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TAILORED PRODUCT RECOMMENDATIONS: MINING USER INTERESTS WITH META PATH DISCOVERY

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ABSTRACT: A recommendation system is an essential part of modern social networking sites and online stores. Two main problems with a product recommendation system—as demonstrated by a legacy recommendation system—are the existence of duplicate recommendations and the unpredictable introduction of new products (cold start). The limitations result from the fact that earlier recommendation systems produce suggestions for new products only based on the user's previous purchasing activity. Included social characteristics of the user, such personality features and current interests, might help to lessen the negative consequences of the cold start issue and remove pointless recommendations. In this work, we present Meta-Interest, an interest analysis and meta-path discovery product recommendation system that considers the personality of the consumer. Even in cases when these or comparable goods are not part of the user's past history, the Meta-Interest function precisely predicts the user's interests and finds the matching objects. To do this, the algorithm looks at the user's current interests first, then suggests products that fit those interests. The suggested approach considers the user's personality in two different ways: it creates links between the related things and the user's aspects of personality; and it forecasts the user's areas of interest using their personality traits. We compared the suggested approach to various modern recommendation methods, such as deep learning and session-based recommendation systems. The experimental results show that, especially in cases when there is a shortage of beginning data, the suggested approach can improve the recall and precision of the recommendation system.

KEYWORDS:Personality-aware Recommendation System, User Interests Mining, Meta-path Discovery and Collaborative Filtering.

1. INTRODUCTION

In the next few years, 2.14 billion people, or one-fourth of the world's population, are likely to be digital users. This is because so many people have personal mobile devices and can connect to the internet. This is where product recommendation systems come in. An online store's success depends on how well it fits the right product with the right customer, given its large customer base and wide range of products. Product selection systems can be broken down into two main groups: When a person views, buys, and rates products in the past, collaborative filtering (CF) systems suggest new products that they might like. On the other hand, many people use popular online social networks like Facebook, Twitter, and Instagram to say what they think and feel about different things or even to say they will buy a certain product in a certain situation. Because of this, social media material became a great way to find out what customers want and are interested in. However, personality computing has made it possible to improve the effectiveness of user modeling in general and recommendation systems in particular by incorporating the user's personality traits into the advice process. We present a method for suggesting products that can figure out what the user wants and then suggest products that fit those needs, even if the user has never used these or similar products before. This is done by looking at what the user is interested in and then suggesting goods that are related to that interest. The suggested system is personality-aware in two ways: it predicts what the user will be interested in

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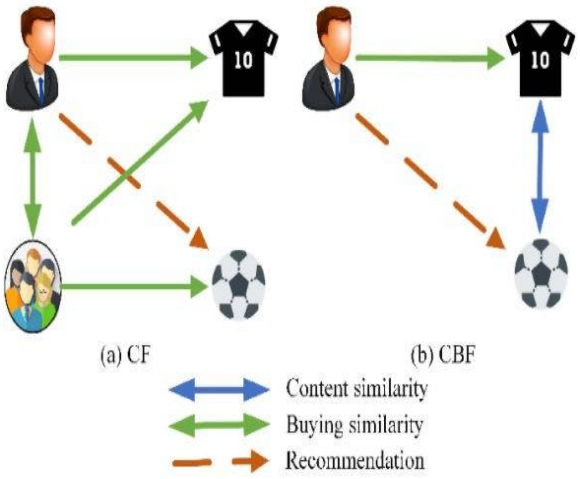
based on his personality traits, and it links the user's personality traits to things that are important to him. The recommended system has a hybrid architecture, which is shown in Figure 1. There are different kinds of nodes and links in the system, so we can think of it as a heterogeneous information network (HIN). The nodes are things, people, and topics, for example. In this case, HIN link forecast could be used to make product suggestions. One example is shown in Figure 2. The job is to figure out if there is a connection between the user and the product (the ball) based on the user's past review and subject interest as shown by an HIN. Finding a good mix between the amount of information used for prediction and the computational difficulty of the methods needed to get that information is one of the hardest parts of link prediction in HIN. Link prediction in HIN needs to be done as quickly as possible because networks often have hundreds of thousands or even millions of nodes. But if only local data is used, forecasts might not be very good, especially in networks with few nodes. So, to make the prediction, we try to gather data from meta-paths that begin at user nodes and end at the expected node, which in this case is a product node.

In short, this work makes the following contributions:

- Set up a way to suggest products that figures out what users want based on what they're interested in right now.
- The suggested method uses the user's Big-Five personality traits to improve the interest mining process and do product filtering that takes personality into account.
- The system can guess both explicit and implicit wants because it uses a graph-based meta route discovery to guess the relationship between people and goods.



2. LITERATURESURVEY

ASurveyonPersonality-AwareRecommendationSystems

Erik Cambria, Huansheng Ning, Mohammed Amine Bouras, Nyothiri Aung, and Sahraoui Dhelim.

In the field of artificial intelligence and personality psychology, personality-aware recommendation systems, or "personality computing," are becoming more widespread than ever. These new recommendation systems differ from the previous ones in that they address issues like data sparsity and cold start. This survey aims to investigate personality-aware recommendation algorithms and classify them into logical groups. This is the first study that examines personality-aware recommendation systems, as far as we are aware. We examine the wide range of design decisions that personality-aware recommendation systems can make by contrasting how they convey personalities and how they make recommendations. We also discuss some of the difficulties personality-aware suggestion systems face and present you with a selection of the most widely used datasets.

A System for Recommending Products with Personality Based on Metapath Discovery and Interest Mining of Users

A recommendation system is an essential component of any modern social network or e-commerce platform. The product recommendation system, which is an example of a typical legacy recommendation system, has two main issues: it continuously suggests the same items and it is

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unable to notify you when new recommendations are made (cold start). These issues arise from the fact that previous recommendation algorithms merely offer new products based on the user's past purchases. It might be possible to eliminate unnecessary recommendations and aid with cold starting by including the user's social attributes, such as personality traits and current interests. Thus, in this paper, we introduce Meta-Interest, a personality-aware recommendation system that mines user interests and discovers metapaths. Even if the user's past doesn't include these or related items, Meta-Interest determines what the user is interested in and the objects that are connected to those interests. This is accomplished by first determining the user's interests and then presenting content that is relevant to those interests. The proposed method is sensitive to the user's personality in two ways: first, it infers topics of interest based on the user's personality traits; second, it associates the user's traits with items related to those traits. The suggested system was put up against new recommendation systems, such as deep learning-based and session-based recommendation systems. Studies have demonstrated that the recommended approach can enhance the recommendation system's accuracy and memory, particularly during its initial setup.

Personality-Aware Product Recommendation System Based on User Interests Mining and Metapath Discovery

A recommendation system is an essential component of any modern social network or e-commerce platform. The product recommendation system, which is an example of a typical legacy recommendation system, has two main issues: it continuously suggests the same items and it is unable to notify you when new recommendations are made (cold start). These issues arise from the fact that previous recommendation algorithms merely offer new products based on the user's past purchases. It might be possible to eliminate unnecessary recommendations and aid with cold starting by including the user's social attributes, such as personality traits and current interests. Thus, in this paper, we introduce Meta-Interest, a personality-aware recommendation system that mines user interests and discovers metapaths. Even if the user's past hasn't included these or comparable products, Meta-Interest may be able to infer what the user is interested in and the items that are connected to that interest. This is accomplished by first determining the user's interests and then presenting content that is relevant to those interests. The proposed method is sensitive to the user's personality in two ways: first, it infers topics of interest based on the user's personality traits; second, it associates the user's traits with items related to those traits. The suggested system was put up against new recommendation systems, such as deep learning-based and session-based recommendation systems. Studies have demonstrated that the recommended approach can enhance the recommendation system's accuracy and memory, particularly during its initial setup.

SystemAnalysis

Yang et al. suggested that users be given computer game suggestions based on their mental types. Techniques for text mining were used to find the players' Big Five personality traits. Then, a list of games was sorted by how well each dominant trait fit the players. The system that was being considered was tried on the Steam network, which has 2050 games and 63 users. In their paper, Wu et al. suggested a greedy re-ranking method that uses personality traits to make a suggested list. Based on personality, the algorithm gets close to what people want when it comes to diversity. Two parts of the friend recommendation method that Ning et al. suggested are dual filtering and the Big-five personality traits model. The process of suggesting friends is based on users' personality traits and their harmony grade. Ferwerda et al. looked at a dataset that included 1415 Last.fm users' listening records and the results of personality tests to see if there was a link between the types of music they liked and their personality traits. For example, an online user survey called "Tune-A-Find" was held, and people who took part used the program. Individual differences (such as musical skill and personality traits), taxonomy selection (such as exercise, mood, and genre), and a number of user experience factors

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were looked at. In the same way, Hafshejani et al. created a collaborative filtering system that uses the K-means algorithm to group people into groups based on their Big Five personality traits. After that, the unknown scores of the sparse user-item matrix are guessed by starting with the users who are grouped together.

Dhelim et al. talked about the pros of keeping track of a user's social attributes, such as personality traits that are portrayed as cyber entities in the digital world. In the setting of the Social Internet of Things (IoT), Khelloufi et al. showed even more benefits of using user social attributes for service recommendation sake.

Zarrinkalam et al. came up with a way to predict links based on patterns in graphs. It works with a representation model that is made up of three different kinds of data: the degree to which topics are similar, the connections between users, and the clear and implicit contributions that users have made to topics. Trikha and his colleagues looked into whether it was possible to figure out what users were really interested in by looking at patterns and matching topics, without taking into account how close the topics were in terms of meaning. Wang et al. tested their proposed system using social networks made up of retweet connections, even though their method for regularization is based on the relation bipartite graph and can be used with any type of relationship.

Advantages

- Personality computing and interest mining are not used on the user's input, which makes the system less useful.
- The collaborative filtering (CF) method is not used by the system.

3. PROPOSEDSYSTEM

A product proposal could be sent as a link prediction in HIN within the suggested system. Forecasting whether or not there is a relationship between the user and the product, represented by the ball, is the aim of this method, given the subject interest specified in an HIN and the user's previous rating. Link prediction in HIN presents a significant challenge: finding a reasonable ratio between the amount of information exploited for prediction and the algorithmic complexity of the approaches required to collect that information. The link prediction method used in HIN needs to be extremely effective because networks typically consist of tens or hundreds of millions of nodes. However, if computation is limited to local information alone, this could lead to worse predictions, especially in networks with high levels of sparsity. We therefore include in our method meta-paths that start from user nodes and end at the predicted node (here, product nodes), where we attempt to fuse the necessary data for the prediction.

Advantages

- Make recommendations for a product recommendation system that uses the user's current activities to determine what needs to be purchased.
- In order to optimize interest mining and perform personality-based product filtering, the system under consideration incorporates the user's Big Five personality characteristics.
- The system can forecast explicit and implicit interests by predicting the relationship between users and products through graph-based metapath discovery.

4. IMPLEMENTATION

The project phase known as implementation is when the conceptual design is turned into a working system. It is therefore arguably the most important stage in building a successful new system and giving the user confidence in the functionality and effectiveness of the system. Implementation entails meticulous planning, research into the current system and its implementation constraints, development of changeover techniques, and assessment of those techniques.

NumberofModules

The module for social authentication based on registration An attribute-based encryption module is called the Security Module. multi-authority functionality.

Registration-BasedSocialAuthenticationModule:

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In this step, the system puts together Alice's trustees. Specifically, Alice is first authenticated with her password, which serves as her primary authenticator. Then, from Alice's friend list, a limited set of friends (for example, five) who have accounts in the system are labeled as Alice's Registration by Alice or the service provider.

SecurityModule:

To safeguard your account from fraudulent messages and preserve your online reputation, authentication is essential. Imagine opening your mailbox to find a fake email because someone had faked your personal information. Receivers' ensuing dissatisfaction and the ensuing spam complaints fall under your purview to resolve in order to restore your reputation. Users can choose their own trustees without any restrictions when using trustee-based social authentication systems. In our tests, we show that the service provider can enhance security guarantees by guaranteeing that no user is chosen as a trustee by an excessive number of other users by imposing a constraint on trustee selections (i.e., Section VII).

Attribute-basedencryptionmodule.

Data stored on each individual node is encrypted by the attribute-based encryption module. The same data is used for the fine-grained concept using user-uploaded data after data encryption and re-encryption. One potential security method for cloud storage has been proposed: attribute-based encryption. Attribute-Based Encryption, or ABE for short. For the purposes of this encryption technique, an identity is a collection of descriptive characteristics. It is possible to decrypt data if the decryptor's identity matches the ciphertext's identity sufficiently.

Multi-authoritymodule.

It is discovered that there is a multi-authority system in which each user is given an identity and allowed to interact with each key generator (authority) under different pseudonymas. Our aim is to develop a multi-authority CP-ABE that meets the previously mentioned security requirements, protects data consumers' private identity information, and is resilient against attacks or collusion against the authorities. This is the first time that an attribute-based multi-authority encryption technique has been put into practice.

5. CONCLUSION

Here, we present a personality-aware product recommendation system that uses interest mining and meta-path discovery to predict the user's needs and the objects that are related to them. Product suggestions are generated by first analyzing the user's current interests and then suggesting products that are relevant to those interests. Two ways exist for the suggested strategy to demonstrate personality awareness. First, it uses the user's personality traits to predict his areas of interest. Additionally, it links the connected items to the psychological characteristics of the user. The experimental results show that the recommended system outperforms state-of-the-art systems in terms of precision and recall, especially when integrating unknown items and users during the cold start phase.

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