and curiosity. This study will concentrate on the current employment of robots in several hotel business areas, particularly service robots. Below are descriptions of the service robots utilized in three primary areas: the hotel, conference and events, and food and beverage.

**Hotel:** The automation of the service with robots is increasingly increasing in the hotel business, from smart chat bots that help customer service to manage robotic assistants that improve customer sensitivity. The various functions of the hotel are influenced by the changing services and technology of the robot. For example, hotel owners use self-help kiosks in advance to reduce waiting times and improve quality. The Henna-Na Hotel in Japan is a great illustration of how hospitality robots may be used in the hotel sector on the front lines. The Henan Hotel, which debuted in 2015, is thought to be the first robotic hotel in the world. <sup>16</sup>. Another recipient of service robot, Connie, is employed at the Hilton Hotel.

**Meeting, events, and conference:** As technology progresses, developers are looking into hiring robots and other automated technologies to perform activities that require human touch. For example, in the field of conferences and conferences, AI and service robots improve service and make meeting demonstrations easier. Currently, robots in the event business and conventions are used for entertainment purposes <sup>17</sup>. Drones, on the other hand, have emerged as pioneers in terms of innovative customer involvement and experience. By collecting live aerial images and films from a range of views, event planners and local specialists have been able to offer their event participants new advertising content or happy recollections of the event. Guests were greeted and

engaged in a brief chat by extraordinary hospitality robots. During the South and Southwest Interactive conference, for instance, the interactive 3d presenter was put to the test. Drone servers may have delivered food and dishes to the gathering in addition to robotic bartenders. Those who are unable to attend meetings can also link to Manta robots or Any bots and “ride” around the room, sharing with others.

**Beverage & Food Services:** Robots are also used in the beverage, and food industry, specifically in the hotel, cafeteria, and food preparation and food preparation sectors<sup>18</sup>. Especially cafes and restaurants, robots take food orders. For example, a humane robot called Pepper operates Pizza Hut in Japan, receiving voice orders from customers<sup>19</sup>. As a result of speech recognition and practical ingenuity, Pepper is able to chat clearly with consumers. Pizza Hut and MasterCard also classified Pepper according to payment method<sup>19</sup>. This means that Pepper receives orders from customers and prepares those orders, saving your time for both the cafe and the customers.

### *Accidents Caused by the Development of the Robot*

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After speculating on how robotic technology might be employed in the future, it's critical to assess the hazards and factors that have contributed to its development. Robotics for hire will be increasingly prominent in the business world. There's no denying that this has improved safety and health. However, robots come with hazards and issues that could negatively affect the workplace. Robots have a slew of other advantages in addition to enhancing worker safety. As a result, robots can be employed to place personnel in potentially hazardous circumstances. In warehouses, for example, robots help to lessen the risk of workers falling. Furthermore, robotic machines can perform at levels well beyond what humans can. As a result, the number of people who need to employ aerial lift technology may be minimized, if not removed entirely. Manufacturing and construction, as well as transportation, are two more areas that have profited from robots. The use of an exoskeleton robot, for example, could lessen an employee's need to execute repetitive movements, which can lead to muscle and joint problems<sup>20</sup>.

Some research is looking into how robotic technology could be used to run a hotel. It's possible that this is related to the hotel market's strategic location. The success of robots solutions at the advanced or professional level is also determined by the degree of service, market expansion, and marketing campaign performance. In recent decades, there has been an increase in the number of deaths and injuries caused by robot interaction. Because of their accessibility and regularity, several tourists and tourism businesses are concerned about the risks and security of deploying robots. If the robots have some mistakes, they may be “burned.”

## Discussion

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### *Implications for Theory*

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The literature evaluations reported in this work reveal that tourism and hospitality-related publications are growing in number, as well as variety of themes, types of publications, and research techniques. However, the analysis found that there are some significant gaps in the literature relating to the tourist sector and research areas that have yet to be addressed. In the hospitality and tourism industries, robotics research is critical. This study examines the design of individual robots and also the topic of machine (robot) to human and machine to machine interactions. However, as robotics advances in the hospitality industries and tourism industries embrace robots more frequently, it is vital to examine the increasingly complicated intelligent environment of robots that interact with other robots and people at the same time. Robots grow more autonomous while also becoming more connected as they become part of the Internet of Things (IoT).

Additionally, while more social science research on the topic is being written, there is no evidence of significant and broad collaborative research across sectors. While the dominance of Asian research is predictable, it does demonstrate that our current understanding of robots in tourism industry and hospitality industry is shaped by views about various robotic cultures, service, tourism, and tourism. This needs a diversity of cultural research and even a greater awareness of the impact of culture on robots, teamwork, and program construction and evaluation when generating and initiating research.

### *Consequences in Practice*

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The findings can be used to produce a number of useful outcomes. To begin with, the research reviewed in this paper indicates a variety of robotic applications in the tourism and hospitality industries. As a result, in addition to transparent room service delivery and concierge roles, this analysis may assist interested physicians in considering novel service techniques for robots. Second, while the number of publications on tourism sectors and hospitality sectors has increased significantly in recent years, there are organizations, such as production, retraining, careers, and organization redesign and redesign. This is a study that will necessitate the active participation of businesses and employees, as well as their financial still a lack of research on corporate and employee habits, behaviour, responses, and impact on backing and readiness to reveal company

strategies, analyses, performance metrics, and other indications. In addition, studies at the small scale (company), industry, and high level are necessary to quantify and investigate the economic impact of robotic use (economic area). The adoption of robots in businesses and the influence of robot distribution in industry sectors (like with any technology) is largely dependent on demonstrating their economic performance and good impact on production. Robust economic research is needed to evaluate the total manufacturing effect of robots, identifying possible dangers and productivity constraints, and help organizations justify increased spending. Third, Service scope as a core interaction area highlights the need for tourism industry and hospitality industry providers to critically think about how robots actually impact them, and that they should be redesigned or reconsidered to make sure that robots and staff can enhance the (cooperative) information generated internally. In addition, the interaction between tourism organizations and hospitality organizations, educational institutes, and robotic manufacturers is highlighted. While literature evaluations indicate tourism as a significant source of robotics application, there is little evidence that tourism organizations have a significant impact on robotic research and design, use robotic-related training, or collaborate closely with robotic manufacturers to build robots. This could result in a “not established here” issue, delaying the discovery, or serious difficulty assembling robots that were developed with technology goals rather than tourism and hospitality theory and the real demands of the company/buyer/employee in mind. The absence of literature on the outside environment is also surprising, implying significant disconnects between academics, industry representatives, and policymakers in the field. The emergence of robonomics and its consequences for tourism and hospitality has highlighted the urgent need for advancement in this sector <sup>4</sup>.

## **Conclusion and Future Scope**

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This paper adds to the growth of information on volume analysis and quality of robotic research publications in tourism, and hospitality. From 2017 to 2022, A total of 10 relevant research books were reviewed from Scopus, Academia.edu,

Web of Science, Researchgate.net, and, Google Scholar. Analysis revealed that article titles fall into broad research areas. The research focuses on robots in restaurants, hotels, airports, and bars, but the overall findings reveal that the number of articles is increasing and that other aspects of tourism and hospitality are being studied.

Additionally, while more sociology research is being written on the topic, there is no indication of significant and broad collaborative study across fields. Secondly,

while the domination of Asian studies is anticipated, it demonstrates how existing perceptions of robots in tourism industry and hospitality industry are impacted by views about certain robotic cultures, service, and tourism. This already demands a range of cultural research as well as a better understand the impact of environment on robotics, participation with service building, and testing when designing and launching research.

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