1. **Introduction:-**

Nowadays multiple websites provide millions of items to their customers. However, finding relevant and interesting items can be challenging due to the tremendous growth of information available. Recommender systems (RSs) have emerged in response to this problem. A recommender system is an information filtering system, which is able to filter large amounts of information, and generate recommendations that will most likely fit user’s needs. Recommendation system is data filtering tools that make use of algorithms and data to recommend the most relevant items to a particular user. A recommender system is predicting the future preference of a set of items for a user and recommends the top items. Recommender systems are used to assist users in making choices from various alternatives.

The collaborative filtering becomes the most widely used information filtering method to recommend items for users. The basic idea of collaborative filtering methods is to make predictions about user preferences based upon the preferences of a group of users who are considered similar to the active user. Collaborative filtering include technique like memory-based method depends on the entire rating which exists in the user-item matrix for forming neighbors of the active user to generate recommendation to his/her preferences. In contrast, the model-based method, the recommendation system use user clustering, users are clustered based on similar preferences according to their rating. After creating the clusters, the aggregation of opinions in each cluster is used to perform the prediction task for the target user.

The following points summarize some challenges in designing CF methods:

- **Sparsity:** The underlying ratings’ matrices are sparse, i.e., most users would have viewed only a small fraction of a large number of available items. As a result, most of the ratings are unknown.
- **Dynamic data:** In this case, data are constantly changing. Thus, the recommender system requires an algorithm that updates quickly and accurately provides the results.
- **Computation time:** The time required for performing computational tasks rises steeply as the number of users and items increases.
- **Recommendation accuracy:** People require recommender systems to predict users’ preferences or ratings as accurately as possible. However, some predictions provided by current systems may be very different from the actual preferences or ratings given by
users. These inaccurate predictions, especially the big error predictions, may reduce the trust of users on the recommender system.

With the above-mentioned issues, it is clear that a good mechanism to find “neighbors” of users is very important. A better way to select “neighbors” of users or items for collaborative filtering can facilitate better handling of the challenges.

Content-based filtering method also recommends items based on a comparison between the content of the items and a user profile. The content of each item is represented as a set of descriptors or terms, typically the words that occur in a document. The user profile is represented with the same terms and built up by analyzing the content of items which have been seen by the user. Several issues have to be considered when implementing a content-based filtering system. First, terms can either be assigned automatically or manually. When terms are assigned automatically a method has to be chosen that can extract these terms from items. Second, the terms have to be represented such that both the user profile and the items can be compared in a meaningful way. Third, a learning algorithm has to be chosen that is able to learn the user profile based on seen items and can make recommendations based on this.

A novel Domain-sensitive Recommendation (DsRec) algorithm make the rating prediction by exploring the user-item subgroup analysis simultaneously, in which a user-item subgroup is deemed as a domain consisting of a subset of items with similar attributes and a subset of users who have interests in these items. The simple example about John’s consumption can also be used to explain the idea of domain detection. Since John gives high rating scores to the both products of iPhone6 Plus and a Louis Vuitton bag, we think John, iPhone6Plus, and the Louis Vuitton bag should belong to the same subgroup. Systematically interpret how to detect user-item subgroups (domains) with a bi-clustering model, which is also a two-sided clustering solution. It has been shown that the two-sided clustering often yields impressive performance over traditional one-sided clustering algorithms. The framework of DsRec includes three components: a matrix factorization model for the observed rating reconstruction, a bi-clustering model for the user-item subgroup analysis, and two regularization terms to connect the above two components into a unified formulation.

A weighted multi-attribute based recommender system (WMARS) use extended user behavior analysis. WMARS obtained data from number of clicked items in the recommendation
list, sequence of the clicked items in recommendation the list, duration of tracking, number of tracking same item, likes/dislikes, association rules of clicked items, remarks for items.

Hybrid filtering technique combines different recommendation techniques in order to gain better system optimization to avoid some limitations and problems of pure recommendation systems. The idea behind hybrid techniques is that a combination of algorithms will provide more accurate and effective recommendations than a single algorithm as the disadvantages of one algorithm can be overcome by another algorithm. Using multiple recommendation techniques can suppress the weaknesses of an individual technique in a combined model. The combination of approaches can be done in any of the following ways: separate implementation of algorithms and combining the result, utilizing some content-based filtering in collaborative approach, utilizing some collaborative filtering in content-based approach, creating a unified recommendation system that brings together both approaches.

The proposed research work is intended to design and develop the hybrid recommendation system to handle the problems of existing recommendation system to improve accuracy of prediction & recommendation.