SMART FASHION RECOMMENDATION APPLICATION USING CLOUD COMPUTING APPLICATION

INTRODUCTION

Clothing is a kind of symbol that represents people's internal perceptions through their outer appearance. It conveys information about their choices, faith, personality, profession, social status, and attitude towards life. Therefore, clothing is believed to be a nonverbal way of communicating and a major part of people's outer appearance. Recent technological advancements have enabled consumers to track current fashion trends around the globe, which influence their choices. The fashion choices of consumers depend on many factors, such as demographics, geographic location, individual preferences, interpersonal influences, age, gender, season, and culture. Moreover, previous fashion recommendation research shows that fashion preferences vary not only from country to country but also from city to city. The combination of fashion preferences and the abovementioned factors associated with clothing choices could transmit the image features for a better understanding of consumers' preferences. Therefore, analysing consumers' choices and recommendations is valuable to fashion designers and retailers. Additionally, consumers' clothing choices and product preference data have become available on the Internet in the form of text or opinions and images or pictures. Since these images contain information about people from all around the world, both online and offline fashion retailers are using these platforms to reach billions of users who are active on the Internet.

Therefore, e-commerce has become the predominant channel for shopping in recent years. The ability of recommendation systems to provide personalized recommendations and respond quickly to the consumer's choices has contributed significantly to the expansion of e-commerce sales. According to different studies, e-commerce retailers, such as Amazon, eBay, and Shop style, and social networking sites, such as Pinterest, Snapchat, Instagram, Facebook, Chictopia, and Look book, are now regarded as the most popular media for fashion advice and recommendations .Research on textual content, such as posts and comments, emotion and information diffusion ,and images has attracted the attention of modern-day researchers, as it can help to predict fashion trends and facilitate the development of effective recommendation systems . An effective recommendation system is a crucial tool for successfully conducting an e-commerce business.

Fashion recommendation systems (FRSs) generally provide specific recommendations to the consumer based on their browsing and previous purchase history. Social-network-based FRSs consider the user's social circle, fashion product attributes, image parsing, fashion trends, and consistency in fashion styles as important factors since they impact upon the user's purchasing decisions. FRSs have the ability to reduce transaction costs for consumers and increase revenue for retailers.

LITERATURE SURVEY

To understand and analyse the application developments of recommender systems, this section first reviews the main recommendation techniques, including traditional methods such as collaborative filtering-based, content-based, knowledge-based, and hybrid methods, and recently developed advanced methods, such as fuzzy set-based, social network-based, trust-based, context awareness-based, and group recommendation approaches.

i **Content-based recommendation techniques**

Content-based (CB) recommendation techniques recommend articles or commodities that are similar to items previously preferred by a specific user. The basic principles of CB recommender systems are:

a. To analyse the description of the items preferred by a particular user to determine the principal common attributes that can be used to distinguish these items. These preferences are stored in a user profile.
b. To compare each item's attributes with the user profile so that only items that have a high degree of similarity with the user profile will be recommended. In CB recommender systems, two techniques have been used to generate recommendations. One technique generates recommendations heuristically using traditional information retrieval methods, such as cosine similarity measure. The other technique generates recommendations using statistical learning and machine learning methods, largely building models that are capable of learning users' interests from the historical data (training data) of users.

ii **Collaborative filtering-based recommendation techniques**

Collaborative filtering (CF)-based recommendation techniques help people to make choices based on the opinions of other people who share similar interests. The CF technique can be divided into user-based and item-based CF approaches. In the user-based CF approach, a user will receive recommendations of items liked by similar users. In the item-based CF approach, a user will receive recommendations of items that are similar to those they have loved in the past. The similarity between users or items can be calculated by Pearson correlation-based similarity, constrained Pearson correlation (CPC)-based similarity, cosine-based similarity, or adjusted cosine-based measures. When calculating the similarity between items using the above measures, only users who have rated both items are considered. This can influence the similarity accuracy when items which have received a very small number of ratings express a high level of similarity with other items. To improve similarity accuracy, an enhanced item-based CF

approach was presented by combining the adjusted cosine approach with Jaccard metric as a weighting scheme. To compute the similarity between users, the Jaccard metric was used as a weighting scheme with the CPC to obtain a weighted CPC measure. To deal with the disadvantage of the single-rating based approach, multi-criteria collaborative filtering was developed.

iii **Knowledge-based recommendation techniques**

Knowledge-Based (KB) recommendation offers items to users based on knowledge about the users, items and/or their relationships. Usually, KB recommendations retain a functional knowledge base that describes how a particular item meets a specific user's need, which can be performed based on inferences about the relationship between a user's need and a possible recommendation. Case-based reasoning is a common expression of KB recommendation technique in which case-based recommender systems represent items as cases and generate the recommendations by retrieving the most similar cases to the user's query or profile. Ontology, as a formal knowledge representation method, represents the domain concepts and the relationships between those concepts. It has been used to express domain knowledge in recommender systems. The semantic similarity between items can be calculated based on the domain ontology.

iv **Hybrid recommendation techniques**

To achieve higher performance and overcome the drawbacks of traditional recommendation techniques, a hybrid recommendation technique that combines the best features of two or more recommendation techniques into one hybrid technique has been proposed. According to Burke, there are seven basic hybridization mechanisms of combinations used in recommender systems to build hybrids: weighted, mixed, switching, feature combination, feature augmentation, cascade and meta-level. The most common practice in the existing hybrid recommendation techniques is to combine the CF recommendation techniques with the other recommendation techniques in an attempt to avoid cold-start, sparseness and/or scalability problems.

v **Computational intelligence-based recommendation techniques**

Computational intelligence (CI) techniques include Bayesian techniques, artificial neural networks, clustering techniques, genetic algorithms and fuzzy set techniques. In recommender systems, these computational intelligence techniques are widely used to construct recommendation models. A Bayesian classifier is a probabilistic methodology for solving classification problems. Bayesian classifiers are popular for model-based recommender systems and are often used to derive the model for CB recommender systems. When a Bayesian network is implemented in recommender systems, each node corresponds to an item, and the states correspond to each possible vote value.

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