**A Secure E-Coupon Service Based on**

**Blockchain Systems**

**Alternative Title:**

**E-coupon Service based on Ethereum Blockchain System along with high Security.**

**Aim:**

Our study aims to introduce a new e-coupon service that does not allow unauthorized forging of e-coupons and manipulation of information on the e-coupon server. To this end, we devise an e-coupon service based on a blockchain system.

**Abstract:**

As the popularity of e-commerce grows, an electronic coupon (e-coupon) is widely used due to its convenience and portability. In most e-coupon services, the information of e-coupons is managed on a decentralized server. However, e-coupon services are often vulnerable to security issues because of centralization. For example, when the e-coupon information which is stored in a centralized e-coupon server is forged, it becomes difficult to match the user and the e-coupon's owner, and an expired e-coupon can be used repetitively (i.e., double-spending). To handle this issue, we propose a new e-coupon service by exploiting a blockchain system to improve the security of the service. To do this, we first design a server to enable the e-coupon service and communicate with the blockchain system. Second, we devise a smart contract on the blockchain system to provide integrity of the e-coupon business logic and the e-coupon's information. We implemented the proposed service on an Ethereum-based blockchain system. The experimental results show that our proposed service improves higher security with a minor performance overhead compared with an existing e-coupon service.

**Existing System:**

We investigate the existing e-coupon processing mechanism in terms of security and e-coupon trading.However, e-coupon services are often vulnerable to security issues because of centralization. For example, when the e-coupon information which is stored in a centralized e-couponserver is forged, it becomes difficult to match the user and the e-coupon's owner, and an expired e-couponcan be used repetitively.

**Disadvantage:**

Verifying an e-coupon is the most important task because the forged or manipulatede-coupons by malicious attacks lead to a financial problem.

**Proposing System:**

We propose a new service that enables secure e-coupontrading via an e-coupon smart contract on a blockchain system and deploys the e-coupon smart contractautomatically. We first design aserver to enable the e-coupon service and communicate with the blockchain system. Second, we devisea smart contract on the blockchain system to provide integrity of the e-coupon business logic and thee-coupon's information. We implemented the proposed service on an Ethereum-based blockchain system. The experimental results show that our proposed service improves higher security with a minor performanceoverhead compared with an existing e-coupon service.

**Advantage:**

* Customers can easily manage the e-coupons via their mobiledevices or PCs.
* For easy management, most e-coupon services manage e-coupon information in a decentralized system.
* The information can be easily manipulated by an administrator.

**Modules:**

* **Admin Configuration**
* **Generate Coupon**
* **Blockchain**

**Modules Description:**

**Admin Configuration:**

Admin will login and add the category and product of ecommerce site. And also he can view the category list and also the product list as well. And also admin can update or delete category and product which have been already added.

**Generate Coupon:**

In this module, here the user will have the initial registration process, after registration. These details will be stored in mysql database. After user login user can view and purchase the product. once the user, purchase more than the amount of thousand, it will generate the coupon code to the user’s mail. After getting the coupon code user have to use the coupon within the validity date. Otherwise the coupon code will be expired.

**Blockchain:**

The e-coupon manager provides an interface to deploy an e-coupon smart contract, get an e-coupon list, download ane-coupon, use the e-coupon, and provide the e-coupon to customers. Furthermore, the manager communicates with the blockchain to obtain and store e-coupon information. For example, when an e-coupon provider issues an e-coupon, the e-coupon provider requests to deploy an e-coupon smart con- tract to the e-coupon manager. Then, the e-coupon manager generates the transaction that deploys the e-coupon smart contract on the blockchain. After then, it stores the e-coupon information and the smart contract address in the server's database. By using the information stored in the database, the e-coupon manager provides e-coupon information to customers. Note that all the e-coupon data stored in the server is only used for displaying to the application. The data modification must be performed via transaction processing based on the data in blockchain.

**Software Requirements:**

* Windows 10 and above
* JDK 11.0
* J2EE
* Tomcat 9.0
* MySQL8

**Hardware Requirements**

* Hard Disk : 80GB and Above
* RAM : 4GB and Above
* Processor : i3 and Above

**Future Enhancement**

We focus on improving the security level by guaranteeing the integrity of e-coupon information. For example, the existing e-coupon service uses a database system.In this system, since an administrator can easily obtain theauthority, the administrator rather easily modifies the datamaliciously. Meanwhile, in our provided service which uses a blockchain system, the administrator cannot easily obtainthe authority since the authority should be obtained by theconsensus of all users. Thus, it is hard to take over theauthority, and we can prevent the malicious modification.This means that our proposed scheme increases the securitylevel.Also, note thatmany studies are underway to improve the performance of the blockchain. Therefore, performance issues withblockchain will be mitigated in the future and we also leavethe improvement for the performance of blockchain as futurework.

**Conclusion:**

We have investigated e-coupon services that store e-coupon information on a decentralized server. We found that the e-coupon information stored in the server can be manipulated by a malicious attacker or administrator. To handle this issue, we present a new e-coupon service that improves security by exploiting e-coupon smart contracts in aEthereumblockchain system using Ganache Software. According to our experimental results, the proposed service prevents the manipulation of e-coupon information with higher security and minor performance overhead. In the future, we will focus on improving blockchain performance.

**Architecture:**



User

Email

E-commerce

Database

E-coupon

User Registration

Shop Here

If user purchase for certain amount…It will generate coupon code

Coupon code, send to mail

Coupon discount , validity Store in blockchain

If coupon code valid to the correct user …It will minus the amount, If it is not, pay actual amount

Check blockchain

Discount the amount

Actual Payment