**Literature Reviews**

1. **Introduction**

**Various recommendation systems have been implemented by business companies to offer customers better services on their products. The implement of the recommendation system mainly uses relevant recommendation algorithms. The recommendation algorithms can be recognized as predicting the customer’s past consuming behavior based on historical data on the database. For example, some users may give their star ratings on the movies that they have watched. After collecting the data, a business company could extract information or analyzing patterns from the data pattern and find customers’ attitudes on movies. If some other customers also have searched these moves and leave related cookies on the website, the recommendation system could recommend the movies as a service to these customers and help them find the movies they are interested in.[1]**

**2.Two main r**ecommendation algorithms****

**Recommendation algorithms mainly include collaborative filtering and content-based filtering. Traditionally, the recommendation system applies collaborative filtering on the business field to find users interested in products.**

**Collaborative filtering is the most renowned methodology in the recommendation system. Business companies use it to analyze historical records and predict customers’ preferences among users based on their common actions. (like/dislike, patterns on products, viewing history). The collaborative filtering algorithm is to utilize customers’ historical preference and calculate the similarity measures among users. And then the evaluation values of the products would help to predict the target user’s preference for a specific product.**

**Content-based filtering algorithm does not emphasize the data directly from the users. The contents would be measured by the content-based filtering approach on the recommendation system through the information learned from a bunch of customers. The algorithm would filter content based on the movie elements like genres including thrill, romance, action, comedy, etc and then provides the recommendations for new release movies. It does not apply any preferences using the historical data collected from neighborhood users or database but just calculates the item elements distance through similarity measures.[2] However, one of the challenging in the collaborative filtering recommendation system is that it would not recommend the movies until customers give their ratings or preference. Consequently, a content-based filtering algorithm has different principles with the Collaborative filtering algorithm.**

**It does not apply preferences using the historical data collected from neighborhood users and stored database, but just calculates the item elements distance through similarity measures.[2]**

1. **Related work in recommendation system**

**Grouplens was the article recommendation system that uses only collaborative algorithms to implement and it enables people to search articles they would like according to their preferences. The system was implemented as the reader clients have the function that displays the predicted scores and users could give their opinions about the articles after their reading.[3]**

**Another example is the combination approach of the content-based filtering algorithm and the collaborative filtering algorithm. The approach targets at integrating both algorithms using feature weights which have been proved through movies in IDMB[4]**

**Some improvements between collaborative filtering and content-based filtering algorithm also have been done. In the context of the CinemaScreen recommendation system which hybridizes the two different algorithms to improve the performance of the recommendation system. The principles of the system are that the system proceeds rating correlation between current user action data and historical user action data and generates a list of weighted for each film. The list works as input to the content-based filtering and then calculates the average of film elements for each film. [2]**

**There is still a challenge that current collaborative filtering systems have to suffer redundancy problems. To solve the problem and improve the performance of the recommendation system, we decide to build a business model and reduce the complexity of the redundancy regarding the movies watched by users. On the other hand, the platform filtering systems also face exponentially increasing data. To improve the performance of the system and match the relation between items using algorithms, we decide to use another approach to implement the movie recommendation system - items based collaborative filtering algorithm.**

**It is different from the previous two algorithms regarding recommendation collaborative filtering and content-based filtering algorithm. Items-based collaborative filtering means the recommendation system would calculate the similarities like ratings based on users’ similarity measures. It would analyze the patterns among items through different similarity measures and then apply the patterns to predict preferences for other users. For example, when users purchase one item, they may tend to buy another relevant item. The project objective is to find the similarity and apply predictions.**

**4. Previous works in item-based collaborative filtering**

**Several related applications have been accomplished using item-based collaborative filtering. For example the personalized book recommendation system in a university named Hebei Agricultural University. This system uses the item-based collaborative filtering algorithm to improve the precision of the book recommendation system based on the viewing history, booking records, collecting books and reviews of college students. The performance of the system has been calculated through Mean Absolute Error(MAE).**

**Another example is that the MRT apps recommendation system in Ningbo which is a city in East China. Their research on the system has a challenging situation that the number of the customer is limited. Consequently, they choose the item-based algorithm to cope with the problem. They make user ID, item name, item number and quantity to the matrix as the input of the data model. After that, they use an algorithm to calculate the similarity measures and then they can find the recommendation user lists.**

**From the previous works, we could find improvements in the recommendation system base on the item-based collective filtering algorithm. In this project, the group project simulates the approach and applies the algorithm to the movie recommendation system. The system mainly has two parts including calculating the item similarity and using it for prediction by through weighted sum.**

**5. References:**

[1] Rasmussen, M., & Karypis, G. (2004). gcluto: An interactive clustering, visualization, and analysis system. *UMN-CS TR-04*, *21*(7).

[2] Salter, J., & Antonopoulos, N. (2006). CinemaScreen recommender agent: combining collaborative and content-based filtering. *IEEE Intelligent Systems*, *21*(1), 35-41.

[3] Resnick, P., Iacovou, N., Suchak, M., Bergstrom, P., & Riedl, J. (1994, October). GroupLens: an open architecture for collaborative filtering of netnews. In *Proceedings of the 1994 ACM conference on Computer supported cooperative work*(pp. 175-186). ACM.

[4] Debnath, S., Ganguly, N., & Mitra, P. (2008, April). Feature weighting in content based recommendation system using social network analysis. In *Proceedings of the 17th international conference on World Wide Web* (pp. 1041-1042). ACM.

[5] Karypis, G. (2001, October). Evaluation of item-based top-n recommendation algorithms. In *Proceedings of the tenth international conference on Information and knowledge management* (pp. 247-254). ACM.