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# A Supervise Personality-Aware Product Develop Recommendation System Based on User Interests and Meta Path Discovery

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**ABSTRACT:** Product recommendation systems are becoming increasingly important for-ecommerce businesses to provide personalized recommendations to their customers. Early recommendation systems have serious problems such as repetition in recommendation, cold start which is unpredictability about new items. These can be overcome when systems analyze user behavior, along with purchase history to make recommendations. So we propose a personality – a ware product recommendation system based on user interest mining and meta-path discovery. User interest mining helps in understanding interests and preferences of users and Meta path Discovery involves identifying relationships between different products and using these relationships to make recommendations. This can be done by analyzing product categories, brands, or other attributes, and identifying patterns in the data that can be used to make recommendations.

## 1. INTRODUCTION

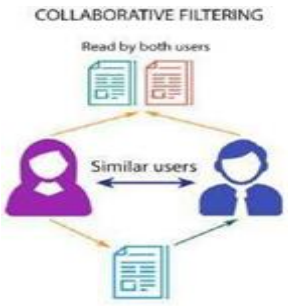
WITH the widespread of personal mobile devices and the ubiquitous access to the internet, the global number of digital buyers is expected to reach 2.14 billion people within the next few years, which accounts for one fourth of the world population. With such a huge number of buyers and the wide variety of available products, the efficiency of an online store is measured by their ability to match the right user with the right product, generally product recommendation systems are divided into two main classes

**(1)Collaborative filtering**

CF systems recommend new products to a given user based on his/her previous (rating/viewing/buying) History

**(2)Content filtering**

or content-based filtering (CBF). CBF systems recommend new items by measuring their similarity with the previously (rated/viewed/bought) products.



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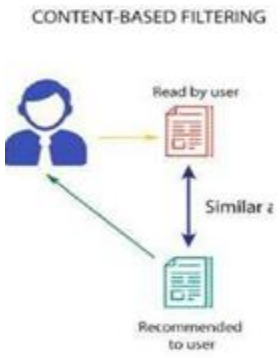


**Fig.1: Collaborative filtering and content filtering**

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with the popularity of online social networks ,many users are expressing their feeling or opinions about different topics, or even explicitly expressing their desire to buy a specific product in some cases. Which made social media content a rich resource to understand the users' need sand interests?

Figure2 the proposed system is based on hybrid filtering approach(CF and CBF) and personality-aware interest mining.

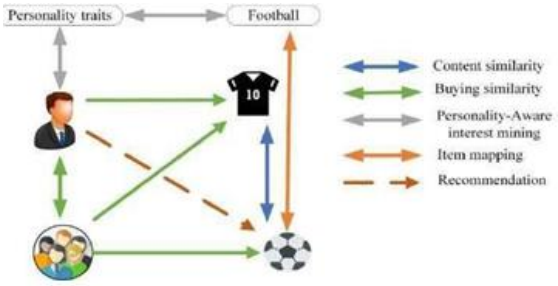


**Fig.2: Interest mining based product recommendations**

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

**The work is summarized as follows:**

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

Incorporate the user's Big-Five personality traits to enhance the interest mining process, and toper form personality-aware product filtering.

A graph-based meta path discovery can predict implicit & explicit interests by identifying the relationships between user and product

## 2. LITERATURESURVEY

**Mininguserinterestbasedonpersonality-awarehybridfilteringinsocial**networks," **by H.Ning,S.Dhelim,andN. Aung**

The first type of filtering, personality-aware filtering, takes into account the user's personality traits, as determined by various psychological models ,such as the Big Five model. Personality-aware filtering analyses the user's likes, dislikes, and behavior on social media to create a profile that predicts their interests based on their personality. The second type of filtering, hybrid filtering, combines two or more different filtering techniques to improve accuracy. Hybrid filtering can combine content-based filtering, which uses the characteristics of the content to recommend similar items, with collaborative filtering, which looks at the preferences of other users to make recommendations. This approach can provide more accurate recommendations for users on social networks. It can also be used to better understand duser behavior and preferences, and to improve the effectiveness of targeted advertising and marketing campaigns.

**Personalizing recommendation diversity based on user personality by W.Wu, L.Chen, and Y.Zhao**

In traditional recommendation systems, users are typically recommended items based on their previous interactions with the system, such as items they have liked, rated, or purchased. However, this approach can lead to a lack. To address this issue, personalized recommendation diversity techniques aim to provide users with recommendations that are both relevant and diverse, taking into account factors such as the user's interests, preferences, and personality of diversity in recommendations, as the system may recommend similar .In this context "personalizing recommendation diversity based on user personality "involves using the user's personality traits, as determined by psychological models such as the Big Five, to provide diverse recommendations.

## 3. EXISTINGSYSTEM:

The existing system for Product re commendation usually relies on either

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collaborative filtering or content-based filtering techniques. Collaborative filtering analyzes user behavior and preferences to generate recommendations for similar users, while content-based filtering uses the attribute so products to recommend items with similar features. However, these systems have limitations such as the cold start problem (when there is not enough data to make accurate recommendations), sparsity of data, and lack of personalization. To address these limitations, newer approaches have been developed, such as hybrid recommendation systems that combine different techniques to provide more accurate and personalized recommendations. Personality-aware recommendation systems, like the one proposed in this project, take into account the user's personality traits and interests to generate recommendation Collaborative filtering (CF) systems recommend new products to a given user based on his/her previous(rating/ viewing/ buying)history and his/her neighbors(similar users) Can not handle fresh items i.e. if an item is not seen during training ,it can't query the Model with that item Content based filtering(CBF) system commend new items by measuring their similarity with the previously (rated/viewed/bought) products

## 4. PROPOSEDSYSTEM:

The key steps involved in our proposed system:

**Data Collection:**

The first step is to collect data on users and products. This may include demographic data, psychographic data, and behavioral data such as purchase history, product ratings, and clicks team data.

**Data Cleaning and Preprocessing:**

Once you have collected your data, you will need to clean and preprocess it to prepare it for analysis. This may involve removing duplicates, handling missing data, and normalizing data.

**User Profiling:**

The next step is to build user profiles based on the data you have collected. This may involve clustering users based on their behavior or preferences, or building a model that predicts user preferences based on their demographic and psychographic data.

**Product Profiling:**

Once you have built user profiles, the next step is to build product profiles. This may involve analyzing product features and attributes, and building a model that can predict the relevance of a product to a Particular User**.**

**Recommendation Algorithm**:

Once you have user and product profiles, the next step is to develop are commendation algorithm. This may involve using collaborative filtering; content based filtering, or hybrid filtering methods.

**Personality Modeling:**

To build a personality aware recommendation system, you will need to develop a model that can capture users' personalities. This may involve using machine learning techniques to analyze users' behavior and psychographic data, and building a model that can predict users' personality traits.

**Meta Path Discovery:**

Meta path discovery is a technique used to discover meaningful paths between users and products in a recommendation system. This involves analyzing the network structure of the data and identifying the most important paths between users and products.

Evaluation: The final step is to evaluate your recommendation system. This may involve using metrics such as precision, recall, and F1 score to measure the accuracy and effectiveness of your system.

**The algorithms involved in our proposed system**

- Interest Mining
- Meta path discovery

**Interest Mining:**

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User interest mining in a product recommendation system that analyzes user behavior and interactions with the system to identify their interests and preferences. It involves collecting and processing data such as user clicks, views, purchases, and search queries, and then applying data mining techniques such as clustering, association rule mining, and classification to extract patterns and trends.

The user interest mining module is responsible for building user profiles that capture the user's preferences, needs, and behaviors. These profiles are used to generatepersonalizedrecommendationsfort heuser.Themodulemayalsoincorporatefeed backmechanismssuchasratingsandreviewst ofurtherrefinetherecommendations.

**Meta Path Discovery:**

The representation model $G = (GU, GT, GP)$ nodes can represent different entities (users,topics and items)and the links can connect different nodes(user-user, user-topic, user-item, topic-item, item-item and topic-topic). We use meta paths [21] to predict thematching score between a given user node in $GU$ and an item node in $GP$.

A meta path is a sequence of relations between nodes defined over a heterogeneous network, which can be used to define a topological structure with various semantics. In our case, we investigate the meta-paths that start from a user node and end with an item node $P:\{u \rightarrow x \rightarrow \cdots \rightarrow x \rightarrow i\}$.

Each meta-path is characterized by the number of links between the sourceand destination nodes and it is called the path length $Pl$. For example, the possible meta-path with path length $P2$ from a user node to an item node a represented in Figure

For a given meta-path $P : \{s \rightarrow x \rightarrow \cdots \rightarrow x \rightarrow d\}$, any path in the network that connect node $s$ and $d$ following the same intermediate node types as defined by $P$ I is called a path instance of $P$. For a given meta-path $P$ path count is the number of all path instances $Pc=|\{p:p \in P\}|$.In our case, we consider all meta-paths that start with a user node and ends with an item node with maximum meta-path length to $lmax = 2$.We have made the maximum length to 3 because short meta-paths are semantically more important than long ones and they are good enough for capturing the structure of the network. Besides that, it is computationally expensive to explore longer meta-path ,because the path count increase exponentially with the increase of the path length $Pl$

## 5. SCREEN SHORT


**FIG:** Logging in as service provider

## 6. CONCLUSION

In this project, we have proposed a personality-aware 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' stoical interest, and eventually recommend the items associated with the 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.

## 7. FUTURESCOPE

In future, it is interesting to explore the application of personality trait recognition techniques to personality-aware

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recommendation systems. Extending Meta-Interest to include other personality traits models, such as the Myers–Briggs type indicator and by integrating knowledge graph and infer topic–items association using semantic reasoning

## REFERENCES

1.W. Wu, L. Chen, and Y. Zhao, "Personalizing recommendation diversity based on user personality," *User Modeling and User-Adapted Interaction*, vol. 28, no. 3, pp. 237–276,2018.

2.H. Ning, S. Dhelim, and N. Aung, "Perso Net: Friend Recommendation System BasedonBig-FivePersonalityTraitsandHybridFiltering," *IEEETransactionsonComputationalSocial Systems*,pp.1–9,2019.[Online].Available:https://ieeexplore.ieee.org/document/8675299/

3.B. Ferwerda, M. Tkalcic, and M. Schedl, "Personality Traits and Music Genres: WhatDo People Prefer to Listen To?" in *Proceedings of the 25th Conference on User Modeling, Adaptation and Personalization*.ACM,2017,pp.285–288.

B.Ferwerda,E.Yang,M.Schedl,andM.Tkalcic,"Personalityandtaxonomypreferences, and the influence of category choice on the user experience for musicstreamingservices,"*MultimediaToolsandApplications*,pp.1–34,2019.

4.Z. Yusefi Hafshejani, M. Kaedi, and A. Fatemi, "Improving sparsity and new user problems in collaborative filtering by clustering the personality factors," *Electronic Commerce Research*, vol. 18, no. 4, pp. 813–836, dec 2018. [Online]. Available :http://link.springer.com/10.1007/s10660018-9287-x

5.S.Dhelim,N.Huansheng,S.Cui,M.Jianhua,R.Huang,andK.I.-K.Wang,"Cyberentity and its consistency in the cyber-physical-social-thinking hyperspace,"*Computers&ElectricalEngineering*,vol.81,p.106506,jan2020.[Online].Available:https://linkinghub.elsevier.com/retrieve/pii/S0045790618334839

6.A. Khelloufi, H. Ning, S. Dhelim, T. Qiu, J. Ma, R. Huang, and L. Atzori, "A Social Relationships Based Service Recommendation System For SIoT Devices,"*IEEEInternetofThings Journal*,pp.1–1, 2020.[Online].Available:https://ieeexplore.ieee.org/document/9167284/

7.F.Zarrinkalam,M.Kahani,andE.Bagheri,"Mininguserinterestsoveractivetopicsonsocialnetworks,"*InformationProcessing&Management*,vol.54,no.2,pp.339–357,2018.

8. A. K. Trikha, F. Zarrinkalam, and E. Bagheri, "Topic-Association Mining for UserInterestDetection,"in*EuropeanConferenceonInformationRetrieval*. Springer, 2018,pp.665–671.

9.J. Wang, W. X. Zhao, Y. He, and X. Li, "Infer user interests via link structureregularization,"*ACMTransactionsonIntelligentSystemsandTechnology(TIST)*, vol.5,no.2,p.23,2014.

10.S.Dhelim, H. Ning, M. A. Bouras, and J. Ma,"Cyber-Enabled Human-Centric SmartHome Architecture," in *2018 IEEE SmartWorld)*.IEEE,oct2018,pp.1880–1886.[Online].Available:https://ieeexplore.ieee.org/document/8560294/