

RecTour 2021

Workshop on Recommenders in Tourism

Virtual Workshop, September 26th, 2021

Proceedings

Edited by

Julia Neidhardt, Wolfgang Wörndl,

Tsvi Kuflik and Markus Zanker

**Co-located with the 15th ACM Conference
on Recommender Systems (RecSys 2021)**



The ACM Conference Series on
Recommender Systems



Copyright and Bibliographical Information

Copyright © 2021 for the individual papers by the papers' authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0). This volume is published and copyrighted by its editors. The copyright for papers appearing in these proceedings belongs to the papers' authors.

This volume is published by Julia Neidhardt, Wolfgang Wörndl, Tsvi Kuflik and Markus Zanker.

Proceedings of the Workshop on Recommenders in Tourism (RecTour 2021), held in conjunction with the 15th ACM Conference on Recommender Systems (RecSys 2021), September 27th - October 1st, 2021, Amsterdam, Netherlands and virtual, <https://recsys.acm.org/recsys21/>.

Julia Neidhardt, Wolfgang Wörndl, Tsvi Kuflik and Markus Zanker (editors).

Further information about the workshop can be found at: <https://web.ec.tuwien.ac.at/rectour21/>

Preface

This volume contains the contributions of the Workshop on Recommenders in Tourism (RecTour), organized in conjunction with the 15th ACM Conference on Recommender System (RecSys 2021), in Amsterdam, Netherlands.

RecTour 2021 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) having 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. 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. Thus, given this diversity, building effective recommender systems within the tourism domain is extremely challenging. 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. 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. 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.

This workshop brings together researchers and practitioners from different fields (e.g., tourism, recommender systems, user modeling, mobile 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 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). RecTour 2021 aims to continue the community building processes and discussions started at previous RecTour Workshops. Topics at RecTour 2021 particularly deal with recommending destinations, stakeholders and users in the loop. Furthermore, in collaboration with Expedia Group, a dataset for research is introduced at RecTour 2021.

Workshop Committees

Organizers

- **Julia Neidhardt**, TU Wien, Austria
- **Wolfgang Wörndl**, TU München, Germany
- **Tsvi Kuflik**, The University of Haifa, Israel
- **Markus Zanker**, Free University of Bozen/Bolzano, Italy

Program Committee

- **Alejandro Bellogin**, Universidad Autonoma de Madrid, Spain
- **Derek Bridge**, University College Cork, Ireland
- **Ludovik Coba**, Koa Health, Spain
- **Linus W. Dietz**, TU München, Germany
- **Dmitri Goldenberg**, Booking.com, Israel
- **Ulrike Gretzel**, University of Southern California, USA
- **Dietmar Jannach**, AAU Klagenfurt, Austria
- **Jan Krasnodebski**, Expedia Group, Switzerland
- **David Massimo**, Free University of Bozen/Bolzano, Italy
- **Iván Palomares**, University of Granada, Spain
- **Antonio Moreno**, Universitat Rovira i Virgili, Spain
- **Francesco Ricci**, Free University of Bozen/Bolzano, Italy
- **Mete Sertkan**, TU Wien, Austria
- **Gabriele Sottocornola**, Free University of Bozen/Bolzano, Italy
- **Pablo Sánchez**, Universidad Autonoma de Madrid, Spain
- **Hannes Werthner**, TU Wien, Austria

Workshop Program

15:00 - 16:20 Opening + Paper Session “Recommending Destinations”

- Workshop opening
- **Adam Woznica and Jan Krasnodebski**: Presentation of the expedia group RecTour Research Dataset (Invited Talk)
- **Dmitri Goldenberg, Sarai Mizrahi, Adam Horowitz, Ioannis Kangas, Or Levkovich, Alessandro Mozzato, Maud Schwoerer, Michele Ferretti, Panagiotis Korvesis and Lucas Bernardi**: I Know What You Did Next Summer: Challenges in Travel Destinations Recommendation
- **Amine Dadoun, Raphaël Troncy, Michael Defoin Platel and Gerardo Ayala Solano**: Predicting Your Next Trip: A Knowledge Graph-Based Multi-task Learning Approach for Travel Destination Recommendation
- **Yasmine Serdouk, Timothée Couble, Eric Couble and Cédric Marcone**: Ski Resorts Recommendation using Deep Neural Networks

16:40 - 17:40 Paper Session “Stakeholders and Users in the Loop”

- **Gokulakrishnan Balakrishnan and Wolfgang Wörndl**: Multistakeholder Recommender Systems in Tourism
- **István Varga and Yuta Hayashibe**: Addressing Overchoice: Automatically Generating Meaningful Filters from Hotel Reviews
- **Ioannis Partalas, Anne Morvan, Ali Sadeghian, Shervin Minaee, Xinxin Li, Brooke Cowan and Daisy Zhe Wang**: Hotel2vec: Learning Hotel Embeddings from User Click Sessions with Side Information

18:00 - 19:00 Keynote and Closing

- **Keynote** *Travel in the Metaverse: Opportunities and Challenges for Recommender Systems* by **Ulrike Gretzel**
- Final Wrap-Up and Workshop Closing

Travel in the Metaverse: Opportunities and Challenges for Recommender Systems

Keynote by Ulrike Gretzel (University of Southern California, USA)

Abstract



The Metaverse, also sometimes referred to as the Spatial Internet, envisions an alternate reality in which digital experiences are pervasive, tangible, shared and experienced through multiple interfaces. Virtual and real experiences blur, creating a dynamic and complex information space. The Metaverse therefore changes the context in which recommendations are presented and processed, with tremendous implications for context-awareness and visualization. It also requires recommender systems to be embedded into virtual or augmented reality experiences. This talk discusses what the Metaverse means for travelers and what theoretical and design implications it has for recommender systems.

About the speaker

Prof. Dr. Ulrike Gretzel is a Senior Fellow at the Center for Public Relations, University of Southern California. Dr. Gretzel's research spans the design and evaluation of intelligent systems, as well as the development and implications of artificial intelligence. Her work in tourism addresses ways in which tourists engage with each other and with tourism organizations through websites, mobile apps and social media, and has analyzed how tourism experiences are represented and marketed online. She studies social media marketing, influencer marketing and the emerging reputation economy. She has also researched smart tourism development, technology adoption and non-adoption in tourism organizations and the quest for digital detox experiences. Dr. Gretzel has published over 100 peer-reviewed journal articles. She is frequently acknowledged as one of the most cited authors in the fields of tourism and persuasion and is a fellow of the International Academy for the Study of Tourism.

Table of Contents

Invited Paper

- **Adam Woznica and Jan Krasnodebski**: Presentation of the expedia group RecTour Research Dataset **1 - 6**

Full Papers

- **Dmitri Goldenberg, Sarai Mizrahi, Adam Horowitz, Ioannis Kangas, Or Levkovich, Alessandro Mozzato, Maud Schwoerer, Michele Ferretti, Panagiotis Korvesis and Lucas Bernardi**: I Know What You Did Next Summer: Challenges in Travel Destinations Recommendation **7 - 22**
- **Amine Dadoun, Raphaël Troncy, Michael Defoin-Platel and Gerardo Ayala Solano**: Predicting Your Next Trip: A Knowledge Graph-Based Multi-task Learning Approach for Travel Destination Recommendation **23 - 38**
- **Gokulakrishnan Balakrishnan and Wolfgang Wörndl**: Multistakeholder Recommender Systems in Tourism **39 - 53**
- **István Varga and Yuta Hayashibe**: Addressing Overchoice: Automatically Generating Meaningful Filters from Hotel Reviews **54 - 68**
- **Ioannis Partalas, Anne Morvan, Ali Sadeghian, Shervin Minaee, Xinxin Li, Brooke Cowan and Daisy Zhe Wang**: Hotel2vec: Learning Hotel Embeddings from User Click Sessions with Side Information **69 - 84**

Position Paper

- **Yasmine Serdouk, Timothée Couble, Eric Couble and Cédric Marcone**: Ski Resorts Recommendation using Deep Neural Networks **85 - 89**