Secure Online Review System using Blockchain

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Abstract - *As technology improves, marketing is slowly becoming digitalized. Each product and information is available on the Internet and marketing platforms using Android applications or on the website. However, with the upgraded marketing ideas, there is also the risk of fraudulent activities like fake feedback and reviews, which may result in the false promotion of the respective company, also a possibility where the owner can alter to maintain the company prospect. To avoid deceptive actions by the third party, a secured system is required where even the company owner will own fewer privileges in retaining the customer service part of the Business. Blockchain technology is a secured platform for booking an online review system to avoid altering feedback and reviews. This technology comes into the picture when reviews are posted; while they are posted, it is encrypted using the AES Rijndael algorithm*

*Key Words***: Blockchain, AES Rijndael algorithm, hash value**

1. INTRODUCTION

A lot of online apps are developed which support digital marketing in a wide range. Sometimes digital market also reaches remote areas with virtual customers. In this era of marketing, feedback and reviews play a significant role in being in the race with other emerging companies. Online review systems carry many benefits to both businesses and consumers. Many entrepreneurs and consumers often and incorrectly view Ecommerce as an easy way to make money. One factor contributing to success is using online customer reviews to build a more substantial online existence. However, online reviews aren't indeed 100% beneficial. There are a few boons and banes associated with online customer reviews. The Business's trustworthiness is improved more that help customers to purchase more quickly that are good are of good quality. Many businesses understand the significance of consumer reviews and attempt to maintain the overall reviews to be attractive. However, the online survey system cannot completely uphold the Business due to fraudulent activities internally and externally.

Organizations who receive a lower review score are encouraged to improve their score to compete in the market by bribing the platform to alter and delete the uploaded comments or reviews. Furthermore, a platform's automatic filtration system filters out some ideas without the users' knowledge. Because of the platform's lack of openness, the reviews have a poor level of validity. On the other hand, because publicly blockchain technology can trace every operation, it delivers excellent transparency. However, various considerations, such as cost and reaction time, must be addressed. This work tends to find the potential of using Blockchain technology in the online review system. Therefore, it is worthy of trading response time with transparency and cost. From the business perspective, the feedback posting with price causes more challenging to generate fake reviews. Besides, the centralized system has many other advantages, such as the reward system, bogus review voting, and global Database.

Thus, for blockchain technology, its potential application is to improve the credibility of consumer's digital review system. Therefore, the conventional online review system is full of dubiousness. Thus, Blockchain helps in improving the online review system transparency to a great extent. Blockchain technology has complexity and novelty. Based on cost and response time, blockchain will identify the pros and cons of the review approach compared to traditional methods. Along with the online review system, implement B2B system also Business-to-Business (B2B) retailer sell products to sellers, i.e., small retailer's sell products to Bigger sellers. These more significant sellers sell products to customers.

2. RELATED WORK

We propose a system to develop an application that will help secure the online reviews from being altered and possess the original review by the customer as it is by maintaining their authenticity. This project mainly

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concentrates on providing the reliability of customers to online business ventures. A blockchain is a decentralized, distributed, and often public digital ledger comprising of records called blocks.

In a computer network where many PCs are involved in the transaction are recorded so the block that is involved in the transaction cannot be altered without altering all subsequent blocks. Using blockchain technology to post the comments/reviews part plays a magnificent role in securing those genuine reviews given by the customers. Also, the necessary security steps like login ID, password are provided for the authenticity of the customers.

[1] The author provides information about the alternate security system, the Interplanetary File System (IPFS), for posting reviews for the purchased products and reducing the transactional cost, unlike the centralized system where each transaction from different nodes in a network must pass through the single body. Also, the time consumed by blockchain technology is more than any other review system, as an authentic review is more important than how fast the review is uploaded.

[2] In this paper, the authors have mentioned the importance of customer reviews by comparing ethereum, smart contract, and IPFS. They have considered the critical functionalities like token number given to users that allow writing a review, access restriction for service providers, address of the users and service provider, etc. With various IDE combined, testing and validation of the methods for the front-end application is performed, which presents the blockchain-based solution for the review system.

[3] Blockchain technology consists of smart contracts where it needs the help of external data sources to access data. Oracle is a data source whose primary function is collecting and providing the inputs to the smart contracts. When the oracle is adopted, the author in this paper referred to the challenges faced with features like Design Challenges, Implementation challenges, Security and Privacy, External Data Semantics, and Governance.

[4] Revain[12, 13]is a review platform that makes use of IBM's artificial intelligence. It screens out and removes potentially fraudulent and low-quality ratings, leaving only "positive" evaluations on the Ethereum blockchain, where they can't be changed or tampered with low-quality reviews. The platform's early

incarnations limit reviews to finished ICO and crowdfunding bitcoin projects. They do plan to expand into e-commerce, booking, and gaming, though.

[5] Customer reviews will become increasingly important for e-commerce businesses and manufacturers as the industry grows. This research paper presents a prototype system for tracking and managing customer reviews. The prototype system approach can be applied to e-commerce businesses as a low-cost solution for managing and analyzing online reviews..

[6] With the explosion of the Internet, the author of this article claims that product reviews have become an essential aspect in creating a brand image and corporate reputation. A poor review can have a significant impact on the business's importance. Negative reviews have spawned an industry known as "reputation management," whose primary goal is to assist businesses in "concealing" negative reviews.

2.1 KEYWORDS

Online review system: In the existing online review system, not being transparent, security is also a significant issue for posted online reviews. The companies that get low score reviews are induced to raise their score for the market competition capability by paying the platform for deleting or editing the posted reviews, manual maintenance of seller product (B2B), and transaction details.

Blockchain: Blockchain technology is a digital record of the transaction which involves a set of blocks. These blocks are said to be discrete and are connected unilaterally, called a chain. Each of the transactions will be confirmed by many computers involved in the network through the Internet. Data uploaded in this chain is encrypted using the hash algorithms (SHA- 256), which post encryption is a considerable number to decrypt.

Hash algorithms: Due to their single distinct hash function that produces individual outputs when given diverse inputs (SHA-1, SHA2, and SHA-256). Encryption is the most widely accepted secure computations connected to blockchain innovation. SHA-256 is being used in this project for obtaining the hash value of the product reviews.

AES Rijndael: is also used for encrypting the hash value.

3. PROBLEM STATEMENT

The authentication of the reviews and feedback on the online applications is considered an essential part of the Business. There is also a possibility of these reviews being misrepresented on their websites for promoting or demoting marketing. Falsification of such reviews causes deceitful situations. However, with the increase in online business applications, the competition amongst similar businesses increased exponentially, leading to maintaining the best reviews on the review page. So the applications or website requires a technology that avoids fraudulent activities, which is necessitated with blockchain technology. Blockchain is a mechanism for digitally duplicating and distributing transaction information over a whole network of computer systems, making it difficult or impossible to edit, hack, or defraud the system.

4. METHODOLOGY

The proposed system is a globalized website that contains reviews of products that the customer purchases. It will also help the user know the actual product quality since the reviews would be genuine, and the application becomes trustworthy for users. Since the secured online review system involves a software application, this project will be performed as a simulation project. Here blockchain technology is used to protect the genuine reviews given by the customers. The customer-posted online reviews are stored in the cloud database. Each review is encrypted using the AES Rijndael algorithm, using blockchain technology & stored in a cloud database.

While displaying product reviews, an encrypted review will be decrypted. The proposed application also maintains small sellers' product transaction details to big sellers, i.e., business-to-business (B2B). Based on this application, customers can view original product reviews, not fake reviews. This enables privacy and security and prevents third-party access and altering it. The online review system in this project possesses a specific set of procedures that follow to give reviews or feedback for the purchase or experience on the website. Mentioned online review system involves the registration, providing the required valid credentials, login id, and password. Creating an example application helps in a better understanding of the project.
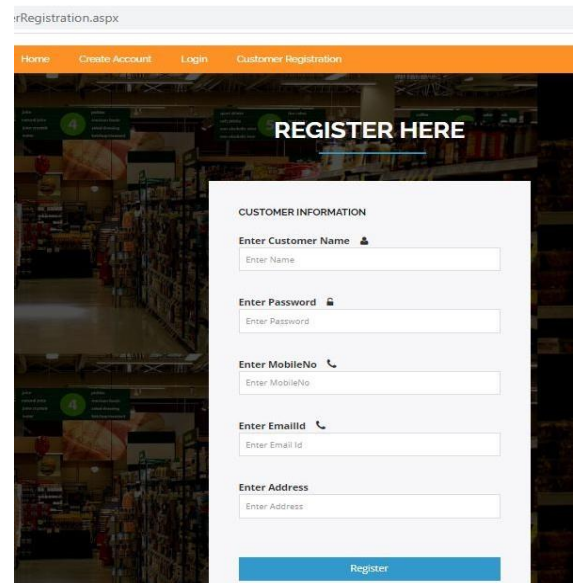

Figure 1: Customer registration process

Figure 3 shows that three categories are involved in the online shopping business: shop owner, Supplier, and customer. Keeping My SQL Server Database as the center for all the online business categories, starting from the shop owner who connects to product stock, Supplier, and digital wallet simultaneously. A shop person refers to the products in the store and manages the product supplier through the orders. The payments of the orders are saved in the Shop owner's wallet, which in turn connects to the Database. The Supplier is related to his digital wallet, Server, and Database, who takes orders from the Shop Owner alone and provides the required.
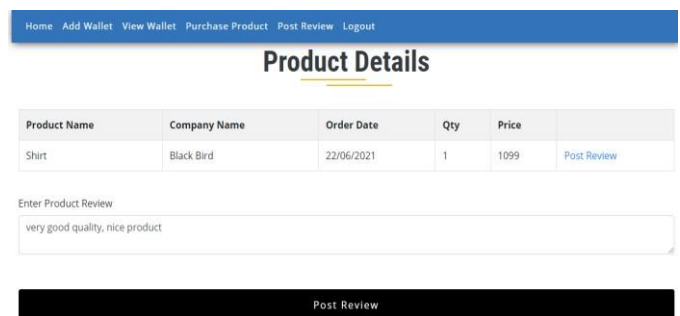

Figure 2: Posting the Customer review

The customer, On the other hand, or a user who is involved with the activities in the application to follow the registration process at the beginning to access the products in the application, then log in to purchase the requirements and provide the review, which will then be secured with a technology called the Blockchain.

Transactions are stored as digital record represents Blockchain. Individual records are stored in a structure called blocks. They are linked together in a single list, called a chain; Each transaction submitted to Blockchain is validated by many computers connected to the Internet.
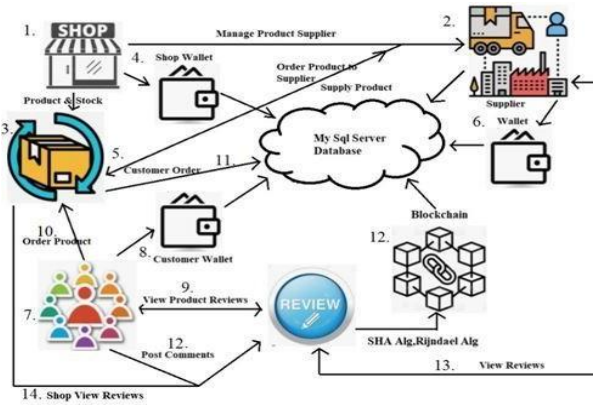

Figure 3: Stepwise Process diagram of the review system

The review or comments posted by customers will be stored in a dynamically created table; this table consists of the fields of the factors that provide necessary information about the product, serial number, review posted dates, and product id. The table is then stored in MY SQL server, cloud database. The server will create two databases possessing the same information to retrieve the data from the second Database if the first Database is altered. The reviews posted by the customer will be encrypted using SHA- 256 and AES Rijndael algorithm. Also, The product ID, customer ID, and product information will be encrypted. The hash values will be 64 characters in length. The comments that are posted engage the Rijndael algorithm. After posting the reviews, the user can log out of the application created for the online purchase.

The Money transaction will be done through the digital wallets of the shop owner and customer wallet. After the purchase of the product, the customer can provide the overall feedback and experience of the purchase. Which is then using Blockchain is stored in the server. Supplier and Shop owners will have access to view the reviews with their respective accounts.

5. RESULTS

This section shows the screenshots of the outcomes. Figure 2 shows tampered status of the review of the customer. When the genuine review of the customer is being tampered with, the review page shows the edited review option where the person who is referring to the review can retrieve the original review by selecting the recover option.
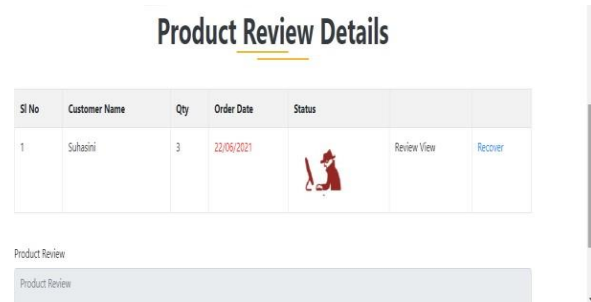

Figure 4: Tampered Status of Customer Review

Figure 5: Recovered Status of Customer Review

Figure 5 shows the recovered status on the review page. The review at the recovery stage is now retrieved from the additional Database stored in the server if the original Database is corrupt by tampering or eavesdropping. Here the review of the customer who was tampered with is recovered and brought to a legit status. This process of retrieving the original review is possible as it will be stored by the blockchain process in the additional Database created while creating the first database table.

6. CONCLUSIONS

A secured online review system using Blockchain has been developed using the C# programming language. For the public purpose and un-trusted practices, this approach is secured and productive, improving the trustworthiness of the online Business. This new approach exclusive in many ways like,

1. Tampering the reviews or feedback will also help to regain the original comments immediately.
2. this approach will reduce the fraudulent activities to a great extent helping in the increase of trust of the Business by the

In recent days, most of the Business is being online, and falsification of the reviews may lead to a misconstruction of the company. Tampering or hacking of the reviews may damage the reputation of the Business. Using this approach will help overcome any uncertainty in the product quality as the original reviews will be displayed immediately. As the online business improvement or deterioration depends on the customer reviews, maintenance of the high-level reviews becomes crucial.

Review platforms have made it easier to tap into the wisdom of the community by speeding up and systematizing the process of sharing the experience. Customers, the media, and legislators have all benefited from online reviews. However, for reviews to be valuable to consumers, vendors, and the general public, review system administrators must carefully evaluate design decisions and represent users' experiences.

ACKNOWLEDGEMENT

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