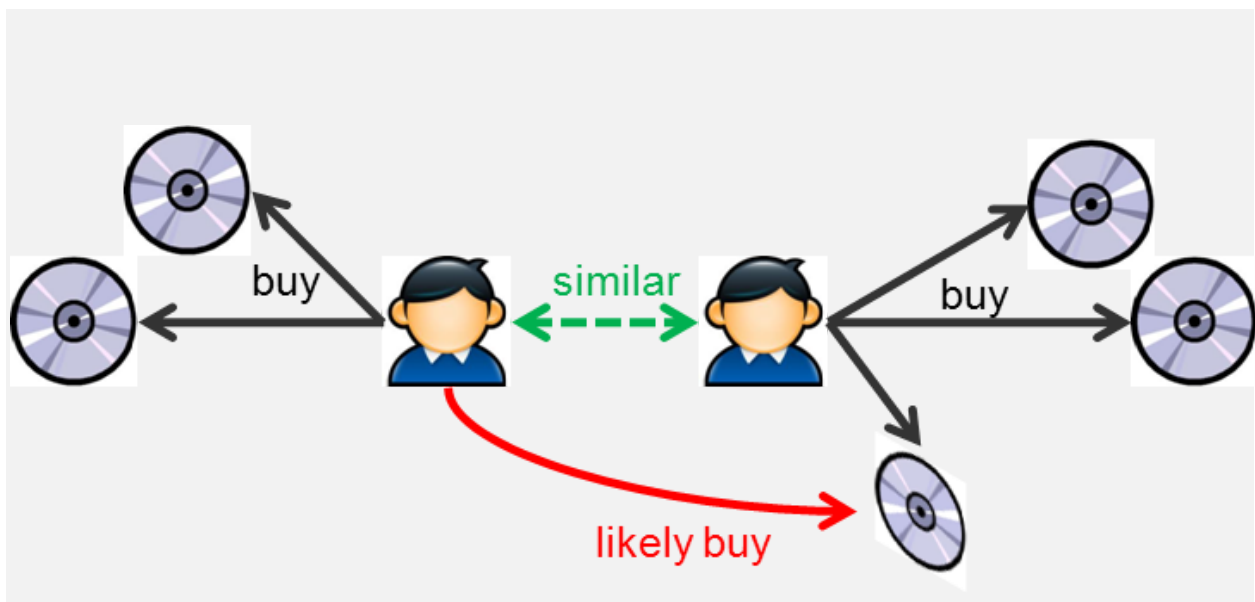# Collaborative Filtering - 16164571

In a world of technology driven purchases and online commerce it is necessary for new ways and more personalised ways of advertising and recommending purchases to customers. A way of doing this is through the use of a strategic approach known as Collaborative Filtering. This is a kind of recommendation algorithm which uses the previous history of users along with identifying similarities in item ratings to provide an accurate recommendation. This method requires minimal data to work and just needs the previous past behaviour of users such as their rating of a certain product, movie or item.
Collaborative Filtering relies on implicit feedback data such as mouse movement, search patterns and purchase history.

The most common collaborative filtering technique and the technique which is used in the movie recommendation project is based on neighbourhood models. This model uses data from users such as ratings. Just like in our recommendation system we have hundreds of movie ratings from random anonymous users.

This algorithm is fed a matrix of ratings (n x m) which has user U_i and item I_j. The goal is to predict the users rating R_{ij} for an item that the user did not watch. The main idea of the process is to calculate the similarities between the user U_i and all other users, then select the top similar users and the predicted value of R_{ij} is taken as a weighted average of the ratings for neighbouring items

$$r_{ij} = \frac{\sum_{k} Similaries(u_i, u_k) r_{kj}}{number\ of\ ratings}$$

We can see how this collaborative filtering technique is used in our recommendation engine. We have a large data set of movies and user ratings to feed into our algorithm. Along with our own provided movie recommendations we can use a combination of these data to predict the ratings of other movies that we might not have watched but other users who have watched movies similar to my personal ratings might have. This is where the example of the neighbourhood model can be seen in our own recommendation system.