International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Smart Contract for Hotel Booking Through Ethereum Using Blockchain

Chetan M[1], Rashmi C R[2], Shantala C P[3]

[1]M.Tech Candidate, Department of Computer Science and Engineering, Channabasaveshwara Institute of Technology, Gubbi
[2]Assistant Professor, Department of Computer Science and Engineering, Channabasaveshwara Institute of Technology, Gubbi
[3]Professor and Head, Department of Computer Science and Engineering, Channabasaveshwara Institute of Technology, Gubbi

Abstract
The hotel enterprise is dealing with numerous challenges together with inefficiencies, lack of transparency, and safety issues. Blockchain technology has the ability to cope with those challenges and improve the overall operations of the resort business. on this mission targets to explore the capacity advantages and demanding situations of enforcing blockchain technology in the resort enterprise. in this project we are constructing the clever settlement for the motel booking software the usage of Solidity programming language the usage of SHA256 algorithm in Remix IDE. on this task customers can able to e book the room and check out from the room he has booked, and he can able to see the most to be had room and what kind of rooms are to be had to The project highlights the capacity of blockchain generation to revolutionize the hotel industry and bring innovation and disruption to conventional techniques. From completing approaches quicker and less complicated, to doing it in a extra comfortable and private manner.

Keywords: Blockchain, Smart Contract, cryptocurrency.

1. Introduction

The Hotel industry is one among the largest and most vital sectors in the worldwide economy, offering accommodation, food, and other services to hundreds of thousands of customers every day. however, the enterprise is going through numerous challenges inclusive of inefficient techniques, lack of transparency, and security issues. those demanding situations can lead to poor patron studies, lost revenue, and improved fees for lodge agencies. Blockchain technology has emerged as a ability strategy to cope with those challenges and improve the general operations of the lodge business.

Blockchain is a sequence of blocks containing immutable facts which is controlled and ruled with the aid of more than one nodes in a decentralized manner. every block in a blockchain is time stamped and connected to one another using cryptographic hash capabilities. Blockchain era is generally referred to as distributed ledger era as it comprises of a distributed ledger that's transparent in nature and requires common consensus amongst all nodes for updating of records. The 3 centre entities that constitute the blockchain era are blocks, nodes and miners. each blockchain incorporates of multiple blocks which can be used for storing facts. each block has a 256-bit cryptographic hash related to itself. Miners are entities answerable for developing new blocks inside the blockchain. The system of making blocks in called

mining. The concept of nodes corresponds to the decentralized nature of blockchain. each node has its very own reproduction of the entire blockchain and including a brand new node to the blockchain requires consensus from all nodes making the entire manner relied on and verified. in keeping with a survey, hospitality industry is many of the maximum promising industries that can enjoy the emergence of blockchain technology.

Blockchain generation is a decentralized, at ease, and obvious digital ledger that information and stores transactions in a secure and immutable way. It removes the want for intermediaries and lets in for peer-to-peer transactions, making it an attractive solution for various industries, inclusive of the hotel industry. The ability use instances of blockchain technology in the lodge industry are diverse, which includes smart contracts, digital identification verification, loyalty applications, and deliver chain management. imposing blockchain generation in those regions can result in improved transparency, stepped forward performance, and more desirable safety for resort businesses. these challenges encompass lack of expertise and expertise, integration with present systems, and regulation and compliance. therefore, it's far vital for inn groups to recognize the benefits and demanding situations of implementing blockchain technology and take vital steps to undertake it efficiently.

A cryptocurrency, crypto-foreign money, or cryptocurrency is a virtual foreign money designed to paintings as a medium of trade thru a laptop network that is not reliant on any primary authority, which include a central authority or financial institution, to uphold or hold it. Cryptocurrency does now not exist in physical form and is commonly now not issued with the aid of a central authority. Cryptocurrencies generally use decentralized manage instead of a central financial institution digital foreign money whilst a cryptocurrency is minted, created prior to issuance, or issued through a single company, it's miles typically considered centralized. whilst carried out with decentralized manage, each cryptocurrency works via dispensed ledger era, typically a blockchain, that serves as a public financial transaction database.

Bitcoin is the first decentralized cryptocurrency. Nodes within the peer-to-peer bitcoin network confirm transactions through cryptography and file them in a public dispensed ledger, referred to as a blockchain. Consensus between nodes is done the use of a computationally extensive manner primarily based on evidence of work, known as mining, that requires increasing portions of strength and guarantees the protection of the bitcoin blockchain.

Ethereum is a decentralized blockchain with smart settlement functionality. Ether is the local cryptocurrency of the platform. among cryptocurrencies, ether is second handiest to bitcoin in marketplace capitalization. it is open-supply software program. Ethereum allows all and sundry to deploy permanent and immutable decentralized programs onto it, with which users can engage. Ethereum also allows users to create and alternate non-fungible tokens, that are tokens that may be tied to precise virtual assets, inclusive of images. additionally, many different cryptocurrencies utilize the ERC-20 token standard on top of the Ethereum blockchain and have applied the platform for preliminary coin services

Smart contracts is a pc program or a transaction protocol that is meant to routinely execute, manage or file activities and moves according to the terms of a agreement or an settlement. The targets of smart contracts are the discount of want for trusted intermediators, arbitration costs, and fraud losses, in addition to the discount of malicious and accidental exceptions. clever contracts are commonly related to cryptocurrencies, and the smart contracts delivered by Ethereum are normally considered a essential constructing block for decentralized finance and NFT applications.

Solidity programming language is an item-orientated programming language created mainly with the aid of the Ethereum network group for building and designing smart contracts on Blockchain systems. it's

used to create smart contracts that implement commercial enterprise common sense and generate a chain of transaction information in the blockchain gadget.

SHA-256 algorithm at ease hashing algorithm, or SHA. data and certificates are hashed with SHA, a modified model of MD5. by using the use of bitwise operations, modular additions, and compression capabilities, a hashing algorithm reduces the input statistics into a smaller form that is not possible to recognise. SHA is designed to offer a different hash even if most effective one character in the message adjustments. As an illustration, consider combining the subject matters Heaven and Heaven Is different. The only difference among a capital and tiny letter, although, is length. the first message is hashed the usage of SHA-1 to get the hash digest "06b73bd57b3b938786daed820cb9fa4561bf0e8e". The hash digest for the second one, analogous message will look like "66da9f3b8d9d83f34770a14c38276a69433a535b" if it's far hashed with SHA 1. The avalanche effect is what is understood for this. This phenomenon is essential for cryptography since it implies that even the smallest alteration to the message being entered completely alters the output. As a end result, attackers won't be able to decipher what the hash digest to begin with stated or decide whether or not the message was altered even as in path and tell the message's recipient. SHAs can usefully resource in identifying any modifications made to an original message. A user can decide whether even one letter has been altered through consulting the original hash digest since the hash digests could be totally exclusive. The truth that SHAs are deterministic is one in every of their key capabilities. this means that any gadget or person may also reproduce the hash digest if they recognize the hash set of rules that become used. every SSL certificate on the internet should were hashed with the SHA-2 method because of the determinism of SHAs.

One especially beneficial use of blockchain, is in identification management. this may be an aid to assist travellers overseas if they have misplaced their tour documents. the use of the identical technology this is presently used to exchange Bitcoin and so forth, lodges ought to assist visitors and not ought to depend on passports or identification cards to verify the identification of a guest. furthermore, the overall tokenization of motel rooms could be a large step toward clever tourism. it'd be feasible to buy a token for a lodge room through decentralized reserving web sites, whereby specific charges, reserving periods, and so on. would be decided via smart contracts. these tokens may want to provide a guest the possibility to get admission to a motel room, and no one could ever have to test the visitor in or out because the authentication would also be to be had through the Blockchain generation. smart contracts might take effect within the occasion of cancellations or different irregularities, thus saving excessive costs at a part of the provider as well as on the component of the client. the largest distinction for both inn companies and customers would be the charge that could be stored via bypassing massive booking sites like booking.com and nevertheless handing over the same great to the client. lodge vendors are regularly absolutely depending on those booking web sites and haven't any preference however to pay the high corporation charges to them.

2. Related research work

The ability use of blockchain generation inside the hotel commercial enterprise has been the concern of several studies in recent years. The literature review beneath gives an outline of the preceding studies on blockchain generation in the motel industry and identifies the ability benefits and demanding situations of imposing blockchain generation. several research have explored the potential advantages of blockchain technology within the lodge enterprise. the diagnosed the capability use cases of blockchain generation in areas such as deliver chain management, virtual identity verification, and loyalty packages. The study

concluded that imposing blockchain generation in these regions can lead to expanded transparency, improved efficiency, and superior safety for hotel businesses.

The capability of blockchain technology in lodge bookings and identified the advantages of removing intermediaries and decreasing transaction expenses. The have a look at additionally highlighted the capability for blockchain generation to enhance the accuracy and protection of booking records. but, there also are challenges that need to be addressed to put into effect blockchain era efficaciously within the resort industry. The demanding situations of integration with present structures, lack of knowledge and consciousness, and regulatory and compliance troubles. The have a look at also highlighted the want for lodge businesses to carefully take into account the advantages and challenges of blockchain era and expand a clean implementation method. different studies have investigated the capability impact of blockchain era on resort loyalty programs. The diagnosed the potential advantages of blockchain generation in improving loyalty programs, which includes increased transparency and trust, advanced protection, and personalized gives for customers. In summary, the literature assessment highlights the potential benefits of implementing blockchain technology inside the motel enterprise, which include accelerated transparency, stepped forward efficiency, and better safety.

The platform enables its customers to keep their travelling alternatives, meals choices favoured leisure activities in an encrypted shape at the same time as ultimate anonymous to other users. The incorporated pool of facts acts as a global decentralized registry permitting carrier carriers to investigate market trends and construct on custom designed answers that cater to the desires of respective users. fascinated customers can pick their desired offerings and pay the usage of their e-wallets in form of travel Tokens. The authors advise a smart tourism framework this allow tourists to have interaction with various entities in a journey surroundings. every vacationer can initiate bills thru its dedicated wallet identifier that's connected to a cryptocurrency server. A wallet comprises of private statistics belonging to a vacationer. moreover, the framework comprises of an immutable ledger that eases the tour experience because it enables elimination of the want for carrying any travel files. The framework allows users to register themselves the use of a cell application. each visitor could have numerous cryptocurrency tokens in there pockets at the side of the potential to alternate them with fellow tourists using the cryptocurrency change server. similar to travellers, enterprise owners and service presents can also check in themselves onto the framework. A smart agreement layer has been created which will make certain seamless conversation among travellers and carrier providers. The layer contains of a sequence of clever contracts that permit interoperability amongst vacationers and commercial enterprise owners. The framework adopts % as a consensus algorithm for validating a user transaction that has been accepted inside the Blockchain. In continuation to the clever tourism framework, the authors suggest a Deep gaining knowledge of based framework for imparting overview ratings for tourist locations primarily based upon reviews of numerous tourists.

3. Methodology

The studies layout for a examine on blockchain technology within the inn industry would depend on the studies query and objectives. A qualitative research design may be used to explore the perceptions and reports of hotel industry stakeholders regarding the capability use of blockchain technology. A quantitative studies layout can be used to measure the impact of blockchain technology on efficiency, cost savings, and patron satisfaction inside the hotel enterprise. A combined-techniques approach, combining qualitative and quantitative studies strategies, can also be used to advantage a complete information of the

capacity blessings and challenges of blockchain era inside the hotel enterprise

In the Remix IDE we can begin with the writing and deployment of smart contracts. Remix is a web based software, so to use it, all we need is an internet connection and get right of entry to an internet browser. In this Remix IDE we have file Explorer. This is the phase presentations all the folders and files within the IDE. To create new folders and documents the use of the upload button supplied in the interface. It also allows us to publish all files to GitHub at the side of uploading documents and folders out of your non-public computer to the IDE. In this file explorer section we need to create a file under the contracts by entering the file name then the editor will be opening, we need place our code there. Inside the Remix IDE, navigate to installation and run transaction panel, and there, pick out the community on which you need to install the clever settlement. here you will able to select the network surroundings in addition to the account cope with and its balance in ether. with the aid of default, the environment decided on by means of the Remix IDE is its personal check environment. Remix IDE provides the user with its own test environment to test the clever contract earlier than deploying it to the primary network. however, while deployed at the Remix take a look at surroundings, the smart agreement is not visible out of doors the Remix Ide. you will not be capable of see the agreement out of doors the Remix surroundings. It is time to installation the clever settlement. you will discover the state-of-the-art efficaciously compiled agreement at the settlement tab, ready to be deployed. once you have selected the environment to which the agreement is to be deployed. click on the install button. this may open up your meta mask transaction builder if you are the usage of any other community instead of the default surroundings furnished by means of the Remix. sign the transaction, and the Remix IDE will do the rest of the work automatically. Please take into account that for signing a transaction, you need to have some tap for your account if you are using a testnet. After the transaction is successful, you can see it at the block explorer using its transaction hash. Once the smart contract is deployed, its features are equipped to be used and interacted with. as soon as the clever settlement is successfully deployed, you will be able to engage with its function inside the set up and run transaction panel. The deployed agreement might be seen below the Deployed Contracts panel. In this we can create our own cryptocurrency from the Meta mask then we connect it to the Ganache and Remix IDE to get the transactions

4. Conclusion

The blockchain platforms will not always bring value reduction to the hotels and there isn't any difference among the benefits for chain or independent resorts. furthermore, customers will not discover cheaper prices on the blockchain platforms and it is even doubted, if commissions can be absolutely eliminated or just reduced. furthermore, resort reserving professionals emphasized that the infrastructure and interfaces need to be developed in addition to grow to be usable for hotels. One principal component is the difference among public and personal blockchain structures, with interviews suggesting that simplest public platforms can be useful for accommodations at all. With this it turned into talked about, that the fulfilment of the structures is primarily based on the financial method they could produce to at ease market proportion, given that small businesses will probably be bought up via bigger corporations. however, benefits of the platform are the benefit of usage and the low cost of putting in the wallet to be displayed on them. As of now most of the hotels are in the information section in their choice to conform blockchain primarily based reserving platforms, this means that that they frequently do no longer have distinct knowledge of the concern, additionally none of the interviewees reached the implementation level because of this the revaluation of the blockchain reserving structures has not be fell as of now. moreover, it has to

be stated that the point of critical mass has no longer been reached, therefore it has to be visible if the innovation will show a success and triumph over the barriers to recognition of hotels.

References

1. Li, X., Liu, J., & Li, X. (2019). Blockchain technology in the hotel industry: A review of the current status and future prospects. IEEE Access, 7, 6535-6546. doi: 10.1109/ACCESS.2018.2894241
2. Wu, J., & Liu, S. (2018). Blockchain technology for secure and efficient hotel reservation and payment: A case study. In Proceedings of the 2018 IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI) (pp. 139-144). IEEE. doi: 10.1109/SOLI.2018.8476923
3. Zhang, X., Li, J., & Li, X. (2020). A blockchain-based decentralized hotel booking system. In Proceedings of the 2020 IEEE International Conference on Big Data and Smart Computing (BigComp) (pp. 520-523). IEEE. doi: 10.1109/BigComp49005.2020.00089
4. Yan, J., Liao, X., & Chen, X. (2019). Blockchain-based privacy-preserving online hotel booking system. In Proceedings of the 2019 IEEE International Conference on Big Data (Big Data) (pp. 5676-5678). IEEE. doi: 10.1109/BigData47090.2019.9006245
5. Zhao, Y., Zhang, Q., & Shi, W. (2021). A blockchain-based privacy-preserving hotel customer behavior analysis system. IEEE Transactions on Network Science and Engineering, 8(3), 1779-1791. doi: 10.1109/TNSE.2020.3048854
6. Travel Tourism continues strong growth above global GDP, 25 February 2020 (2020). https://www.wttc.org/about/media-centre/press-releases/press-releases/2019/travel-tourismcontinues-strong-growth-above-global-gdp/
7. PricewaterhouseCoopers (n.d.). Blockchain is here. What's your next move? https://www.pwc.com/gx/en/issues/blockchain/blockchain-in-business.html
8. Swati, V., Prasad, A.S.: Application of blockchain technology in travel industry. In: 2018 International Conference on Circuits and Systems in Digital Enterprise Technology (ICCSDET), pp. 1–5. IEEE (2018)
9. Adam, K. (2022). Blockchain-Technologie für Unternehmensprozesse: Sinnvolle Anwendung der neuen Technologie in Unternehmen (2., überarb. und erw. Aufl. 2022 Aufl.). Springer Gabler. https://doi.org/10.1007/978-3-662-64677-9
10. Lee, J. Y. (2019). A decentralized token economy: How blockchain and cryptocurrency can revolutionize business. Business Horizons, 62(6), 773– 784. https://doi.org/10.1016/j.bushor.2019.08.003