

DECENTRALIZED HOTEL ROOMS BOOKING SYSTEM USING PRAGMA SOLIDITY AND BLOCKCHAIN TECHNOLOGY



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Abstract— To facilitate the growth of the home-sharing economy, we have developed a decentralized platform that is compatible with both cryptocurrency and more traditional forms of payment. We are constructing a distributed variant of Airbnb. Blockchain is tremendously helpful for websites like Airbnb. This is due to the fact that it has the ability to store users' online identities. By looking up the ID number linked to your account, customers can quickly determine if you are a reliable host. We are removing complete control of Airbnb. We have built an Decentralized AirBnB that incorporates three main functionality 1) Rent OUT your Space 2) View Available Space 3) Rent A Space From someone.

Keywords— Blockchain, AirBnB, Booking, solidity, decentralized platform, hotel booking

I. Introduction

Since the hospitality and tourism industries are intertwined, the recent COVID-19 period has had a significant impact on the hotel industry.

Following the COVID, the hotel industry experienced substantial expansion. Therefore, it must be completely transparent when operating. User must remain in their comfort zone with regard to data, money, and everything else. Users as well as industry executives will undoubtedly benefit from the industry's adoption of technology.

One of the most intriguing advancements in digital technology in recent years is blockchain technology, which, despite its relative young, has the ability to profoundly change how transactions are carried out and information is both stored and accessible. Taking a closer look at the blockchain, defining it, and exploring its present and potential future applications within the hotel business are all covered in this article.

For individuals working in hospitality management, blockchain technology provides a number of benefits, with the security and stability advantages being among the most evident. When dealing with financial transactions, for instance, it can be crucial that all data be decentralized, traceable, and that the database can never be taken offline or destroyed by a cyberattack.

Additionally, technology might be incredibly important in streamlining actual payments. Currently, dealing with offshore settlements can make this relatively difficult. Blockchain technology has the ability to speed the entire

process and make it more transparent, which will boost confidence.

The travel sector also depends on the transfer of data and even personal property among numerous businesses. Accessing and storing information can be made more simpler by the blockchain, enabling improved collaboration and eventually enhancing the general travel experience for customers.

Blockchain technology has many benefits for the hospitality industry, including increased stability and security. The usage of this technology considerably simplifies and opens up hotel management. When customers can get the lowest hotel rates without going via a travel agency, everyone wins.

By eliminating the need for a third party, BlockChain Hotel Management utilises Blockchain technology to directly link vacationers with service providers in the hospitality industry. Thus, travellers can quickly acquire inventory from travel suppliers on a private platform without paying markup fees, and suppliers can conveniently distribute inventory to customers without incurring additional costs due to intermediaries.

It will allow hotels to connect with their guests on a more personal level and facilitate a more streamlined reservation process. Because of this, we can now pay our suppliers without any middlemen. Hotels using blockchain technology can cut costs by eliminating middlemen and putting more emphasis on direct interaction between guests and staff.

Because blockchain hotel management reduces both operational costs and the prices that guests pay, it has the potential to reduce the market share of OTAs and other intermediaries. Exchange of data, payment processing, and booking systems all benefit greatly from its implementation. In addition, it guarantees that everyone is compensated in full. It's a great tool for hotels to advertise their available rooms.

Blockchain hotel management software eliminates the need for costly intermediaries by permitting instantaneous transactions between travel agents and their clients. Using this system, hoteliers and hospitality companies may more easily track and adjust room availability and pricing in real time.

Techno Heaven has developed a Blockchain hotel booking system to aid hotels in taking reservations, processing payments, and renting out rooms on a global scale. This blockchain-based hotel booking solution drastically cuts the fees often charged by middlemen, saving hotels a lot of money.

Using blockchain technology, Techno Heaven has developed a new distribution platform for the hotel

industry. By connecting tourists directly with tour operators through Blockchain Hotel Booking, we hope to boost the industry's bottom line and provide greater value to customers. Blockchain hotel booking technology has leveled the playing field for small and large businesses to compete.

Hotels using the blockchain hotel booking system have a number of advantages for travel agencies and agents, including easier and safer payment settlement and protection from fraud. Sci-fi utopia To further democratize the hotel booking process and convey an air of apparent straightforwardness, blockchain hotel booking technology enables hoteliers to engage directly with their guests.

Furthermore, blockchain hotel booking technology enables a more personal interaction between hoteliers and their customers. In addition, this innovation provides consumers with direct access, eliminating the need for intermediaries while also providing them with instantaneous access to the most competitive hotel rates. Blockchain hotel booking system facilitates easier and more streamlined inventory management. Hoteliers also have the option of providing their guests with more transparent services.

Blockchain hotel booking technology allows suppliers to distribute their stock directly to customers without incurring any middleman fees, while sellers of tours and travel can gain access to their stock on a specialized platform free of markup charges. Using Blockchain for Hotel Booking makes it easy to handle all of your travel transaction needs, so you can devote your time and energy to other aspects of your vacation.

Silicon Valley: a utopia for technophiles Blockchain hotel booking creates a distributed database application for travel agencies. We then invite hotel suppliers to join our Blockchain Hotel Booking Technology, where they may generate e-vouchers, provide marketing materials to their sales staff, streamline operations through the use of QR codes, and more. In addition, you can sell your hotel discount voucher indefinitely and anywhere in the world. Authorized travel agencies can simply explore and make group reservations on our hotel website and receive fast confirmation.

In order to lessen their financial reliance on third-party booking platforms, hotels may focus more of their resources on providing superior natural value and services to travellers throughout the world thanks to this blockchain hotel booking technology.

Because blockchain technology is decentralised and transparent, booking through Lock Chain's marketplace is less expensive and safer. Business travellers use Lock Chain tokens to pay for hotels instead of credit cards (LOC). Through the LOC Ledger, a database that records all payment information, all transactions are monitored. A susceptible channel is used to share credit card information in typical hotel transactions that take place outside of the LOC marketplace. Due to the hotel's subpar digital infrastructure, there have been multiple instances of credit card data being hacked. The LOC Ledger is decentralised, holding secure copies of the transaction in numerous locations to thwart fraud. Time-stamped, cryptographically protected, and added to the chain in a reflexive manner, transactions are made such that any tampering would be discovered. This network safeguards you from annoying credit card fraud and dubious hidden costs.

Blockchain technology has the potential to transform the tourism industry because it can bring security and transparency to a number of key touchpoints. A travel agent must submit the necessary information to the various businesses when booking hotels and flights for a client. Due to the fact that accountability is shared across the entire network, blockchain technology could improve the security and transparency of this operation. The level of trust between all parties involved will rise as a result of similar developments in international transactions.

II. EASE OF USE

- A. A smart contract for booking hotel rooms - this should be written in Solidity and deployed on the Ethereum blockchain. The smart contract should handle room availability, pricing, payment processing, and booking confirmations.
- B. A user interface - this can be a web or mobile application that allows users to search for available hotel rooms, book rooms, and make payments using cryptocurrency.
- C. Integration with external payment gateways - since most hotels still accept traditional forms of payment, it's important to have a way to convert cryptocurrency payments into fiat currency payments that hotels can accept.
- D. Integration with existing hotel booking systems - to increase the availability of rooms and to reduce the amount of manual work required, it's important to integrate with existing hotel booking systems like Expedia, Booking.com, or Airbnb.
- E. Security measures - since blockchain systems are vulnerable to hacks and attacks, it's important to implement robust security measures like encryption, two-factor authentication, and regular security audits.

III. LITERATURE SURVEY

[1] The International Conference on Communication and Signal Processing (ICCSP), 2020, "Conference Room Booking Application Using Flutter." As A. Praveen et al. Due to the high degree of unpredictability inherent in last-minute hotel bookings, we often fail to get a room. "Book The Room" is a programme that can help you avoid this kind of problem. Using this tool, [1] we are able to verify the availability of the conference space at any time and book it months in advance. If more than two hours have passed after the limit was imposed, a moderator approval request will be submitted. The clearance allows the usage of the conference room. The requests are processed by the administrator in the order they were received.

[2] BOOKiiIT - Designing a Venue Booking System (Technical Demo)," by H. Singh and R. R. Shah, will be presented as a technical demonstration at the IEEE Sixth

International Conference on Multimedia Big Data in 2020. (BigMM).

Each institution has a system in place to handle accommodation reservations. In a university or college, a number of offices may be responsible for room reservations, with the majority of requests arriving by mail. Functions of the system face a plethora of challenges, such as a lack of availability information, a lack of automation, inadequate reservation management, reservation disputes, a lack of clear communication, etc. These examples highlighted the need for a space management system that is straightforward, efficient, visually appealing, and simple to implement and utilise. Design thinking and the PACT framework were introduced and utilised during the development of BOOKiIT to ensure its usability and efficacy across a wide range of application contexts. The Indraprastha Institute of Information Technology (IIITD) was the initial beneficiary of this programme, however other educational institutions are able to easily copy its components.

[3] 2022's "Smart Room Vacancy Status Checking and Booking System," written by P. Somwong, S. Jaipoonpol, P. Champrasert, and Y. Somchit. "2022 ITC-CSCC: 37th International Technical Conference on Circuits/Systems, Computers, and Communications"

In this study, we provide a system that can use digital sensors to determine a room's availability in real time. In addition, it offers a web application for managing hotel reservations. LoR sensors collect data on environmental parameters such as temperature, noise, and illumination to provide real-time information into the location of a specific area. These datasets are then used as training data for machine learning models capable of determining with high precision whether a room is currently occupied or not. The objective of the tests is to establish the dependability of the system prediction and online application. The outcomes indicate that the designed method obtains a high level of accuracy and F1-score for predicting room vacancy. Moreover, consumers can schedule rooms via a web application, which is an added benefit.

[4] When it comes to booking a luxury hotel, "Luxury Hotel Booking and Scarcity Messages: Does Online Purchase Behavior Matter?" by S. Banerjee and A. Pal may be the answer. ICIM 2020: The Sixth International Conference on Information Management

Hotel booking services regularly use "limited availability" or "book now" language to entice customers to make reservations quickly. However, it is still unclear how these communications influence consumers' willingness to book. Three study concerns, with a premium on five-star hotels, are discussed here. What is the difference between limited-time scarcity signals (like "20% discount - only 1 day left") and limited-quantity scarcity messages (like "20% discount - only 1 room available") when it comes to swaying consumers' tendency to book a high-end hotel? To what extent do frequent online purchasers react differently than infrequent online buyers when confronted with messages of scarcity, and how do these differences affect their likelihood of booking a high-end hotel room? Does the frequency with which a client makes online purchases (frequent vs. infrequent) and the type the restriction messaging (limited-quantity vs. limited-time) influence

their decision to book a high-end hotel? The data was collected from 96 individuals who took part in a web-based study. The results showed that compared to limited-quantity scarcity marketing, time-based scarcity messaging increased booking intent. In addition, frequent online consumers had a higher propensity to make a reservation compared to their less frequent counterparts. But the interaction itself was unremarkable. The results have implications for the management of luxury hotels, the providers of online hotel reservation systems, and internet users in general. Even while regular customers being influenced by messaging of exclusivity is a favourable indicator for marketers, the study serves as a helpful reminder to . However, it remains unclear how these communications affect consumers' booking propensity. Here are explored three study concerns, with a focus on five-star hotels. What is the distinction between limited-time scarcity signals (such as "20% discount - only 1 day left") and limited-quantity scarcity messages (such as "20% discount - only 1 room available") when it comes to influencing consumers to book a luxury hotel? When confronted with messages of scarcity, to what extent do frequent online buyers respond differently than infrequent online buyers, and how do these differences affect their likelihood of reserving a high-end hotel room? Does the frequency with which a customer makes online purchases (regular versus uncommon) and the type of restriction messaging (limited-quantity versus limited-time) influence their decision to book a luxury hotel? The information was received from 96 persons who participated in an online survey. Results demonstrated that time-based scarcity messaging increased booking intent compared to limited-quantity scarcity marketing. Moreover, frequent online shoppers were more likely to make a reservation than their less frequent peers. However, the interaction was uneventful. The findings have ramifications for the management of luxury hotels, online hotel reservation systems suppliers, and internet users in general. Even while regular customers being swayed by exclusive messaging is a positive sign for marketers, the study serves as a beneficial reminder for consumers to avoid developing shopaholic purchasing habits when making online purchases. to avoid developing shopaholic buying habits when making purchases online.

[5] Enhanced Hotel Booking Application Using PEGA, 2020 4th International Conference on Electronics, Communication, and Aerospace Technology (ICECA), 2020 Flying Colors is a Hotel Booking Program by R. Dhanagopal, N. Archana, and R. Menaka. To refine their hotel search results and make an online reservation, users can choose the desired date, location, and hotel type. This structure was based on agile development concepts, which are optimised for working in a remote setting with several communication channels and fast absorbing changes. In terms of mobile capabilities, user experience, and analytics, the PEGA7 Business Process Management (BPM) Tool is revolutionary. With PEGA's assistance, the development of this software will enhance the velocity, vigour, and efficiency of routine company operations. To speed the process while maintaining a high degree of safety, a system is built to manage the complete work flow from beginning to end..

[6] 2017 2nd International Conference on the Applications of Information Technology in Developing

Renewable Energy Processes & Systems (IT-DREPS), K. M. O. Nahar and R. M. Al-Khatib, "EPSSR: Energy preserving system for smart rooms."

Electricity wasting is one of the most pressing problems we face today. We all know of houses, schools, and offices where the lights remain on even if no one is present. This happens when someone is irresponsible, forgets to dim the lights, or is in a hurry. Energy Preserving System for Smart Rooms (EPSSR) is proposed in this paper as a means to reduce energy consumption in smart spaces. Using the ESP8266 chip, a Wi-Fi device with a full TCP/IP stack and MCU functionality, we developed lighting controls to reduce energy consumption. Internet of Things (IoT) new tech removes the requirement for electrical outlets or plugs, allowing for a wide variety of lighting control options in "smart" rooms. For the purpose of our research, we propose using a chip, two infrared sensors, and a seminar room to keep track of how many individuals enter and exit different rooms. A person's presence triggers the light and an increment in the counter. Until there are no longer any counters in the room that are greater than zero, the light will remain on. If a person leaves a room, the counter decreases by 1. If the room's person count drops to zero, the lights will be turned down gradually through relay link. This research proposes a workable strategy for reducing energy consumption that has real-world implications.

[7] 2019 IV Jornadas Costarricenses de Investigación en Computación e Informática (JoCICI), 2019, "Smart Meeting Room Management System Based on Real-Time Occupancy," L. M. Sánchez, I. Daz-Oreiro, L. Quesada, L. A. Guerrero, and G. López.

A PIR sensor and an AWS IoT button should be installed in every smart meeting room, according to the conclusions of this study. Consequently, the booking system will accurately reflect the availability of meeting rooms. IoT devices can connect to a REST web service using a Wi-Fi module for management, allowing them to work in tandem with the free and open-source Meeting Room Booking System (MRBS). In order to evaluate the system, 47 persons participated in a storyboard review. Everyone participating filled out User Experience Questionnaires (UEQs), and respondents were asked to score their overall satisfaction with the product and provide feedback using both positive and negative descriptors. 19 people ultimately evaluated simulated smart conference rooms and offered input via the UEQ survey. Positive evaluation results indicate that participants view the proposed system favourably.

"A Low-Power Electric-Mechanical Driving Approach for True Occupancy Detection Using a Shuttered Passive Infrared Sensor," by L. Wu and Y. Wang. *IEEE Sensors Journal*, volume 19, number 1, pages 47-57. (January 2019).

[8] Passive infrared (PIR) sensors are the most common type of sensors used in buildings for this purpose. PIR sensors are motion detectors, but they react only to changes in incident radiation, leading to annoying lighting fluctuations, missed threats, and wasted energy. To address this issue, a Lavet motor passive infrared (LAMPPIR) sensor-powered optical shutter is developed for reliable presence detection. In order to reduce the sensors are the most prevalent form of building sensors

utilised for this purpose. PIR sensors are motion detectors, however they only respond to changes in incident radiation, resulting in unpleasant illumination variations, missed threats, and energy waste. For dependable presence detection, a Lavet motor passive infrared (LAMPPIR) sensor-powered optical shutter is designed to overcome this issue. In order to minimise the power consumption by up to 89%, the size by up to 60%, the weight by up to 75%, the cost by up to 31%, and the acoustic noise by up to 12 dBA, a single figure electro-mechanical driving strategy is introduced for LAMPPIR in comparison to conventional servo and stepper motors. In particular, the field of view (FOV) of a PIR sensor is intermittently sliced by a signal generated by an electro-mechanical vibrator driving a semi-transparent prolonged infrared optical barrier. Studies including the continuous monitoring and analysis of the voltage outputs generated by the LAMPPIR sensor enable the fine-tuning of the aperture width and shuttering time for accurate presence detection. Experiments indicate that 100% classification accuracy can be attained when recognising stationary residents from 4.5 m and when detecting moving residents from 10 m. This would indicate that the detection range of C-PIR and Ro-PIR sensors has grown (4.0 m for stationary and 8.0 m for moving occupancy detection for both sensors). In addition, the field of view (FOV) of the LAMPPIR sensor is 90 degrees horizontally and 100 degrees vertically, which is adequate for most applications. After 31 hours of testing, 97% of rooms were accurately categorised as either inhabited or unoccupied, and 93% of rooms were correctly categorised as either inhabited or unoccupied, stationary, or with a moving occupant. consumption by up to 89%, the size by up to 60%, the weight by up to 75%, the cost by up to 31%, and the acoustic noise by up to 12 dBA, we introduce a single figure electro-mechanical driving approach for LAMPPIR in comparison to conventional servo and stepper motors. Specifically, a PIR sensor's field of view (FOV) is intermittently sliced by a pulsed signal generated by an electro-mechanical vibrator driving a semi-transparent protracted infrared optical barrier. Parametric studies involving the constant monitoring and analysis of the voltage outputs generated by the LAMPPIR sensor make it possible to fine-tune the caption width and shuttering time for high-precision presence detection. Experiments show that 100% classification accuracy may be achieved while detecting stationary residents from a distance of 4.5 m, and when detecting moving inhabitants from a distance of 10 m. This would imply that the detection range of both C-PIR and Ro-PIR sensors has increased (4.0 m for stationary and 8.0 m for moving occupancy detection for both sensors). Moreover, the LAMPPIR sensor's field of view (FOV) is 90 degrees horizontally and 100 degrees vertically, which is sufficient for most uses. After 31 hours of testing, 97% of rooms were correctly classified as either inhabited or unoccupied, while 93% of rooms were correctly classified as either occupied or unoccupied, stationary, or with a moving inhabitant.

VI. EXISTING SYSTEM

The existing approach allows the platform to collect a 20% service fee of the entire reservation price. The current system is vulnerable to SQL injections and other forms of data attack due to the lack of security mechanisms that were implemented when the system was originally built. It is not possible to scale the current technology to handle more sophisticated use cases.

A. Figures and Tables

S.no.	Authors	Adopted methodology	Features	Challenges
[1]	Praveen et al	Blockchain	The "Book The Room" software will come to your aid in preventing such an eventuality.	The administrator serves the queued requests in order of arrival.
[2]	H. Singh and R. R. Shah	Blockchain	User-friendly and effective in a variety of use contexts	It is simple to reproduce for other institutions.
[3]	Linu Shine	Blockchain	System has a very high accuracy rate and F1-score for predicting room vacancies.	More expensive and resource-intensive

V. PROPOSED SYSTEM

We present a decentralized home-sharing network that allows both short- and long-term stays and accepts both cryptocurrency and more conventional forms of payment. That's right, we're building a decentralized Airbnb. Platforms like Airbnb can benefit greatly from blockchain technology. This is because it can remember a user's digital footprint. Guests can immediately verify your credibility as a host by checking your account ID number. Our goal is to free ourselves from any Airbnb responsibilities. We've developed a decentralized version of AirBnB with three core features: Two steps: 1) List your space for rent and 2) Browse Current Listings 3 Rent a location from a third party

The booking system built on the blockchain is open, easy to navigate, and reliable due to its tamper-proof nature. The cost of making a reservation through this method is always the same. This type of reservation system can be accessed from a mobile device using dedicated apps. Hotel bookings are handled through a solidity-based smart contract that is powered by the ethereum coin. When using a block chain to make hotel reservations, it is easy to see how many rooms are still available.

IV. CONCLUSION

The tourism industry is just beginning to explore the broader applications of blockchain technology. Researchers from around the globe are collaborating on blockchain-based travel

frameworks and applications. In recent years, the rapid spread of blockchain research has led to the development of novel and exciting travel-related applications. On your next trip, you no longer need to worry about identity theft or lost travel documents due to blockchain technology. This article discusses the significance of blockchain technology for the hospitality and tourist industries. This study focused on blockchain technology and its possible hotel industry uses. This exploratory study comprises of a literature review pertaining to the application of blockchain technology to the hotel industry. This report examines the prior five years' worth of research on blockchain technology and its applications in the hotel and tourism industries. The paper includes various significant case studies from the hotel industry to aid readers in comprehending the subject at hand. It also permits us to consider novel study avenues. How challenging do you believe it is to deploy blockchain technology in the hotel industry? Can we anticipate a shift in hotel profitability due to the introduction of blockchain? Nonetheless, the study presents itself as an intriguing addition to the current literature that will help readers extend their viewpoints and make substantial contributions to the advancement of science.

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