Semantic-Based Collaborative Filtering to Improve Visitor Cold Start in Recommender Systems

Authors : Baba Mbaye

Abstract : In collaborative filtering recommendation systems, a user receives suggested items based on the opinions and evaluations of a community of users. This type of recommendation system uses only the information (notes in numerical values) contained in a usage matrix as input data. This matrix can be constructed based on users' behaviors or by offering users to declare their opinions on the items they know. The cold start problem leads to very poor performance for new users. It is a phenomenon that occurs at the beginning of use, in the situation where the system lacks data to make recommendations. There are three types of cold start problems: cold start for a new item, a new system, and a new user. We are interested in this article at the cold start for a new user. When the system welcomes a new user, the profile exists but does not have enough data, and its communities with other users profiles are still unknown. This leads to recommendations not adapted to the profile of the new user. In this paper, we propose an approach that improves cold start by using the notions of similarity and semantic proximity between users profiles during cold start. We will use the cold-metadata available (metadata extracted from the new user's data) useful in positioning the new user within a community. The aim is to look for similarities and semantic proximities with the old and current user profiles of the system. Proximity is represented by close concepts considered to belong to the same group, while similarity groups together elements that appear similar. Similarity and proximity are two close but not similar concepts. This similarity leads us to the construction of similarity which is based on: a) the concepts (properties, terms, instances) independent of ontology structure and, b) the simultaneous representation of the two concepts (relations, presence of terms in a document, simultaneous presence of the authorities). We propose an ontology, OIVCSRS (Ontology of Improvement Visitor Cold Start in Recommender Systems), in order to structure the terms and concepts representing the meaning of an information field, whether by the metadata of a namespace, or the elements of a knowledge domain. This approach allows us to automatically attach the new user to a user community, partially compensate for the data that was not initially provided and ultimately to associate a better first profile with the cold start. Thus, the aim of this paper is to propose an approach to improving cold start using semantic technologies.

Keywords : visitor cold start, recommender systems, collaborative filtering, semantic filtering
Conference Title : ICSWNLP 2018 : International Conference on Semantic Web and Natural Language Processing
Conference Location : Paris, France
Conference Dates : March 15-16, 2018