Journal of Harbin Engineering University Vol 44 No. 8
ISSN: 1006-7043 August 2023

Secured Authorized Recommendation (SAR) Analyzing the User Relationships on Social Media through Machine Learning (ML) Algorithm

J. Chitra[1], Dr. S. K. Piramu Preethika[2]
[1]Research Scholar, VISTAS
[2]Assistant Professor, VISTAS

***Abstract*-** With the growing social media more challenges and security have been a big concern in today's' world. Users usually have multiple identities (IDs) in different social media websites with some other names and accounts. Particularly, kids and teenagers are affected due to several unwanted recommendations of sites, games or videos. The primary patterns of the online user-relationship are being analysed in the proposed system. The proposed system also tries to discover the process through which the user relationship network functions. Also, the user perspective can be tracked and recommendations are made according to the users requirements. Moreover, the system implies a secured Authorized Recommendation (SAR) theory to confirm the age limit of the users from the parents/guardians. The system suggests recommendation according to their age seeking permission of the parents. To implement the theory the system accommodates a social user relationship management scheme. Through machine learning algorithm (ML) and Keyword matching the user relationships are studied validating the personalized accounts of the users. For Experiment analysis a twitter dataset from kaggle is taken and the user relationship analysis is made and suitable recommendations are made accordingly. The experiments prove the proposed system to be more efficient.

***Keywords*-** *user relationships, keyword matching, machine Learning (ML), social networks, social network analysis, Recommendation.*

I. Introduction

The speedy development of web technology along with internet 2.0, leading to people preferring the online social network. It has established itself as a preferred communication platform to permit users to distribute information, reminiscent of news, views, and knowledge. The use of social networks draws an attention on the psychology and on the behaviour of the users who use the social network [1]. Users of social networks see an entirely different communication channels and they also exhibit many different characteristics. The users of any social networks have an active customers list that too for any enterprise, it has its own list [2]. People generally use social media, that has more services like video, web sites, games, etc.. As social media have become more accessible to kids and teenagers it creates a concern of misuse among the users. The collective emotional state of online communities may have huge impact on society stated by Yingying Zhang. Through emotional reactions over online the user relationships can be predicted [3].

A. User Relationship management

Each and every user's relationship can be analyzed and predicted through the social media. Some of the popular Social Media (SM) services are the Blogger, Twitter, FB, LinkedIn, Flickr, YouTube, Ning, and Igloo. Any organization can improve its performance in many ways by using the SM. Some of the parameters that can be increased are through finance [7], executive learning, employee performance and innovation. The systems in the Face Book (FB) allows the users to specify the access control (AC) policy. This AC policies can be used to connect the needed resources by using the social graph topologies [4]. As a real time, example, in FB by selecting the choices and choosing a relationship out of the available ones, the relationships can be predicted. Various available options are "public", "private", "friend" or "friend of a friend". The Circles in Google+ helps the users to formulate a customized relationships and establish an interconnection. Due to the increase in using the social media services, researchers have analyzed and developed models to extract the relationship among the users using access control models. [5] The policies that are formed are done by taking

multiple forms of relationships into consideration. [6] These models use the depth parameter and also the trust worthiness of any relationships into consideration. These parameters are used so as to regulate the spread of information. Having the "friend" relationship type only predicts the relationships that are possible among the same type of accounts. There are other topology-based policies and these are based on factors like identified quantity, a common set of friends, and it may also include strangers of additional convey distance. Though these models have their own advantages, the main limitations are, they cannot process many categories of relationships that might be possible.

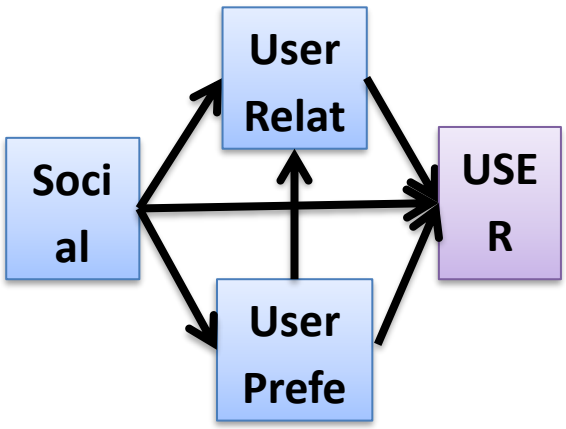


Figure 1. User relationship Implementation

B. Social Network (Sn) Theory Implementation

Social media (SM) theory aims on validating prototype relationships among user that can combine to figure NWs [9].

The main contribution of the paper is below:

- In the study the system implements a User relationship management scheme all the user relationships are analyzed using a machine learning algorithm (ML).
- The system suggests recommendation according to their age seeking permission of the parents.
- Further, through automated keyword matching and parental control the social activities of the kids are noted and approvals for the sites are taken from the parents.

This research paper is arranged as follows: Section 2 deliberates an outline of the various related work on social media technology and relationship management; Section 3 gives an introduces produces a implementation on the user relationship and machine learning algorithm; Section 4 discusses the result of the various statistical tests that have been executed; and Section 5 presents a conclusion of this study, and it also gives an on future work that are possible.

II. Literature Survey

Researchers have studied on defining a user relationship from a natural language and many are still working on this theory. Also, several learning algorithms are used to understand the social media user relationships which are not effective.

Trainor *et al*. [10] proposed a statement indicating that "using social media technology enhances the operational efficiency of the enterprise by collaborating internal and external attributes".

Lam *et al*. [11] predicted that the SM initiatives were able to help corporate in making innovative ideas, and also enhanced the operational efficiency. The users' behaviour and operations can be influenced by the social media. Many of the user's and their decisions are influenced and at times manipulated by social media. Many times, these social medias create discomfort, and anxiety to the users.

III. Approach Implementation

3.1 Secured Authorized Recommendation (SAR) Analyzing the User Relationships (UR)

This section describes the approach and method implemented in the paper. Figure1 shows the system architecture of the approach.

The below diagram depicts an outline structure of handling the user relationship in social media. Initially the recommendations are suggested through sketching the user preference. The key procedure of validation, categorization and secured recommendation are as follows:

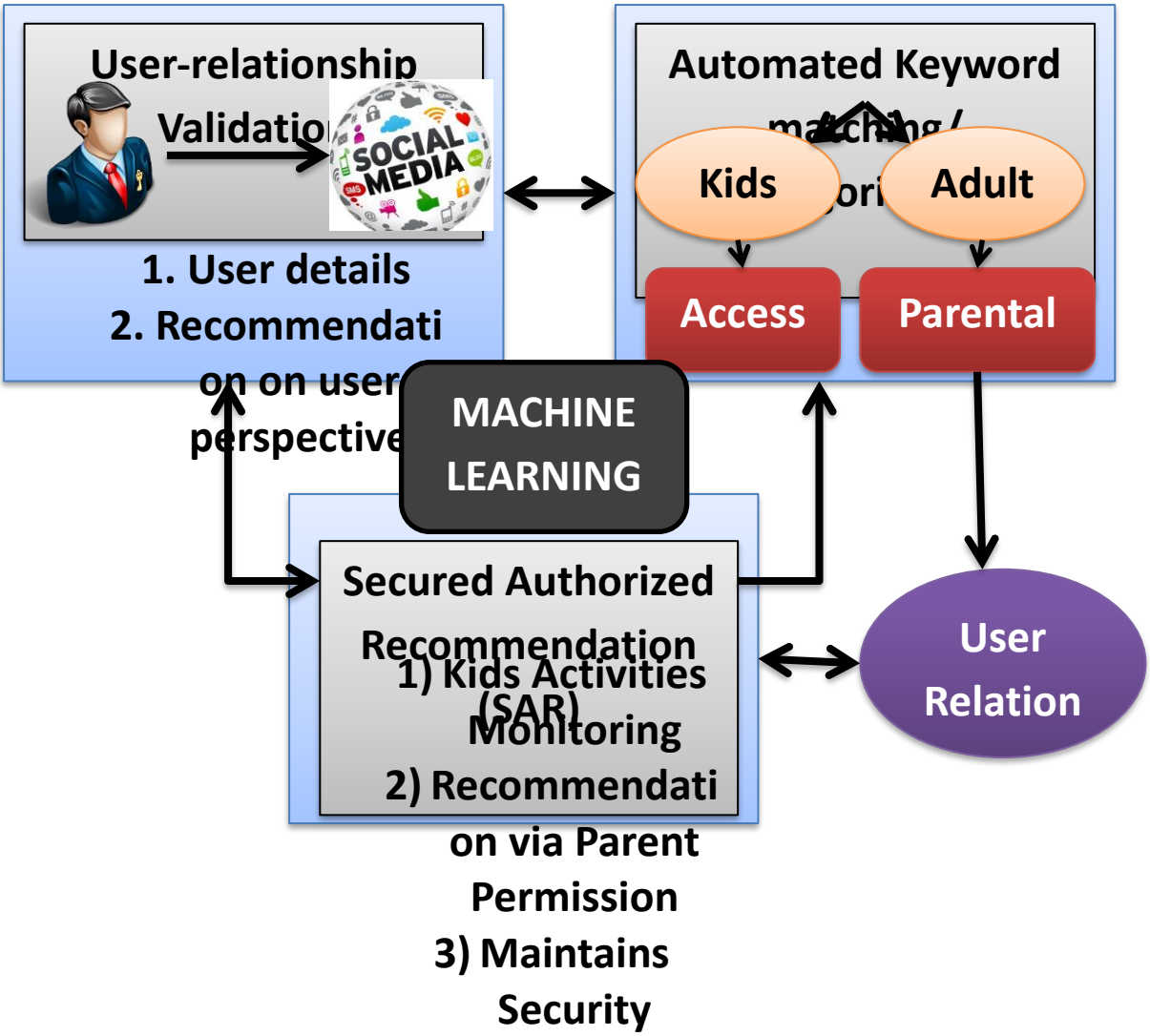


Figure 2. System Architecture

3.2 Recommendation through Machine Learning

- **User Relationship Validation Phase:**
  In this phase initially the user uploads data or post in the corresponding social media. Then through a proper machine learning the user preferences are captured and the suitable recommendation are suggested consequently. This phase handle the basic user details collection format to perform recommendation on user perspective.

- **Automated Keyword matching/ Categorization**
  The secont phase is Automated Keyword matching/ Categorization in which the scheme undergoes an automatic keyword matching of the user data and categorizes the user according to their age, preferences and views. Here the age categorization is the main implementation to be performed. Where the user age are categorized as
  - Kids/Teenagers (Below 18)
  - Adults/Parent control (Above 18)

- **Kids/Teenagers (Below 18)**
  Through deep Machine learning (ML) of the user relationship management the user below 18 age limit are chose and blocked from some unwanted sites automatically. If the blockage from the user account is cracked then immediately intimation to the users respective parent account is sent requesting for conformation. If the parent grants permission then the site is grant access for the kids

operation. . The activities of the kids are noted frequently if any misuse or addiction detected then immediately a report is sent to the parent control

- **Adults/Parent control (Above 18)**
  In the parent control the authority of access granting for the kids are provided to the parents. Any difference in child activity or any addiction predicted tehn the paprnt have access to control the respective site, video or even a game.

3.3 Secured Authorized Recommendation (SAR)

Hereby, the system assures a suitable secured recommendation validating each user's age limit. Moreover the system offers an additional Kids Activities Monitoring implementation to focus on kids downloads and uploads. Every parents are intimated about the kids social media activity and the Recommendations and access are produced via Parent Permission only.

- Maintains Security
  The system further formulates a high-level security by implanting the user relationship management scheme and provides a safe secured feel to every parent assuring for the kids bright future.

IV. Result Analysis

A twitter dataset from kaggle is taken. The main idea of using the data set was to train a CrowdFlower AI Age/relationship predictor. The various contributors who were involved were requested to validate a Twitter profile. These contributors were asked to analyze and decide on whether the user was a male or a female. The user's age limit and relationship of an individual were also predicted. The dataset that was used contained more than 20,000 twitter data. Each dataset has a user name, a random tweet, an account profile associated with an image. These datasets had a location, a link for the location and also a sidebar color.

Case 1. Calculate the user age and relationship by the randomly sampling and by comparing relevant one the relationships among the user are predicted.

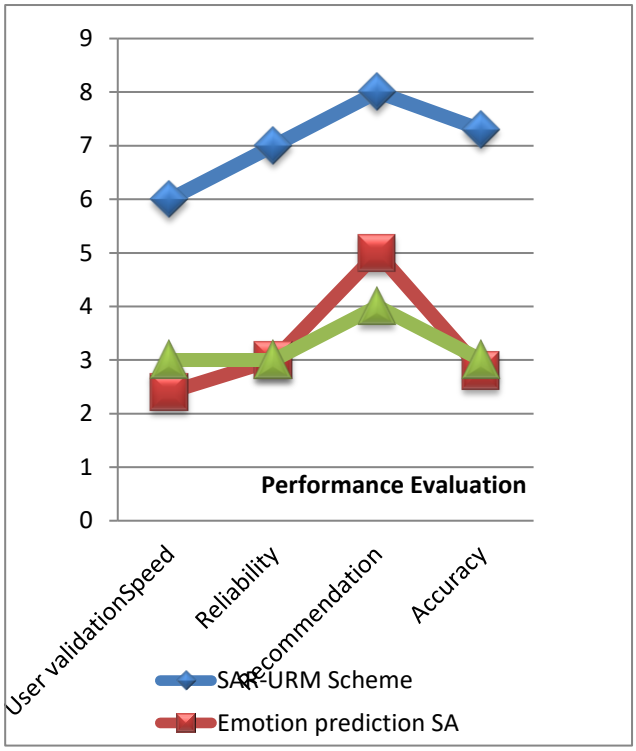
Case 2: To compute the average score for all tweets with a total sample of 500 users.

Case 3: The developed system was able to analyze the present and notable differences in the user relationships and interconnectivity relations among the users.

Like, the A-Group used Dict A and the B-Group used Dict B, and so on.

All kind of user Account validation	Matched Relationship	Coverage Rate (%)
20,000	10,000	1.5

Table 1. Coverage rate of User Relationship using Dic A and B.

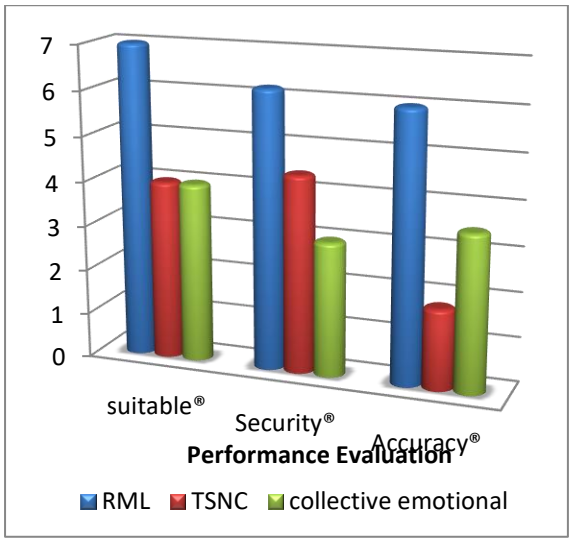


Graph 1. User Relationship Prediction: existing vs Proposed

User Relationship theories	SAR-URM Scheme	Emotion prediction SA	Meta-graph embedding
User validation Speed	6	2.4	3
Reliability	7	3	3
Recommendation	2	5	6
Accuracy	7.3	2.8	3

In result analysis, a comparison of the existing user relationship models with the proposed SAR-URM model is done in Graph 1. The comparison of

existing User relationship algorithms such as Emotion prediction SA and Meta graph embedding is done with the proposed SAR-URM model. In the comparison SAR-URM model is proved to be best in user relationship identification providing speed, reliability, recommendation and Accuracy.



Graph 2. Recommendation system comparison

In the above graph 2 the suitable recommendation rate, security and Accuracy rate on recommendation is compared. The comparison is made with the existing collective emotional technique and Topic-based Social Network Communities (TSNC) with the proposed Recommendation through machine learning (ML). The system states that the evaluation of proposed framework is proved to be better in security.

V. Conclusion

Recommending users with the similar interst are common. But recommendation on basis of the user relationship is something new achieved in the paper. The system uses a secured Authorized Recommendation (SAR) by validating the user age and user relationship. The theory further deliberates a keyword matching technique to identify the age limit and relationship of the user. In case of unauthorized access predicted by the underage users then immediately an alert to the parent are sent for conformation. This system produces an authorized secured access to all the users keeping the kids in controlled, accessible and secured environment.

Further, the system focus on applying positive and negative labels so that it will be easy to find the difference among the positivity spreading users and negative users.

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