Use of machine learning technology for tourist and organizational services: high-tech innovation in the hospitality industry

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Abstract

Purpose – *Technological innovation has been changing the tourism industry precipitously and making the holiday experience more enjoyable and easier than before. The purpose of this study is to identify the current and future changes by the machine learning (ML) system as artificial intelligence in the hospitality industry.*

Design/methodology/approach – *This study has a descriptive research approach because building knowledge on technology and applying this knowledge to a tourism research are still new extensions in social studies, especially in tourism.*

Findings – *This research shows the value of using ML in the quality of data, features and algorithms besides stating the difficulties of data analysis in hospitality. This research also provides a comparison of automated ML techniques and the use of a robot for customer services in the hotel.*

Originality/Value – *This research contributes to the tourism and technology literature by shedding light on the use of ML in tourism advancement to predict future business conditions, revenue, challenges and also to identify the current trend of tourist demand.*

Keywords *Technology, Tourist, Tourism industry, Technological development, AI, Machine learning, Hospitality*

Paper type *Trends paper*

Introduction

In a particular industry, today's success is not dependent on specific tasks; explicitly, the tourism industry requires a huge amount of statistics and the ability of analyzation. It is the fundamental perception in the framework of future tourism development to ensure the accessibility of data about the tourist and for the tourist. According to Jia *et al.* (2019), in current years, technological development and internet networking have brought the advantage of monitoring methods and data collection through mobile application, online review, video investigation, comments and other resources. This revelation starts at the end of the 1970s through the founding of the computer reservation systems and continues in the late 1980s with global distribution systems and finally in the 1990s followed by the development of internet (Seetanah, 2019).

Data science and machine learning (ML) techniques were introducing software as tangible service in the hospitality industry, and these software use data to categorize input objects or estimate the output for statistical models of building and training (António *et al.*, 2017). Usually, ML application is used in four ordinarily forms, namely, supervised, semi-supervised, unsupervised and reinforcement learning (Tripathy *et al.*, 2019) to offer focused services to the customers and identify the worth in real-time, besides intensified customer engagement and loyalty. ML helps consumers find out the best services with convenient fragments and accurate information sourcing from the data of previous tourists' reviews and

comments. On the other hand, ML helps employees to use previous customers' data to perform more efficiently and work more directly, such as benefiting from an automatic management system that predicts the future business condition and plans all the preparation for the future or understands the smart services and existing reaction.

Moreover, the ML technique makes it easier for employees to maintain the quality of service, which can relieve them from extra pressure and workload. Moreover, booking and occupancy, revenue management, segmentation, demand forecasting, yield management, pricing, performance evaluation, brand monitoring and competitive analysis are the most valuable benefits of using ML in the tourism and hospitality industry (Tanpanuwat, 2011). Therefore, the purpose of this study is to observe the impact of technological innovation in the tourism industry and customers' satisfaction and willingness to receive technological support in services, besides identifying the employees' assessment of using ML technology in the hospitality industry.

Literature review

ML system is based on hyperparameters, and the task of the hyperparameters is automatically set up before the machine starts learning (Hutter *et al.*, 2019). In the hospitality industry, mechanized system is beneficial for both service receivers and service providers.

Machine learning and tourism

Learning is the procedure of acquiring knowledge; therefore, in 1959, Martens tried to find out in his research if the "machine can think?" as a human to learn its functions and initiated that ML is an application to automate and simplify as an indicative description of again and again practice behavior to recognize specific items (Mondal, 2020). In general, people learn through their life experiences owing to their aptitude for the purpose. In comparison, computers as artificial intelligence which learn through algorithms (Lisi and Esposito, 2014), and the expedition of AI was beginning in the 1950s but became in limelight in present days through the use of ML, deep learning and natural language subset (Collins and Smith, 2013). ML is shaped on the data set to infer the design of algorithms and is used to solve different actions and future predictions (Sun *et al.*, 2019) by structured data, unstructured or semi-structured data and voice and image recognition.

In general, ML is used for clustering, classification and regression, but in tourism and hospitality, ML has been used for revenue management, operational analytics and customer experience improvement (Ganga *et al.*, 2018). The objective of ML technology in hospitality is to assemble the arrangements of gathering data and learning from it and improve self-capability through experience without the involvement of human and plain reprograming. At first, experts gather, choose, organize, preprocess and transmute to the machine as data set and then build analytical models. These models can be used in the different utilities of hospitality such as hotel champ autopilot (pictorial messages rendering to clients' deeds), Allora by Avvio (an influential website recommender appliance to every visitor of the website), Zoe by Quicktext (encourage and influence the customer to book direct) and Chatbots (approximating talking to imagined friend 24/7) forecast prices and customers demand with the uppermost exactitude rate by the ML model structure or a device application.

Customer services and automatic messaging: connecting with the customer and informing them about the different offers and felicitate them on special days is a method to attach with customers; therefore, hotels have installed ML to do this job smoothly. In 2019, Harris conducted research and found that 64% of customers are willing to receive a voice call or text, and among this rate, 44% of customers want to receive text, but manually this task is

fairly impossible to become the best choice. AI-backed virtual assistants are adopted in the hotel for automatic messaging (Harris, 2019; Aceto et al., 2019).

Check-in and check-out with facial recognition: present hotels offer self-service aptitudes to customers; therefore, it is not required to wait at the front desk. Facial recognition allows them to easily check-in and check-out without time waste (Unal and Tecim, 2018). At first, Marriott International Hotel Group installed a facial recognition system in their hotels with the association of Alibaba's Fliggy travel service platform. The hospitality corporation records that the facial recognition machine can learn the customer's ID photo during check-in and check-out within 1-3 min.

Service with the robot: modern technology and machines have changed human employment, and nowadays robots take place in that position to help humans to complete tasks as quickly as possible, such as hotel housekeeping, room service and concierge services are done by robots (Ivanov et al., 2017). According to Zhong and Verma (2019) presently, customers commonly use dashboards, robot service for food delivery, toiletries and control other facilities within the hotel and their rooms.

Virus assassination robots in hotel service: virus assassination robots are one of the current innovations implemented in a hotel in Texas; it is a high-tech resolution hygiene system to prevent virus infraction. Besides, the Westin Houston Hotel use "Germ-Zapping Robots" and "LightStrike" to combat germs; in this system, robots use UV light to kill the germs and disinfect the stored products to keep the hotel compartment virus free (Rosen, 2020). This hotel operates two virus-killing robots to maintain the daily hygienic and cleaning system of its 273 rooms, lobby, meeting room, bar, café and restaurant. These virus assassination robots are operating by the algorithm and follow the data instruction to find out the virus and germs to destroy. As much as through algorithm technic, these robots can learn from their own experience. Westin group is willing to continue to use these robots for cleaning purposes to offer the travelers clean rooms and a safe environment.

Organizational tasks and machine learning

ML and data mining methods allow employees to be part of an automated management system, where employees and managers can predict the future of business conditions through collected data or customers review and plan all the preparation for the upcoming time (Argote and Hora, 2017). It also enables them to find out undetected information from gathered info. ML supports connecting customers and hotel management from one point of view, where both parties can recognize and understand the smart services and existing reaction (Brynjolfsson and Mitchell, 2017). Therefore, hotels install machines to do specific tasks accurately such as booking and occupancy, revenue management, segmentation, demand forecasting, yields management, pricing, performance evaluation, brand monitoring, competitive analysis and data collection from internal and external to understand customer behavior. In this segment, the procedure of ML is directed to the operation, besides the organization may investigate new data of customer demand, behavior and future tourism trend (Benckendorff et al., 2019).

Methodology

This study has a descriptive research characteristic because learning technology is a new area in social studies, especially in tourism. Mouton and Marais (1996) emphasize that descriptive study has an inductive nature and such as a typology, researcher attempts to find out the relationships and pattern which have helped to understand the concept before producing the data. Researchers offer different descriptive research strategies based on new data generated or existing data. According to literature, there is a rare exact developed scale or measurement tool for learning technology. However, it has not been encountered with a specific methodological approach because of the conceptual nature of

the learning technology. This study will first try to capture and evaluate the conceptual and theoretical basics. Despite receiving a few sources, some secondhand data (related literature, some statistical indicators) and researchers' experiences or observations can provide sufficient infrastructure for this study. Therefore, this study methodology is constructed as descriptive based on theoretical approaches without using quantitative and qualitative analysis.

Conclusion

Using ML has empowered hotels to have progressive tools to appraise and improve performance and modern days' tourism is developing on the bases of technological availabilities starting from searching for information on a specific travel destination. Furthermore, bookings and reservations through the online system have become easier to select and shift from one to another comfortable area with advance offers. The support and use of ML-based tools have made hotel occupation more flexible than ever before. To reach a point where hospitality organizations can apply ML systems for customer's satisfaction and support of employees in the task, management must have the motivation toward using modern technology.

Tourism needs to focus on ML technology to develop a better service system for tourists and to support the hoteliers through technological advancement in the organization. This research contributes to the tourism and technology literature by shedding light on the use of ML in tourism advancement to predict future business conditions, revenue, challenges and also to identify the current trend of tourist demand. Moreover, it helps to improve hospitality-related ML approaches and indicate the impacts in addition to the above-mentioned what best applies to big data in the hospitality industry.

This research also expresses the value of connecting ontologies and ontology rational and also considers the difficulties of data analysis capabilities in hospitality. In the future, the author proposes to convey on the application of ML on automated customer service configuration and identify the impact of ML on employment in hospitality and how far customers are satisfied with ML systems. The comparison of automated ML techniques such as the use of a robot and human involvement for customer services can also become a source for future research.

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