

中文摘要

当今时代,人们获得视频资源的途径变得越来越多,可获得的视频资源的数量以爆炸性的方式增长。在另一方面,用户对视频信息的需求日趋多元化和个性化。然而,人们使用和管理视频数据的能力却没有随着视频数量的增加同步增长。用户需求和现实技术之间的矛盾造就了用户和视频数据之间的“意图鸿沟”(intention gap)。为了满足用户的多样性需求,克服“意图鸿沟”,视频内容的个性化定制服务的研究应运而生。与传统的视频服务相比,个性化定制系统更能够满足用户的需求、提高服务质量和增强用户体验。视频内容个性化定制技术具有广泛的应用前景和市场需求,因此具有重要的研究和应用价值。

传统的个性化推荐定制系统例如在线图书推荐系统等大多应用了协同滤波等信息过滤的方法,由于这些方法只考虑了应用用户与用户之间、项目与项目之间的相似关系进行推荐,并没有考虑数据本身的内容信息,因此对基于内容的视频个性化定制并不适用。在视频内容个性化定制方面,虽然已经有研究者做了一些工作,然而由于视频数据的多样性和内容的复杂性,前人的工作只局限在特定环境和数据下的个性化定制和分析,并没有形成统一的个性化定制框架。

本文针对用户对视频内容的个性化需求提出了从视频结构化分析、视频理解到视频内容排序的一个统一的个性化定制模型。该模型首先对视频数据进行结构化分析使视频数据有序化;然后在理解用户需求的基础上对视频内容进行理解和分析;最后把分析出来的视频内容按照用户的喜好进行排序,并把最终的排序结果提供给用户作为视频个性化定制的内容。为了验证该模型的有效性和可推广性,在本文我们在新闻视频、在线视频和体育视频等三种不同类型的视频数据上进行了实验分析,实验结果证明该模型是有效的,具有很好的推广能力。本论文的研究成果有很强的实际应用价值,而且也为视频内容个性化定制领域的后继研究工作提供了一个参考。

Abstract

Nowdays, there are many ways for users to access video resource, and the number of videos grows rapidly. On the other hand, the user's needs become more diversified and personalized. However, people's capacities of using and managing video data have not increased with the growth of the video. The confliction between the user's requirement and the actual technologies results in the "intention gap" between the users and the video data. In order to meet the diverse need of the user and overcome the "intention gap", the video content personalization technologies are required. Compared with the traditional video services, the personalization system can better meet the needs of users, improves service quality, and enhances the user experience. Video content personalization technologies have broad application background and market demand, therefore the research is very important.

The traditional personalization recommendation systems, like the online book recommendation system etc, almost employ the collaborative filtering algorithm. However, the algorithm only considers the similarity between the users and the items for recommendation, and not considers the content of the data. Therefore, it is not suitable for video content personalization. Some works have been contributed to deal with the video content personalization. However due to the diversity and complexity of the video data, these works are limited to the specific application environment. In this paper, we propose a unified video content personalization model. In the model, firstly the structure of the videos is analyzed. Then, by considering the user's requirement the contents of the videos are analyzed. Finally, by ranking the video contents according to the user's preference the video content personalization is achieved. In order to verify the validity and generality of the model, we test it on three different types of videos: news video, online video and sports video. The experimental results show that the model is valid and the generalization capacity is good. The research results of the paper have strong practical application value, and set up a landmark in the video content personalization domain.