Tourism Recommender Systems as a Vehicle for Social and Cultural Inclusion

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Abstract

Recommender systems for tourism have become so popular that our smartphones are now full of applications that can suggest customized itineraries anywhere and anytime. Most of them, however, recommend similar itineraries, usually even in the same overcrowded areas. In this article, we present the concept of an integrated framework for cultural tourism with different characteristics. Such a framework can propose alternative customized itineraries to favor cultural and social inclusion of visitors with local residents, for example, in urban suburbs or agricultural and industrial regions. Therefore, the system has to provide user interfaces to enable organizations, local enterprises, and visitors to analyze and exploit rich open data sources. In this way, local institutions could better plan and handle cultural tourism and public resources. Small businesses could cost-effectively promote their services. Visitors could receive personalized routes with knowledge related to local communities, cultures, traditions, and others.

Keywords

Recommender systems, Open data, Cultural heritage, Point of interest

1. Introduction and Motivations

Tourism is increasingly one of the most relevant economic sectors of a country[1]. We are realizing this especially these days when the crisis due to the COVID-19 pandemic is seriously affecting all those who work in this sector. Among the different types of tourism, cultural tourism is one of the most important ways of revitalizing the economy and stimulating other sectors related to tourism [1]. The benefits of cultural tourism can be even more important in the most disadvantaged areas. Cultural tourism can, for example, help increase income and employment, especially in disadvantaged social groups, with fewer opportunities to enter the world of work: young people, women, individuals with low education and limited experience. In addition to this, urban suburbs, agricultural and industrial regions can represent destinations for an alternative cultural heritage, as long as they can make themselves known as such. In this article, we present the concept of an integrated system to promote cultural tourism different from the usual one, in which tourists are often invited to visit the most popular places and to attend the most advertised businesses [2], thus also causing an overload of public services and utilities. Our system should make the visitor aware of the possibility of living satisfying experiences even following alternative routes in areas less overwhelmed by mass tourism. In this way, it would act as an instrument of social and cultural connection between the tourist and residents, as well as local service providers, producers, and guides. Recent technological developments in networking, Internet of Things, Artificial Intelligence, and Machine Learning [3] (e.g., Deep Learning [4]) play a central role in the creation of smart cities [5]. As a result, many local institutions, regions, public and local organizations have begun to exploit the potential of open data by providing and receiving access to rich repositories. Such data is often made available through open data initiatives, such as the European Open Data Portal[2], thus enabling the creation of services that combine data from multiple sources. These services provide a wide range of data, including municipal information, data from services and companies, data from sensor networks, and meteorological information. One of the greatest benefits of open data repositories is that they offer opportunities for building personalized applications and services that can enhance the user's experience based on the current context of use. As a result, local institutions and tourism service providers can direct visitors to places and services in underdeveloped areas, offering personalized itineraries enriched with interactive components and personalized content. Overall, this system may ensure multiple benefits to different actors, such as the followings:

- tourists could receive suggestions of alternative cultural itineraries, personalized based on their interests, information related to their physical (e.g., location, weather conditions, means of transport,

Joint Proceedings of the ACM IUI 2021 Workshops, April 13-17, 2021, College Station, USA

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[1]https://www.tourism-review.com/tourism-industry-is-the-pillar-of-economy-news11210

[2]https://www.europeandataportal.eu/en

time of the day, day of the week) and social (e.g., social media network) context [6], and open data. The system could also enable tourists to express their feedback on the experienced itinerary and to share their impressions through social media;
- tourists could reap significant benefits from a system capable of suggesting alternative cultural heritage not only in terms of perceived accuracy, but also of novelty, serendipity, and diversity of the recommendation list [7];
- local administrations could better plan and manage the impact of tourism on public services and utilities such as local transport. Furthermore, the system could suggest alternative itineraries to the traditional ones, normally concentrated on a limited number of well-known sites, thus mitigating the overcrowding of the most visited areas;
- tourists, local administrations, small businesses, service providers, and residents could collaboratively create itineraries, thus fostering intercultural and social exchange through greater awareness of different cultural identities acquired by sharing traditions, customs, cuisine, and other information on cultural tourism;
- all the actors involved could participate in the promotion of alternative cultural heritage through a curation process, according to the models and methods developed, for example, as part of the European H2020 SPICE project[3].

2. Idea and Background

The problem of personalizing the tourist experience consists in determining a plan with a sequence of visits of a given number and categories of points of interest (POIs) [8]. For instance, a tourist might be interested in having lunch in a local cuisine restaurant, taking an educational tour with some stops of cultural interest, and ending the day in a popular music club. Another tourist may want to eat some street food and then go to a local folklore show. These sequences of visits must be carried out in a predetermined time interval and must be accompanied by information for each visit to a POI, the total cost of the itinerary, and the orientation on the map. In order for visitors to receive personalized visit plans, a recommender system (RS) is needed. RSs are software tools that provide the target user with suggestions of items likely to be of her interest [9]. They are successfully applied in manifold domains, including music, movies, and research papers [10]. Several RSs for tourists have also been proposed [11, 12]. More specifically, many systems can recommend POIs and itineraries among them. Some recent itinerary recommenders deserve to be mentioned for some brilliant solutions of specific aspects. For example, the PersTour system [13] takes into account the user's interests and the popularity of POIs, also indicating the time to be spent in each of them. In general, POIs represent particular places. However, sometimes POIs can represent larger areas (for example, entire architectural or cultural districts, or street markets) in which tourists may want to take walks, such as in [14]. We propose a system that can recommend complete personalized experiences to the target user. Specifically, our system must be able to provide the user, and possibly her travel companions as well, with recommendations of POIs and itineraries among them. For this purpose, advanced user modeling techniques are required that allow the system to select suitable textual and multimedia content [15]. Those techniques must be able to exploit heterogeneous information such as social data (obtained by analyzing the user's activity on social media), sensor data, and open data [16]. To the best of our knowledge, there are no tourist recommendation systems in the literature capable of suggesting personalized experiences to the user based on the integration of all such data. In [17], the authors propose an approach to take advantage of linked open data (LOD) and generate a recommendation of personalized itineraries with related textual and multimedia content. The recommendation engine considers the active user profile, the current context of use, and the POIs extracted from LOD. Novel aspects of the proposed system are the extraction and subsequent filtering of POIs through dynamic queries as well as the definition of the itinerary taking into account the popularity and diversity of the POIs in terms of their categories, the overall length of the itinerary, and the travel time. A similar approach is illustrated in [18], where the author proposes the personalized recommendation of individual POIs using the information extracted from social networks such as Facebook[4], and the target user's preferences and interests captured asking her to rate a sample of chosen images reflecting particular categories of POIs. Another noteworthy recommender is the one proposed in [19], which first identifies and assigns a relevance score to specific POIs, then suggests routes of interest among them. However, unlike the recommender we propose, which relies on open data, the authors employ a closed database (i.e., Foursquare[5]) as a data source for their system. In developing our recommender, we intend to leverage an open-source dashboard technology and data management technology that gives a single point of access to open data. For this purpose, several integrated platforms are available, including Digital Enabler[6], Snap4City[7], and

[3] https://spice-h2020.eu/

[4] https://www.facebook.com/

[5] https://foursquare.com/

[6] https://digitalenabler.eng.it/suite/

[7] https://www.snap4city.org/

OneSait[8]. Those platforms provide tools for developing the Internet of Things and managing data collected from multiple sources. They also furnish dashboards for viewing data by users as well as local institutions and tourism-related organizations, thus enabling all of them to create itineraries in a collaborative way.

3. Conclusions

In this article, we have introduced the concept of an integrated system for first collaboratively creating and then recommending alternative personalized itineraries to tourists in areas other than those normally visited by mass tourism. Personalization takes place based on the user's interests, the physical and social context of use, and nearby businesses and services. This system relies on open data and allows local institutions and small businesses to access it via a dashboard. In this way, institutions can better plan and manage public services and utilities, whilst small businesses can make visitors aware of their offers without having to invest financial resources to promote themselves. The goal of our system is to offer the visitor personalized itineraries in underdeveloped or disadvantaged areas, such as urban suburbs or agricultural and industrial regions, highlighting them as alternative destinations for a new cultural tourism. This way, the system could promote and favor the inclusion of tourists in the social and cultural fabric of the places they are visiting, thus enhancing social development and a greater intercultural awareness of values and cultural identities by exploring new different forms of cultural heritage.

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