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SMARTSTAY: A FAST AND SECURE WEB-BASED HOTEL BOOKING SYSTEM USING HTML AND PHP

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ABSTRACT

The development of the online hotel booking system centered around the utilization of HTML for crafting the frontend interface, encompassing the design and layout of web pages. HTML played a pivotal role in providing the necessary structure and elements to present hotel information, room options, and booking forms seamlessly to users. The frontend was meticulously designed to be responsive, ensuring accessibility across various devices for a smooth user experience. On the backend, PHP was employed to manage and process data, handling user input, room availability, and reservation details. Leveraging PHP's server-side scripting capabilities, the system seamlessly interacted with databases, facilitating dynamic content generation. Notable features of the online hotel booking system include a robust search functionality enabling users to find available hotels based on specified criteria, like dates and room preferences. Detailed information about each hotel, encompassing amenities, pricing, and room descriptions, was easily accessible. From the testing being done on the system, we have proved that the system has the best response time out of all the other booking systems, which is 27ms compared to other booking websites like Trivago(239ms), Hotels.com(1.47s), Expedia(2.02s), Booking.com(2.06s), and Agoda(286ms). The system also gathered an outstanding 4.29-star average rating from the survey being handed out to users. Based on the review percentage, the system collected a staggering 43% votes for 5-star, 46% votes for 4-star, 11% votes for 3-star, and 0% for both 2-star and 1-star. The system also prioritized a secure and user-friendly booking process, allowing users to effortlessly select their desired room and complete reservations with confidence. The rooms are also managed by the admins. In this case, admins can add, edit, or delete rooms, respectively, according to the situation. The availability of rooms can be changed by the admin, too.

Keywords: online hotel booking, web application development, PHP, HTML, MySQL, room reservation system, XAMPP, secure web systems.

INTRODUCTION

The development of a hotel booking system using PHP and HTML aims to create a user-friendly and efficient web-based platform. This system will enable users to easily search for hotels, explore their amenities, and make reservations. Recognizing the common difficulty users face in navigating complex websites with inadequate filtering options, our focus is on providing a seamless experience for both guests and hoteliers. Our approach involves a thorough understanding of system requirements through the gathering of user needs. In terms of economic development, the tourism industry generates income for nations through the consumption of goods and services by tourists, taxes, development of enterprises, and employment opportunities, among others [1]. The design and development will utilize a combination of front-end and back-end technologies. Emphasis will be placed on creating a system that is reliable and easy to navigate. A MySQL database will be implemented to store hotel information, including details like name, location, room types, and pricing. The user interface, developed with HTML, will empower guests to search for hotels based on various criteria such as location and price. Once a hotel is selected, users will have access to comprehensive information, including amenities, room types, availability, and pricing. The system will undergo rigorous testing to ensure it meets quality standards and fulfills the specified requirements. This holistic approach ensures the creation of a robust hotel booking system that enhances the experience for both guests and hotel owners. Owing to the advancement in information technologies, an increasing number of hotel customers are booking rooms through online booking systems [2].

Despite the increasing popularity of online hotel booking systems, customers frequently encounter various issues during their usage. The process of searching for and reserving a suitable hotel can be confusing and time-consuming. Navigational challenges, inaccurate or incomplete information, limited availability of preferred rooms or dates, and unreliable customer support contribute to a frustrating and unsatisfactory booking experience. These problems not only lead to customer dissatisfaction

but also result in revenue loss for the hotel booking platform. An efficient and user-friendly online hotel booking system is essential to address these challenges and provide a seamless booking experience for customers. Instances of users discovering hidden costs, such as taxes, service fees, and surcharges that are not transparent during the booking process, can lead to unexpected expenses. Furthermore, users may face language barriers or cultural differences when booking hotels in foreign countries or regions, leading to misunderstandings and miscommunications. Additionally, the frequency of online purchasing is positively related to age, education, and income [3].

This system entails providing administrators with the capability to log in, as well as the ability to add, delete, and update the status of rooms, transitioning them between available and booked. Additionally, administrators can adjust the prices of rooms. For users, the system enables them to promptly select preferred dates, browse through various room options available on the chosen date, and ultimately make reservations for their desired rooms. Given great efforts to develop direct-selling channels and the constantly increasing investments in economy hotel websites, the hotel industry is concerned with whether hotel websites can offer users a positive experience and encourage online direct sales [4]. Some popular online travel communities (e.g., TripAdvisor, TravBuddy, Minube.com, Travellerspoint, WAYN, responsibletravel) offer best and worst hotel or destination lists (e.g., "dirtiest U.S. hotels," "top 25 hotels", "top 10 holidays"), which summarize travelers' reviews. These rating lists are very popular, yet their effect on travelers' decision-making has not been explored previously [5]. Similar to the offline environment, where consumers need traditional cues like brand and reputation for decision making, Internet users rely on website attributes to judge the potential gains and losses according to [6]. A study on how different factors could influence the channel choice is needed; specifically, an updated version of influential factors with new factors, e.g., online word of mouth, should be developed. To discover how the channel itself and product attributes would influence customers' choice of channel, it is better to group factors into Product Related Factors (factors closely related to the core product room and hotel service, influenced by the hotel) and Channel Related Factors (factors not related to the core product and controlled by the website) [7]. Among the methods that can be done is by doing a survey. The questionnaire starts with questions about hotel booking experience and ends with collecting demographic data [8]. Very recently, hospitality entities have begun to make their service offerings more tangible to consumers. Within this emerging trend, experiential appeals to consumers are emphasized through design, particularly for lifestyle hotels [9]. To build a strong brand, a hotel should develop its own distinctive image that differentiates itself from competitors and communicate the major benefits to its target customers [10].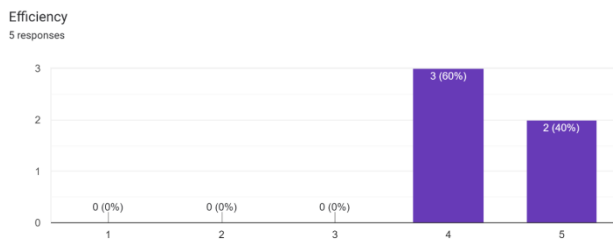 This ongoing system aims to develop a set of life cycle-based sustainability indicators to be used as filters in online platforms to help users make more sustainable choices, thus promoting sustainable and circular tourism (CT) systems [11]. It is important to understand consumer behavior in online environments and develop strategies to increase customer loyalty towards the website. From a theoretical perspective, it is important to develop a model that explains the antecedents of relationship marketing in e-commerce [12]. The phenomenon of last-minute booking is more nuanced than simply deal-oriented booking. Last-minute deal-seeking customers wait until the last minute mainly to find inexpensive hotel deals, but some might not be searching for such deals. Part of the reason is that mobile technology, such as smartphones and tablets, enables travelers to book a hotel room anytime and anywhere, even at the last minute, regardless of whether there are deals or not [13].
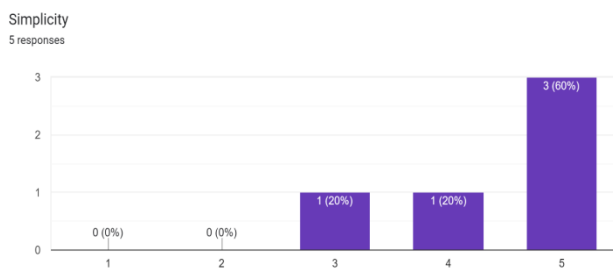
METHOD

The approach utilized in the development of an online hotel booking system plays a vital role in ensuring its efficacy, dependability, and user-friendly nature. The process commences with a comprehensive examination of system requirements, involving stakeholders to identify crucial features and limitations. Subsequently, during the design phase, a high-level architectural design is crafted, prioritizing scalability, security, and user-friendliness. An essential step in this process is the design of the database, which involves organizing data such as hotel details and room availability. Following this, the development and testing phases are executed, wherein features are implemented and rigorous testing is conducted to guarantee the system's reliability. Real-time viewing times for each hotel were acquired to reflect consumers' click-through behaviors during the information search and acquisition process according to [14]. To test the influence of ratings and number of reviews on consumer trustworthiness and its further effect on product consideration, [15] conducted a full factorial between subjects design 2 (good vs. bad rating) x 2 (high vs. low number of reviews) in a decisioncontrolled setting where participants were asked to book a hotel in a fictitious Web site designed for the experiment. [16] monitored various consumer discussion forums (e.g., Travlo dcity.com, Expedia.com, and Hotel.com) and randomly collected a total of 1396 hotel reviews. [17] analyzed the data using NVivo 11 and created a word cloud that visually displayed the word frequency count. After excluding basic words (hotel, staying, room), [18] identified the most frequently mentioned words. Those include cleaning (n = 533), location (n = 524), breakfast (n = 472), service (n = 408), privacy (n = 389), bed (n = 368), comfortable (n = 364), and security (n = 280). According to [19], the frequency of room rate change is analysed using count data models. This is something usual when users have a change of mind while booking rooms. [20] believe that topics discussed in online hotel reviews could attract potential consumers' attention and are thus helpful in forecasting hotel demand.
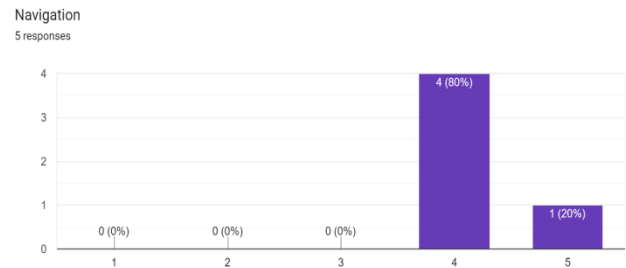
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In offline voice communication, the tone and style of communication are particularly important. However, in e-commerce platforms, businesses more frequently communicate with customers through text, which weakens the importance of tone and highlights the importance of text presentation [21]. One method relevant to apply is by doing surveys. An online questionnaire can be handed out to users to answer. A Google Form would be an excellent choice to implement this method. Google Form is a professional online questionnaire platform used to publish online surveys [22]. Moreover, user preference can differ due to hotel size and, more specifically, the number of rooms available, which is usually recognized as a key factor in defining dynamic pricing [23]. According to [24], in order to establish a revenue management strategy in Internet hotel reservation, the first hypothesis that must be made is whether or not an IDS (internet distribution system) channel is always open: Do hoteliers close IDS channels? Do they prefer other channels to sell their product? Figure-1 below shows the response we gathered from users responding to the features of the system. For efficiency, we gathered a majority of 60% people who voted 4 for the rating. Next, for simplicity, we got a majority of 60% on a 5-point rating. For the last three features, we achieved 80% on 4(c), 80% on 5(d), and 60% on 5(e), respectively. Most of the features were given a rating above 3, which is very impressive.
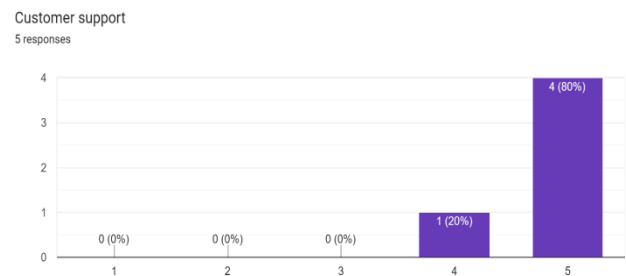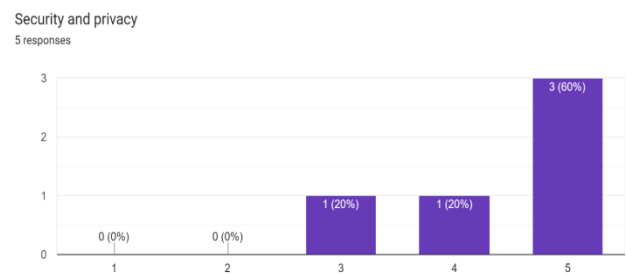
(c)

(d)

(a)

(b)

(e)

Figure-1. Results of (a) efficiency, (b) simplicity, (c) Navigation, (d) customer support, and (e) security and privacy features.
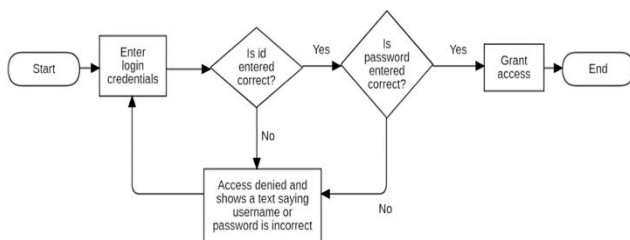
Table-1 below shows the performance enhancement that has been done in this current research and the comparison being made with other existing systems. The response time shown in this research is 27ms, while other systems are 239ms, 1470ms, 2020ms, 2060ms, and 286ms, which signals that they take more time for response. System testing was also implemented in the login module for users. It was tested by keying in an unmatching username or password from what's stored in the database.

Table-1. Performance comparison.

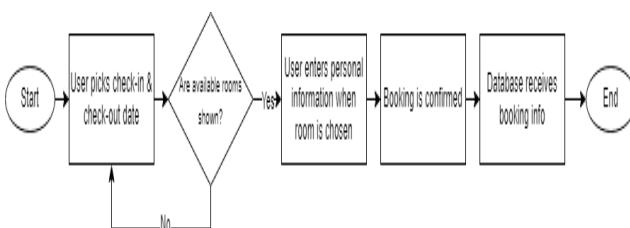| Website	Response Time (ms)	Customer Review (Average)	Review Percentage (%)				
			Stars				
			5	4	3	2	1
My research	27	4.29 Stars	43	46	11	0	0
Trivago	239	3.06 Stars	41	10	4	4	41
Hotels.com	1470	1.6 Stars	11	3	2	3	81
Expedia	2020	1.23 Stars	4	1	1	2	92
Booking.com	2060	1.95 Stars	19	4	2	3	72
Agoda	286	3.94 Stars	61	15	2	1	21

Login Feature

The login module is one of the most important parts in the development of this site. Admin login credentials will be kept in the database securely. Admin can log in and log out of the system. If an admin tries to log in without registering first, they will be denied access to the site. In another case, if the password entered doesn't match the ID, then their access will also be denied. An existing admin must register other admins first before proceeding to log in. Figure-2 shows how the process of a login goes through for an admin.
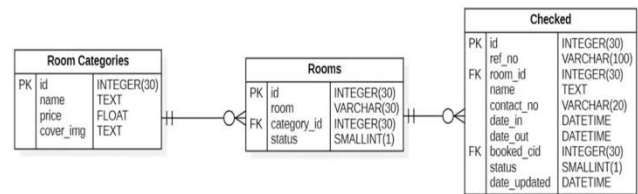

Figure-2. Admin login flowchart.

Room Booking Algorithm

Figure-3 below shows the flowchart for booking a room. A user is required to search for available rooms by using the calendar to choose the date of check-in and check-out. No results will be displayed if the chosen day of check-in is fully booked. Straight after choosing the date, users will be presented with rooms that are available on the chosen date [25]. A user is required to enter their name, contact number, and a suitable check-in time when a booking is placed.

Figure-3. Room booking flowchart.

Database Management

From the ERD diagram below, three tables are crucial for the booking flow of the system. All of the tables have their own ID, which is also the primary key [26]. The Room Categories table has a one-to-many relationship with the Rooms table. Meanwhile, the Rooms table has a one-to-many relationship with the checked table. This explains the foreign key in Rooms because category_id is the primary key for the Room Categories table. Next, the foreign key in the Checked table (room_id & booked_id) comes from the Rooms and Room Categories table primary key.

Figure-4. ERD diagram for the database.

Development Tools

This system consists of one part, which is the software part. The software used is phpMyAdmin, XAMPP, and Sublime Text. The development of this system will mainly be programmed by using Sublime Text as the programming tool. Xampp serves as a control panel to manage all the connections, such as Apache and MySQL. This software is highly efficient as it enables developers to create and test their programs on a local web server. And lastly, phpMyAdmin is primarily used for the database because of its reliability. It is a core element of the structure in building a certain website or software. Figure 5 below shows the tools used, which are phpMyAdmin, XAMPP, and Sublime Text. PhpMyAdmin stands out as a widely used free and open-source administration tool designed for MySQL and MariaDB. Functioning as a portable web application primarily written in PHP, it has gained significant popularity, particularly among web hosting services, as one of the leading tools for MySQL administration. XAMPP, a cross-platform web server solution stack package, is an open-

source and free offering developed by Apache Friends. It primarily includes the Apache HTTP Server, MariaDB database, and interpreters for scripting languages like PHP and Perl [27]. The coherence between the components in XAMPP and those commonly used in real web server deployments facilitates a seamless transition from a local test server to a live server. Sublime Text, a shareware text and source code editor compatible with Windows, macOS, and Linux, offers native support for various programming languages and markup languages. To support plugins, Sublime Text incorporates a Python API.

Security Testing

To ensure the system was safe from being breached, testing was conducted on the security half to make sure the login system couldn't be breached easily. The login module was tested by keying in an unmatching username or password from what's stored in the database. A positive result was achieved as access was denied because of incorrect login credentials. The figure below shows the outcome of an incorrect username/password keyed in.

Figure-5. Login page.

RESULTS AND DISCUSSIONS

This system incorporates multiple software components in its development with the primary aim of streamlining the room booking process. Web development is accomplished using HTML and PHP, while CSS and JavaScript contribute to styling aspects. Additionally, PHPMyAdmin serves as the database platform, housing data related to administrators, users, and room details. The pivotal element in the system is the search filter, which effectively eliminates irrelevant rooms from the search results. To enhance security, comprehensive login features have been implemented, ensuring that only registered users can access the site by validating login credentials fetched from the registration database. Until now, this social aspect in the use and analysis of consumer data during ad generation has received little attention in the current literature [28]. To properly review how personal

information has been defined and conceptualised, it is important to assess how it has been typified in existing work [29]. According to [30], web SSO (single sign-on) schemes are increasingly common in consumer web services alongside traditional password-based login methods. These SSO schemes aim to improve login security and reduce the number of passwords users need to remember as they enable authentication to relying party (RP) sites using a single identity provider (IdP) account.

Formula

The formula is used to find the average customer rating. The rating represents the star rating ranging from 1 to 5 stars. Meanwhile, the x represents the percentage of users who voted for a particular rating.

$$(x_5 \times Rating_5) + (x_4 \times Rating_4) + (x_3 \times Rating_3) + (x_2 \times Rating_2) + (x_1 \times Rating_1) \qquad (1)$$

User Registration

In the user registration segment of our online hotel booking system, we have devised a smooth and user-friendly process to guarantee a trouble-free experience for our guests. Employing HTML and PHP, we've developed a simple registration form enabling users to effortlessly establish accounts. This form captures crucial information like name, contact number, and check-in date, prioritizing the security of their personal details. To further streamline the user experience, we've incorporated validation checks to ensure the accuracy of entered data. Our dedication to user privacy is paramount, and we've integrated encryption techniques to protect sensitive data throughout the registration process [31]. Through this meticulously designed registration system, our goal is to offer a secure and efficient onboarding experience, instilling a sense of trust and convenience for our esteemed users. Reference [32] suggests that the most prevalent website identification/authentication mechanism is the use of credentials in the form of a user ID/password (PW) combination (hereafter referred to as login credentials).

Admin

The admin page is designed for overseeing room bookings, adjusting room availability, and updating room statuses. Admins can confirm specific bookings by navigating to the booked section, where they can click the "view" and "edit" buttons to finalize the confirmation. [33] Considers the reservation process for a hotel. Customers may book for a single day or for up to n consecutive days. They call the combination of a check-in and a check-out day a pair. As there are different rooms in a hotel, the customers pay different prices. Therefore, a combination of a price and a pair becomes a product. Admins are responsible for easing the booking process for the customer. This is a really vital section for us as consumers may seek utilitarian benefits, such as ease of use, price, and product/service offering comparisons, but they may also consider hedonic benefits, such as visually appealing

website designs, which provide enjoyment in the online experience [34]. The website design plays a big role in determining the customer's satisfaction. The relationship between overall interaction and customer repeated bookings is examined through three effects and hypotheses that argue the influence of reply rate, acceptance rate, and the confirmation time on customer repeated bookings. Considering the information asymmetry in the online market, the online platforms' information cannot always completely satisfy customers' needs and expectations [35].

Figure-6. Booked directory.

In Figure-7, an admin is responsible for assigning available rooms to users who have booked through the system. Admin must manually choose the room that matches the booking details of the customer. The admin only needs to click the check-in button and fill out the user's details for confirmation.

Figure-7. Check-in directory.

In Figure-8, an admin is required to check out users who have agreed to do so based on their booking confirmation beforehand. Admin can view users who have been checked out and users who have just checked in.

Figure-8. Check-out directory.

From the room category page in Figure-9 below, the admin can edit and delete existing rooms by their categories. Admin can also add extra rooms if required. Admins are required to upload an image, set the price, and name the category of the newly added room in the list.

Figure-9. Room category directory.

In Figure-10, an admin is able to add, edit, and delete multiple rooms. For instance, a deluxe room can be added multiple times, with the condition that each room has a different room number. If an admin chooses to unlist a room for booking, they can set the availability to available or unavailable.

Figure-10. Room directory.

Booking Form

In the booking form, the user has to enter their name, contact number, and check-in date so that the admin can identify and confirm the booking. The check-in date and days of stay are automatically filled in as soon as the user picks the check-in and check-out dates from the calendar beforehand. Users can choose any time of the day for the check-in time. The check-in time is flexible to make sure users don't have to deal with any time constraints whenever they choose to book their desired room. More importantly, the responsibility of filling out the forms falls onto the users so that the admin can verify the users who booked the room.

Summary

The user interface of the system is designed to be user-friendly and easy to navigate, ensuring a seamless booking process for all users. The simplified procedure allows travelers to explore available hotels, access detailed descriptions, high-resolution images, and authentic customer reviews, empowering them to make well-informed decisions prior to confirming reservations. Additionally, the system provides flexibility for users to modify or cancel reservations effortlessly, enabling them to manage bookings online without any inconvenience. Ultimately, the online hotel booking system transforms the

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way individuals plan and secure their accommodations, offering a comprehensive set of features, an intuitive interface, real-time updates, and adaptable reservation management options to create a convenient and reliable platform for travelers. Reference [36] shows that a high rating valence and a high frequency of posted reviews can motivate potential consumers to make purchase decisions earlier, emphasizing the importance to managers of improving and maintaining a strong and substantial online reputation. Therefore, the service delivery and success of the service delivery depend upon the involvement of these two parties, namely, the hotel that provides the service and the online travel agency. Hence, when a service encounter fails on the part of an online travel agency, the failure attribution gets shared between the hotel (which provides the room service) and the online travel agency (the channel through which the customer books the hotel) [37]-[40].

CONCLUSIONS

This research details the development of an online hotel booking system utilizing HTML and PHP. The proposed system comprises a software component designed to enhance user navigation during the room booking process. Users are provided with the option to apply filters to refine their search results, a crucial feature aimed at attracting more users to the site. The system also plays a vital role in promoting transparency and trust within the hospitality industry. This resulted in a gain of trust from the customers. The system obtained a review percentage of 43% from 5-star rating, 46% from 4-star rating, 11% from 3-star rating, and 0% from both 2-star and 1-star rating, respectively. Travelers can obtain comprehensive information about hotels, such as descriptions, amenities, and photos. This transparency cultivates trust and empowers travelers to make informed decisions, ultimately contributing to a more gratifying and pleasant experience. From the research findings, we've obtained an excellent and improved response time of 27ms. The response time is much faster than other well-known booking websites such as Trivago, Hotels.com, Expedia, Booking.com, and Agoda, which are on a response time of 239ms, 1470ms, 2020ms, 2060ms, and 286ms, respectively. Moreover, the average rating from users is 4.29 stars, which tops ratings from hotels like Trivago, Hotels.com, Expedia, Booking.com, and Agoda, which are on an average rating of 3.06 stars, 1.06 stars, 1.23 stars, 1.95 stars, and 3.94 stars. Realistically, an online travel agency is an intermediary between the consumer and the service provider.

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AUTHOR CONTRIBUTIONS

The authors' contributions are as follows: "Conceptualization, I. Fedorchenko and A. Oliinyk; methodology, J.A.J. Alsayaydeh; software, M.A. Alomari; validation, A.W.Y. Khang; formal analysis, S.G. Herawan; investigation, S. Mamchenko; resources, I. Fedorchenko; writing—original draft preparation, A. Oliinyk and J.A.J. Alsayaydeh; writing—review and editing, M.A. Alomari and A.W.Y. Khang; funding acquisition, S.G. Herawan and S. Mamchenko.

DATA AVAILABILITY STATEMENT

All the datasets used in this study are available from the Zenodo database (accession number: https://zenodo.org/records/15545751).

REFERENCES

[1] A. J. Sánchez-Medina and E. C-Sánchez. 2020. Using machine learning and big data for efficient forecasting of hotel booking cancellations. Int J Hosp Manag, vol. 89, doi: 10.1016/j.ijhm.2020.102546.

[2] T. Saito, A. Takahashi, N. Koide, and Y. Ichifuji. 2019. Application of online booking data to hotel revenue management. Int. J Inf. Manage, 46: 37-53, doi: 10.1016/j.ijinfomgt.2018.11.003.

[3] D. Boto-García, E. Zapico, M. Escalonilla y J. F. Baños Pino. 2021. Tourists' preferences for hotel booking. Int. J Hosp Manag, vol. 92, doi: 10.1016/j.ijhm.2020.102726.

[4] L. Li, M. Peng, N. Jiang, and R. Law. 2017. An empirical study on the influence of economy hotel website quality on online booking intentions. Int J Hosp Manag, 63: 10-10, doi: 10.1016/j.ijhm.2017.01.001.

[5] L. V. Casaló, C. Flavián, M. Guinalíu and Y. Ekinci. 2015. Do online hotel rating schemes influence booking behaviors?. Int J Hosp Manag, 49: 28-36, doi: 10.1016/j.ijhm.2015.05.005.

[6] L. Wang, R. Law, B. D. Guillet, K. Hung, and D. K. C. Fong. 2015. Impact of hotel website quality on online booking intentions: ETrust as a mediator. Int J Hosp Manag, 47: 108-115, doi: 10.1016/j.ijhm.2015.03.012.

[7] J. N. K. Liu and E. Y. Zhang. 2014. An investigation of factors affecting customer selection of online hotel booking channels. Int. J Hosp Manag, 39: 71-83, doi: 10.1016/j.ijhm.2014.01.011.

[8] Z. Hossain, A. K. M., N. B. Hassim, J. A. J. Alsayaydeh, M. K. Hasan, and M. R. Islam. 2021. A tree-profile shape ultra-wideband antenna for chipless RFID tags. International Journal of Advanced Computer Science and Applications, 12(4): 546-550, doi: 10.14569/IJACSA.2021.0120469.

[9] J. Baek and C. Michael Ok. 2017. The power of design: How does design affect consumers' online hotel booking? Int. J Hosp Manag, 65: 1-10, doi: 10.1016/j.ijhm.2017.05.001.

[10] C. H. Lien, M. J. Wen, L. C. Huang, and K. L. Wu. 2015. Online hotel booking: The effects of brand image, price, trust, and value on purchase intentions. Asia Pacific Management Review, 20(4): 210-218, doi: 10.1016/j.apmrv.2015.03.005.

[11] I. Arzoumanidis, L. Petti e A. Raggi. 2022. Online booking platforms: Towards making more sustainable choices. Cleaner Production Letters, 3: 100009, doi: 10.1016/j.clpl.2022.100009.

[12] A. Bilgihan and M. Bujisic. 2015. The effect of website features in online relationship marketing: A case of online hotel booking. Electron Commer Res Appl, 14(4): 222-232, doi: 10.1016/j.elerap.2014.09.001.

[13] Y. Jang, C. C. Chen and L. Miao. 2019. Last-minute hotel-booking behavior: The impact of time on decision-making. Journal of Hospitality and Tourism Management, 38: 49-57, doi: 10.1016/j.jhtm.2018.11.006.

[14] X. Xu and Y. Luo. 2023. What makes customers click? An analysis of hotel list content using deep learning. Int. J Hosp Manag, vol. 114, doi: 10.1016/j.ijhm.2023.103581.

[15] D. Gavilan, M. Avello, and G. Martinez-Navarro. 2018. The influence of online ratings and reviews on hotel booking consideration. Tour Manag, 66: 53-61, doi: 10.1016/j.tourman.2017.10.018.

[16] S. Kim and Y. K. Kim. 2022. Regulatory framing in online hotel reviews: The moderating roles of temporal distance and temporal orientation. Journal of Hospitality and Tourism Management, 50: 139-147, doi: 10.1016/j.jhtm.2022.01.006.

[17] A. W. Y. Khang, S. J. Elias, N. Zulkifli, W. A. Indra, J. A. J. Alsayaydeh, Z. Manap, and J. A. M. Gani. 2020. Qualitative-Based QoS Performance Study Using Hybrid ACO and PSO Algorithm Routing in MANET. Journal of Physics: Conference Series, vol. 1502, doi: 10.1088/1742-6596/1502/1/012004.

[18] I. Fedorchenko, A. Oliinyk, J. A. J. Alsayaydeh, A. Kharchenko, A. Stepanenko, and V. Shkarupylo, "Modified genetic algorithm to determine the location of the distribution power supply networks in the city," ARPN J. Eng. Appl. Sci., vol. 15, no. 23, pp. 2850–2867, 2020, doi: 10.5281/zenodo.5163692. [Online]. Available: http://www.arpnjournals.org/jeas/research_papers/rp_2020/jeas_1220_8427.pdf.

[19] I. Mohammed, B. D. Guillet, and R. Law. 2019. Last-minute hotel booking and the frequency of dynamic price adjustments of hotel rooms in a cosmopolitan tourism city. Journal of Hospitality and Tourism Management, 41: 12-18, doi: 10.1016/j.jhtm.2019.08.005.

[20] D. Zhang and B. Niu. 2024. Leveraging online reviews for hotel demand forecasting: A deep learning approach. Inf Process Manag, 61(1), doi: 10.1016/j.ipm.2023.103527.

[21] C. Gong, J. Liu, R. Law, and Q. Ye. 2022. Exploring the effects of official-structured managerial responses on hotel online popularity. Int J Hosp Manag, vol. 106, doi: 10.1016/j.ijhm.2022.103293.

[22] A. Jattamart, P. Nusawat, and A. Kwangsawad. 2023. How can hesitation in hotel live-streaming payment be overcome? Examine the role of entrepreneurial performance and viewers' personality traits. Journal of Open Innovation: Technology, Market, and Complexity, 9(2): doi: 10.1016/j.joitmc.2023.100052.

[23] E. Bigne, J. L. Nicolau, and E. William. 2021. Booking across channels: The effects on dynamic pricing. Tour Manag, vol. 86, doi: 10.1016/j.tourman.2021.104341.

[24] A. Alzua-Sorzabal, J. K. Gerrikagoitia, and E. Torres-Manzanera. 2013. Opening and closing the Internet booking channel for hotels. A first approximation. Tour Manag Perspect, 5: 5-9, doi: 10.1016/j.tmp.2012.10.001.

[25] N. A. Afifie, A. W. Y. Khang, A. S. B. Ja'afar, A. F. B. M. Amin, J. A. J. Alsayaydeh, W. A. Indra, S. G. Herawan, and A. B. Ramli. 2021. Evaluation Method

of Mesh Protocol over ESP32 and ESP8266. Baghdad Science Journal, 18(4): 1398-1401, doi: 10.21123/bsj 2021.18.4(Suppl.).1397.

[26] J. A. J. Alsayayadeh, M. F. Yusof, M. Z. Abdul Halim, M. N. S. Zainudin and S. G. Herawan. 2023. Patient Health Monitoring System Development using ESP8266 and Arduino with IoT Platform. International Journal of Advanced Computer Science and Applications (IJACSA), 14(4): 617-624. http://dx.doi.org/10.14569/IJACSA.2023.0140467.

[27] V. Shkarupylo, I. Blinov, A. Chemeris, V. Dusheba, J. A. J. Alsayaydeh, and A. Oliinyk. 2021. Iterative Approach to TLC Model Checker Application. 2021 IEEE 2nd KhPI Week on Advanced Technology (KhPIWeek), Kharkiv, Ukraine, pp. 283-287, doi: 10.1109/KhPIWeek53812.2021.9570055.

[28] J. Cheng, B. Chen and Z. Huang. 2023. Collective-based ad transparency in targeted hotel advertising: Consumers' regulatory focus underlying the crowd safety effect. Journal of Retailing and Consumer Services, vol. 72, doi: 10.1016/j.jretconser.2023.103257.

[29] R. Belen Saglam, J. R. C. Nurse, and D. Hodges. 2022. Personal information: Perceptions, types, and evolution. Journal of Information Security and Applications, vol. 66, doi: 10.1016/j.jisa.2022.103163.

[30] S. G. Morkonda, S. Chiasson and P. C. van Oorschot. 2024. Influences of displaying permission-related information on web single sign-on login decisions. Comput Secur, 139: 103666, doi: 10.1016/j.cose.2023.103666.

[31] J. A. J. Alsayaydeh, Irianto, A. Aziz, C. K. Xin, A. K. M. Z. Hossain, and S. G. Herawan. 2022. Face Recognition System Design and Implementation using Neural Networks. International Journal of Advanced Computer Science and Applications (IJACSA), 13(6): 519-526. http://dx.doi.org/10.14569/IJACSA.2022.0130663.

[32] Y. Bang, D. J. Lee, Y. S. Bae y J. H. Ahn. 2012. Improving information security management: An analysis of ID-password usage and a new login vulnerability measure. Int. J Inf. Manage, 32(5): 409-418, doi: 10.1016/j.ijinfomgt.2012.01.001.

[33] N. Aydin and S. I. Birbil. 2018. Decomposition methods for dynamic room allocation in hotel revenue management. Eur J Oper Res, 271(1): 179-192, doi: 10.1016/j.ejor.2018.05.027.

[34] A. Bilgihan, K. Nusair, F. Okumus and C. Cobanoglu. 2015. Applying flow theory to booking experiences: An integrated model in an online service context. Information and Management, 52(6): 668-678, doi: 10.1016/j.im.2015.05.005.

[35] J. Wu, J. Cai, X. (Robert) Luo, and J. Benitez. 2021. How to increase customer repeat bookings in the short-term room rental market? A large-scale granular data investigation. Decis Support Syst, vol. 143, doi: 10.1016/j.dss.2021.113495.

[36] Z. Zhang, S. Liang, H. Li, and Z. Zhang. 2019. Booking now or later: Do online peer reviews matter? Int J Hosp Manag, 77: 147-158, doi: 10.1016/j.ijhm.2018.06.024.

[37] C. Manu, S. Sreejesh, and J. Paul. 2021. Tell us your concern, and we shall together address it! Role of service booking channels and brand equity on post-failure outcomes. Int. J Hosp Manag, vol. 96, doi: 10.1016/j.ijhm.2021.102982.

[38] W. A. Indra, A. W. Y. Khang, Y. T. Yung, and J. A. J. Alsayaydeh, "Radio-frequency identification (RFID) item finder using radio frequency energy harvesting," ARPN J. Eng. Appl. Sci., vol. 14, no. 20, pp. 3554–3560, 2019.

[39] M. Yukhymchuk, V. Dubovoi, and V. Kovtun, "Decentralized coordination of temperature control in multiarea premises," Complexity, vol. 2022, pp. 1–18, 2022, doi: 10.1155/2022/2588364.

[40] A. Altameem, M. Al-Ma'aitah, V. Kovtun, and T. Altameem, "A computationally efficient method for assessing the impact of an active viral cyber threat on a high-availability cluster," Egyptian Informatics Journal, vol. 24, pp. 61–69, 2023, doi: 10.1016/j.eij.2022.11.002.