

# ITEM RECOMMENDATION FOR WORD-OF-MOUTH SCENARIO IN SOCIAL E-COMMERCE

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### ABSTRACT

A recommendation system is an integral part of any modern online shopping or social network platform. Product recommendation systems, as a typical example of legacy recommendation systems, suffer from two major drawbacks: recommendation redundancy and unpredictability concerning new items (cold start). These limitations place because the legacy take recommendation systems rely only on the user's previous buying behavior to recommend new items. Incorporating the user's social features, such as personality traits and topical interest, might help alleviate the cold start and remove recommendation redundancy. Therefore, in this paper, we propose Meta-Interest, Item Recommendation for Word-of-Mouth-Scenario in Social E- Commerce. Meta-Interest predicts the user's interest and the items associated with these interests, even if the user's history does not contain these items or similar ones. This is done by analyzing the user's topical interests and eventually recommending the items associated with the user's interest. The proposed system is personality aware from two aspects; it incorporates the user's personality traits to predict his topics of interest and to match the user's personality facets with the associated items. The proposed system was compared against recent recommendation methods, such deep-learning-based 25 recommendation session-based systems and recommendation systems. Experimental results show that the proposed method can increase the precision and recall of the recommendation system, especially in a cold start setting.

# I. INTRODUCTION

With the widespread use of personal mobile devices and the ubiquitous access to the internet, the global number of digital buyers is expected to reach 2.14 billion people within the next few years,

Page | 1896

Index in Cosmos JUNE 2025, Volume 15, ISSUE 2 UGC Approved Journal which accounts for one-fourth of the world's population. With such a huge number of buyers and the wide variety of available products, the efficiency of an online store is measured by its ability to match the right user with the right product. here comes the usefulness of a product recommendation system. Generally speaking, product recommendation systems are divided into two main classes: Collaborative filtering (CF), CF systems recommend new products to a given user based on his/her previous (rating/viewing/buying) history. ss

Far from that, with the popularity of online social networks such as Facebook. Twitter. and Instagram, many users use social media to express their feelings or opinions about different topics or even explicitly express their desire to buy a specific product in some cases. This made social media content a rich resource to understand the users' needs and interests. On the other hand, the emergence of personality computing has offered new opportunities to improve the efficiency of user modeling in general and. particularly, recommendation systems by incorporating the user's personality traits in the recommendation process. In this work, we propose a product recommendation system that predicts the user's needs and the associated items, even if his history does not contain these items or similar ones. This is done by analyzing the user's topical interest, and eventually recommend the items associated with the theses interest. The proposed system is personality-aware from two aspects; it incorporates the user's personality traits to predict his topics of interest and to match the user's personality facets with the associated items. As shown in Figure 2, the proposed system is based on the hybrid.

Since we have multiple types of nodes (users, items, and topics), the system is modeled as a heterogeneous information network (HIN), which



includes multiple types of nodes and links. In our case, product recommendation could be formulated as link prediction in HIN. For example, in Figure 2, given the user's previous rating and topical interest represented in a HIN, the problem is to predict whether or not a link exists between the user and the product (the ball). One of the main challenges of link prediction in HIN is how to maintain a reasonable balance between the size of information considered to make the prediction and the algorithm complexity of the techniques required to collect that information. Since, in practice, the networks are usually composed of hundreds of thousands or even millions of nodes, the method used to perform link prediction in HIN must be highly efficient. However, computing only local information could lead to poor predictions, especially in very sparse networks. Therefore, in our approach, we make us of metapaths that start from user nodes and end up in the predicted node (product nodes in our case) and try to fuse the information from these meta-paths to make the prediction.

The contributions of this work are summarized as follows:

1. Propose a product recommendation system that infers the user's needs based on her/his topical interests.

2. The proposed system incorporates the user's Big-Five personality traits to enhance the interest mining process, as well as to perform personality aware product filtering.

The relationship between the users and products is predicted using a graph-based meta path discovery, therefore, the system can predict implicit as well as explicit interests. The remainder of this paper is organized as follows. In Section 2, we review the related works, while in Section 3, the system design of the proposed system is presented. In Section 4, we evaluate the proposed system. Finally, in Section 5, we conclude the work and state some of the future directions.

# II. SYSTEM ANALYSIS & DESIGN EXISTING SYSTEM

Yang et al. [4] proposed a recommendation system of computer games to players based on their

Page | 1897

Index in Cosmos JUNE 2025, Volume 15, ISSUE 2 UGC Approved Journal personality traits. They have applied text mining techniques to measure the players' Big- five personality traits, and classified a list of games according to their matching with each dominant trait. They have tested their proposed system on 2050 games and 63 players form Steam gaming network. While Wu et al. [5] presented a personality based greedy re-ranking algorithm that generates the recommended list, where the personality is used to estimate the users' diversity preferences. Ning et al. [6] proposed a friend recommendation system that incorporates the Bigfive personality traits model and hybrid filtering, where the friend recommended process is based on personality traits and the users' harmony rating.

Ferwerda et al. [7] studied the relationship between the user's personality traits and music genre preferences, they have analyzed a dataset that contains personality test scores and music listening histories of 1415 Last.fm users. Similarly in [8] they conducted an online user survey where the participants were asked to interact with an application named Tune-A-Find, and measured taxonomy choice (i.e. activity, mood, or genre), individual differences (e.g. music expertise factors and personality traits), and different user experience factors. Similarly, Hafshejani et al. [9] proposed a collaborative filtering system that cluster the users based on their Big-Five personality traits using K-means algorithm. Following that, the unknown ratings of the sparse user-item matrix are estimated based on the clustered users. Dhelim et al. [10] discussed the benefits of capturing the user's social feature such as personality traits that are represented as a cyber entities in the cyberspace. Similarly, Khelloufi et al. [11] showed the advantages of leveraging the user's social features

In the context of service recommendation in the Social Internet of Things (SIoT).

Zarrinkalam et al. [12] presented a graph-based link prediction scheme that operates over a representation model built from three categories of information: user explicit and implicit contributions to topics, relationships between users, and the similarity among topics. Trikha et al.



[13] investigated the possibility of predicting the users' implicit interests based on only topic matching using frequent pattern mining without considering the semantic similarities of the topics. While Wang et al. [14] proposed a regularization framework based on the relation bipartite graph, that can be constructed from any kind of relationships, they evaluated the proposed system from social networks that were built from retweeting relationships.

#### DISADVANTAGES

- 1. The system is less effective since it is not implemented by user interest mining or personality computing.
- 2. The system doesn't implement the Collaborative filtering (CF) method.

### **PROPOSED SYSTEM**

In the proposed system, product recommendation could be formulated as link prediction in HIN [3]. For example, in this system, given the user's previous rating and topical interest represented in a HIN, the problem is to predict whether or not a link exists between the user and the product (the ball). One of the main challenges of link prediction in HIN is how to maintain a reasonable balance between the size of information considered to make the prediction and the algorithm complexity of the techniques required to collect that information.

Since in practice, the networks are usually composed out of hundreds of thousands or even millions of nodes, the method used to perform link prediction in HIN must be highly efficient. However, computing only local information could lead to poor predictions, especially in very sparse networks.

Therefore, in our approach, we make use of metapaths that start from user nodes and end up in the predicted node (product nodes in our case), and try to fuse the information from these meta-paths to make the prediction.

# ADVANTAGES

- 1. Propose a product recommendation system that infers the user's needs based on her/his topical interests.
- 2. The proposed system incorporates the user's

Page | 1898

Big-Five personality traits to enhance the interest mining process, as well as to perform personality-aware product filtering.

3. The relationship between the users and products is predicted using a graph-based meta-path discovery, therefore, the system can predict implicit as well as explicit interests.

#### SYSTEM ARCHITECTURE



# Fig. SYSTEM ARCHITECTURE III. IMPLEMENTATION

# MODULES MODULE DESCRIPTION Web Image Server

In this module, the Web Image Server login by using valid user name and password. After login successful he can do some operations such as View users and give authorization, View Sellers and give authorization, View user's Request and generate secret key using RSA, Add Image Category and View all Categories, View all Cloth images with Rank and FeedBacks, View all User Purchased Cloths with All details, View All Cloth images with ranks in chart, View All keyword with ranks in chart, View All Number of Feedbacks per each cloth with scores in chart.

#### View and Authorize Users

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

#### **Online Seller**

In this module, there are n numbers of Seller are present. Manager should register before doing any operations. Once Seller 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



Seller will do some operations like View Profile, Add Cloth Images, View All Cloth images with scores and Feedback and give option to show similar images while clicking on some image and give Update(only contents and not images) and delete option, View all User Purchased Cloths with All details and Total Bill.

#### Users

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be database. After stored to the registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like View Profile, Manage Account, Requst Secret key to search images and view secret key if it is generated in this page only, Enter secret key to Search Cloth Images by key word and show only Cloth images and give click option to view related Cloth images and give feedbacks, give option to purchase cloth, View all search transactions and give link to show number of time keyword is searched, View all vour Purchased Cloths with All details and Total Bill and View all Recommended Products or Cloths.

# **IV.** CONCLUSION

# CONCLUSION

In this paper, we have proposed a personalityaware product recommendation system based on interest mining and meta path discovery, the system predicts the user's needs and the associated items. Products recommendation is computed by analyzing the user's topical interest, and eventually recommend the items associated with the those interests. The proposed system is personality-aware from two aspects, firstly because it incorporates the user's personality traits to predict his topics of interest. Secondly, it matches the user's personality facets with the associated items. Experimental results show that the proposed system outperforms the state-of-art schemes in terms of precision and recall especially in the cold start phase for new items and users.

However, Meta-Interest could be improved in different aspects:

Page | 1899

Index in Cosmos JUNE 2025, Volume 15, ISSUE 2 UGC Approved Journal 1. In this work, the users' personality traits measurement was conducted through questionnaires. Integrating automatic personality recognition system, that can detect the users' personality traits based on their shared data, into Meta-Interest is one of our future directions.

2. The proposed system uses Big-Five to model the user' personality . Extending Meta-Interest to include other personality traits models such as the Myers–Briggs type indicator is a future direction.

The proposed system could be further improved by integrating a knowledge graph and infer topicitem association using semantic reasoning.

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