MINING USERS TRUST FROM E-COMMERCE REVIEWS BASED ON SENTIMENT SIMILARITY ANALYSIS

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ABSTRACT

In e-commerce platforms, user evaluations are often seen as valuable tools that influence users' perceptions, emotions, and propensity to make purchases. The ideas, feelings, and interests of the customers may be expressed via all of this information. Numerous studies have shown that persons who have the same attitude towards comparable topics are more inclined to trust one another. In this research, we examine how asking for and accepting feedback and ideas in e-commerce platforms suggests that customers may have some level of confidence in one another when they purchase. In line with this perspective, a sentiment similarity analysis method focused on E-commerce system reviews is proposed in order to investigate user trust and similarity. We categories trust into two groups: direct trust and propagation of trust, which denotes a relationship of trust between two people. We introduce an entity-sentiment word pair mining approach for similarity feature extraction, where sentiment similarity yields the direct trust degree. The transitivity characteristic is used to calculate the spread of trust. We discuss the tightness of trust using the shortest route method and provide an improved shortest path approach to carry out the propagation trust connection between users using the suggested trust representation model. A dataset of extensive assessments of E-commerce websites is gathered in order to assess the models' viability and algorithmic correctness. According to the experimental findings, sentiment similarity analysis may be a useful tool for determining user trust in e-commerce systems

Index Terms:- e-commerce platforms, propagation, entity-sentiment, representation model.

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I.INTRODUCTION

1.1 MOTIVATION:

E-commerce websites, on the other hand, often compile extensive text evaluations that document historical comments around a certain topic or product. Customers often lack the ability to discern which evaluations, given the abundance of information, are reliable. Diverse customers may have varying perspectives and points of view. Also, there will be a wide range in their views on the goods and services in terms of attitudes, interests, preferences, etc. Some customers rate a product positively because they like particular features, while others rate it negatively because they dislike certain features. As a result, it is hard for a customer to determine which individuals are reliable and which evaluations are appropriate. In order to avoid deceiving the user when he wants to buy an item, it is essential that customers build trust with other users in order to get evaluations he can rely on, an opinion source, and protection from unreliable remarks [1], [5]. E-commerce websites, on the other hand, often compile extensive text evaluations that document historical comments around a certain topic or product. Customers often lack the ability to discern which evaluations, given the abundance of information, are

reliable. Diverse customers may have varying perspectives and points of view. Also, there will be a wide range in their views on the goods and services in terms of attitudes, interests, preferences, etc. Some customers rate a product positively because they like particular features, while others rate it negatively because they dislike certain features. As a result, it is hard for a customer to determine which individuals are reliable and which evaluations are appropriate. In order to avoid deceiving the user when he wants to buy an item, it is essential that customers build trust with other users in order to get evaluations he can rely on, an opinion source, and protection from unreliable remarks**.**

1.2 PROBLEM DEFINITION:

The problem at hand is multifaceted and centralizes on the challenge of fostering trust within the realm of online e-commerce, particularly concerning user-generated reviews. In today's digital landscape, consumers heavily rely on these reviews to inform their purchasing decisions. However, the sheer volume of available information, coupled with the inherent diversity of perspectives among customers, complicates the process of discerning the reliability of

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these reviews.Consumers are confronted with a barrage of opinions, each potentially influenced by individual biases, preferences, and experiences. Navigating through this sea of feedback becomes increasingly daunting, leading to skepticism and uncertainty regarding the credibility of the information presented. As a result, consumers are often left feeling overwhelmed and apprehensive about making informed choices.Central to this issue is the crucial role of trust in facilitating decision-making processes. Trust acts as a linchpin, bridging the gap between consumers and the vast array of products and services available online. However, in the absence of face-to-face interactions or tangible experiences, establishing trust in virtual environments poses a unique set of challenges.Moreover, the text emphasizes the significance of similarity between users as a catalyst for fostering trust. Consumers are more inclined to trust individuals who exhibit similarities in their purchasing patterns, sentiment styles, and linguistic expressions. Recognizing and leveraging these similarities can potentially enhance trust-building efforts within e-commerce platforms.Ultimately, the overarching goal is to address the trust deficit in online e-commerce systems through the systematic analysis of user reviews and ratings. By

employing advanced sentiment analysis techniques and examining patterns of similarity among users, there is an opportunity to enhance recommendation services and bolster consumer confidence in the online shopping experience.

II.LITERATURE SURVEY

- Haifeng Liu; Feng Xia; Zhen Chen proposed a Recommender systems (RSs) have become important tools for solving the problem of information overload. With the advent and popularity of online social networks, some studies on network-based recommendation have emerged, raising the concern of many researchers. Trust is one kind of important information available in social networks and is often used for performance improvement in social-network-based RSs. However, most trust-aware RSs ignore the fact that people trust different subsets of friends pertaining to different domains, such as music and movies, because people behave differently in diverse domains according to different interests. This paper proposes a novel recommendation method called TruCom. In a multicategory item recommendation

domain, TruCom first generates a domain-specific trust network pertaining to each domain and then builds a unified objective function for improving recommendation accuracy by incorporating the hybrid information of direct and indirect trust into a matrix factorization recommendation model. Through relevant benchmark experiments on two real-world data sets, we show that TruCom achieves better performance than other existing recommendation methods, which demonstrates the effectiveness and reliability of TruCom.

- Ping-Yu Hsu, Hong-Tsuen Lei and Shih-Hsiang Huang explains about this study adopted a sentiment word database to extract sentiment-related data from microblog posts. These data were then used to investigate the effect of different types of sentiment-related words on product recommendations. The results indicate that posts containing strong sentiments received more clicks than posts containing neutral sentiments. Posts containing more than one positive sentiment word generate more effective recommendations than posts containing only one positive sentiment word. This

study also demonstrated that posts with a negative polarity classification received more clicks than those with a positive polarity classification. Additionally, the microblog posts containing implicit sentiment words received more clicks than those containing explicit sentiment words. The findings presented here could assist product or service marketers who use Plurk or similar microblogging platforms better focus their limited financial resources on potential online customers to achieve maximum sale revenue.

- Qin Chen,Siyi Wang and Angela Lin presented a survey on Lack of trust is one of the fundamental reasons for losing customers from "faceless" e-commerce websites in the consumer-to-consumer market. In order to combat problems with dishonest market participants, a reputation system based on the trustworthiness of sellers has been widely established by the service provider. Traditionally this trust model is mainly based on feedback mechanism while neglecting the other important factors, such as, refund rate, which may lead to transaction risks in the new transaction. This paper proposes a global

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reputation rating method by using joint beta probability density functions to combine positive feedback rating and refund rate. The new trust model has the advantage of tractability and scalability as well as its theoretical sound basis on statistics.

- Stylianos Kraounakis, Ioannis N. Demetropoulos, A. Michalas, M. Obaidat,P. Sarigiannidis and M. Louta describe an approach distributed systems built in open competitive and highly dynamic pervasive environments are composed of autonomous entities that act and interact in an intelligent and flexible manner so as to achieve their own goals and aims. System entities may be classified into two main categories that are, in principle, in conflict. These are the service resource requestors (SRRs) wishing to use services and/or exploit resources offered by the other system entities and the service resource providers (SRPs) that offer the services/resources requested. Seeking for the maximization of their welfare, entities may misbehave, thus leading to a significant deterioration of system's performance. The scope of this paper is to present a computational model for

trust establishment based on a reputation mechanism, which incorporates direct SRRs' experiences and information disseminated from witness SRRs on the basis of their past experiences with SRPs. The designed mechanism discriminates between unfair feedback ratings intentionally and unintentionally provided, takes into consideration potential changes to providers' behavior, and weighs more recent events in the evaluation of the overall reputation ratings. The proposed model has been extensively evaluated through simulation experiments. It exhibits good performance, as the reputation computation error introduced due to false feedback provision decreases significantly.

- Pasquale De Meo,Emilio Ferrara and Domenico Rosaci presented a survey on understanding the dynamics behind group formation and evolution in social networks is considered an instrumental milestone to better describe how individuals gather and form communities, how they enjoy and share the platform contents, how they are driven by their preferences/tastes, and how their behaviors are influenced by

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peers. In this context, the notion of compactness of a social group is particularly relevant. While the literature usually refers to compactness as a measure to merely determine how much members of a group are similar among each other, we argue that the mutual trustworthiness between the members should be considered as an important factor in defining such a term. In fact, trust has profound effects on the dynamics of group formation and their evolution: individuals are more likely to join with and stay in a group if they can trust other group members. In this paper, we propose a quantitative measure of group compactness that takes into account both the similarity and the trustworthiness among users, and we present an algorithm to optimize such a measure. We provide empirical results, obtained from the real social networks EPINIONS and CIAO, that compare our notion of compactness versus the traditional notion of user similarity, clearly proving the advantages of our approach.

III. EXISTING SYSTEM

Various studies have focused on understanding and quantifying trust in online environments, particularly in e-commerce settings. These studies have explored different dimensions of trust, including semantic trust in information propagation mechanisms, trust management models considering direct and indirect trust paths, and the correlation between trust and interest similarity. Additionally, research has investigated methods such as contextual trust evaluation, recommendation trust models based on transaction context similarity, and trust extraction from user similarities derived from profile information and shared text. These efforts highlight the importance of trust in facilitating online interactions and decision-making processes, with implications for enhancing recommendation systems and improving user experiences in e-commerce platforms.

DISADVANTAGES OF EXISTING SYSTEM:

❖ In the existing work, the analysis, both at the document level and at the sentence level, cannot exactly

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discover the specific objects whether people like or dislike..

❖ An Existing methods concern directly in overall trend which is insufficient when the system calculates the trust based on sentiment similarity.

IV PROPOSED SYSTEM:

The proposed system revolutionizes sentiment analysis and trust computation within e-commerce platforms. By adopting a meticulous approach to review analysis, it uncovers nuanced sentiments pertaining to specific product attributes, enabling a deeper understanding of consumer feedback. This granular analysis enhances decision-making processes by providing businesses with valuable insights into customer preferences and perceptions. Moreover, the integration of sentiment into direct trust computation adds a novel dimension to trust evaluation. By considering users' shared emotional inclinations towards products or services, the system offers a more holistic assessment of trust dynamics, fostering more accurate trust calculations and reflecting the complex interplay between subjective opinions and trustworthiness in online interactions.

Furthermore, the system's utilization of a graph-based propagation algorithm for trust computation represents a significant advancement in understanding trust relationships among users. By leveraging the structural aspects of trust networks, it efficiently determines the strength of trust connections through intermediaries, offering invaluable insights into the reliability of user recommendations and interactions. Overall, these innovations propel e-commerce platforms towards a deeper understanding of consumer behavior, ultimately empowering businesses to make more informed decisions and enhance the overall user experience.

ADVANTAGES OF PROPOSED SYSTEM:

- The system is affective since the sentiment similarity of reviews of two different users is firstly based on extracting the entity-sentiment word pairs of each review, and then performing similarity computing on the entity-sentiment word pairs.

- The system effectively proposes a system in which trust can be established according observations on whether the previous interactions

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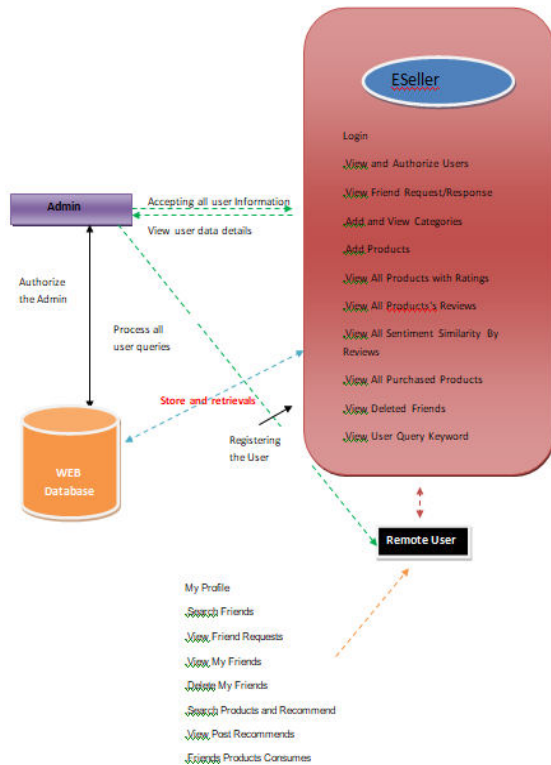among the subjects, and can be called direct trust.

V. SYSTEM DESIGN

Fig1: Architecture of system.

VI.MODULE DESCRIPTION:

ESeller

In this module, the ESeller has to login by using valid user name and password. After login successful he can perform some operations such as View and Authorize Users,View Friend Request/Response ,Add and View Categories ,Add Products,View All Products with Ratings ,View All Products's Reviews ,View All Sentiment

Similarity By Reviews ,View All Purchased Products ,View Deleted Friends ,View User Query Keyword ,View All Product Consumes By Users ,View All Recommended Products ,View Product Rank Results .

Viewing and Authorizing Users

In this module, the admin views all users details and authorize them for login permission. User Details such as User Name, Address, Email Id and Mobile Number.

Add and View Category as Domain

In this module, the admin adds Categories like Movie, Products, and Sports etc.

Add Posts as Products

In this module, the admin can add Posts by Selecting Domains and by Providing Posts Details Such as, Post Name, Description, Images and Uses.

View all Posts with Rating based on Ranks

In this module, admin can see all his added posts with details (Post Name, Description, Uses and Images) along with Rating and Rank. Rating is Calculated Based on Ranks.

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View User Query Keyword and Analyze the Query Subgroup

In this, the admin can see all the query keyword used by the users to search for posts and the Exact Matched Posts and the Query Subgroup (Posts which come under Matched Posts Category).

View all Recommended Products

In this, the admin can see all the posts which are recommended by the users to their friends. Recommended posts can be seen by selecting particular Category.

Categorize Users Based on Products Consumes with user Images

In this, the admin can view all the users who are all liked a particular post and who are all recommended a particular post. The result can be seen in a design graph by selecting a particular post name.

View Product Rank Results

In this, the admin can view products ranks in a graph. The Rank is calculated based on the number of likes made on particular post.

User

In this module, there are n numbers of users are present. User should register before performing any operations. Once user

registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user can perform some operations like Search Friends,View Friend Requests,View My Friends,Delete My Friends ,Search Products and Recommend ,View Post Recommends ,Friends Products Consumes

Viewing Profile Details

In this module, the user can see their own profile details, such as their address, email, mobile number, profile Image.

Search Friends, Request, and View Friend Requests, View all Friend Details

In this, the user search for other users by their names, send requests and view friend requests from other users. User can see all his friend details with their images and personnel details.

Search Query by keyword

In this, the user can search for post by query keyword and the results will displayed in as two groups. The one is exactly matched posts and the other is posts which are all belongs to matched post's categories.

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The user can like or dislike and can recommend found posts to their friends by giving their opinion on that post.
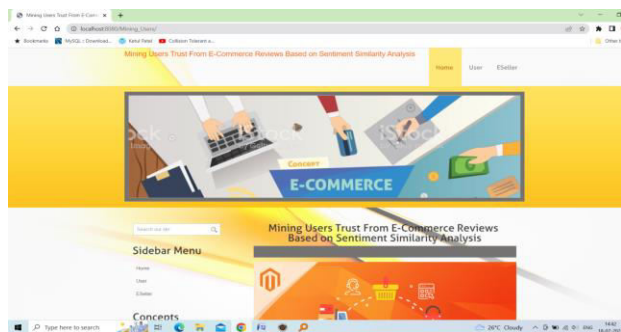
View all Your Friends Recommended Posts to You

In this, the user can view all his friends recommended posts to user. The user can view recommended post details with a friend opinion on that post.

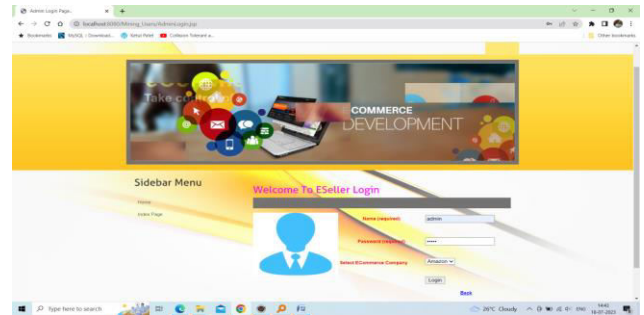**View Your Friends Products Consumes details with their images**

In this, the user can view all his friends products consumes details that is, if the friend liked or recommended on any post, those details will be shown in a design with friend details.
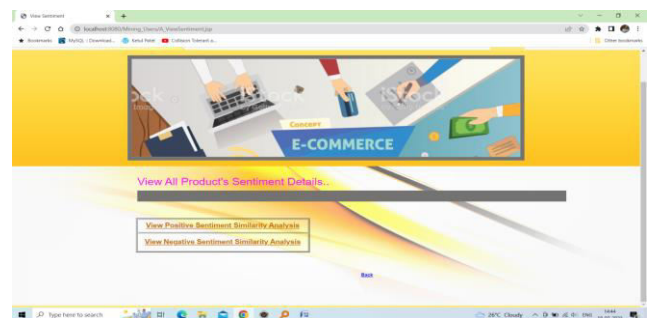
VII. RESULT:

Home Page

Admin Login

AdminMain
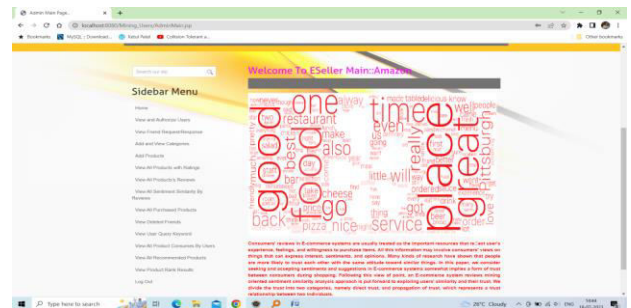
Authorize Users

View sentiment

View Positive Sentiment

User Registration

VIII. CONCLUSION

We address the problem of user trust mining in e-commerce platforms in our work. Direct trust and propagation trust are the two kind of trust relationships that we identify. We move our attention from examining user trust to estimating sentiment similarity in their evaluations. We compute the sentiment similarity of reviews using entity-sentiment word pairs mining. This allows us to build direct trust linkages using sentiment similarity analysis, which includes sentiments and ratings elements. Together, these elements are used to examine the sentiment-direct trust connection. In addition, we provide a weighted trust graph model for computing propagation trust. Utilising the propagation traits of trust is the process of propagation trust. It is an example of an indirect trust between two users who do not have direct trust in one another, obtained via intermediary users who do have direct trust in one another. An enhanced shortest route technique, with a time complexity of $O(V2)$, is the foundation for the propagation trust calculation method. V is the number of nodes in the network.

IX. FUTURE ENHANCEMENT

Improving the algorithm's computing efficiency is a relevant problem that needs further research, especially in light of the large user base of contemporary E-commerce platforms.

X. REFERENCES

[1] H. Liu, F. Xia, Z. Chen, N. Y. Asabere, J. Ma, and R. Huang, ``TruCom:Exploiting domain-speci_c trust networks for multicategory item recommendation,''IEEE Syst. J., vol. 11, no. 1, pp. 295_304, Mar. 2017.

[2] P.-Y. Hsu, H.-T. Lei, S.-H. Huang, T. H. Liao, Y.-C. Lo, and C.-C. Lo,``Effects of sentiment on recommendations in social

11

network," in ElectronMarkets. Berlin, Germany: Springer, 2018, pp. 1_10, doi: 10.1007/s12525-

018-0314-5.

[3] C. Qin, W. Siyi, and A. Lin, ``The joint beta distribution with refund rate

in online C2C trust building: A theoretical study on Taobao," in Proc.Int. Conf. E-Learn. E-Technol. Educ. (ICEEE), Lodz, Poland, Sep. 2012,pp. 191_196.

[4] S. Kraounakis, I. N. Demetropoulos, A. Michalas, M. S. Obaidat,P. G. Sarigiannidis, and M. D. Louta, ``A robust reputation-based computationalmodel for trust establishment in pervasive systems," IEEE Syst. J.,vol. 9, no. 3, pp. 878_891, Sep. 2015.

[5] P. De Meo, E. Ferrara, D. Rosaci, and G. M. L. Sarné, ``Trust and compactness in social network groups," IEEE Trans. Cybern., vol. 45, no. 2, pp. 205_216, Feb. 2015.

[6] M. G. Ozsoy and F. Polat, ``Trust based recommendation systems," in Proc. IEEE/ACM Int. Conf. Adv. Social Netw. Anal. Mining (ASONAM), Niagara Falls, ON, Canada, Aug. 2013, pp. 1267_1274.

[7] L. Sheugh and S. H. Alizadeh, ``A fuzzy aproach for determination trust threshold in recommender systems based on social network," in Proc. 9th Int. Conf. E-Commerce Developing Countries, Focus E-Bus. (ECDC), Isfahan, Iran, Apr. 2015, pp. 1_5.

[8] Y. Ruan, L. Alfantoukh, and A. Durresi, ``Exploring stock market using twitter trust network," in Proc. IEEE 29th Int. Conf. Adv. Inf. Netw. Appl., Gwangiu, South Korea, Mar. 2015, pp. 428_433.

[9] C.-N. Ziegler, Social Web Artifacts for Boosting Recommenders, vol. 487. Berlin, Germany: Springer, 2013.

[10] C.-N. Ziegler and J. Golbeck, ``Investigating interactions of trust and interest similarity," Decis. Support Syst., vol. 43, no. 2, pp. 460_475, 2007.

[11] N. Lathia, S. Hailes, and L. Capra, ``Trust-based collaborative _ltering," in Trust Management II, vol. 263, Y. Karabulut, J. Mitchell, P. Herrmann,and C. D. Jensen, Eds. Boston, MA, USA: Springer, 2008, pp. 119_134.

[12] D. H. Alahmadi and X.-J. Zeng, ``ISTS: Implicit social trust and sentiment based approach to recommender systems," Expert

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Syst. Appl., vol. 42, no. 22, pp. 8840_8849, 2015.

[13] M. Koufaris and W. Hampton-Sosa, ``The development of initial trust in an online company by new customers,'' Inf. Manage., vol. 41, no. 3, pp. 377_397, 2004.

[14] H. Zhong, S. Zhang, Y. Wang, and Y. Shu, ``Study on directed trust graph based recommendation for E-commerce system,'' Int. J. Comput. Commun. Control, vol. 9, no. 4, pp. 510_523, 2014.

[15] M. Li, Y. Xiang, B. Zhang, and Z. Huang, ``A sentiment delivering estimate scheme based on trust chain in mobile social network,'' Mobile Inf. Syst., vol. 2015, Sep. 2015, Art. no. 745095, doi: 10.1155/2015/745095.

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