論 文 の 要 旨

題 目   A Study on Efficient Utilization of Word of Mouth in Recommender Systems
（口コミ情報と情報推薦の効果的な連携手法の研究）

氏 名   房冠深

In this thesis, we studied the utilization of word of mouth in recommender systems, in order to improve their performance.

In Chapter 1, we introduced the overview of recommender system, including their purpose and the main techniques. Additionally, we also described the shape of word of mouth, and pointed out the two types of information where we focus our attention: 1) the user-generated tweets in Twitter and 2) the textual reviews included in users' feedbacks.

In Chapter 2, we went through the related works of content-based and collaborative filtering recommender system. For the former, we concentrated our attention on tourism domain, to present the structure of relevant systems including the techniques applied. For the latter, we reviewed the both the primary and state-of-the-art model- based approaches of recommendation, and presented their advantages and drawbacks.

In Chapter 3, we focused on using Twitter and Wikipedia on content-based tourism recommender system, to realize a seasonal recommendation of sightseeing spots. For the spots, we proposed a generation of seasonal feature vectors to characterize their seasonal variant features. By using such vectors as the profiles of spots, we developed a new recommender system which provides a list of spots to fit both the user's preference and the travel season. Additionally, we also discussed the ignorance of the noise included in tweets. In experiments, the effectiveness of the proposed system is evaluated by not only the experiments but also questionnaire of participants.

In Chapter 4, we proposed a method to predict ratings of the user's unpurchased items for recommendation, including a topic gradient descent method (TGD) for the matrix factorization (MF) model. From the given textual review in the feedback, its topics are derived by Latent Dirichlet Allocation model. Using such topics, in the learning of the proposed method the latent factors of the users and items are iteratively updated by dynamically assigned updating steps. In the evaluation, we conduct a series of experiments utilizing 11 datasets, including YELP challenge dataset and per-category Amazon reviews.

In Chapter 5, the thesis is concluded with future work. It is pointed out that our work could be improved by application of natural language processing techniques, such as thesaurus analysis in the component of user profiling.

The contributions of this thesis are summarized as follows:

1) We proposed a generation of seasonal feature vectors (SFVs) for sightseeing spots,

and a new tourism recommender system to provide a list of sightseeing spots with the awareness of the user's travel season. The results of evaluations indicate that the proposed SFVs certainly characterize the variable seasonal features of the spots. More concretely, the variance of SFVs follows Gaussian distribution and the similarity of SFVs reflects the similarity of the features of the corresponding spots in a designated season. For the proposed system, the result of questionnaire verifies that in most of the case it successfully provides seasonal tourism recommendations to fit user's demand.

2) We propose topic gradient descent method (TGD) for the MF model. By using TGD, we further proposed a method of rating prediction of the user's unpurchased item for recommendation. Firstly, the experimental results verified that TGD certainly converges the squared error of the rating prediction. Secondly, it also shows that the proposed method of rating prediction outperforms MF in the recommendation. Especially, the proposed method is demonstrated to have higher accuracy than MF in the prediction of high-scored ratings, which is considered as an ordinary scene of recommendation. Even comparing with state-of-the-art recommendation model of TopicMF, it also achieves a superiority of performance.