

Online Customer Reviews on Restaurant Using Blockchain

D. Saveetha

Department of Information Technology, SRM Institute of Science and Technology, SRM Nagar, Kattankulathur, Kancheepuram, Chennai, TN, India. E-mail: saveethd@srmist.edu.in

Dr.G. Maragatham

Department of Information Technology, SRM Institute of Science and Technology, SRM Nagar, Kattankulathur, Kancheepuram, Chennai, TN, India. E-mail: maragat.g@srmist.edu.in

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Abstract

Modern day businesses are largely dependent on digital technologies. People prefer viewing the reviews before making any decisions. It applies to all consumables like buying Electronic items, Clothing, Travel, Guest-House, Restaurant, Rental, Housing, Automobile, Cosmetics, Jewellery, Movies, etc. Online services like Mantra, Yelp, Amazon, Facebook, Google My Business, Trip Advisor offer great services to the customer. However, drawbacks of these systems are fake reviews, negative reviews and sometimes even tampering of the reviews given by the customers, which has a huge impact on the business leading to huge financial losses. Sometimes a competitor in the business might also influence the ratings being provided. The centralized storage of these reviews also leads to problems like tampering or manipulation of the data being stored. In this paper we propose an application in the restaurant industry that solves all these drawbacks by making use of the Ethereum blockchain. The food reviews given by the customers are stored as smart contracts in the blockchain, which can't be altered, thus guaranteeing the authenticity of the reviews. Validity of the reviews is ensured because it is difficult for the restaurants to delete or create new accounts to wipe away the bad reviews given. Blockchain is immutable so we ensure that the reviews are genuine and the system is trustable.

Keywords

Ethereum, Blockchain, Smart Contracts.

Introduction

Online reviews are becoming the defacto form of marketing and communication rather than the traditional forms. In recent years most of the customers (90%) have the habit of reading the reviews and then making any decisions. This has a huge impact on the

behaviour of the local consumers (88%) because they believe online reviews as a personal recommendation system. If a business has got good reviews, customers prefer them rather than the businesses with lesser reviews. So the businesses with negative feedback lose their customers to competitors with better online ratings. Trustworthiness of the review is a crucial factor when customers make the decision, because due to fake reviews customers might be misled. Customers track the reviews being updated online, thus making the business people also to keep a track of the reviews on the online platforms so as to maintain their reputation proposed by Salah, K., 2019. They even respond immediately to any kind of feedback given be it positive or negative. Due to the influence of digital marketing, online review sites too have surged. Customers often prefer to write about their pleasant experience rather than unpleasant ones. Owners now urge the customers to leave feedback, by even complimenting them with discounts, gift, or cash which is against the business ethics. The food industry is adopting blockchain to avoid all these types of tampering with the data. Many giants like Nestle, Starbucks, and Carrefour have started to include blockchain. There is a prediction that by 2025, 20% of the top-10 global grocers will be using blockchain.

Smart Contracts

Smart Contracts are created by the user where the terms and conditions are specified when the contract is first created. Smart Contracts are stored in the blockchain and when the conditions are met it executes automatically. Smart contracts can be executed on the public and private blockchain except multichain. Solidity is the programming language which is used to write the smart contract.

How Smart Contract Works

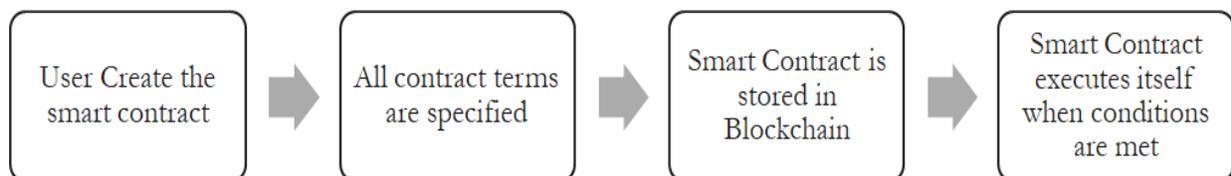


Fig. 1 Smart contract work flow

Advantages of Smart Contract

Some of the advantages of the smart contract are

1. Security
2. Speed and low cost

3. Standardization
4. Accuracy
5. Transparency
6. Autonomy

The paper is presented as follows, Section II elaborates on the motivation for the work, Section III, related works, and Section IV the proposed work is discussed with snapshots of the smart contracts deployed on the ropsten test network. Finally, in Section V we draw the conclusions.

Motivation

Revoo, 2019 did a study in 2016 and found that online reviews can increase the sales by 18%. A Berkeley study stated that a half-star improvement for a restaurant would increase the fill-up in peak hours by 30% to 49%. If consumers really like the reviews then they will really try it out. Blockchain has several applications in the food industry and it can affect almost every part of a restaurant's business, from food sourcing, reviews, promotions, food quality, and safety, transparency for restaurants and customers, faster and secure food delivery.

The reviews written do not authenticate/reveal the identity of the author, it's difficult to know which reviews are honest and which are fabricated. So the quality of reviews helps in the growth of a business to a large extent.

Related Work

Since blockchain is still emerging we have very few papers that the use Ethereum Blockchain proposed by Salah, 2019.

Revain, 2019 is a review platform using IBM's Artificial Intelligence. It keeps only the good reviews, filtering out fake and low-quality reviews on the Ethereum blockchain.

Lina. Review, 2019 is a free review platform to store the reviews securely and also to maintain the integrity of the reviews as well as issuing user rewards for customers. Maintenance fee is charged by the platform, for the activities done on it.

Dentacoin, 2020 is the first trusted dental services review system based on blockchain. It provides multiple solutions allowing the dentists to register and get reviewed by the public. They collect market statistics as well as the patient feedback.

Karthick T, 2018 is specially designed for the Amazon's review system. This blockchain based system connects the sellers, consumers, and reviewers which was implemented as policy based load balancing in fog layer.

Anandan, M, 2020 is the world's first blockchain based restaurant that was created to tokenize the restaurant reviews and provide rewards to quality reviews. Their goal was to help raise awareness about truly good restaurants in Japan and also to create a global social media platform where food reviewers can earn for their contributions instead of just working as volunteers. Since reviews are stored in blockchain, it can't be modified.

Online review systems proposed by ponnusamy, 2020 help the consumers and businesses. Consumers can search for good quality product while the business trustworthiness can be improved.

Good quality products will lead to higher downloads and thereby sales numbers also increase which in turn increases the ratings proposed by ponnusamy, 2020. Review authors and the online portals are to be trusted when consumers decide a product based on the reviews.

eWoM helps to spread the ideas and also increase the business by the use of electronic word of mouth communication. Since it cannot be tested before consuming in the food and beverage industry, a review from experienced source helps in making the customer decision by goral, 2015.

Proposed Work

We use Remix IDE which is an open source tool to write smart contracts from the browser. The smart contract is written in solidity language for collecting the reviews from the customer. We have considered few options like customer service, ambience, quality of food, taste and the overall rating for the restaurant. The customer enters the detail in smart contract which is then deployed on the ropsten test network. The ropsten test network is a public testnet for ethereum blockchain which uses Proof of Work. We are using Injected web 3 to deploy the smart contract and also use metamask to interact with the blockchain. Metamask is a browser extension that talks to the ethereum blockchain for our web application.

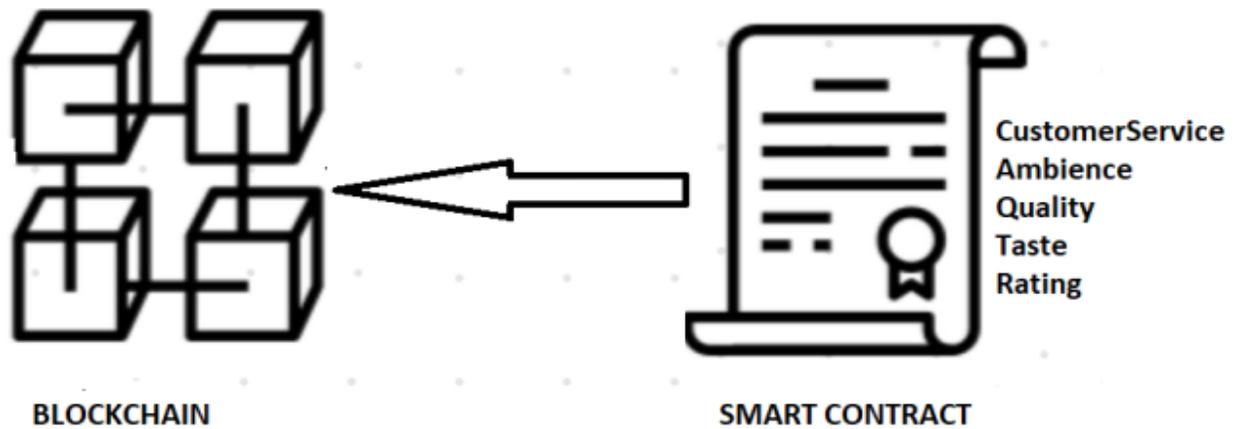


Figure 2 Work flow diagram

```
4 string quality;  
5 string customerservice;  
6 string taste;  
7 string ambience;  
8 uint rating;  
9  
10 function setQuality(string newQuality){  
11     quality=newQuality;  
12 }  
13 function getQuality() returns(string) {  
14     return quality;  
15 }  
16 function setCustomerService(string newCustomerService){  
17     customerservice =newCustomerService;  
18 }  
19 function getCustomerService() returns (string){  
20     return customerservice;  
21 }  
22 function setTaste(string newTaste){  
23     taste=newTaste;  
24 }  
25 function getTaste() returns(string) {  
26     return taste;  
27 }  
28 function setAmbience(string newAmbience){  
29     ambience=newAmbience;  
30 }  
31 function getAmbience() returns (string){  
32     return ambience;  
33 }  
34 function setRating(uint newRating){  
35     rating=newRating;  
36 }  
37 function getRating() returns(uint) {  
38     return rating;  
39 }  
40  
41 }
```

Figure 3 Code for smart contract

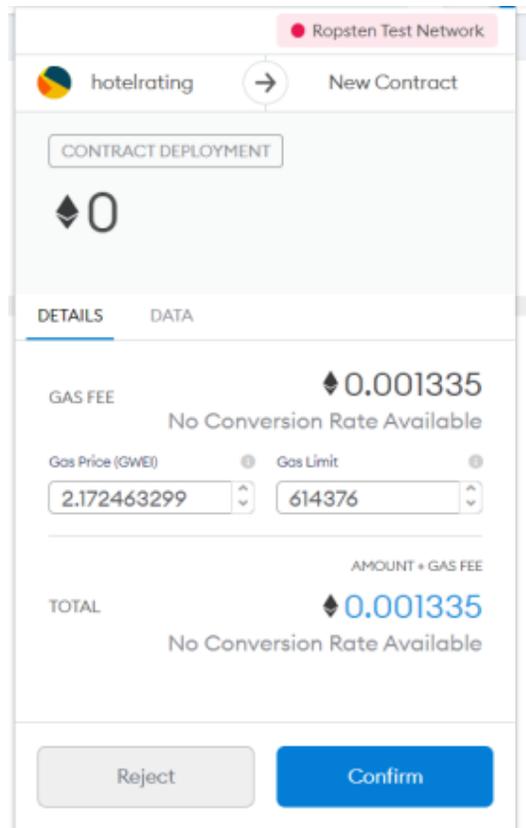


Figure 4 Confirmation for smart contract deployment

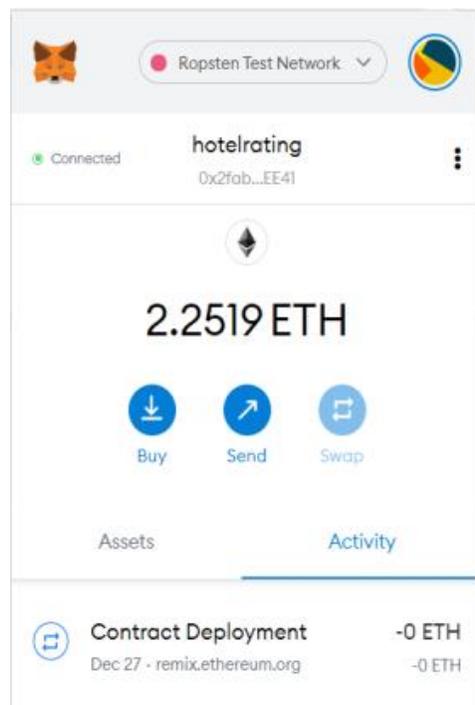


Figure 5 Contract deployed

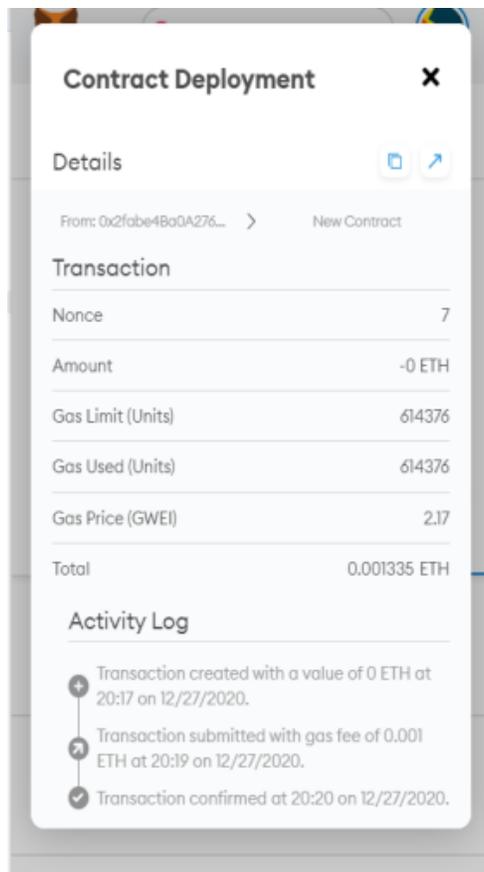


Figure 6 Smart contract deployment details

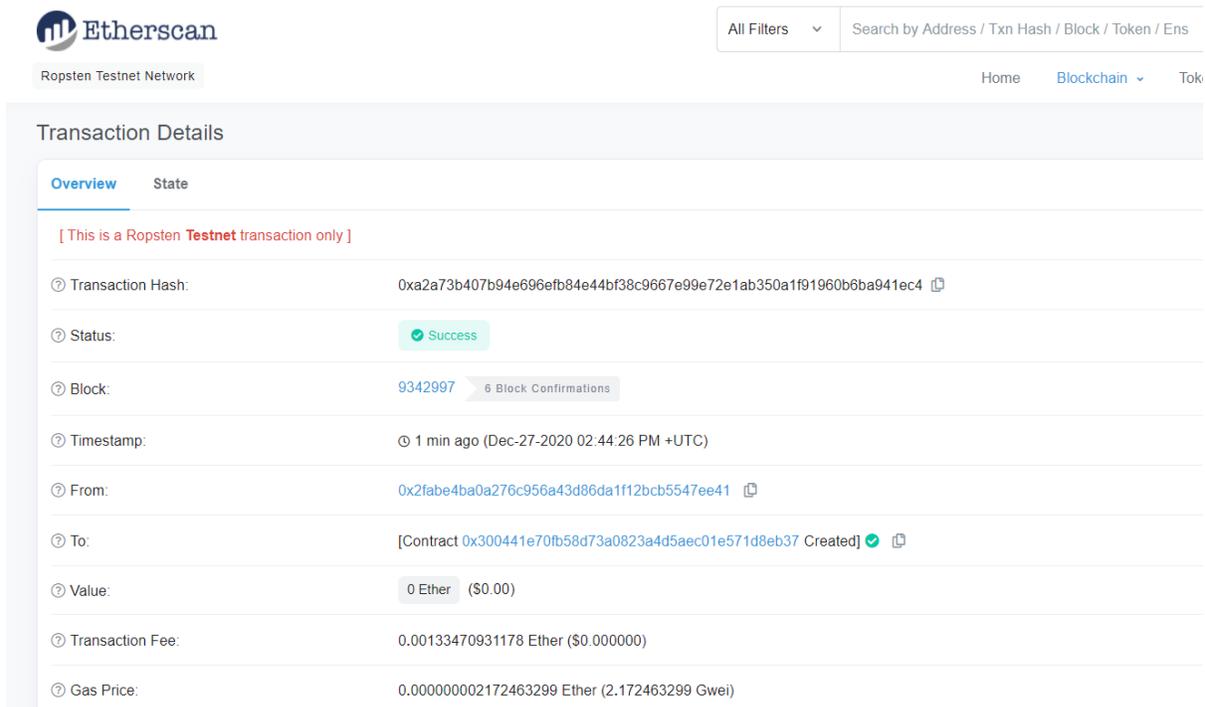


Figure 7 Contract deployed on ropsten testnet

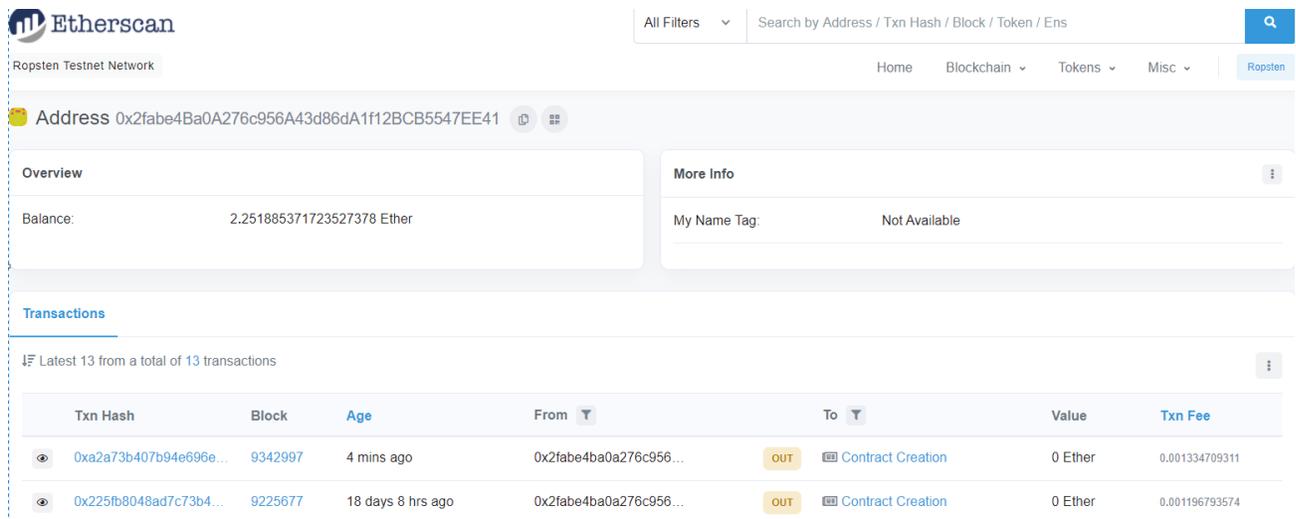


Figure 8 All Transaction details

Conclusion

Thus we have deployed an application for collecting the online reviews in food industry. This online review application helps to increase the sales and business (brand) by employing blockchain technology which is secure, transparent and immutable. The reviews once stored cannot be modified by anyone, so it is the authentic review given by the customers.

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