Fake Product Identification using Blockchain

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Abstract: Fake product identification using blockchain will help the customer to identify the genuine product and will also help the manufacturer to build confidence in the customer. In recent years, block chain has received increasing attention and even numerous applications are being emerged in this technology. Our Project uses the Decentralized Block chain technology approach to ensure that the consumers do not fully rely on the merchants to determine if the products are genuine, in that way the manufacturers can use this system to provide genuine products without having to manage direct-operated stores, which can significantly reduce the cost of product quality assurance. This system will also help the manufacturers to deliver the complete information of the product to the customer through scanning the QR code. The information shared is scripted using Blockchain to make it more secure and trusted. This will also enable the customers to determine whether the products aren't fake.
Keywords: blockchain, customer, decentralized, fake product, genuine products, manufacturers, QR code.

I. INTRODUCTION

Fake product identification using blockchain is the process in which the manufacturer will feed in all the detailed information of the original product in a form of QR code and deliver it to various distributors, retails and finally to the customer. This QR code when scanned by the customer will provide the complete information of the original product in a form of website and the final website will be highly secured as we implement the concept of Blockchain, no third party like admin or hackers can hack the information as the system is completely implemented using decentralized blockchain technology.

The Existing system uses current tracking of Product delivery. In this method the admin can take all the control and can modify the data. So, here we need to depend on the third party for trusted delivery and security. The existing system also has a lot of possibility to fake the real product during the delivery to the customer and therefore the existing system is less secure.

Based on the problems in the existing system, we are going to propose this technology using block chain. Our system will enable the communication between the customer and all the other departments in a secure manner. To make this system more trusted and secured we are going to generate the script using smart contract and Ethereum Blockchain. We also introduce a decentralized application for making user friendly GUI (Graphical User Interface) for the customers to see the product details. Thus, this system will be proven for more security and privacy. This system is implemented in NetBeans IDE, Remic IDE, Ethereum node, Solidity-Smart Contract and My SQL. The basic hardware requirements only require 20 GB or above Storage space and 4 GB or above RAM.

II. BLOCK CHAIN

Blockchain technology is most simply defined as a decentralized, distributed ledger that records the provenance of a digital asset. Nowadays we use many social networking sites like Google, Facebook, etc. While using these sites our data will be stored in their servers. The disadvantage due to this is, our data will be centralized. So it becomes easy for the hacker to hack all the data at the same time. The advantage of blockchain is using Math and cryptography block chain which provides an open decentralized database for every transaction involving, values like money, goods, property, work or even votes.

A. Sentiment-Aware Deep Recommender System with Neural Attention Networks

With the advent of web technology, user-generated textual reviews are becoming increasingly accumulated on many e-commerce websites. These reviews contain not only the user comments on different aspects of the products but also the user sentiments associated with the aspects. Although these user sentiments serve as vital side information for improving the performance of recommender systems, most existing approaches ignore to fully exploit them in modeling the fine-grained user-item interaction for improving recommender system performance. Thus, this paper proposes a sentiment-aware deep recommender system with neural attention network (SDRA), which can capture both the aspects of products and the underlying user sentiments associated with the aspects for improving the recommendation system performance. Particularly, a semi-supervised topic model is designed to extract the aspects of the product and the associated sentiment lexicons from the user textual reviews, which are then incorporated into a long short-term memory (LSTM) encoder via an interactive neural attention mechanism for better learning of the user and item sentiment-aware representation.

Furthermore, a co-attention mechanism is introduced to better model the fine-grained user-item interaction for improving predictive performance. The extensive experiments on different datasets showed that our proposed SDRA model can achieve better performance over the baseline approaches.

1) *Advantages*
a) Faster processing.
b) Security.
2) *Disadvantages*
a) Information overload.
b) Power Use.

B. Song Recommendation with Non-Negative Matrix Factorization and Graph Total Variation

This work formulates a novel song recommender system as a matrix completion problem that benefits from collaborative filtering through Non-negative Matrix Factorization (NMF) and content-based filtering via total variation (TV) on graphs. The graphs encode both playlist proximity information and song similarity, using a rich combination of audio, meta-data and social features. As we demonstrate, our hybrid recommendation system is very versatile and incorporates several well-known methods while outperforming them. Particularly, we show on real-world data that our model overcomes with respect to two evaluation metrics the recommendation of models solely based on low-rank information, graph-based information or a combination of both.

1) *Advantages*
a) Distributed
b) Stability
2) *Disadvantages*
a) Storage
b) Inefficient

C. Fake News Detection in Social Media using Blockchain

Blockchain technology has opened the gate of creating decentralized applications, where security is a big concern. Here, any transaction ever held is recorded permanently. Over the years, some non-reputable sources have been publishing fake and attractive news stories. Due to the lack of any regulatory systems, this news cannot be verified. Hence, these unreliable sources can publish whatever they want, and even in some cases, it makes chaos in society. In recent times due to the ease in internet availability and social media, inappropriate news can spread more quickly than ever before. In some cases, fake news is more attractive than the real one. Thus, people become misguided.

1) *Advantages*
a) Using of Blockchain's peer-to-peer network concepts, Blockchain is a shared, trusted, public ledger of transactions, that everyone can inspect but which no single user controls.
b) This ledger runs on a peer-to-peer (P2P) network of computers.
2) *Disadvantage*
More or less security and less performance.

D. Detection of fake opinions on online products using Decision Tree and Information Gain

Online reviews are one of the major factors for the customers to purchase any product or to get service from many sources of information that can be used to determine the public opinion on the products. Fake reviews will be published intentionally to drive the web traffic towards the particular products. These fake reviewers mislead the customers to distract the purchaser's mind. Reviewers' behaviours are extracted based the semantical analysis of his review content for the purpose of identifying the review as fake or not. In this work the reviews are extracted from the web for a particular product, along with the reviews of several other information related to the reviewers also been extracted to identify the fake reviewers using decision tree classifier and Information Gain. Significance of the features on the decision is validated using information gain. Experiments are conducted on exhaustive set of reviews extracted from the web and demonstrated the efficacy of the proposed approach.

1) *Advantage:* Decision rule classifier is applied for various potential features such as response, useful profile, template, star rating, reply, thick, etc. to identify whether review is fake or not.
2) *Disadvantage:* In the context of decision trees, the term is sometimes used synonymously with mutual information.

E. Semantic-Enhanced and Context-Aware Hybrid Collaborative Filtering for Event Recommendation in Event-Based Social Networks

The fast development of *event-based social networks* (EBSN) provides a convenient platform for recruiting offline participants via online event announcements. Given its ever-increasing new events, how to accurately recommend users their most preferred ones are a key to the success of an EBSN. In this paper, we propose a *semantic-enhanced and context-aware hybrid collaborative _filtering* for event recommendation, which combines semantic content analysis and contextual event influence for user neighborhood selection. In particular, we _first exploit the latent topic model for analyzing event description text and establish each user a long-term interest model and short-term interest model from her event registration history. We next establish each event an influence weight to jointly represent its social impact among users and its semantic uniqueness among events. For one user, we select her neighbors according to their long-term interest similarities weighted by events' influences. For new event recommendation, we construct a user-event rating matrix based on users' short-term interest models and for each user, we compute event rating predictions from her neighbors' ratings. The experiments based on the real-world dataset demonstrate the superiority of our algorithm over the peer schemes.

1) *Advantages:* The scHCF scheme which combines the social relationship with content information.
2) *Disadvantages:* The two actions are exclusive to each other: A user cannot register as both to one event at the same time.

III.ANALYSIS TABLE

The following table gives the analysis of techniques and methods used in research papers on Block Chain.

Table I
Analysis of techniques and methods used in research papers on Block Chain

S.no	Title	Year	Author	Technique	Drawback
1	Sentiment-Aware Deep Recommender System with Neural Attention Networks.	2019	Aminu Da'u	Recommender system, LSTM, deep learning	The performance largely depends on how the textual information is utilized
2	Song recommendation with non-negative matrix factorization and Graph total variation.	2016	Pierre Vandergheynst	Recommender system, graphs	The latter has no analytic solution unlike the one we use in this work.
3	Fake News Detection in Social Media using Block chain.	2019	Shovon Paul, Jubair Islam Joy	Fake-news detection in social media	More or less security and less performance
4	Detection of fake opinions on online products using Decision Tree and Information Gain	2018	Sanjay *K.S*	Entropy, Information Gain, Decision Tree.	In the context of decision trees, the term is sometimes used synonymously with mutual information.
5	Semantic-Enhanced and Context-Aware Hybrid Collaborative Filtering for Event Recommendation in Event-Based Social Networks.	2018	Shenghao Liu	Hybrid collaborative filtering, event semantic analysis.	The two actions are exclusive to each other: A user cannot register as both to one event at the same time.

IV.CONCLUSIONS

With this system, the product's journey from the manufacturer to the customer can be recorded. This recorded information is provided as a QR code to the customers using Blockchain. So, the customers can be assured that the information provided about the product's aren't fake. Through this implementation the Manufacture will also be benefited by proving the manufactured products aren't fake and they will also be able to track the product's pathway. Since it has been very easy for the hacker to hack the information of the original product and produce a fake product similar to the original product, we use block chain technology to implement this system. Block Chain is proven to improve security and thus it provides both the manufacturer to deliver an honest product to the customer. This implementation benefits as it's easy to implement and it also requires less operation cost.

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