

Session 3.1 Recommender Systems with Machine Learning and AI

Time & Location: 10:20-12:00, Dec. 2, L010

Chair: Jane Yung-jen Hsu (許永真)

(1) Rating Matrix Pre-padding for Video Recommendation

Yang Liu (Beijing University of Technology), Guijuan Zhang (Beijing University of Technology), Xiaoning Jin (Beijing University of Technology), and Yaozong Jia (Beijing University of Technology)

The personalized video recommendation system provides users with great convenience while surfing in the video websites. Among many algorithms adopted by recommendation system, the collaborative filtering algorithm is the most widely used and has achieved great success in practical applications, however, the recommended performance suffers from the problem of data sparsity severely. Generally, as the number of users and videos increase continuously, the sparsity of rating matrix will get higher because of the limited user-video ratings and eventually the recommendation become awful. We propose a model that adopts Doc2Vec to get a better understanding of video's text information, then integrates the video's genre information into the task of user-video rating matrix pre-padding to reduce the sparsity of ratings. The experimental results show that pre-padding ratings is of high quality and the algorithms based on collaborative filtering achieve better performance on the padded datasets.

(2) Using AHP to Choose the Best Logistics Distribution Model

Mei-Chiao Lai (Fuzhou University of International Studies and Trade), Wu Tsay (Fuzhou University of International Studies and Trade), and Zhen Wang (Fuzhou University of International Studies and Trade)

Choosing an appropriate distribution model for an e-commerce enterprise will undoubtedly greatly strengthen the core competitiveness of the enterprise. This paper aims to explore decision making of the best logistics distribution model to improve the distribution efficiency by taking the Dangdang E-commerce as an example. The research method used is Analytic Hierarchy Process (AHP), firstly to clarify the various impact indicators of the logistics distribution model selection, and then deeply analyze the factors affecting Dangdang's logistics distribution choices. The relative weights of each index are obtained through measurement, and then the scores are evaluated to obtain the priority of distribution model. The final delivery model provides Dangdang E-commerce recommendation.

(3) Replay spoofing detection system for automatic speaker verification using multi-task learning of noise classes

Hye-Jin Shim (University of Seoul), Jee-Weon Jung (University of Seoul), Hee-Soo Heo (University of Seoul), Sung-Hyun Yoon (University of Seoul), and Ha-Jin Yu (University of Seoul)

In this paper, we propose a replay attack spoofing detection system for automatic speaker verification using multi-task learning of noise classes. We define the noise that is caused by the replay attack as replay noise. We explore the effectiveness of training a deep neural network simultaneously for replay attack spoofing detection and replay noise classification. The multi-task learning includes classifying the noise of playback devices, recording environments, and recording devices as well as the spoofing detection. Each of the three types of the noise classes also includes a genuine class. The experiment results on the ASVspoof2017 datasets demonstrate that the performance of our proposed system is improved by 30% relatively on the evaluation set.

(4) Personalized Content-Based Music Retrieval by User-Filtering and Query-Refinement

Ja-Hwung Su, Tzung-Pei Hong, Jyun-Yu Li, Jung-Jui Su

In recent years, music is an important media because it can relax us in our daily life. Therefore, most people listen to music frequently and current music websites offer online listening services. However, because the semantic gap, it is

not easy to effectively retrieve the user preferred music especially from a huge amount of music data. For this issue, this paper presents a personalized content-based music retrieval system that integrates techniques of user-filtering and query-refinement to achieve high quality of music retrieval. In terms of user-filtering, the new user interest can be inferred by the user similarities. In terms of query-refinement, the user interest can be guided to the potential search space by iterative feedbacks. The experimental results show the proposed method does improve the retrieval quality significantly.

(5) Named Entity Filters for Robust Machine Reading Comprehension

Yu-Yan Peng, Jane Yung-Jen Hsu

The machine reading comprehension problem aims to extract crucial information from the given document to answer the relevant questions. Although many methods regarding the problem have been proposed, the similarity distraction problem inside remains unsolved. The similarity distraction problem addresses the error caused by some sentences being very similar to the question but not containing the answer. Named entities have the uniqueness which can be utilized to distinguish similar sentences to prevent models from being distracted. In this paper, named entity filters (NE filters) are proposed. NE filters can utilize the information of named entities to alleviate the similarity distraction problem. Experiment results in this paper show that the NE filter can enhance the robustness of the used model. The baseline model increases 5% to 10% F1 score on two adversarial SQuAD datasets without decreasing the F1 score on the original SQuAD dataset. Besides, by adding the NE filter, other existing models increase 5% F1 score on the adversarial datasets with less than 1% loss on the original one.