

A Smart MobiWeb Mashup Trip Planner Tool

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ABSTRACT

A wide range of Mobile Web-based applications are nowadays being built and proposed as mashup applications. Their aim is to be intuitive enough to be easily created by end-users directly selecting interactive elements, content and functionalities from existing resources, without requiring any technical skills.

We propose in this article a Mobile Web Trip Planner Tool that mashups heterogeneous online travel information provided from multiple Restful Web services to recommend custom visit plans. This application takes into account tourist preferences (type of stay, interest) and constraints (duration, budget, locomotion modality). Moreover, it considers real-time events (e.g., weather data or temporary unavailability of a touristic site) to adapt proposed schedules.

CCS Concepts

•Information systems → Mashups;

Keywords

Mashups, RESTful Web services, Mobile Web application, Tourism

1. INTRODUCTION

With the proliferation of APIs accessible via the Web, mashups and applications coming in the context of the Programmable Web concept¹, the opportunity of linking these mobile devices with Web contents and services is leading the way to shift in how mobile Web-based applications are offered. Indeed, a wide range of mobile Web-based applications are nowadays being built and proposed as mashups applications. They are based on reusing a large number of existing data

¹<http://www.programmableweb.com/>

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and services to create a significant added-value with reduced application development costs [3].

Tourism is an example of domains where we observe a large proliferation of Web APIs and where personalization is often desirable. However, a large part of touristic Web applications doesn't provide any client customization support. These applications typically publish lists of information that refer to a variety of products (locations, attractions, activities, etc.), and the user must visit multiple independent Web sites to plan her/his trip, separately query dedicated services and then manually combine the results. Other ones bring a weak help to the users in terms of personalized trip organization. They usually propose basic planning support with "when, where and how" to go to a given destination but they lack in terms of customization [1]. The users are in fact demanding smart tourism support for creating, managing and updating their itineraries with taking into account their preferences. In this paper we propose a system which allows to intuitively select, from a large amount of online touristic travel information, available via different RESTful Web services, adequate ones and compose them to construct touristic plans that satisfy tourists requirements.

The remainder of this article is structured as follows: we describe in Section 2 an illustrative scenario. Section 3 presents an overview of our MobiWeb Trip Planner Tool. Then, we summarize related work in Section 4 and finally Section 5 concludes the paper.

2. ILLUSTRATIVE SCENARIO

Tourists need generally to plan their visits and stays before traveling. Let's consider Alice, a tourist arrived to Tours (the main city in Loire Valley, France) who would like to visit the region. As constraints, she plans to stay only two days without exceeding 350 €.

To organize her stay, Alice should visit multiple independent Web sites, separately query dedicated services (check weather forecast for the given time interval to make either inside or outside activities), selects her activities (castles, museums, gardens, festivals, restaurants, hotels, etc.) and manually feeds the outputs of one search as input to the next one to combine resulted data taking into account Alice's time and budget considerations.

To satisfy this kind of request a more appropriate tool is needed to facilitate integration of contents. In this sens,



Figure 1: Service Mashup based on time and cost user constraints

we propose a trip planner tool based on service mashup approach to help end-user planning for his/her visit according to his/her current needs. For illustration, Figure 1 shows Alice’s scenario where different services are aggregated to generate the visit plans. Based on user constraints, i.e. time and budget, and user context, travelers are suggested about potential interesting visit plans. These suggestions can be displayed on smartphone, tablet or laptop.

3. OVERVIEW OF THE SMART MOBIWEB MASHUP TRIP PLANNER TOOL

3.1 Architectural overview

The architecture of the application is depicted in Figure 2 that highlights the main modules of the implemented prototype. The aggregation process is based on configuration, a well established theory in Artificial Intelligence allowing to compose complex objects [4].

The configuration aggregator collects, processes, and combines data from different RESTful services while considering user constraints and preferences. To interact with end-users, two modules are proposed: (i) visual constraints expression module allowing users to communicate their constraints using drag and drop technique. And (ii) visual plans generation module exposing the generated plans in two possible ways: as textual view (list of steps) or map view.

3.2 Functional overview

The MobiWeb Mashup Trip planner recommends touristic plans to help travelers making decision. It allows users manipulating, in a more powerful way, data retrieved from multiple Web data sources, and aggregating them in a single integrated view. Data are obtained from the Web using RESTful APIs. Examples of considered data sources are: (i) the Place API, which can be used to collect touristic places,

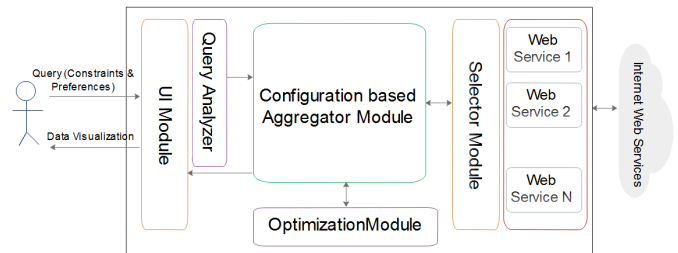


Figure 2: Application architecture

(ii) the booking API to make hotels and restaurants reservation, (iii) the Weather API to integrate current weather data, as well as (vi) the Google Maps API to display geolocalisations in the Google Map user interface.

Based on these data sources, the tool can generate touristic plans that correspond to Alice’s constraints. Among the numerous alternatives that can be offered we can mention different types of places to visit (castles, gardens, wine cellars, landscapes, cities, etc.), different visit modes (a maximum of places or longer visit time), etc. As constraints, we can mention for example the duration of the stay, the maximum budget, the type of the visit (solo, family, reduced mobility, etc.), the type of accommodation, the type of Restoration, the transportation mode, etc.

3.3 Illustration on a scenario

To illustrate the prototype implementation we consider again the Alice’s scenario. First, she expresses her constraints and preferences. The mashup process will consider them while selecting and aggregating data retrieved from different services to generate visit plans. Next, Alice defines the wished trip pattern steps by dragging and dropping icons of a corre-

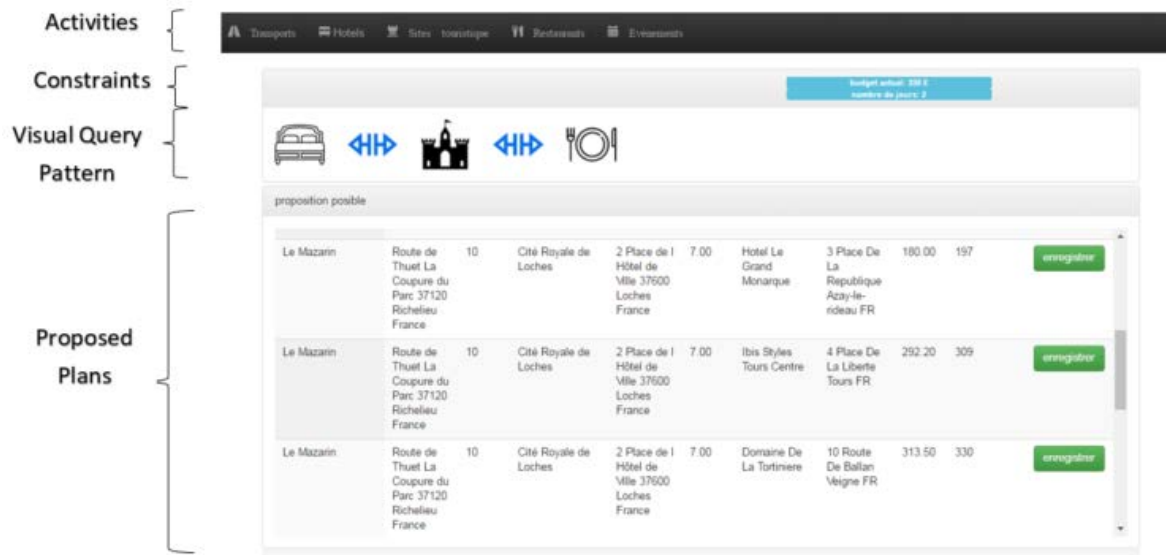


Figure 3: Screenshot of Mobile Web Mashup Trip Planner

sponding category i.e. castles, museums, wonderful places, hotels, restaurants, transport, etc. Then the request is processed, retrieved data are filtered and configured to fulfill the demands. The system provides, as depicted in Figure 3, a set of touristic plans that fulfill Alice’s demands. Now, Alice can choose the preferred plan according to other criteria. For instance, a plan containing a hotel and a restaurant will be more interesting to discover the gastronomy of the region than the one including a hotel which proposes the catering service for almost the same price.

4. RELATED WORK

These last years, the touristic domain has kept the interest of several researchers for resolving multiple issues. The authors of [5] propose an intelligent recommendation system for tourism using Semantic Web technologies. The system provides personalized recommendations of tourist attractions at a given destination. Also, the system allows integration of heterogeneous online travel information based on Bayesian Network techniques. It recommends tourist attractions to a user by taking into account the travel behavior. An overview of mobile tourism recommender systems is given in [2]. This work presents a systematic approach based on a classification scheme that takes into account three different aspects namely their chosen architecture, the degree of user involvement in the delivery of recommendations and the criteria taken into account for deriving recommendations i.e. user constraints based, pure location aware, context aware and critique based.

The originality of our system is the possibility to use both manual and automatic touristic plans generation. We believe that the tourist will be in an interesting autonomy. He/She will rely on the help of automated smart environments enabling matching tourists requirements with avail-

able opportunities.

5. CONCLUSION AND PERSPECTIVES

In this paper, we propose a smart trip planner system as mobile Web application based on mashup concept. It enables a seamless aggregation of heterogeneous data extracted from multiple Web resources and Web APIs in order to recommend touristic plans satisfying traveler’s requirements. This tool constitutes a first step towards a more important framework for automated mashups modeling and development. The next step will focus on enhancement of the tool by covering the three big stages of a tourist stay (before, during (for dynamic plans generations) and after (for trajectories analysis)); (ii) touristic plans optimization ; (iii) multimodal transportation (soft, collective, automobile) ;(iv) real-time monitoring of tourists in order to update tourists preferences using her/his real choices.

6. REFERENCES

- [1] G. Büyüközkan and B. Ergün. Intelligent system applications in electronic tourism. *Expert systems with applications*, pages 6586–6598, 2011.
- [2] D. Gavalas, C. Konstantopoulos, K. Mastakas, and G. Pantziou. Mobile recommender systems in tourism. *Journal of Network and Computer Applications*, 2014.
- [3] E. M. Maximilien. Mobile mashups: Thoughts, directions, and challenges. In *IEEE Conference on Semantic Computing (ICSC)*, pages 597–600, 2008.
- [4] B. M. Stein. *Functional models in configuration systems*. PhD thesis, Citeseer, 1995.
- [5] W. Wang, G. Zeng, D. Zhang, Y. Huang, Y. Qiu, and X. Wang. An intelligent ontology and bayesian network based semantic mashup for tourism. In *2008 IEEE Congress on Services-Part I*, pages 128–135.