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Hybrid Recommender System Using Emotional Fingerprints Model

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ABSTRACT

With today's information overload, recommender systems are important to help users in finding needed information. In the movies domain, finding a good movie to watch is not an easy task. Emotions play an important role in deciding which movie to watch. People usually express their emotions in reviews or comments about the movies. In this article, an emotional fingerprint-based model (EFBM) for movies recommendation is proposed. The model is based on grouping movies by emotional patterns of some key factors changing in time and forming fingerprints or emotional tracks, which are the heart of the proposed recommender. Then, it is incorporated into collaborative filtering to detect the interest connected with topics. Experimental simulation is conducted to understand the behavior of the proposed approach. Results are represented to evaluate the proposed recommender.

KEYWORDS

Emotional Fingerprints, Hybrid recommender systems, Movies Recommender Systems, Sentiment Analysis

1. INTRODUCTION

Nowadays, People are using the internet in their everyday tasks more than ever (Borg & Smith, 2018). Thus, users get a large volume of information every time they search for something online. Accordingly, this big amount of information overwhelmed users (Mezni & Fayala, 2018), (Kunaver & Požrl, 2017). Therefore recommender systems are important to suggest the most suitable items for users (Lacerda, 2017). The recommender systems intended to automatically understand the user's inclinations and provide them with an item list that they will mostly like (Karimi, Jannach, & Jugovac, 2018). There are three approaches to the recommender systems: Collaborative Filtering (CF) (Nalmpantis & Tjortjis, 2017), Content Based (CB) (Frolov & Oseledets, 2017) and hybrid (Sulikowski, Zdziebko, & Turzyński, 2017) as on (Figure 1).

CF goal is to give the users a customized recommendation based on "votes" made by others in form of ratings (Fu, Qu, Moges, & Lu, 2018), (Pang et al., 2018), (F. Wang et al., 2017). It is remarked by the ability to provide new recommendations to users that vary from what they have already chosen or seen before (Xie, Chen, Shang, Huang, & Li, 2015), (Valcarce, Parapar, & Barreiro, 2018), (Pang, Jin, Zhang, & Zhu, 2017). Whereas in CB systems, a user can receive recommendation without any assistance from others. It is suitable for finding different user's interests (Champiri, Shahamiri, & Salim, 2015), (Xu, Dutta, Datta, & Ge, 2017), (Mezni & Fayala, 2018), (Jang, Yang, Kim, & Park, 2018). It relies on finding item features, and create a user profile based on her preferences (Shu, Shen, Liu, Yi, & Zhang, 2018).

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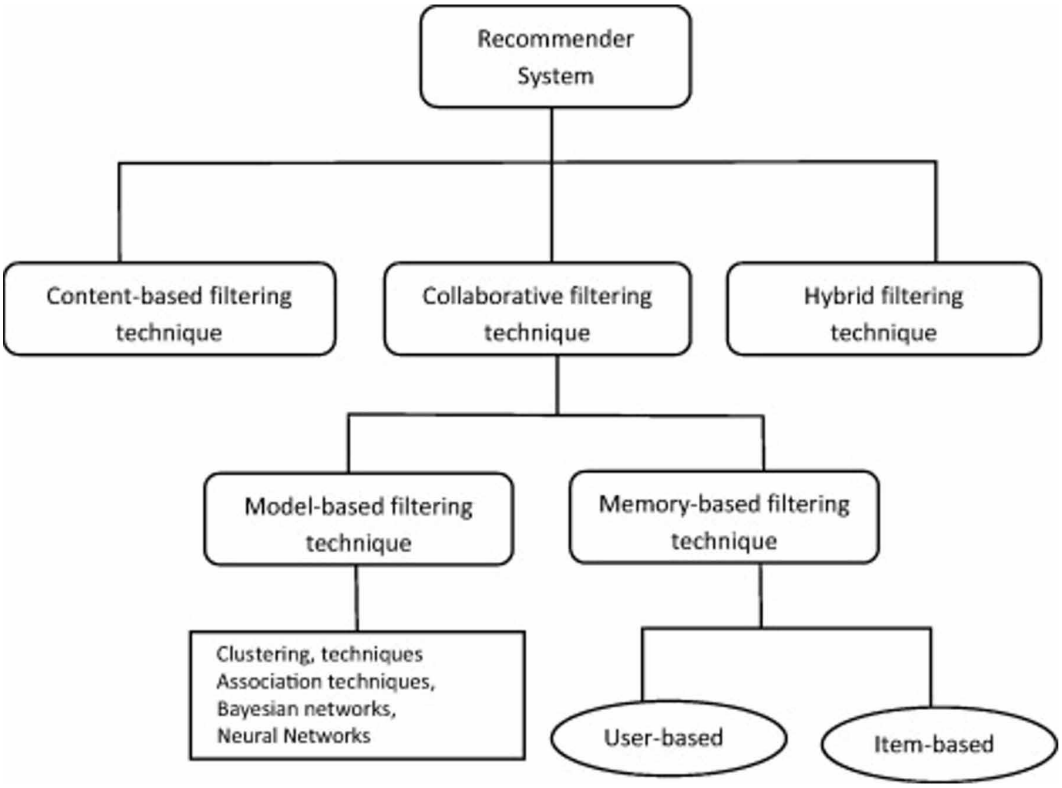
Figure 1. Recommender systems approaches (Batchakui, 2017)



Traditional recommendation systems suffer from multiple limitations. For example, to enable the CF making a good recommendation, there should be enough set of ratings, which usually does not happen (Parvin, Moradi, & Esmaeili, 2018), (Ha & Lee, 2017). This sparsity problem leads to poor recommendation (Chu & Lee, 2017). Further, most of similarity metrics use the user ratings only without taking into account any other source of information (Parvin et al., 2018). Additionally, traditional CF suffers from the cold start problem (Gonzalez Camacho & Alves-Souza, 2018). This affects the newly added users or items to the system because there is no previous information about either users or items. Therefore, it cannot find or use any past preferences. The recommendation can be poor as it will not give her any dissimilar but relevant products (Zhao, Wang, Wang, Zhou, & Jiang, 2018), (Minkov, Kahanov, & Kuflik, 2017). Additionally, CB methods also suffer from other problems such as Over-Specialization. This means the system gives a recommendation for similar items to what already rated before (Hariadi & Nurjanah, 2017).

Currently, online users are not just content consumers, rather, they are content producers (Li, 2018), (Yang, Shin, Joun, & Koo, 2017). Every day, many people express their opinions online about different topics. A large percentage of internet users are using these reviews in their decisions such as to buy a product or not (Brazytė, Weber, & Schaffner, 2017), (Wang & Guo, 2017). Therefore, many researchers have studied the content produced by users on the web like on (Contratres, Alves-Souza, Filgueiras, & DeSouza, 2018), (Zheng, Luo, Sun, Zhang, & Chen, 2018), and (Bader, Mokryn, & Lanir, 2017). They applied sentiment analysis techniques on reviews to extract user's opinions and then used them in the recommendation process. Nevertheless, the previous researches had many drawbacks, for example, it overlooked the importance of using verbs and pronouns; rather, they based their investigation on a single word or emotion. Additionally, the researchers also overlooked tracking emotions connected to some object/subject in time. This will be discussed in more details in section 2.

Conclusions and Future Work

Badya Al-Hamadani and Joan Lu (2013). *Design, Performance, and Analysis of Innovative Information Retrieval (pp. 154-178).*
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