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Influence of Artificial Intelligence and automation in hotel industry

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Abstract

As computer technology has advanced, artificial intelligence has become more reliable, enhancing its standing within the business world. Indeed, hospitality companies increasingly use AI to carry out customer service tasks, which is especially important within hotels and resorts. In this article, you get a closer look at which way artificial intelligence is revolutionizing the hospitality industry. This study aims to identify the factors that Influence AI in Hotel Industry. Secondly, this study is focused on knowing the upcoming automation in luxury hotels. Additionally, a significant factor to keep in mind is that the effectiveness of AI depends on the quality and consistency of the data it utilizes. Therefore, it is important for hotels to adopt systems that consistently gather accurate data and ensure that the property management system serves as the definitive source for data-informed decisions. Certain AI applications, such as generative AI and revenue management systems powered by AI, are already commonly used and incorporated into routine operations.

Keywords: Artificial Intelligence; Automation; Hotels; Pricing; Food Production

1. Introduction

The integration of automation into food production has been widely explored in academic and industrial research, focusing on its transformative impact on efficiency, sustainability, and quality. This section synthesizes existing studies to provide a comprehensive understanding of the advancements, challenges, and future directions in the field. on. In a world that continually demands more from its food systems, automation has emerged as a transformative force in how food is grown, processed, and delivered. From precision farming techniques to smart factories, the integration of technology into food production is revolutionizing traditional practices. This shift is not just about efficiency but also addresses critical challenges such as food security, sustainability, and the need for consistent quality to meet global demand. Automation in food production spans a diverse range of innovations, including robotics, artificial intelligence, and data-driven processes [1]. These advancements allow for higher yields, reduced waste, and enhanced safety standards, reshaping the way we think about agriculture and manufacturing. Whether it's autonomous tractors navigating fields, AI algorithms predicting crop diseases, or robots assembling meals in industrial kitchens, automation offers solutions that were once the realm of science fiction. This book explores the profound impact of automation on food production, examining its role in addressing global challenges, fostering innovation, and creating a future where technology and tradition coexist harmoniously. As we delve into this dynamic field, we'll uncover how these technologies are reshaping the journey from farm to fork, redefining the possibilities of what and how we eat. In order to arrive at the final overview of possible ways to automate the process of performing systematic reviews, several searches were performed. To get an initial idea about which steps could possibly benefit from automation, a basic internet search was conducted using the Google search engine. The employed search query was very general. "Automating steps of systematic reviews". Since the goal of this initial search was to gain basic insights, only the first

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three pages of results were considered. Among them, four review papers were found to be related to the questions considered. Among them, four review papers were found to be related to the question [2].

2. Review of Literature

AI encompasses numerous branches, including Robotics, Big Data, Expert Systems, Machine Learning, Neural Networks, Speech Recognition, Cognitive Computing, and more. By integrating these technologies, artificial intelligence replicates human behavior. Presently, various professionals are using AI for research and exploration within the industry. In this modern age, successful hotels that meet guest expectations find AI to be a valuable asset through diverse strategies. Several key aspects of AI contribute to the intelligence of hotels. These include concierge robots, digital assistants, voice-activated services, travel experience enhancers, and automated data processing. AI technology not only reduces the need for human involvement with its voice assistants but also enhances the quality of guest services in hotels [3]. With advancements in technology, AI has become a consistent and appealing option in the business sector. The hotel industry, in particular, is increasingly implementing AI to enhance customer service, a crucial aspect for hotels. This article provides insight into how AI is transforming the hospitality sector. It involves machines or computers exhibiting intelligent behaviors. Though artificial intelligence has been around since the 1950s, it is only recently regarded as reliable enough for significant business functions. Currently, AI is utilized in various ways within this service industry, such as collecting customer data, improving technology for personalized services, advanced problem-solving, and aiding in sales processes and direct messaging. Artificial intelligence (AI) pertains to the simulation of human intelligence in machines, which incorporate mechanical and electronic components and are programmed with coding languages to mimic human actions. In today's world, artificial intelligence addresses highly complex challenges [4].

Artificial intelligence is becoming increasingly significant in the hospitality sector, primarily because it can perform traditional human tasks at any time. This offers hotel owners the opportunity to save a considerable amount of money, minimize human error, and enhance service quality. With AI's assistance, the hospitality industry can indeed elevate its offerings, providing more opportunities for correcting mistakes. A pivotal aspect of AI in this field is its ability to respond quickly to guests. Some hotels implement artificial intelligence for in-person customer service [5]. Providing face-to-face services is a fundamental element in the hospitality sector, and when paired with AI, it becomes much easier through the use of an AI robot named 'Connie', utilized by the Hilton brand. This robot offers information to guests, and its unique feature is its ability to interpret human speech and recommend appropriate responses to inquiries. Chatbots and messaging also play a significant role; for instance, AI chatbots on social media platforms enable customers to pose questions and receive nearly instant answers around the clock. This is particularly beneficial for hotels, as it is often unfeasible for humans to provide such immediate responses. In terms of data analysis, we can refer to Métis podium, which illustrates how technology collects and utilizes data. After analyzing the data, it presents performance insights aimed at improvement [6]. Data analysis clearly shows how information is gathered and employed by technology, leading to enhanced performance outcomes.

Blockchain serves as an ever-expanding ledger that permanently records all transactions. In this system, all transactions occur in a sequential manner that is secure and immutable. This technology enables the secure transfer of assets, money, and contracts without the need for a third-party intermediary. It operates as a software protocol based on Internet technology.

Blockchain and Artificial Intelligence are two key technologies that enhance operations in the hotel industry. Blockchain enhances the security of financial transactions within this sector. The primary reason behind this is Artificial Intelligence. Various AI algorithms are integrated into Blockchain, allowing for greater autonomy in operations. This technology interconnects numerous physical devices and vehicles using wired networks, Wi-Fi, and Bluetooth technology. These interconnected devices are known as smart devices. All these smart devices come equipped with sensors, actuators, electronic components, network connectivity, and software programming that enable them to gather and share data with each other [7].

Hyper-Personalized Hotel Rooms illustrate the implementation of IoT in the hospitality sector. Through this concept, guests can manage the air conditioning, heating, and ventilation systems from a single location automatically. Location-Based Information is another example of IoT already utilized in the hospitality industry. This technology incorporates GPS, beacon technology, and Bluetooth capabilities, facilitating the collection and delivery of location-specific information to the front desk of an establishment. This system can provide details about available menu items at a restaurant upon request, thus aiding in optimizing staffing needs [8].

Electronic Key Cards: This IoT system facilitates the use of internet communication technology to create electronic keys for guests. With this technology, the electronic key is configured on the guest's smartphone, allowing them to unlock the

door with the same device. This system is connected to the check-in desk. When the guest checks out of the hotel, the electronic key is automatically deactivated on their phone [9].

Voice-Controlled Customer Service: Some establishments in the hospitality sector have already implemented this system to automate various operations, enhance the guest experience, and reduce maintenance and energy expenses. Robotics is a branch of Artificial Intelligence that consists of electronic and mechanical components, functioning through logic derived from computer science. It integrates elements from computer science, mechanical engineering, electronics, nanotechnology, and bioengineering. In modern times, robots are also being utilized in the hotel industry. There are several benefits to employing robots in this sector, as they can operate 24/7 and are more efficient than humans. Additionally, they do not require monthly salaries, needing only periodic maintenance [10]. They never refuse any task. While the rise of automation in the hotel sector may lead to job losses for some individuals, the implementation of specific automation systems requires significant initial investment.

The initial robot hotel was set up in Nagasaki, with robots taking on roles such as information assistants, receptionists, and managing guest check-in processes. Subsequently, modifications were implemented, allowing robots to perform the responsibilities of a concierge (bellboy) and interact with guests. Numerous hotel properties have since integrated robots into their services. Some of the robots can manage guests' luggage and assist with baggage using a pin number. Eventually, robots became very prominent in the front office and started providing room service as well. Currently, some robots can summon elevators for guests and deliver various supplies to guest rooms, which enhances the overall appeal. Nowadays, robots efficiently deliver any requested service, such as towels by the poolside; these robots are referred to as robotic butlers. They also guarantee delivery within a 15-minute timeframe, which is a unique feature of these robots.

A sensor is a device designed to detect and respond to specific inputs from the surrounding environment. These inputs may include light, heat, motion, moisture, pressure, or numerous other environmental factors. Sensors generate signals that can be translated into a format understandable by humans. Below are several examples of the key sensors utilized in the hotel industry.

3. Artificial Intelligence in Hotel

The latest generation of AI-powered chatbots, integrated with booking engines, can respond to common visitor queries 24/7 in multiple languages. These chatbots provide specific information about room rates and availability, and they even allow guests to complete bookings directly in the chat window, capturing personal and payment data. To effectively integrate AI, it's essential to begin with a specific problem you wish to address in your business, whether that involves analyzing customer data, tailoring communications with guests, or enhancing automation. It is vital to collaborate with technology providers who can showcase real-world applications and have carefully integrated AI into their systems in response to these genuine challenges. Conversely, other technologies, including predictive maintenance and facial recognition, are still in the early adoption phase, but an increasing number of hospitality firms are beginning to implement them. The hotel sector is significantly influenced by artificial intelligence (AI), which facilitates the delivery of tailored guest experiences, enhances operational efficiency, refines revenue management through fluctuating pricing, automates check-in and check-out processes, analyzes guest data to anticipate needs, and boosts overall effectiveness via targeted marketing strategies and predictive maintenance, ultimately leading to increased customer satisfaction and loyalty. By personalizing guest interactions, AI examines guest data to customize suggestions, foresee preferences, and deliver a smooth, personalized stay. Numerous hotels employ AI-powered virtual concierges and chatbots to improve guest engagement. In terms of streamlining operations, AI automates routine tasks such as check-ins, housekeeping planning, and room service requests, allowing staff to concentrate on services that prioritize guests. To optimize pricing strategies, AI adjusts room rates in real-time according to demand, market trends, and competitor pricing, maximizing revenue opportunities. For enhancing marketing initiatives, AI-driven analytics generate focused advertising and tailored marketing strategies that encourage direct bookings. Regarding revenue management, AI evaluates extensive datasets to inform pricing and promotional tactics, ensuring that hotels enhance their profitability. Finally, AI streamlines the analysis of vast amounts of data, providing insightful information about guest preferences and behaviors to enhance strategic decision-making.

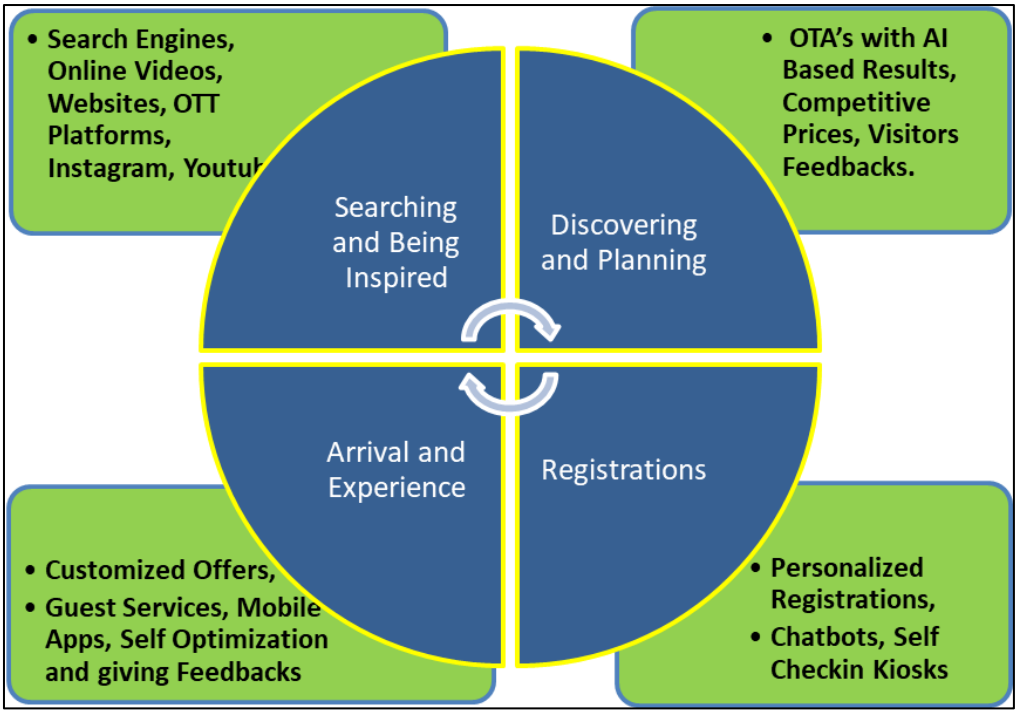

Figure 1 AI in Hotel Industry

AI makes a difference you execute energetic estimating techniques that alter room rates based on real-time request and advertise conditions. This guarantees you get the foremost income per accessible room by offering at the leading costs. AI-powered promoting instruments moreover offer assistance make customized advertisements, driving to more coordinated bookings, and expanding general income. Drive operational effectiveness [11]. By mechanizing dreary and time-consuming errands, AI permits your staff to center on more key and guest-centric exercises. AI-powered frameworks can oversee stock, handle bookings, and indeed foresee support needs, guaranteeing smooth and proficient operations. This not as it were diminishes costs but too makes strides visitor involvement by giving faster and more exact administrations. Improve visitor involvement. AI empowers you to offer exceedingly customized encounters to your visitors. By dissecting visitor information, AI can anticipate inclinations and tailor administrations appropriately. This might incorporate customized room settings, tweaked proposals for eating and exercises, and opportune benefit conveyance. Such customized consideration can altogether make strides in visitor fulfillment, dependability, and rehash trade. Make strides in check-in handle. The potential for AI to move forward the benefit aspect of hospitality is boundless. On the off chance that an AI can right away match up with your versatile phone or utilize facial acknowledgment are no need for formal recognizable proof or check-in. With a versatile room key as well, voyagers ought not to delay between entering the inn and settling into their rooms. Oversee room benefit No need to be called or held up for somebody to acknowledge your arrange, AI will permit a visitor to communicate right away. The nourishment or refreshments may indeed be conveyed naturally by AI bots. AI frameworks will be greatly productive in staying to plans and keeping up guidelines when it comes to cleaning and planning for the entry of visitors. 6. Spare on control Shrewd innovation will raise the foot line of lodgings by sensing what lights and apparatuses are being utilized and turning off those that arena to spare control. AI-powered visitor devotion and maintenance programs AI-driven CRM frameworks dissect visitor inclinations and remain history to form exceedingly customized dependability programs. AI can predict which rewards and advancements will empower rehash remains, boosting visitor maintenance and coordinate bookings whereas decreasing dependence on OTAs. AI-enhanced request estimating and income advancement AI investigations showcase patterns, competitor estimating, and authentic booking information to supply precise request figures [12]. This empowers lodgings to alter estimating, promoting endeavors, and asset allotment in development, guaranteeing ideal inhabitance and productivity amid top and moo seasons. Robotized housekeeping and prescient support AI-driven housekeeping stages like Arrangements upgrade room cleaning plans, guaranteeing quicker turnovers and made strides proficiency. AI-powered IoT sensors too identify hardware wear and tear, foreseeing support needs some time recently disappointments occur reducing operational downtime and expensive repairs. AI-driven occasion and conference administration Inns facilitating conferences, corporate occasions, and weddings can use AI to robotize scene bookings, oversee visitor records, and customize attendee encounters. AI-powered planning instruments guarantee ideal utilize of occasion spaces, making a difference lodgings increment event revenue and expand space use.

3.1. Revenue Management Software

The use of AI systems has made it possible for revenue managers to be more dynamic in their revenue management strategies. Traditionally, revenue management systems optimized rates by analyzing historical data and relying on predefined rules and manual adjustments. The introduction of AI and machine learning has given RMS the ability to consider many more factors, such as special events, weather patterns, and competitor pricing, allowing them to optimize rates in real time, Instead of scouring the web to check competitors' rates, revenue managers can leverage AI tools to continuously monitor competitor pricing and market trends. RMS' can suggest rate updates based on gathered intelligence and prompt hotels to make changes as soon as they become applicable. AI has helped hoteliers automate repetitive tasks and provide valuable insights to help increase productivity and profitability. Cloud beds Intelligence, a new AI and machine learning layer, is built to supercharge all functionalities of the hospitality management system and break down departmental silos, delivering unmatched decision-making intelligence for revenue managers, marketers, GMs, operations staff, and more [13]. The innovative platform layer implements causal AI using rich datasets within the Cloud beds platform and from partner data, which will allow hoteliers to better understand and forecast property performance and take actionable steps to boost revenue, optimize time and costs, and improve the guest experience.

Figure 2 Revenue Management Software

3.2. Online Travel Agencies

Responding to online reviews attracts higher ratings and improves ranking in search engines. AI-driven reputation management tools simplify this process by aggregating reviews from different channels (like Google and Tripadvisor) into one spot. However, responding to each review can be quite time-consuming, especially if hotels want to personalize replies and avoid boilerplate formulas. To speed up the process further, reputation management tools have started to incorporate generative AI to write personalized responses following simple prompts such as "reply professionally and constructively." The service at the hotel's restaurant is terrible. The servers act as if they are doing you a favor. For such a nice hotel, I would expect better service and not have to wait 10 minutes to get a server's attention [14]. Do better. AI will quickly generate a response: "Dear [guest name], Thank you for your feedback. We apologize for the poor service you experienced at our restaurant. This is not the standard we strive for, and we are addressing this with our team to

ensure it doesn't happen again. We hope you'll give us another chance to provide the excellent service you deserve. Please contact me directly if you have any further comments or concerns."

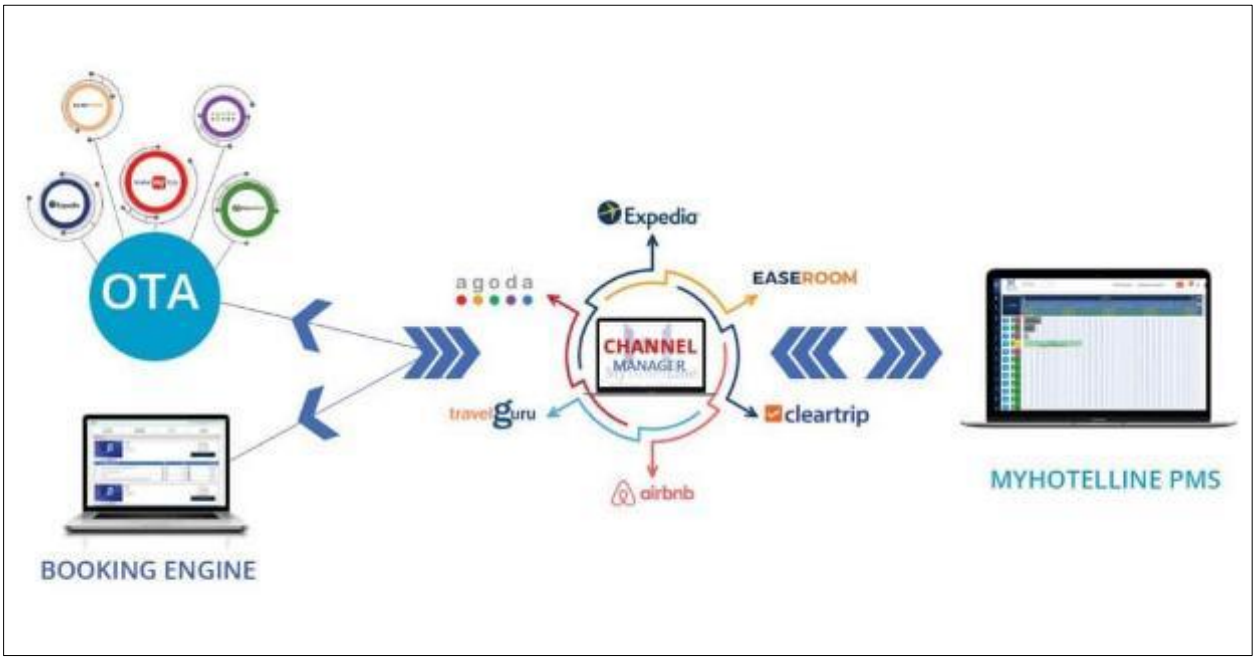

Figure 3 Online Travel Agencies with PMS and Channel Manager

3.3. Automation in Food Production

The integration of artificial intelligence (AI) into hotel gastronomy represents a transformative shift in the hospitality industry, ushering in a new era of innovation, efficiency, and personalized guest experiences. This abstract provides a comprehensive overview of the multifaceted relationship between AI and hotel gastronomy, exploring key drivers, implications, and opportunities that characterize this dynamic partnership. At the forefront of this relationship is the pursuit of personalized guest experiences, facilitated by AI-powered systems such as chatbots and virtual assistants [15]. These intelligent systems leverage machine learning algorithms to analyze guest data and preferences, delivering tailored recommendations, reservations, and dining experiences that enhance guest satisfaction and loyalty. AI is revolutionizing menu engineering and culinary creativity within hotel dining establishments. By analyzing vast amounts of data, including guest preferences and market trends, AI algorithms optimize menu selections, pricing strategies, and promotional activities. Additionally, AI-driven recipe generation algorithms foster culinary innovation by suggesting unique dishes and flavor combinations, enhancing the overall dining experience for guests. Operational efficiency and sustainability are also driving forces behind the adoption of AI in hotel gastronomy [16]. AI-powered kitchen automation systems streamline food preparation processes, optimize inventory management, and minimize waste, leading to cost savings and improved efficiency. AI-driven analytics and optimization tools help hotels minimize their environmental footprint by optimizing energy usage, reducing food waste, and promoting sustainable sourcing practices. The integration of AI into hotel gastronomy represents a transformative opportunity for hotels to differentiate themselves, drive operational excellence, and deliver unparalleled guest experiences. By embracing AI-driven solutions and leveraging data-driven insights, hotels can create immersive dining experiences, foster guest loyalty, and position themselves for success in an increasingly competitive market landscape. As AI continues to evolve and advance, its integration into hotel gastronomy holds the promise of unlocking new possibilities and redefining the boundaries of culinary excellence and guest satisfaction [17].

4. Conclusion

The existing form of literature highlights the transformative potential of automation in food production while addressing its challenges and implications. However, there remains a need for further research to explore the social and ethical dimensions of automation, particularly its impact on labor markets and food accessibility. This study aims to contribute to this ongoing discourse by examining innovative automation strategies and their role in shaping a sustainable and efficient food production system. Implementing IoT in the hotel industry has led to a reduction in maintenance expenses. In the hospitality sector, our focus is on offering the utmost comfort to our guests, and AI plays

a significant role in enhancing that comfort. The advent of various smartphones has enabled individuals to connect globally and start diverse businesses from home, contributing to globalization. With intense competition and the need to attract a broad customer base within tight timeframes, hotels worldwide will need significant technological advancements to meet rising demands. In an increasingly interconnected world, hoteliers must embrace the innovative combination of IoT, AI, and integrated service devices to transform their environments and elevate existing service standards.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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