

Analysis of the use of Artificial Intelligence techniques in the Tourism websites of travel destinations

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1 Introduction

In this work, the official tourist websites for 4 different world travel destinations (Thailand, Canary Islands, Dubai and Tokyo) are analyzed in terms of their usage of Artificial Intelligence techniques. Namely, we examine the use of recommender systems, personalized multi-criteria decision systems, planners and natural language topic analysis that the websites use to make the offered information more useful, engaging and customized for the users. Many of the concepts and methodologies mentioned in this work were examined by lecturers and speakers of the course *Artificial Intelligence Seminar: Artificial Intelligence applications in Tourism*. ([Cor19](#)), ([Mor19](#)), ([Seb19](#)), ([Val19](#)), ([Bor19](#)), ([Age19](#))

2 Website 1: Amazing Thailand

Thailand is a country located in Southeast Asia and covers a total area of approximately 513,000 square kilometers (198,000 square miles) and is the 50th largest country in the world and the 12th largest in Asia. The tourism authority of Thailand also called as TAT has a official website named as [Amazing Thailand](#), where people from different countries or nations can plan an allegedly wonderful trip to Thailand. They offer a wide range of recommendations for different types of places and activities:

- Hotels.
- Food and drinks.
- Events and festivals.
- Attractions.
- Shopping.
- Things to do.

The user can constraint the recommendations provided on the above mentioned aspects. For hotels, the user can restrict the recommended hotels on:

- rating (for example, 5 star hotels).
- price range (for example, \$50 - \$100).
- tourism standards (for example, guesthouse standard).
- destination (for example, Bangkok).

Apart from these main restrictions, the user can also provide some keywords, e.g. "pets" to filter hotels based on their allowance of pets.

For food and drinks (Figure 1), the user can provide constraints on:

- lifestyle (for example, street food).
- category (for example, brunch).
- cuisine (for example, Asian).
- destination (for example, Bangkok).

- price per head (for example, \$0 - \$50).
- tourism standards (for example, Dinner cruise standard).

For attractions and events and festivals, the user can constrain recommendations by selecting the category (for example, art and culture), sub-category (for example, performing arts) and also the destination or place. Regarding things to do, the user can get recommendations by selecting the type of activity (for example, fishing). The user can select the category of shopping (for example, diamonds) to get the recommendations about the places where the user can find a specific type of product. All the constraints are crisp sets (for example, the user can select the type of cuisine from the options that are provided), in case of price they are precise (numerical values such as \$50), in all the constraints there is no notion of the ambiguity or uncertainty, e.g. there are no linguistic expressions such as "very expensive" or "quite cheap".

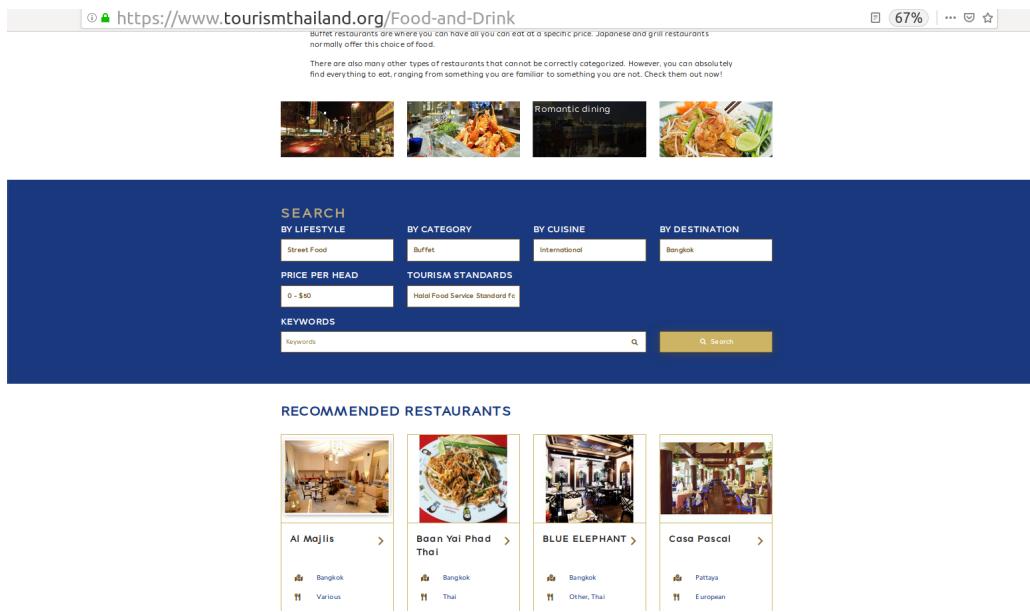


Fig. 1. The user can provide the preferences for food and drink recommendations.

Based on the constraints provided by the user, a set of recommendations will be displayed. These recommendations are organized by the date of occurrence, i.e. they are contextualized in terms of time. If there are many events on the same date, then the events with higher importance will be displayed (for example, in case of events and festivals, they have shown the international balloon festival as top recommendation). However, when the user selects one of the recommended items, the website is not displaying similar items related to selected items. Based on this, we can consider that the data is internally organized in an ontological structure that takes into account the date and the relevance of the items given a set of attributes that define their category or subcategory, but without comparing similarities between different items when suggesting new recommendations.

The recommendations provided to the user are based on their explicitly indicated personal interests (as they can select or filter the recommendations based on their personal

taste). The personal attributes can change from one user to other. However, if two users have same interests, then they will get same recommendations. The user cannot constraint recommendations on the adjustment of the items per day. However, the degree of personalization is quite higher by using the constraints for every type of recommendation (for example, hotel, shopping, etc.) mentioned above. However, the website does not learn user tastes or preferences from implicit user actions (e.g. time spent in an item's page), nor there is a way to give different weights or priorities to each constraint.

The website does not request much information from the user: the only details provided by the user are the log-in credentials. Nevertheless, if the user does not want to create an account, the user can still obtain the recommendations, but he or she cannot save the recommended trip plans. Regarding accessing user's information from social networks, as mentioned earlier, the recommendations are not drawn from the user's social media activity, however, the users can share the trip details or the places details on their social platforms.

Based on the obtained recommendations, the system clearly uses a content-based recommendation approach. Whenever a user provides a set of queries, the system is matching them to the ontological attributes of the query elements and retrieving the recommendations which satisfy these attributes. The user demographic position does not impact on the obtained recommendations, as accessing the website from different locations has given same recommendations, so we can rule out the possibility of recommendations being obtained with a demographic approach. For the recommended items, there are no ratings or descriptions provided by other users; there is no evidence that the recommendations are drawn by using collaborative filtering.

The website does not offer any kind of group recommendation facility. However, if the group members share similar interests, they can constraint recommendations on those interests. One major feature of the website is that it considers the aspect of sustainability, as there is a section in recommendations called *Green Tourism*. This opens a separate website called as [7Greens](#), where there are a wide range of articles regarding sustainability. There are options for the users to chose green routes to travel (Figure 2).

Apart from the recommendations about hotels, food, etc., Thailand tourism website offers a solid Trip Planner (Figure 3) where the user has to provide the start place, end place, number of days, trip category (i.e. type of trip the user is interested in) and the website generates a clear plan for the number of days that user has mentioned (Figure 5). For the recommendations provided as part of the plan, a set of valuable facts are shown, including the time for travelling by car (however, user can select a different type of transportation), the location and the attraction description with the reviews from the TripAdvisor's API are displayed. For every recommended attraction, the user can add it to be a part of the final plan (so the user can take the final decision on the configuration of the plan). The description of attractions in the plan (Figure 4) includes the category of the attraction (e.g. a museum), price and contact details. The user can also see the hotels and restaurants near the attraction. The user can interact with the planner and decide the route and also the activities on the day. The planner considers the temporal information mentioning the time required to reach the place, the time required to visit the place and the time needed to go from one attraction to another one with different means of transportation (Figure 6). Hence, it adapts the suggestions based on the trip duration specified by the user, to recommend journeys ranging from a single day to several ones.

The Facebook account of [Amazing Thailand](#) mainly posted in their native language *Thai*. When we translate the posts in the browser we can see that there are some inconsistent translations. However, as the coronation of their new king was on May 5th 2019, this is the main focus of the recent posts. Initial posts mainly focuses on the description and

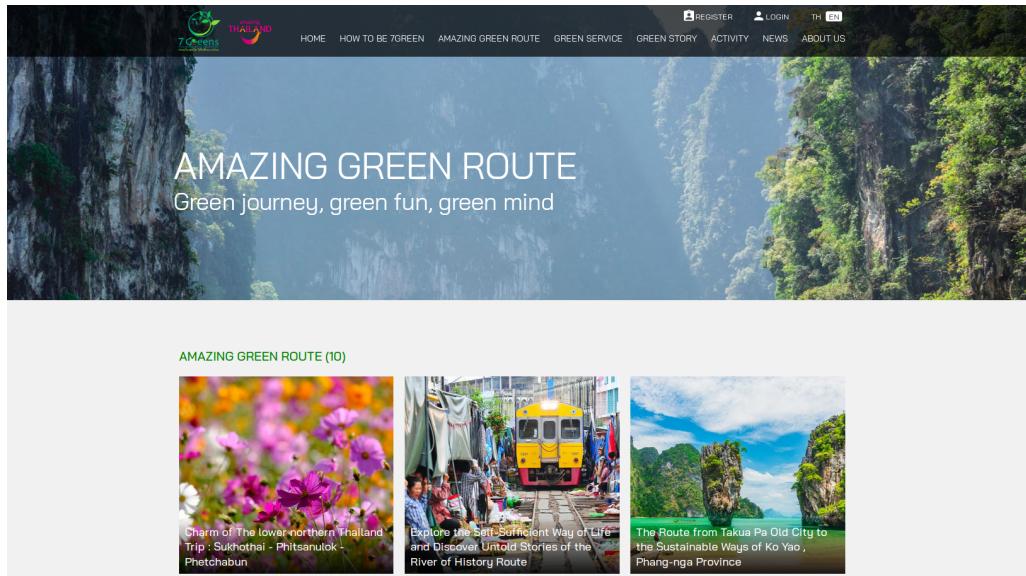


Fig. 2. 7Greens, the sustainable tourism page of Amazing Thailand.

SUGGESTED TRIPS

 Buri Ram - Si Sa Ket - Ubon Duration : 5 Days, 4 Nights Places : Phanom Rung Historical Park, Centre of Southern Thailand	 5Days 4Nights : Satun- Phuket - Duration : 5 Days, 4 Nights Places : Adang Rawi Islands, Ko Hin-ngam
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Fig. 3. The user can provide preferences and filters for the trip planning.

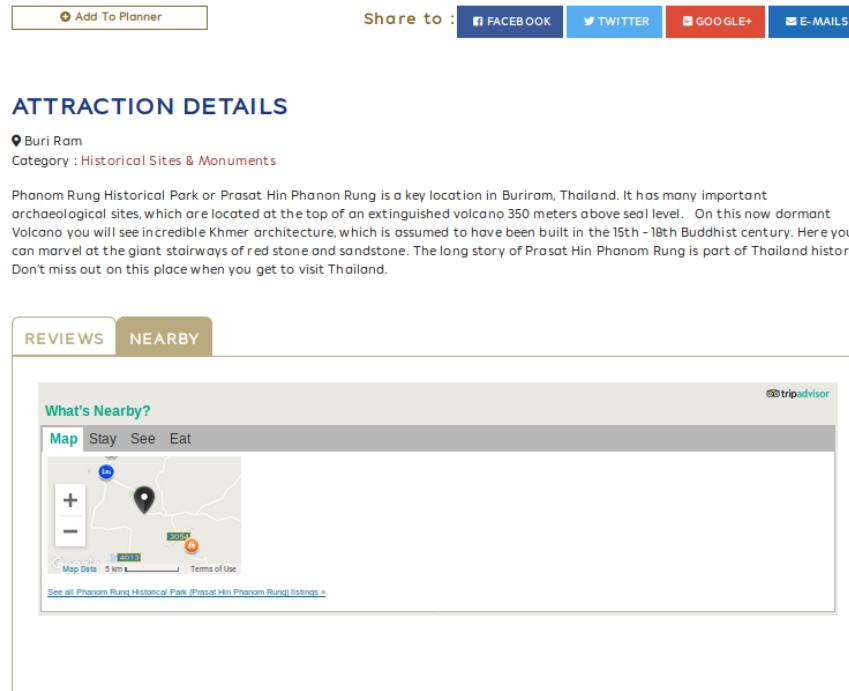


Fig. 4. Recommended attraction details and nearby places.

The screenshot displays a 'TRIP PLANNER' for a 5-day trip from Buri Ram to Si Sa Ket. The itinerary is broken down into five days: Day 1 (Buri Ram), Day 2 (Si Sa Ket), Day 3 (Ubon Ratchathani), Day 4 (Ubon Ratchathani), and Day 5 (Si Sa Ket). Each day section includes a map, a photo of the attraction, and a 'GO TO MAP' button. The 'Day 1: Buri Ram' section shows a map of the area around Phnom Rung Historical Park.

Fig. 5. 5 days trip planning by the planner.

Fig. 6. Different transportation options suggested by the planner from one attraction to the other.

preparations for the coronation, the posts also invite the people to come and participate in an event called *Surf Fest*. The descriptions to the posts are clearly related and mainly talks about the food and attractions present in Thailand. Some posts also talks about the transportation and train services available. Overall, we can conclude that posts of Amazing Thailand consider all ages of people, talking about both the night life and day life, targetting families, groups and individuals that travel alone.

3 Website 2: Hola Islas Canarias

[Hola Islas Canarias](#) is a tourist website for Canary Islands, supported by the regional government. As one of the most visited regions of one of the most visited countries of the world (Spain), one can expect the tourism website of Canary Islands to include innovative resources to be very appealing to visitors. The website promotes traveling and performing activities in the different islands of the Atlantic archipelago. One of the notable features of the website is the presence of an AI chatbot, that can help the user to get information and recommendation via written communication (only available in Spanish, though).

The website displays recommendations for a wide variety of items, ranging from activities to stays and locations to visit. For each of them, different types of filter constraints can be applied to match the tastes or personal interest of each user. A common filter is the island where to perform the activity or stay, while the rest of filters are dependent on the context of the particular item. Some of the items and their filters are as follows:

- Beaches. The recommendations can be filtered by the type of beach (for children, popular or unspoiled) and even by the type of sand (white, volcanic, red or golden). An example of recommendation is depicted in Figure 7.
- Spas: There are no spa-specific filters, only the island selection.
- Shopping: The shops can be constrained to be street markets or commercial areas.
- Museums: The user can choose among museums of cultural and historical interest, and also there is a specific category for sustainable, ecology-related museums. Therefore we realize that the website is interesting in promoting places dedicated or related with nature preservation.
- Places with charm: They can be divided in old quarters, hamlets and villages.

When the recommended item is a place, once it is clicked, a description, an image gallery and map are shown, together with points of interests close to them, allowing to use checkboxes to select which ones we are interested. The types of places that are shown tend to be semantically similar to the one source place (for instance, for beaches one can filter in the map other beaches, zones for water activities, natural pools and restaurants; for villages, restaurants are also there, but instead of beach-related places we have wineries, cheese shops and museums). For this reason, we think that is likely that the website uses an internal ontology that organizes the types of places, for instance in a tree-like hierarchy where the root might be "place", and some of the children concepts may be "coast place" (with children such as "beach" or "natural pool"), "city" (with "village" being a child, that can have ontological attributes of type "building" such as "museum" or "cheese shop"). One hypothesis is that when selecting a place, other places of ontological similarity (e.g. few edges in the tree) are displayed. Nevertheless, some places are forced to be always available independently of their similarity to others; namely restaurants, motivated by the common sense principle that no matter where the traveler is, he or she may become hungry.

The recommendations of the site that we have just examined are not directly personalized to a given user, in the sense that when searching for a certain type of place with the

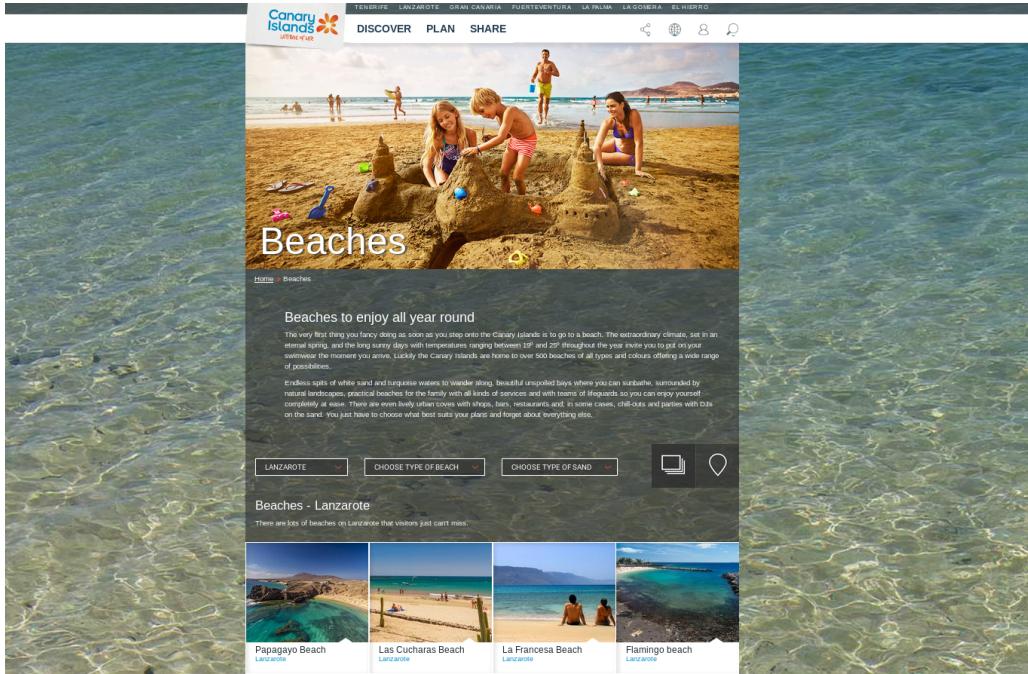


Fig. 7. Beach recommendation for Lanzarote island. The type of beach and sand can be used for detailed filtering.

same filters, every user will get the same response. The user cannot set weights, priorities or scales of tolerance (e.g. whether a feature is just preferred or totally mandatory) in the constraints to determine the final recommendation. Nevertheless, the filters incorporate a certain degree of taste-based customization (such as the type of sand, depending on one's preferences).

To get a higher degree of customization, a feasible option is to talk to the chatbot. For instance, we simulated being a user who is willing to escape from the stress on the city, and unwind in a quiet, deserted beach. When asked for a "quiet beach", the chatbot successfully identifies the personality or preference of the user, and answers saying: "It seems that you are looking to get out of the crowds and take rest in the heart of nature. These are the most awesome unspoiled beaches of the islands". The original conversation is depicted in Figure 8. We can infer that a knowledge structure is used to describe the items of the recommendation pages, such as storing tags representing their ontological features, that the chatbot tries to match with the lemmatization of the user query to get results, and using similarity metrics (e.g. here "beach" was found as a tag for some items, and the word "quiet" was matched with "unspoiled" because of their resonable semantic similarity, perhaps found using Wu-Palmer metric in WordNet, or more sophisticated techniques, such as pre-trained word embeddings). This hypothesis is reinforced by the fact that if we provide a query with terms not closely related to the items, such as "football", we do not get a successful response (however using another sport, "golf", provides links to golf courts, since they are one of the recommendable places of the website). The communication with the chatbot is quite fast, and it does not require to

enter much information to get interesting information, just one or two keywords revealing our intention is enough (provided that the query is related to the website, as explained).

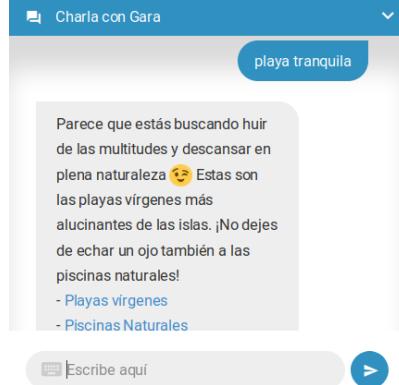


Fig. 8. A user asks the chatbot for quiet beaches, and it correctly identifies the request and offers links to unspoiled beaches. The chatbot is only available in Spanish.

To bring customization even further, the users can register and log in the website, so that they can click a button when viewing an item to add it to their preferred activities or places. We infer that the system takes these explicit preference indications of the user to further recommend places and activities with a high degree of content similarity (e.g. beaches of the same type, or restaurants in the same village) to the previously selected ones. There is no sign that the selection of other users are used to estimate inter-user similarity for a collaborative-based recommendation model. Therefore, it is more feasible to believe that the recommendations are only content-based, building a profile of the user preferences based on his or her selected places and activities. Additionally, the system can use the registration data to offer recommendations, such as "children beaches" if the user has stated that it has children in the registration form. As a negative point, it should be stated the four-step registration form asks a lot of information, which may make the user cancel the process before completing it. We consider that some of the information is not relevant for the website, such as the post code and the city of the user, with the country or region being enough to provide fairly accurate information for the website. Some users will consider this as a privacy concern, since it is not clear that the website respects the principle of only asking the exact degree of strictly needed information.

An specific customization option is offered for the case of beaches: the "Beach-Goers Test", an engaging 6-step 4-image selection game (as shown in Figure 9) from which the website infers the user's beach-related personality, to provide a set of beaches that best suit the user's preferences, taking into account the attribute-based matching between the user profile and the beaches. An example of result is shown in 10.

We think that the website does not model user preferences with fuzziness, but it cannot be completely discarded. All the filters are clearly crisp categorical values where generally it does not make a lot of sense to establish intermediate levels of membership (e.g. it does not make sense to make a graduation from "sand type" from "volcanic" to "red" to "golden"), yet fuzziness would be more appropriate for modeling the way how the user behaves in the website. Yet, again, there is no evidence of implicit information being gathered and used to model the user profile of the recommender system (e.g. analyzing

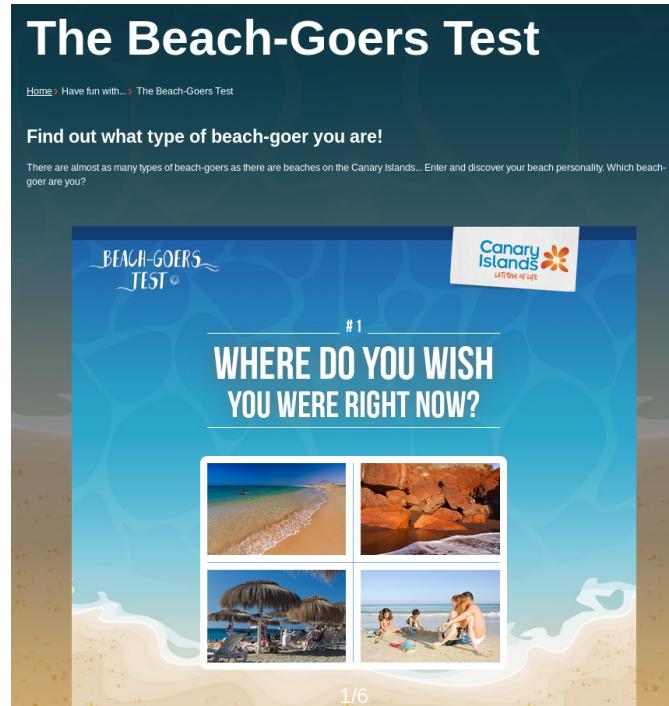


Fig. 9. Test where the user selects images to help the system understand the user's beach preferences.



Fig. 10. Classification of the user and recommendation of beaches based on his or her choices in the test.

how much time the user spends in an item's page to infer the interest in the item), nor advanced context-based recommendations (e.g. the activities are recommended no matter the season), yet some group properties are taken into account by the system as already mentioned, such as the presence of children. Nevertheless, there is not an explicit group recommender that asks the preferences or characteristics (e.g. budget or disability) of the each of the group members to build recommendations that try to maximize or minimize a certain criteria of the group (e.g. maximize enjoyment of one or all members on average or minimize misery). The website and the item descriptions are available in many languages, yet some features are not available for all (such as the chatbot, that only shows up if Spanish is selected).

This website lacks any fully automated planning system. It offers the possibility for the user to see a list with the places that he or she has selected as willing to visit, and the activities to do. However, there is no AI-driven organization of the tasks that distributes them in different days according to the preferences of the user or the estimated duration of the activities. The website proposes the users to plan the trip by themselves. Nevertheless, travel information is displayed for each island, divided in different means of transport. It is even possible to see specific travel options between a start and a destination island, as shown in Figure 11; this small automated partial planning module presumably accesses external databases of transportation companies to facilitate the user's global planning task. The duration of the planned trip is specified, but not the start and end hours in which it should take place.

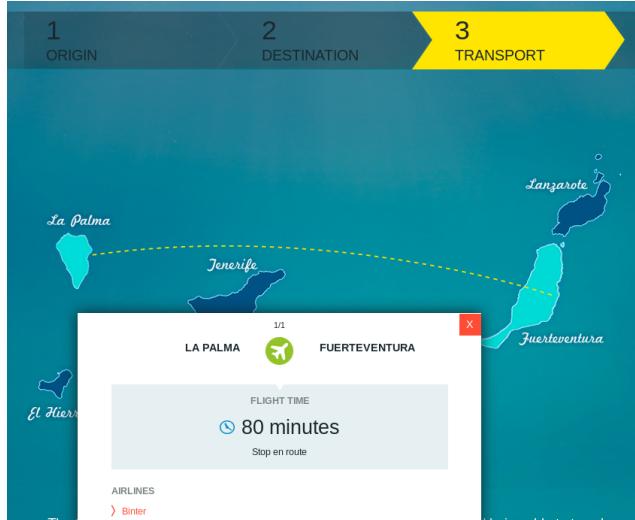


Fig. 11. Automated plan to travel from an island to another one.

The social network pages of Canary Islands display short messages, mainly focused on paradise-looking pictures. The used words avoid complex sentences and use simple terms instead, where words and expressions such as "hot" or "good weather" are common, and hashtags are mainly locations in the islands or islands themselves, such as "#LaPalma", to direct users to the part of the archipelago that they are most interested in. Both the images and the texts are directed to a wide range of users, including families, e.g.

showing Aquarium messages targeting children (e.g. "Who has not visited Aquarium", with children images).

4 Website 3: Visit Dubai

Tourism in Dubai is a part of the Dubai government's strategy to maintain the flow of foreign money into the emirates. Dubai's lure for tourists is based mainly on shopping, but also on its possession of other ancient and modern attractions. The official tourism website [Visit Dubai](#) offers a wide range of recommendations and trip planning facilities.

The website has two main categories of recommendations:

- *Shop, Dine, Relax*: This category deals with the recommendations of Shopping, Cuisine, Beaches and Spas.
- *See, Thrill, Play*: This category mainly deals with the recommendations regarding Entertainment, Arts, Sports, Cultural heritage, Nature, Theme parks and Adventures.

Most of the recommendations provided by the website are generic, which means that the user cannot provide any constraints on these recommendations. For hotels, the user can provide constraints on price, star rating of the hotel, amenities (e.g. pets, gym). The user can also sort the recommendations from high price to low price and the user can also visualize the hotel price for different currency (Figure 12).

Fig. 12. Hotel recommendations with the filters.

For every recommendation there is a corresponding TripAdvisor rating, user reviews followed by the recommendations of similar places and nearby places. The underlying structure of the points of interest can be interpreted as a hierarchical structure with the elements having the similar characteristics of the places being in same group or cluster, since similar places are recommended given a current one (as shown in Figure 13).

The screenshot shows a travel recommendation interface. At the top, there are three icons: a menu, a location pin, and a search bar. Below this, the title "World-class luxury footwear" is displayed. A short description follows: "Located on the ground floor of [The Dubai Mall](#), Level Shoes is Dubai's leading luxury shoe destination." A detailed paragraph describes the store's offerings: "Everywhere you turn, you see shoes, shoes and more shoes. From the most elegant heels to flip flops to loafers, Level Shoes has got you covered. The concept store features 40 designer boutiques and four key areas featuring a multitude of brands: Women's Designer, Contemporary, Men's and Trend." Another paragraph highlights the store's facilities: "The leading brands in the world of shoes are available in the 96,000 square foot space, from Adidas to Converse as well as smaller-production and high-end brands like Gucci and Christian Louboutin." Below this, there are contact details: Telephone (+971 800 538 3573), Email (stylist@levelshoes.com), and Website ([Visit Site](#)). To the right, under "More Like This", are recommendations for "Marks & Spencer" (with a small image of a person shopping) and "Deira Covered Souk" (with a small image of a souk). Further down, under "Browse Nearby", are recommendations for "Switch Restaurant & Lounge" (with a small image of a restaurant interior), "Galerie Lafayette" (with a small image of a woman in a store), and "Reel Cinemas" (with a small image of a movie screen). Each recommendation includes a small icon and a rating of 5 stars.

Fig. 13. Selected recommendations and its nearby places, related places recommendations.

The user can save the places that he or she finds interesting, which will be considered during the planning phase. There are family- and couple-based holiday recommendations. Other than these, there are no other individual personality-based recommendations, and the user cannot set weights or priorities in the preferences to determine the final recommendation.

From the obtained recommendations we can say that this is clearly a content based recommendation system. For every recommendation, there are a set of similar places that user can visit (if user selects a particular shopping mall, all the other high rated shopping malls will also be displayed), the main content feature can be seen as the position or location, as a set of nearby recommendations are also being displayed for every recommendation. However, they have also taken into account users demographic position and recommended some flights for travelling to Dubai (Figure 14).

Strong contextualized recommendations are available in the website, including a special summer recommendations page which focuses only on beaches (season contextualization), shopping and trills (Figure 15). Another category is stopover in Dubai, which provides recommendations to the user considering a short stay (time contextualization). There are also recommendations if the visit is business-based (event contextualization).

The only groups considered by the website are couple and family (Figure 16), as mentioned earlier. However, the recommendations for these two cases are also static. Desert, wildlife activities with treks to Marmoom and Hatta have their own pages in the website. There are several articles talking about the history and sustainable nature in these two places. There is also a department of tourism page where they mentioned about the Green Tourism awards to encourage pioneering hotels that have supported environmental awareness.

The screenshot shows the Visit Dubai website's flight search interface. At the top, there are links for 'VISIT DUBAI', 'BUSINESS IN DUBAI', and 'DEPARTMENT OF TOURISM'. On the right, there are user profile icons and a search bar. Below the header, the 'DUBAI' logo is prominently displayed with a '1' notification icon. The main content area is titled 'Flights to Dubai' and displays a search summary: '141 results'. A search form on the left allows users to 'Edit your search' with fields for departure date (18/05/2019), return date (26/05/2019), cabin class (1 Adult, Economy), and departure time (Outbound: 00:00 - 24:00). The search results table lists five flight options:

Airline	Departure	Duration	Arrival	Price
Wizz	21:55 SDR	21h 20m 1 Stop OTP	21:15 (+1) DWC	AED 2,122
flydubai+Wizz Air+ Iberia	10:30 DXB	24h 5m 2 Stop SOF, MAD	08:35 (+1) SDR	
Wizz	21:55 SDR	21h 20m 1 Stop OTP	21:15 (+1) DWC	AED 2,148
flydubai+Wizz Air+ Vueling Airlines	10:30 DXB	24h 10m 2 Stop SOF, BCN	08:40 (+1) SDR	
BRITISH AIRWAYS	09:20 SDR	21h 5m 2 Stop MAD, LHR	08:25 (+1) DXB	AED 2,205
BRITISH AIRWAYS	13:00 DXB	26h 10m 2 Stop LHR, MAD	13:10 (+1) SDR	

Each flight row includes a 'Select flight' button. The total duration for all flights is 21h 5m.

Fig. 14. Recommended flights from Spain to Dubai using demographic features.

The screenshot shows the Visit Dubai website's homepage with a large banner featuring a woman in a wetsuit standing in front of the Burj Al Arab hotel. The banner text reads: 'What are you waiting for? Summer is a short trip away' and includes 'BE INSPIRED' and 'START PLANNING' buttons. Below the banner, there are four circular icons representing different travel categories:

- THRILLS AND SPILLS**: Welcome to theme park city
- SUN, SAND, SKIES**: Find the perfect beach for you
- SHOPPER'S PARADISE**: Indulge in retail therapy

At the bottom, there is a section titled 'What would you like to do?' with a call to action: 'Pick an option to start exploring'.

Fig. 15. Season contextualized recommendations for summer.

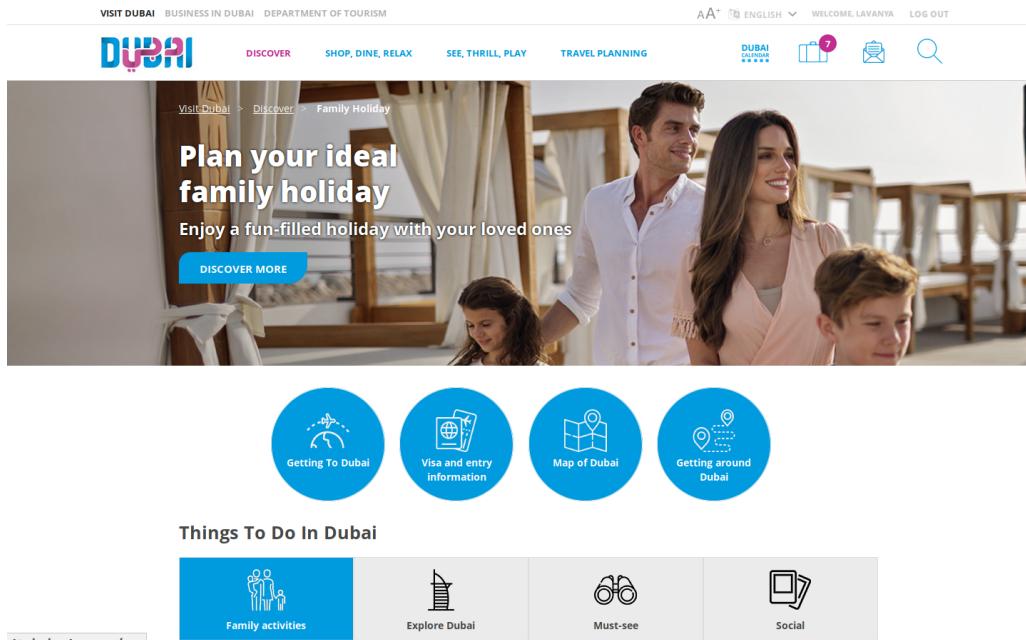


Fig. 16. Recommendations for the family.

The planning system present in the website is a naive planner, not a fully automated system. The user has to add some attractions to the planner and drag and drop the added attractions to particular day. It is completely a manual planner (Figure 17). The transportation information is provided in a separate page mentioning what kinds of transportation are available in Dubai. There is no mention of temporal information to the trips as the planner is a manual planner.

Currently the Muslim celebration of Ramadan is taking place in Dubai. Mostly the social media page of Visit Dubai consists of the mentioning the Ramadan decorations and events. There are high percentage of beach and night-life posts. They have also showed proud of their technological vanguard, reflecting the image of a country of breakthroughs that they want to show to the world. There are not many posts related to family, however, there is a small set of pages in the website which exclusively targets families, showcasing activities for kids.

5 Website 4: Go Tokyo

[Go Tokyo](#) is the official tourism website of the capital of Japan, showing information of how to reach and what to do in Tokyo.

The items that the website recommends are places to visit. There is a strong contextual filtering based on the season, with the ability to get recommendations for Spring, Summer, Autumn and Winter. Each category of point of interest can be filtered by a considerable number of subcategories, which allows a notable degree of specialization of the user's interests. Some examples of locations with their possible constrained types include:

- Attractions: landmarks, theme parks, zoos and aquariums, parks and gardens, water-fronts, beaches and pools, scenic spots, theaters, science museums, sports, sumo.

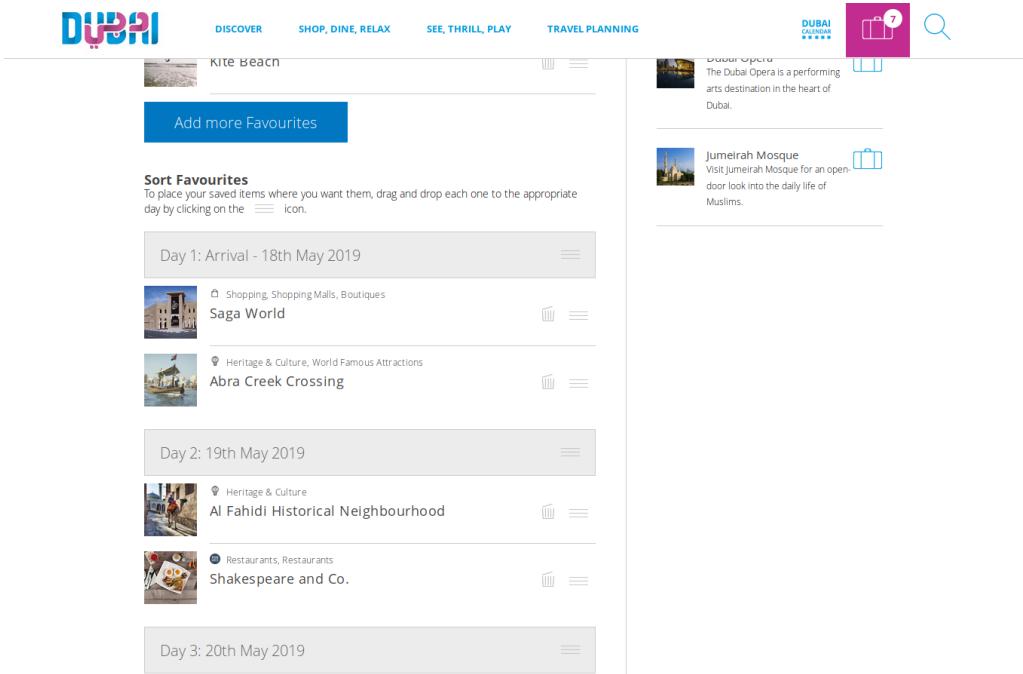


Fig. 17. Manual planner available in the Visit Dubai website.

- Culture: bathhouses, local food, local markets, local crafts and textile, manga and anime, pop culture, cultural experience, traditional and performing arts, temples and shrines, sumo.
- History: temples and shrines, historical sites, history museums, statues and monuments, UNESCO World Heritage.
- Nature: cherry blossoms, autumn leaves, rivers, waterfronts, beaches, islands, mountains, camping and glamping, parks and gardens, hiking and trekking, diving and snorkeling. Despite of the fact that we have not found explicit mentions to sustainability, the great range of nature-related places and activity is an implicit sign of how important is for Tokyo to take care of the fauna and flora that makes some of their environments unique.
- Shopping: shopping streets and arcades, malls and department stores, tax-free shopping.

It can be seen that types of places can be found when browsing in different major categories (e.g. sumo is both considered an attraction and a cultural element; temples are both cultural and historical). When a specific point of interest is selected, a description and a set of tips is displayed, as well as a set of keywords. This leads to think that each point of interest is defined by a set of semantic attributes in the underlying model, that is assumed to define an ontology.

The recommendations provided by the system are generic, i.e. not specific for the user. The system uses TripAdvisor's API to gather the ratings of each point of interest. The reviews of other visitors can be checked when browsing the page of the point of interest, as shown in 18. The website presents a section with the touristic attractions with the top reviews in TripAdvisor.

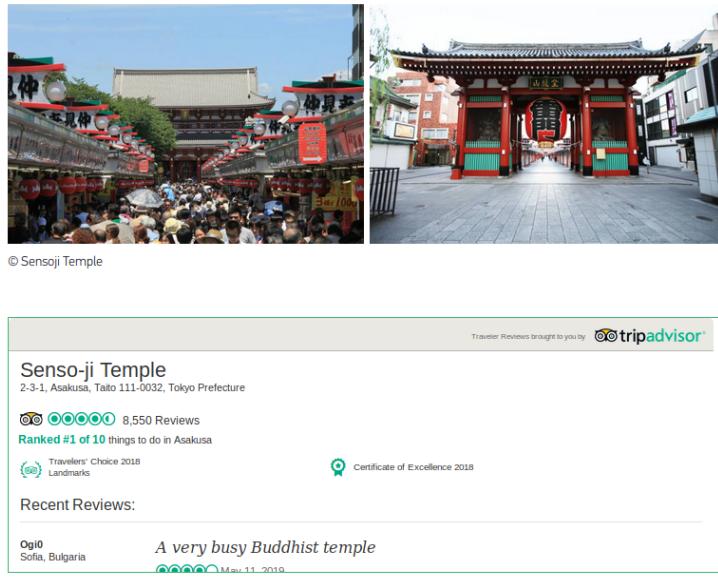


Fig. 18. A point of interest (temple) featuring very positive user reviews.

When checking the page of a place, similar points of interest can be checked. The recommendations are content-based, i.e. places similar to those that the user has just visited, according to the ontology model (with a set of tags that best matches the previous ones). Nevertheless, a collaborative component seems to be considered as well, being prone to place in the first positions points of interest with a high average rating in TripAdvisor. Therefore, it cannot be discarded that this recommender is a hybrid approach between content-based and collaborative filtering. There is no evidence that the top rated place take into account the text information of the reviews to adapt the final review score instead of just computing the average of the numeric ratings. We think, nevertheless, that is highly likely that TripAdvisor (whose API is used by this website) does indeed use natural language processing, particularly sentiment analysis, to refine the accuracy of the review ratings, based on the negativity or positivity of the used terms. TripAdvisor may use a fuzzy modeling approach to map expressions to fuzzy variables (ranging from a positive to a negative polarity), and specifically techniques such as term hesitance computing and consensus score determination, that may be used to break ties between points of interest with a seemingly very similar average rating. The website allows the user to add the places that they like most to a list of favourites, but we have found no evidence that modifying the favourite list affects the way how points of interests are shown in later recommendations, therefore we do not think that this website creates a custom profile of the user preferences, but only uses the external opinions and ratings of TripAdvisor's users. There are no register or log-in options for the websites, unlike in other sites that offer high travel customization options. Therefore there is no information requested to the user, so no privacy concerns arise. There is lack of evidence proving that implicit information is used for recommendation assessment.

The lack of user-specific recommendations is compensated by the presence of a high degree of explicit specification of the user preferences within the user interface. As said, there are many categories and subcategories for points of interest, but the level of detail

is even higher in the case of hotels, where a large number of amenities can be selected, depending on the user characteristics (e.g. children presence or budget, checking suite or high class for rich tourists, or affordable hostels for those who prefer to save money). An example of this selection, that uses the TripAdvisor's API, is shown in Figure 19. This high degree of customization can help groups plan trips that take into account all the members (e.g. pet compatibility, access for disabled people), given the lack of an automatic group recommendation system that would take into account the preferences of each member with the use of AI techniques.

Fig. 19. Hotels with a high degree of preference-based filtering.

The website includes an automatic planner for visiting sets of points of interests in a specific zone of Tokyo. Even though it is not a full-trip planner, but limited to a certain number of activities within a radius, it can help travelers reduce their need of manual planning. In Figure 20, the planner has found the recommended path that starts in a specific train station and goes through different points of interest. A detailed sequence of the points of interest, means of traveling and the time to spend in each point is also displayed, in a fashion that resembles Google Maps' routes, as shown in Figure 21. The plans are not built based on personal information induced from the user, but the user can select among a wide range of plan options manually, and the underlying elements of a zone of Tokyo become connected with the plan. Depending on the size of the zone, it may take less than an hour, few hours or even a full day to complete the trip.

The Facebook page of Go Tokyo has a wide range of posts taking into account different types of tourists. The majority of posts also describe the gastronomy in Tokyo, mentioning different types of traditional foods (e.g. "Macha"). For party lovers, there are posts regarding the night-life in Tokyo, especially mentioning the Roppongi Art Night event of 2019. There are also some posts regarding the greenery (mostly flowers) in Tokyo, mentioning the importance of the environment, and giving the world an image of sustainability. All the May posts are related to the Golden week, which is one of the largest holidays in Japan this year; they also talk about events where Ninja traditions are showcased. To attract kids there are some posts about the Disney animation movies such as *Toy Story* and *The Incredibles 2* (there is a theme park featuring Disney franchises).



Fig. 20. Planner's map with the steps in a travel to visit different points of interest.

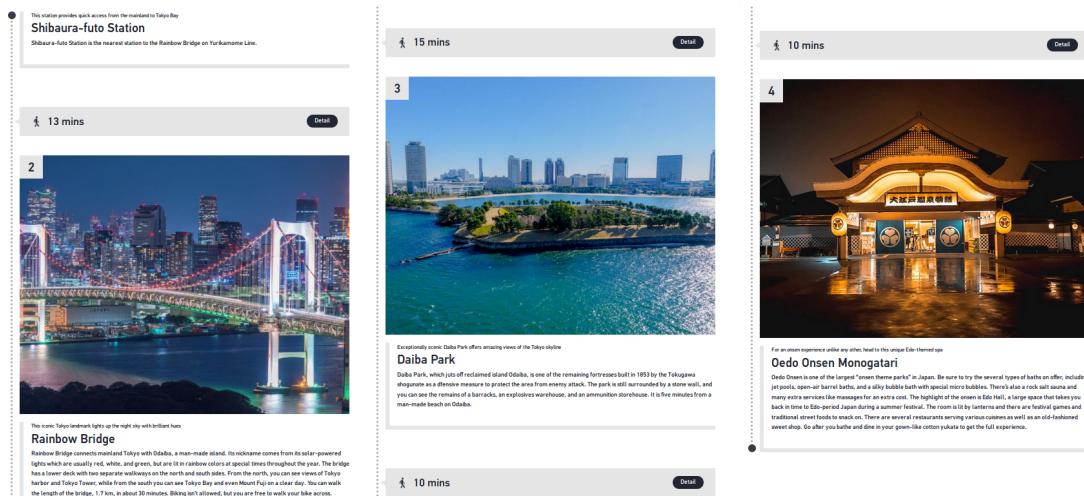


Fig. 21. Planner's map with the steps in a travel to visit different points of interest.

6 Conclusions

In this work we have analyzed the tourism websites of Thailand, Canary Islands, Dubai and Tokyo, paying special attention to their obvious or hypothetical underlying use of Artificial Intelligent techniques. Each of the websites uses a subset of AI techniques, specially recommender systems, present to some extent in all the four sites. Some of the websites include also customization systems and partial planner algorithms that facilitate the traveler's planning task. There are more features that the websites may incorporate in the future for greater customization and automatizing, such as group recommendations or full-trip planning. We expect these kinds of more advanced techniques to be present in the major traveling websites, those dedicated to trip organization in a global scale, not limited to specific locations, such as the websites analyzed in this work. These powerful travel websites can gather a large amount of data (Big Data) of their users to provide very specific and personalized information, that would allow to build complex trip plans with a minor effort from the user's side.

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