**Domain-Sensitive Recommendation with User-Item Subgroup Analysis**

**ABSTRACT:**

Collaborative Filtering (CF) is one of the most successful recommendation approaches to cope with information overload in the real world. However, typical CF methods equally treat every user and item, and cannot distinguish the variation of user’s interests across different domains. This violates the reality that user’s interests always center on some specific domains, and the users having similar tastes on one domain may have totally different tastes on another domain. Motivated by the observation, in this paper, we propose a novel Domain-sensitive Recommendation (DsRec) algorithm, to 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 proposed 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. Extensive experiments on Movielens-100K and two real-world product review datasets show that our method achieves the better performance in terms of prediction accuracy criterion over the state-of-the-art methods.

**EXISTING SYSTEM:**

* Existing recommender systems have been indispensable nowadays, which support users with possibly different judgments and opinions in their quest for information, through taking into account the diversity of preferences and the relativity of information value.
* Collaborative Filtering (CF) is an effective and widely adopted recommendation approach. Different from content-based recommender systems which rely on the profiles of users and items for predictions, CF approaches make predictions by only utilizing the user-item interaction information such as transaction history or item satisfaction expressed in ratings, etc. As more attention is paid on personal privacy, CF systems become increasingly popular, since they do not require users to explicitly state their personal information.
* Besides, most of these clustering CF approaches are performed in a two-stage sequential process: domain detection by clustering and rating prediction by typical CF within the clusters.

**DISADVANTAGES OF EXISTING SYSTEM:**

* The existing system has some problems which might limit the performance of typical CF methods.
* However, it is observed that this assumption is not always so tenable. Usually, the collaborative effect among users varies across different domains.
* However, such divide-and-conquer style brings a new problem, i.e., the algorithm cannot take full advantage of the observed rating data which is limited and precious

**PROPOSED SYSTEM:**

* We propose a novel Domain-sensitive Recommendation (DsRec) algorithm, to 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 proposed 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.
* Extensive experiments on Movielens-100K and two real-world product review datasets show that our method achieves the better performance in terms of prediction accuracy criterion over the state-of-the-art methods.
* There are three components in the unified framework.
* First, we apply a matrix factorization model to best reconstruct the observed rating data with the learned latent factor representations of both users and items, with which those unobserved ratings to users and items can be predicted directly.
* Second, a bi-clustering model is used to learn the confidence distribution of each user and item belonging to different domains. Actually, a specific domain is a user-item subgroup, which consists of a subset of items with similar attributes and a subset of users interesting in the subset of items. In the bi-clustering formulation, we assume that a high rating score rated by a user to an item encourages the user and the item to be assigned to the same subgroups together.

**ADVANTAGES OF PROPOSED SYSTEM:**

* Develop a novel Domain-sensitive Recommendation algorithm, which makes rating prediction assisted with the user-item subgroup analysis.
* DsRec is a unified formulation integrating a matrix factorization model for rating prediction and a bi-clustering model for domain detection.

**SYSTEM ARCHITECTURE:**

**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIREMENTS:**

* System                           :         Pentium Dual Core.
* Hard Disk                      :         120 GB.
* Monitor                         :         15’’ LED
* Input Devices                 :         Keyboard, Mouse
* Ram                               :         1GB.

**SOFTWARE REQUIREMENTS:**

* Operating system           :         Windows 7.
* Coding Language           :         JAVA/J2EE
* Tool                               :         Eclipse
* Database                        :         MYSQL