STUDY ON RECOMMENDATION SYSTEMS AND ITS CHALLENGES

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Abstract: - In the current scenario, recommendation is the most effective system to grab consumer's attention. But much attention is not provided on producer's or manufacturer's consideration. This paper aims at considering the literature review on various recommendation models and their challenges. The significance of this system according to manufacturer/producer's perspective is also discussed. The contribution of sentiment analysis in recommendation is also discussed and its challenges or possibilities in implementing in the current trend is also concluded.

Keywords: Recommendation system, collaborative filtering, content-based filtering, sentiment analysis

I. LITERATURE SURVEY

Recommendation system can be defined as system that enhance decision making strategy under complex circumstances based on various techniques and availability of data in the relevant domain. (A.Ziani, 2017) implemented recommendation system using Collaborative filtering method. Dividing the method in two categories is:-

- Memory based algorithms

    It computes a prediction by combining ratings of selected users or items that are judged to be relevant.
    - o User based CF algorithm
    - o Item based CF algorithm
- Model based algorithms

    It uses all available ratings to learn a model, which can then be used to predict the rating of any given item by any given user.

Recommender system is commonly classified into three types according to how recommendations are made:-

- Content based filtering
- Collaborative filtering
- Social filtering

This system transforms reviews texts into a numerical evaluation and feeds them into a recommendation system to implement a collaborative filtering. The proposed system combines sentiment analysis and recommendation using collaborative filtering to develop recommendation system. Semi-supervised classification based opinion analysis is integrated to support multilingual recommendation.
Following are the steps for developing recommendation system:-
Firstly, the process of opinions classification extracts the statistical features set such as: number of words, emotionalism, addressing, reflexivity...etc.
Secondly, the resulting features vector will be the numerical representation of the review's text in the classification phase by the semi-supervised SVM.

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Finally, a polarity score is generated to compute the vote for the collaborative filtering of the recommendation phase.

(Yibo Wang, 2018) Content based method and collaborative filtering is used in building hybrid recommender system.

To improve accuracy, timeliness and stability of recommender system, framework is proposed.

Considering the usage of online information and user-generated content, Collaborative filtering method recommends items by measuring the similarity between users. The similarity between users' preference can be measured by correlation calculation. In this way, users who have similar interest in movies are sorted in the same group, and then movies are recommended by their reviews and ratings of movies that they have seen. However, the correlation and similarity are difficult to calculate due to the sparsity of user's basic data, such as users' rating on movies that they have watched and their browsing history.

Content based filtering is used to track user history to achieve timeliness and overcome the limitation of collaborative filtering method.

(F.O. Isinkaye, 2015)

Recommender systems handle the problem of information overload that users normally encounter by providing them with personalized, exclusive content and service recommendations. They reduce transaction costs of finding and selecting items in an online shopping environment.

Recommendation systems have also proved to improve decision making process and quality recommender systems support users by allowing them to move beyond catalog searches.

Amazon uses topic diversification algorithms to improve its recommendation. Some of the problems associated with content-based filtering techniques are limited content analysis, overspecialization and sparsity of data

Also, collaborative approaches exhibit cold-start, sparsity and scalability problems.
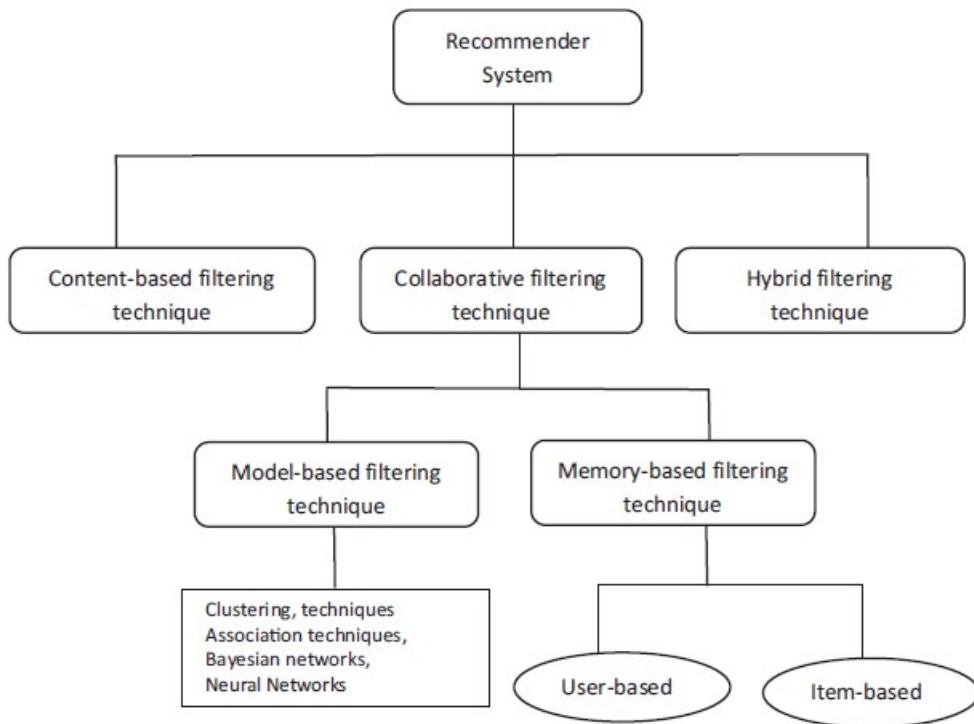

Figure 1 Recommendation techniques

II. CHALLENGES

-   *Ignorance of sentiment*

    The sentiment used in reviews and ratings are ignored while recommendations are generated.

-   *Accuracy*

Accurate recommendations may fail in case of less number of data, misspelled words, multiple reviews ,etc.

- *Stability*

In case of less number of records/dataset, stability may not be achieved by the recommendation system because with the increase in number of review and ratings , the recommendation may vary.

- *Interaction of users not considered*

Multiple interaction among users are not considered in recommending products.

- *Sparsity*

Less amount of data results in challenge of data being sparse and not in adequate amount to generate recommendation. This becomes a challenge when thresholds are used in generating recommendation.

- *Cold start*

Cold start is limitation that arise in recommending products to new user whose records are not available or cannot be traced because of various reasons.

III.   NEED OF IMPROVEMENT IN RECOMMENDATION SYATEM

(Yibo Wang, 2018) Content based method and collaborative filtering is used in building hybrid recommender system. To improve accuracy, timeliness and stability of recommender system, framework is proposed.
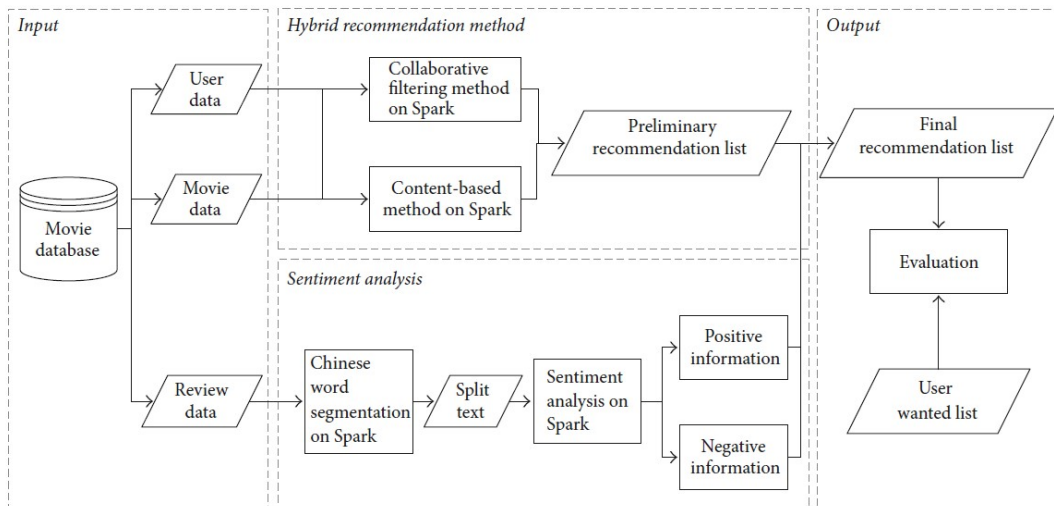

Figure 1 Proposed framework for recommender system (Yibo Wang, 2018)

(Wafa Shafqat, 2019) proposed a model to generate location profiles based on recommendation of location and weather.
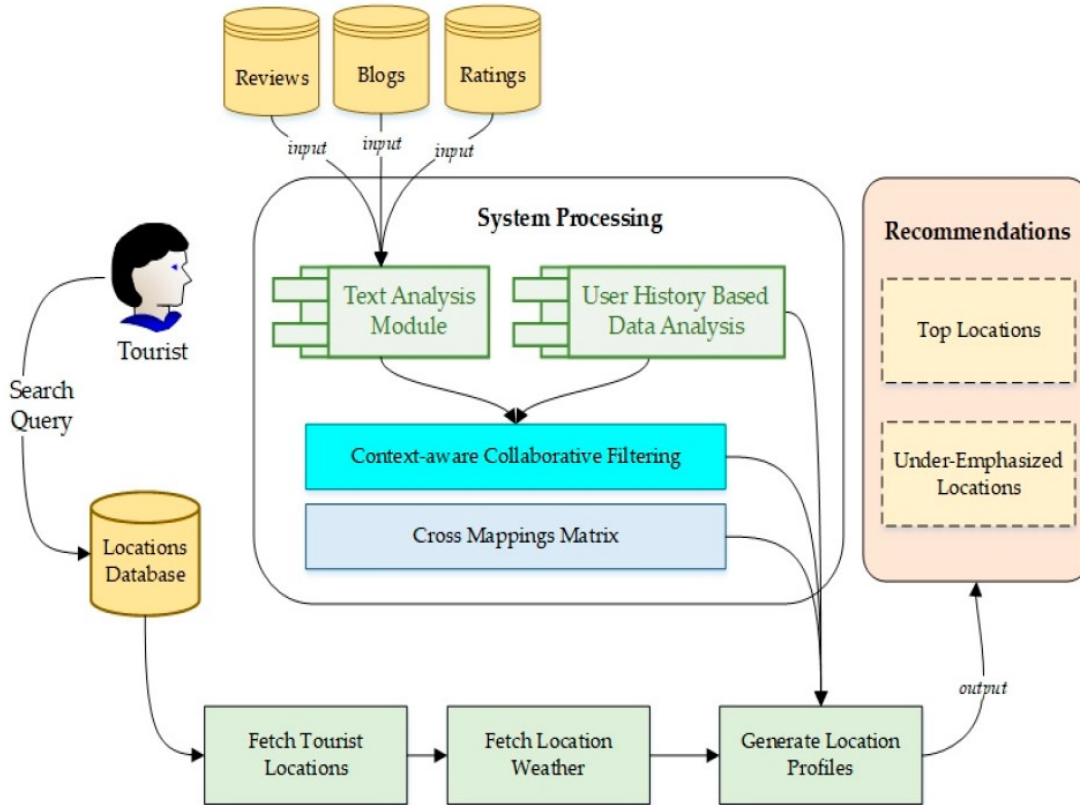
Figure 2 Proposed Recommendation Model (Wafa Shafqat, 2019)

To expand the features from location and weather, future enhancements are possible.

IV.   CONCLUSION

From the background study and proposed models, no work on producer's perspective is noted which is one of the scope or research area. To maintain/enhance the customer satisfaction or to handle the customer's demand timely, recommendation system based on producer's perspective may prove useful. Recommendation of products which is in demand on each day may help producer to enhance its production and supply and reduce the production of those products which is rated and recommended very less. This will help the business person float their products in the market and meet the customer's requirement timely which will help them enhance their position in market and stabilize their stock and reduce deadstock or loss of resources also. It will help customers also to purchase their liked products as and when needed without the hindrance of 'OUT OF STOCK' message in the currently trending products.

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