RecTour 2019: Workshop on Recommenders in Tourism

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ABSTRACT

The Workshop on Recommenders in Tourism (RecTour) 2019, which is held in conjunction with the 13th ACM Conference on Recommender Systems (RecSys), addresses specific challenges for recommender systems in the tourism domain. In this overview paper, we summarize our motivations to organize the RecTour workshop and present the main topics of the submissions that we received. The topics of this year's workshop include context-aware recommendations, group recommender systems, hotel recommendations, destination characterization, next-POI recommendation, user interaction and experience, preference elicitation, user modeling and application of machine learning algorithms in the context of tourism recommender systems.

CCS CONCEPTS

• **Information systems → Recommender systems**; • **Human-centered computing → User models**.

KEYWORDS

Tourism recommenders, next-POI recommendations, context-aware recommendations, destination characterization, machine learning for tourism recommenders.

1 INTRODUCTION

RecTour 2019 focuses on a variety of challenges specific to recommender systems in the tourism domain. This domain offers considerably more complicated scenarios than matching travelers with the presumably best items. Planning a vacation usually involves searching for interconnected and dependent product bundles, such as means of transportation, accommodations, attractions, and activities, with limited availabilities and contextual aspects (e.g., spatio-temporal context, social context, activity sequence, and environment) with a major impact. In addition, travel related products can be considered as emotionally loaded and are thus largely experiential in nature; therefore, decision taking is often not solely based on rational or objective criteria [4, 8]. Therefore, information provisioning at the right time about destinations, accommodations and various further services and possible activities is challenging. Additionally, and in contrast to many other recommendation domains, information providers are usually small and medium sized enterprises (SMEs) that many times do not possess the capacity to implement basic recommender systems. Moreover, there is no single, standard format to house information which might be included in these systems. Last, much of the tourism experience is co-produced, i.e., it occurs during the consumption of the product and interaction with the provider. Therefore, the context of the recommendation is extremely important [2]. Thus given this diversity, building effective recommender systems within the tourism domain is extremely challenging [6].

The rapid development of information and communication technologies (ICT) in general and the web in particular has transformed the tourism domain whereby most travelers rely little on travel agents or agencies [7]. Indeed, recent studies indicate that travelers now actively search for information using ICT in order to compose their vacation packages according to their specific emotionally driven preferences [9]. Additionally when on-site, they search for freely available information about the site itself rather than renting a visitor guide that may be available, but considered to be expensive and sometimes outdated.

However, like in many other cases, the blessing of the web comes with a curse; the curse of information overload. As such, recommender systems have been suggested as a practical tool for overcoming this information overload. However, those designing tourism-focused recommender systems face huge challenges as the tourism domain is extremely complex.

2 WORKSHOP GOALS

This workshop brings together researchers and practitioners from different fields (e.g., tourism, recommender systems, user modeling, user interaction, mobile, ubiquitous and ambient technologies, artificial intelligence and web information systems) working in the tourism recommendation domain. The workshop aims to provide a

forum for these people to discuss novel ideas for addressing the specific challenges for recommender systems in tourism with the goal to advance the current state-of-the-art in this field. Another goal of the workshop is to identify practical applications of these technologies within tourism settings from the point of view of individual users and user groups, service providers, as well as from additional stakeholders (e.g., destination management organizations). Finally, RecTour 2019 aims to continue the community building processes and discussions started at previous RecTour Workshops, i.e., at RecTour 2016 in Boston, MA, USA [1], at RecTour 2017 in Como, Italy [3], and at RecTour 2018 in Vancouver, BC, Canada [5].

3 WORKSHOP TOPICS

This year we received 13 submissions. The key topic areas of these submissions can be summarized as follows.

Context-aware recommender systems. The aim is to not only provide personalized recommendations for points-of-interests (POIs), destinations, hotels, restaurants and other items, but to adapt the recommended items also to the current context. This includes the location of a user but also additional attributes such as weather, season, date, time of visits, demographic data of a user or user history.

Group recommender systems. People are often not traveling alone but together with their family or friends. Therefore, travel recommendation is often a problem of recommending to a group of people, where individual preferences and group dynamics need to be taken into account. A related topic is to recommend peers to travel with.

Recommending composite items. Combining POIs to a suitable path to follow is an instance of the Tourist Trip Design Problem (TTDP), which involves moving from recommending single items to personalized sets or sequences of relevant items. Within TTDP, users choose from a large number of items (in the context of leisure activities), but then figure out how to combine them into a practical itinerary or route. One topic in this regard is predicting the next POI a traveler is likely interesting in.

Decision making and user interaction issues. Several workshop submissions address the problem of how to present items to support decision making. Thus, visualizations that represent aggregated data are very important in this context. In addition, some paper address issues on how to incorporate user feedback, e.g. in a conversational recommender system.

Different information sources. Several approaches have been proposed, which retrieve and analyze data from social network sources. However, apart from product databases in the travel industry, crowdsourcing plays a major role in several submitted papers. One focal point is analyzing information from user reviews.

Various application scenarios within tourism. Application domains considered in this year's workshop submissions include

the hotel sector with the aim to recommend hotels enriched by cross-domain information, museum applications or air travel bookings.

Additional topics of interest. RecTour 2019 received papers which, among other topics, discuss the challenges of evaluating recommender systems, applying machine learning algorithms, natural language analysis of review data and multidimensional modeling of users and travel recommendations.

RecTour 2019 will feature a keynote presentation by Francesco Ricci from the Free University of Bozen-Bolzano, Italy, who is one of the leading and most influential researchers in recommender systems for travel and tourism.

4 SUMMARY

The submission to RecTour 2019 draw special attention to the various challenges for recommender systems in the tourism domain and offer useful and well-considered approaches for addressing them. Therefore, the workshop series constitutes an important forum for recommender systems research in this popular application domain. The workshop proceedings can be found on the website of the workshop at http://www.ec.tuwien.ac.at/rectour2019/.

The relevance of tourism as a major application domain for recommender systems is also highlighted by the fact that this year's ACM RecSys Challenge originates from the domain of online travel recommender systems. Using data from trivago, a global hotel search platform, participants had to build a click-prediction model based on user session interactions. A detailed description of the challenge can be found at http://www.recsyschallenge.com/2019/.

REFERENCES

[1] Daniel R Fesenmaier, Tsvi Kuflik, and Julia Neidhardt. 2016. RecTour 2016: Workshop on recommenders in tourism. In *Proceedings of the 10th ACM Conference on Recommender systems.* ACM, 417–418.

[2] Carlos Lamsfus, Dan Wang, Aurkene Alzua-Sorzabal, and Zheng Xiang. 2015. Going mobile: Defining context for on-the-go travelers. *Journal of Travel Research* 54, 6 (2015), 691–701.

[3] Julia Neidhardt, Daniel R Fesenmaier, Tsvi Kuflik, and Wolfgang Wörndl. 2017. RecTour 2017: Workshop on Recommenders in Tourism. In *Proceedings of the Eleventh ACM Conference on Recommender Systems.* ACM, 386–387.

[4] Julia Neidhardt, Rainer Schuster, Leonhard Seyfang, and Hannes Werthner. 2014. Eliciting the users' unknown preferences. In *Proceedings of the 8th ACM Conference on Recommender systems.* ACM, 309–312.

[5] Julia Neidhardt, Wolfgang Wörndl, Tsvi Kuflik, and Markus Zanker. 2018. RecTour 2018: Workshop on Recommenders in Tourism. In *Proceedings of the Twelfth ACM Conference on Recommender Systems.* ACM, 525–526.

[6] Francesco Ricci. 2002. Travel recommender systems. *IEEE Intelligent Systems* 17, 6 (2002), 55–57.

[7] Hannes Werthner, Aurkene Alzua-Sorzabal, Lorenzo Cantoni, Astrid Dickinger, Ulrike Gretzel, Dietmar Jannach, Julia Neidhardt, Birgit Pröll, Francesco Ricci, Miriam Scaglione, et al. 2015. Future research issues in IT and tourism. *Information Technology & Tourism* 15, 1 (2015), 1–15.

[8] Hannes Werthner and Francesco Ricci. 2004. E-commerce and tourism. *Commun. ACM* 47, 12 (2004), 101–105.

[9] Zheng Xiang, Vincent P Magnini, and Daniel R Fesenmaier. 2015. Information technology and consumer behavior in travel and tourism: Insights from travel planning using the internet. *Journal of Retailing and Consumer Services* 22 (2015), 244–249.