Cityzen: a Social Platform for Cultural Heritage Focused Tourism

Alex C. Olivieri
Data Semantics Lab
Institute of Information Systems
HES-SO
Rue du Technôpole 3
Sierre Switzerland
alex.olivieri@hevs.ch

Roland Schegg
Institute of Tourism
HES-SO
Rue du Technôpole 3
Sierre Switzerland
roland.schegg@hevs.ch

Maria Sokhn
Data Semantics Lab
Institute of Information Systems
HES-SO
Rue du Technôpole 3
Sierre Switzerland
maria.sokhn@hevs.ch

ABSTRACT

The way tourists organize their travels is evolving day after day. While in the past, information was more obtained by the support of tour operators, nowadays this is mainly obtained through the Internet. Among many options, on the Internet it is possible to get information about interesting things a place has and to make reservations. This new touristic paradigm brings attractive opportunities such as saving money and discovering unexploited information proposed by tourists that already have visited targeted places. But, it comes with a major shortcoming. Information on the Internet can be overwhelming and it can lead to a lot of time spent on planning a travel. Moreover, the Internet contains outdated and incorrect information which can cause incorrect travel planning. These issues can become even more preponderant when dealing with niche domains, such as cultural heritage, where the information is not pervasive. This paper presents the Cityzen platform for planning cultural heritage focused travels. This platform aims to provide a semantic web oriented data model that acts as central repository and which can be used by tourists for accurately and efficiently planning their sightseeing. This platform deals with cases of incorrect and incomplete information by using the social web as possibility of actively engage users in the information management while they explore the provided information.

Categories and Subject Descriptors

H.3.5 [**Information Systems Applications**]: Online Information Services

Keywords

Tourism, Social Media, Social Web, Mobile Application, Gamification, Cultural Heritage

1. INTRODUCTION

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Social web is a set of relations that link people through the World Wide Web [1]. *Social media*, defined as *"a group of Internet-based applications that are built on the ideological and technological foundation of Web 2.0, and which allow the creation and exchange of user-generated content"* [12], is the set of platforms that form the social web. Social media has gained great appliance in different real world domains, such as economic life. Moreover, projects and companies based on social media communities have gained great value and loyalty [13].

Social media for tourism is an emerging research topic, but it has been applied to tourism already for some time. For example there are platforms such as TripAdvisor.com and Booking.com that make the social web a pillar of their product. Nowadays, tourism is leveraging social media in various ways. The main areas where social media has a key role include information search, decision-making behaviors and tourism promotions [16].

Even though platforms are ameliorated by social media (for instance, the information provided by users as feedback for their experiences in Booking.com), the current trend for the tourism domain is only to allow users to enrich the existing information, but not to let them insert new knowledge (TripAdvisor is one example). Besides, some social media such as Local by Google or Facebook Places, do not always let users modify the content. This is the effect of being commercial social media platforms. Specific niche domains, which do not have business as purpose, such as cultural heritage, can get big advantage from users participation in the data management, as users could possess valuable knowledge that is not included by any information provider. Moreover, users can contribute also in correcting data that result conflicting when integrated from different sources.

This paper describes our Cityzen platform for accurately planning cultural heritage travels. The platform is based on a data model specifically defined for cultural heritage touristic purposes. The data model contains data coming from cultural institution datasets that are connected to online datasets through Linked Data [4], resulting in a Semantic Web [3] compliant platform. We developed two mobile applications for interacting with the platform. The first application shows how users can have a richer experience when planning a travel and performing their sightseeing. The second application allows users to participate and help in the data management.

With this work we provide two main contributions:

a) participation of social web in the data management for correcting and completing information and b) a platform that offers aggregated and aligned information for enriching the travel experience.

The paper is organized as follows: in section 2 we propose a scenario which helps to explain the issues that the Cityzen platform aims to solve; in section 3 we describe the data model for the platform, the instance data we integrated into the data model and the architecture of the platform; in section 4 we present the applications for interacting with the Cityzen platform, both for visualizing and managing the data; in section 5 we recap the paper and we provide our conclusions.

2. MOTIVATING SCENARIO

This section describes a scenario where a tourist named Mary performs a cultural heritage sightseeing. The scenario starts with the travel planning and then continues with the sightseeing execution. This scenario helps to highlight the inconveniences and dissatisfactions that Mary experiences during her sightseeing, which the Cityzen platform aims to solve.

Mary is a solo traveler with a passion for cultural heritage exploration and she likes to organize her journeys autonomously. While attending a conference in Geneva, a city in Switzerland, she hears about an interesting historic city named Sion. In the evening, she browses the Internet about this place and she decides that it is worthy to spend her last day in Switzerland by visiting Sion.

As usually, she starts to plan her travel by searching useful information on the Internet. She searches for Sion in combination with other keywords related to the cultural heritage domain, and she gets various internet websites. While navigating on these internet sites, she notices that the data provided are not always coherent and some of them are conflicting. For instance, one internet website says that the "Tourbillon Castle" is open for visitors between 10:00 and 18:00 while another one says from 11:00 to 17:30. Being in this situation, Mary tries to aggregate the data provided by various internet sites and she prepares a sightseeing plan compelling with the time she has for her trip. In order to minimize the moving between the places she chose to visit, she lists them in a detailed order.

The day of her visit to Sion, she follows her plan and she enjoys the city. However, she feels disappointed as she did not visit some interests she planned to. One of the reasons for her disappointment is that some pieces of information she had, such as opening hours, were wrong. Moreover, during her visit, she met other tourists with common interests, and they revealed her some interesting things worthy of being seen which were not mentioned in any source she read on the Internet.

The motivating scenario emphasizes some issues that travelers can find while organizing a trip by themselves. Data are sparse, thus difficult to aggregate and, even more problematic, their content can be conflicting. Moreover, information about some items can be not available. Social knowledge aims to solve these issues. Users who have knowledge about cultural heritage could participate to the information management, and by doing so they can correct and complete the available data. This is true for all categories of data, also beyond the cultural heritage use case. But this use case is really significant because of the heterogeneity of the cultural heritage domain.

3. CITYZEN PLATFORM

In this section we describe the details of the Cityzen platform. We start by explaining how the Cityzen data model is defined and how it is made Semantic Web compliant by reusing the available and well known vocabularies. After that, we introduce the datasets from which we get the instance data and we describe how we integrate the data and we align them to the data model. We finish by describing how we make the platform accessible for users' applications.

3.1 Cityzen Data Model

The main purpose of the Cityzen platform is to provide capabilities to plan a travel focused on cultural heritage and to explore the information in a spatial and temporal fashion for tourists. Cityzen should provide distributed information, aggregated in a unique data model in order to avoid tedious internet researches.

A data model is the data structure for the information assumed to be useful for a certain purpose [10]. Together with the Institute of Tourism of our university, we defined what we believe is the appropriate data model for the purpose of the Cityzen platform. This data model is showed in Figure 1. Since we want the platform to be Semantic Web compliant, we modeled the data model as an Owl ontology (the terminological box - TBox) that will be later filled with real instance data (the assertional box - ABox) [2]. By doing so, our data model and the instance data will be part of the Open Linked Data (LOD) world and in this way we will be able to use data provided by others and make ours available to others as well.

The data model is focused on the cultural heritage interest concept because we want tourists to be able to visualize all the cultural heritage points for a city they planned to visit. Cultural heritage includes three main categories: a) build environment (building, townscapes, archeological remains), b) natural environment (rulal landscapes, coasts and shorelines, agricultural heritage) and c) artefacts (books & documents, objects, pictures) [14]. From this categorization, we decided to create five subclasses of cultural interest: *Folklore*, *Cultural Event*, *Cultural Place*, *Cultural Person* and *Physical Object*. These summarize the main categories and allow us to propose the main interests we believe are relevant for tourists.

The platform will provide users with information such as multimedia files, titles, descriptions, authors etc. about cultural heritage items in order to let them choose what they wish to visit. Since we want to aggregate information coming from different sources, an item can have different representations depending on the data provider. To manage this situation we decided to apply the methodology proposed by the Europeana initiative [7], which has the mission of helping cultural institutions around Europe to share their digital collections with a wider audience. Europeana, by using an *aggregator* entity, allows to manage the situation when data about the same cultural interest are provided by different providers. In our work we did not use directly the Europeana classes and properties, but we prepared a file for the alignment among our classes and properties and the corresponding ones from Europeana. This file will allow us to align the two schemes whenever is needed, so

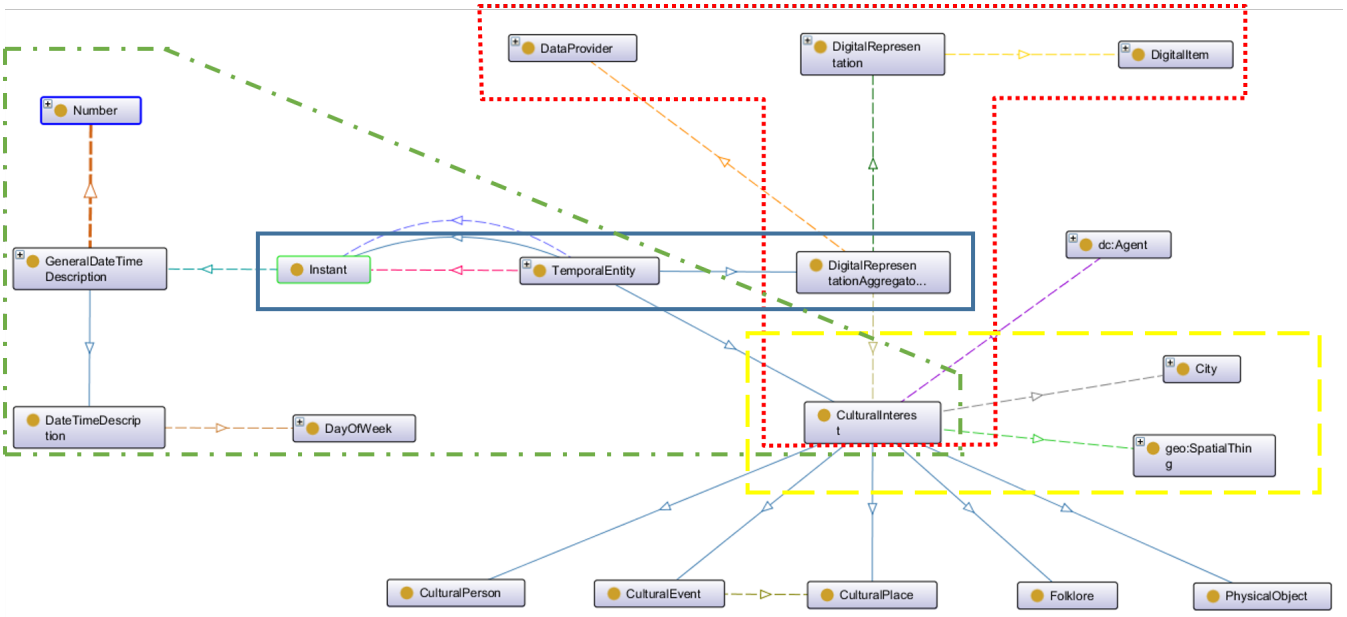

Figure 1: Cityzen Data Model.

in this way we will be able in future to share the data collections we aggregated with other institutions. Europeana has three main classes: edm:ProvidedCHO, edm:WebResource, ore:Aggregation [1]. edm:ProvidedCHO represents the provided cultural heritage object, edm:WebResource represents the digital representation of the cultural heritage object and ore:Aggregation is the class that links a cultural heritage object with the digital representation provided by a provider. In our data model, the Europeana core classes are represented by the classes *cityzen:CulturalInterest, cityzen:DigitalRepresentationAggregator and cityzen:DigitalRepresentation*. We use the class *cityzen:DigitalItem* to represent real digital item instances such as an image URL. This modeling allows us to divide a cultural object from its digital representation and to associate information about the provider of such digital representation defined by the class cityzen:DataProvider. Our mapping of the Europeana sub model can be seen in the red-dotted T area of Figure 1.

```
@prefix owl: <http://www.w3.org/2002/07/owl#>
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
@prefix cityzen: <http://www.hevs.ch/datasemlab/cityzen/schema#>
@prefix geo: <http://www.w3.org/2003/01/geo/wgs84_pos#>
@prefix owlTime: <http://www.w3.org/2006/time#>
```

Listing 1: Data Model - Namespaces

Our platform aims to help users planning their travels after they have explored what they would like to visit. In order to have a full vision of cultural interests, the platform shows their evolution over time. For this purpose we use the OWL Time Ontology [11], which allows us to define if a cultural interest has a duration over time (interval) or if it can be considered as started and finished at the same time (instant). OWL Time Ontology provides two properties, owlTime:hasBeginning and owlTime:hasEnd, which link the class owlTime:TemporalEntity to the class owlTime:Instant. If an individual of the class owlTime:TemporalEntity is connected through the two properties to the same individual of the class owlTime:Instant, then that owlTime:TemporalEntity individual is considered an instant, otherwise it is considered an interval. As showed in the blue solid rectangle in Figure 1, we embedded this part of the OWL Time Ontology directly within our data model by defining the class cityzen:DigitalRepresentation Aggregator as subclass of owl:TemporalEntity, because as mentioned previously, a cultural interest can have more representations, and we want to show its representation over time.

To properly plan a trip, especially when the available time is limited, a tourist must know when it is possible to visit the cultural interests and also to know the distances among them. For this purpose we modeled the data model with the concept of space and opening time. In the following we will describe both these concepts. For the concept of space we decided to provide two pieces of information with different granularity. For every cultural interest we provide the city where the cultural interest is located and its GPS position as can be seen in the yellow long dashed rectangle in Figure 1. The city information is mainly for searching proposals, while the GPS position will be mainly used for creating visiting routes. cityzen:City is an internal class of the data model whose instances can be connected to instances of the DBPedia class *http://dbpedia.org/ontology/City* through the property owl:sameAs. We did not use directly the DBPedia class because the scope of the Cityzen platform for now is limited to the small canton of Valais and the cities we will address are rarely present in DBPedia. For the GPS position information, we exploited the GeoNames Ontology [2] which makes possible to add geospatial seman-

[1] Europeana Namespaces:
ore: <http://www.openarchives.org/ore/terms/>
edm: <http://www.europeana.eu/schemas/edm/>

[2] http://www.geonames.org

tic information to the Word Wide Web. More precisely, we use the class geo:SpatialThing and we connect the class cityzen:CulturalInterest to it by using the property geo:location. Geonames defines two data type properties named geo:lat and geo:long and these allow to specify the latitute and longitute of a GPS location.

The opening time modeling is showed in the green dash dotted trapezium of Figure 1 and for this purpose we used again the OWL Time Ontology, but in this case we used more of its classes and relationships. As previously done, we used the classes owlTime:TemporalEntity and owlTime:Instant in the same was as we did before. However, here we embed the OWL Time Ontology by defining cityzen:CulturalInterest as subclass of owlTime:Temporal Entity. Then we used four more OWL Time classes, namely owlTime:GeneralDateTimeDescription, owlTime:DateTimeDescription, owlTime:DayOfWeek and owlTime:Number. owlTime:GeneralDateTimeDescription allows the "*description of date and time structured with separate values for the various elements of a calendar-clock system*". By defining as instances of owlTime:Number the hours (owlTime:hours property) in which cultural interests are accessible, and by linking instances of owlTime:DateTimeDescription (it is a subclass of owlTime:GeneralDateTimeDescription) to instances of owlTime:DayOfWeek, we can specify that a Cultural Interest is available for being visited at a certain time for a certain day.

The data model is equipped also with other properties, both object and data type ones, which are used to provide additional information about cultural heritage interests. These properties mainly use the Dublin Core vocabulary [3], which defines terms that can be used for describing documents. Since these properties provide only additional information and are not part of the core data model, for sake of brevity we do not describe them.

Once the data model is defined, what is needed next are the real data about cultural heritage.

3.2 Data Integration and Alignment

Cultural heritage datasets are traditionally held and managed by cultural institutions such as libraries, archives and museums. Their mission is more of outreach and interpretation rather than simply describing materials for search and retrieval. Integrating these datasets can be useful for aggregating and completing the information they contain, but this is challenging because usually these institutions format the data without following a common standard [9]. Moreover, institutions rarely provide online services for accessing their data, making difficult the usage of their data for outer processes such as tourism.

The scope of the Cityzen platform is for now limited to the canton of Valais of which Sion is the capital, thus we need data concerning this area of Switzerland. Two institutions made their information available for our project, Digital Valais/Wallis [4] and Médiathèque du Valais [5]. Médiathèque du Valais is an institution which aims to conserve and to make available electronically collections of printed documents and multimedia files concerning the canton of Valais. This institution follows the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) [15] which define a technical option for catalog and repository services to make their metadata available to other services, based on HTTP and XML standards. OAI-PMH provides a basic level of interoperability if the data are described using the Dublin Core vocabulary. Digital Valais is a project that aims to digitize the collective memory of Valais by creating an Internet platform on which the population, communities, schools and the societies, in 2015 and beyond, will deposit archives and documents worthy of interest. Unfortunately, in Digital Valais all data are defined with an internal representation, which does not use any common vocabulary.

Some data contained in these two datasets provide information about the same cultural interests, and once integrated and aligned, these data can complement each other and provide a more complete knowledge base. However, some data are conflicting and in section 4 we will explain how social media can provide positive outcomes in resolving conflicts and completing information.

The two datasets contain different data and define them with different terms, and this makes impossible a direct alignment with the data model. As a first step, we analyzed each data set and for each of them we figured out the data that are defined also in our data model. After that, using Java we created a converter capable of transforming the XML representation of the Médiatèque and the JSON representation of Digital Valais to the RDF representation of the Cityzen data model. The converter can parse cultural interests represented in XML or JSON and convert them into their RDF representation. As a result of this, we were able to integrate the data from the two datasets and align them with the data model.

3.3 Cityzen Architecture

The Cityzen platform is thought as a web platform which makes its data freely accessible through internet. The idea is that anybody who wants to use the information contained within the Cityzen data model can access it and use it. For implementing this, we use Amazon EC2, Apache Tomcat and Eclipse RDF4J together.

RDF4J [6] is a powerful Java framework for processing and handling RDF data. It includes creating, parsing, scalable storage, reasoning and querying with RDF and Linked Data. It offers an easy-to-use API that can be connected to all leading RDF database solutions. RDF4J fully supports the SPARQL 1.1 query and update language for expressive querying and offers transparent access to remote RDF repositories using the exact same API as for local access. RDF4J provides two web applications for making the data available online and for interacting with them. The RDF4J Workbench allows the interaction with the RDF4J framework. Using the Workbench it is possible to create an RDF4J repository that will contain the data model and the instance data loaded in the form of RDF serializations, such as RDF/XML. The RDF4J Server allows the repository to be accessible online and thus it makes the data available to applications. It provides HTTP access for RDF4J repositories, exposing them as SPARQL endpoints. Both of them come as *war* files that can be deployed on a server.

To provide the online access for the Cityzen repository,

[3] http://dublincore.org/specifications/

[4] https://www.valais-wallis-digital.ch/en/a/#!/explore/media

[5] http://www.mediatheque.ch/

[6] http://rdf4j.org/

we decided to deploy the RDF4J Workbench and the RDF4J Server into an Apache Tomcat Server [7] and then use Amazon Elastic Compute Cloud (Amazon EC2) [8] to make it reachable online. Figure 2 shows the full architecture of the Cityzen platform.

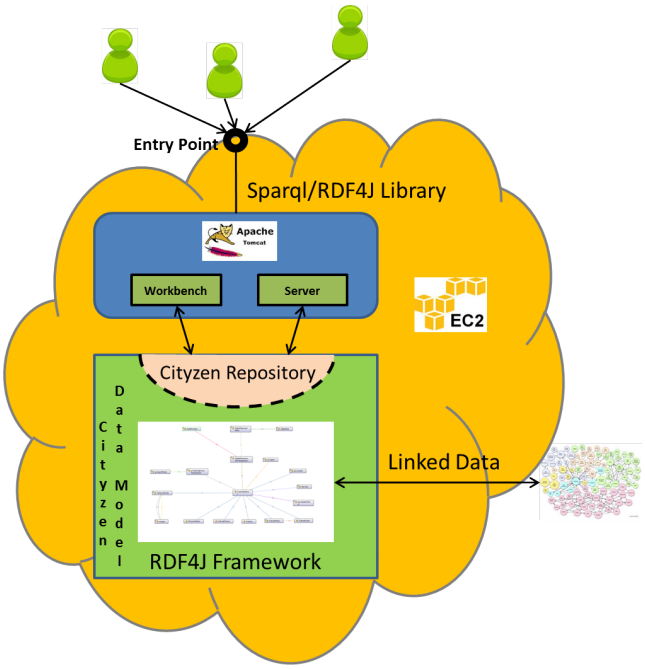

Figure 2: Cityzen Platform Architecture

Now that the data model is available online, there are two methodologies to access the instance data, by expressing SPARQL queries directly over HTTP, or by using the RDF4J client Java libraries. Regardless on the methodology used, the developers must specify the entry point of Cityzen repository by using the URL *http://ec2-52-39-53-29.us-west-2.compute.amazonaws.com:8080/openrdf-sesame/* and specifying *CityZenDM* as repository. The appendix at the end of the paper shows the link to access the RDF/XML version of the data model and for its SPARQL endpoint. Figure 3 shows an example of performing a SPARQL query to ask the first two cultural interest instances on the above-mentioned repository.

4. USER INTERACTIONS

Cityzen is a social platform that provides users with information but at the same time it requests users to share their knowledge to complete, correct and enrich the information contained in the knowledge base. This section presents the applications developed for providing platform interactions for users interested on exploring and managing data.

4.1 Cityzen Touring App

The main purpose of the Cityzen platform is to provide support to tourists for organizing their travels at the discovery of cultural heritage and to allow them to have reliable and interesting experiences. For this, we developed an application which allows the visualization of cultural interests of a chosen city, showing related images, description and other data defined in the data model. Moreover, the application provides a Google map style navigation to guide tourists along their sightseeing. We named these two different features *"cultural heritage viewer"* and *"cultural heritage navigator"*. An extract of them is showed in Figure 4.

The *viewer* lets the users select the city they are interested in and then decide of which typologies of cultural interest they want the information to be visualized. For illustration, the first screen of Figure 4 shows some cultural interests of the category folklore, each of them including an image and a title. By clicking on one of them, the user can visualize more details about the selected cultural interest. Eventually, the user can decide to add it to her sightseeing list or not. The *navigator* lets users visualize places of interests they added in the sightseeing list on the map and it guides them towards these places. As a future work, we plan to embed on the navigator extra feature which will allow users to find best path to their destinations.

We use two methodologies to access the data in the Cityzen Touring application. For the viewer, we use native SPARQL query over HTTP and for the navigator we use defined web services implemented using with RDF4J java libraries. The idea of providing a dedicated web service approach to access data besides the SPARQL query approach is driven by the fact that it allows developers to use the data without having knowledge of the data model. Moreover, it allows us to have more control on the data model and on the data itself and ease the development task although at the expense of the flexibility that SPARQL provides.

4.2 Users Participation

In the previous sections, we highlighted that issues appear when integrating data from different sources which refer to the same piece of information and when those datasets cannot completely fill the data model. In Semantic Web applications, conflicting or wrong data lead to problems, while missing data do not. In fact, semantic web languages in contrast to database management systems use the open-world assumption [8], which states that the truth value of a statement may be true irrespective it is known to be true.

In the following, we describe three approaches used in the Cityzen platform for exploiting social media to solve information conflicts, to complete incomplete information and to let users insert new information.

4.2.1 Correcting Conflicting Information

The Cityzen platform data model is based on an OWL ontology, thus its schema is composed by entities (Classes or Literals) connected through properties (object properties or datatype properties). The schema is subjected to restrictions and if data inserted violate these restrictions, it means that data are incorrect.

[7] http://tomcat.apache.org/
[8] https://aws.amazon.com/ec2/

Enter or select endpoint ▾ 53-29.us-west-2.compute.amazonaws.com:80[illegible]0/openrdf-sesame/repositories/CityZenDM

Query:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX schema: <http://www.hevs.ch/datasemlab/cityzen/schema#>

SELECT DISTINCT ?culturalInterest
WHERE {
  ?culturalInterest rdf:type schema:CulturalInterest
} LIMIT 2
```

Execute

culturalInterest
http://www.hevs.ch/datasemlab/cityzen/data#9dec8165-50ff-4e66-a208-9c9db66ae880
http://www.hevs.ch/datasemlab/cityzen/data#4dcd82f4-9de4-402e-bf47-df8656838a3c

Figure 3: Query example using Eionet Simple SPARQL client

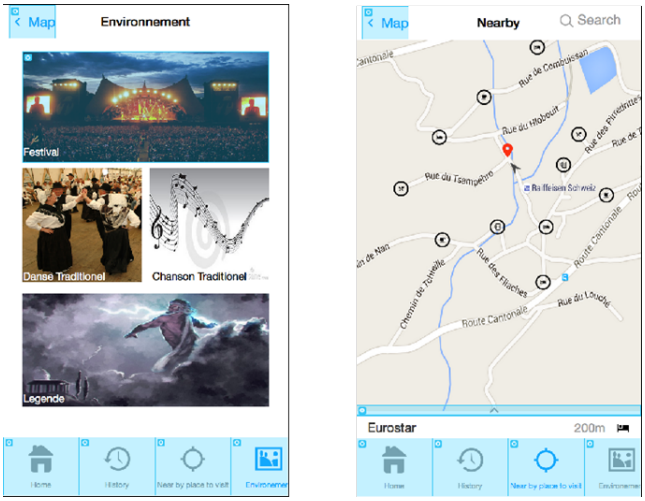

Figure 4: Cityzen Touring App

A concrete example is showed in Listing 2 where the property geo:location is defined as owl:FunctionalProperty.

```
1  @prefix cityzen: <http://www.hevs.ch/datasemlab/cityzen/
       schema#> .
2  @prefix geo: <http://www.w3.org/2003/01/geo/wgs84_pos#> .
3
4  geo:location rdf:type owl:ObjectProperty ;
5
6            rdfs:subPropertyOf owl:topObjectProperty ;
7
8            rdf:type owl:FunctionalProperty ;
9
10           rdfs:domain cityzen:CulturalInterest ;
11
12           rdfs:range geo:SpatialThing .
```

Listing 2: Geo Position

"A functional property is a property that can have only one (unique) value *y* for each instance *x*" [9], thus each instance of the domain class CulturalInterest can be linked with at most one instance of the range class geo:SpatialThing. The two datasets we integrated contain information that are related to the same cultural interest, the Tourbillon castle in Sion. While the Médiathèque du Valais dataset says that the castle is located in *Sion*, the Digital Valais dataset says that it is located in *CV*. Since the data model expresses the fact that a cultural interest can be only in one place, we deduce that here we are facing a conflict.

When a conflict appears, the Cityzen platform treats this situation in the following way. In the data model no datum is inserted, but all conflicting data are placed in a separate database used for supporting the conflicts resolution. In section 3 we said that user can discriminate their interests by choosing the cultural interest categories they are interested in, and their choices are saved as preferences in the application. We use the stored preferences to analyze and send push notifications to the user's phone whose interests fall in the category a conflict belongs. For example, the Tourbillon castle is categorized as a CulturalPlace, and the Cityzen platform sends the notification to all people interested in cultural places. Users can then decide if they would like or not to respond to the conflict notification, depending if they have interest and knowledge to share about that conflict. The policy of the platform is to consider the data as correct and to insert them into the Cityzen data model once at least 10 people rated one of the options and the most rated option has been chosen 70% of the times.

4.2.2 Completing Information

The Cityzen Data Model is designed to provide the information needed for planning a travel and for having a proper experience while traveling. The datasets that we integrated, as well as others, are created by the institutions which manage them for their needs. Nevertheless, these datasets may contain more or less data compared to the ones we model in the Cityzen data model. The former situation does not influence the platform, we just have to ignore the data we do not need when integrating the datasets. The latter case does influence the platform, in fact, it makes the platform incapable of providing complete information. Since the Cityzen platform employs OWL ontology for the data model, this absence of information does not create

[9] https://www.w3.org/TR/owl-ref/#FunctionalProperty-def

issues to the logical level, but it creates shortages on the application level.

Even though it is possible that the missing data can be managed internally by our team, this is a challenging and time consuming task, therefore we decided to ask this task to be performed by the crowd.

For this task we decided to embed the *Gamification* into the Cityzen platform. Gamification is a methodology that integrates ludic mechanisms to reinforce the experience quality. It is based on the application of game-design elements and game design principles in non-game contexts [6]. In the Cityzen platform we applied the method *G.A.M.E* (Goals, Actions, Merit, Evaluation) [5]. G.A.M.E is a methodology which is based on: the *goal* which is thought to be achieved through a ludic user experience *the actions*, performed by users which are moved by some outcome *the merit* if they perform well *the evaluation* . The goal of gamification in the Cityzen Touring application is to involve users to share their knowledge while exploring cultural heritage interests in order to solve missing or conflicting information they have. For instance, while users visualize the information provided by the Cityzen platform, they can encounter some incomplete data, and in this case gaming procedures such as *enigms* are proposed to be solved. For example when a date is missing, in this case if the user clicks on the missing item, the application opens a date picker and allows her to choose the data she believes as correct. While playing, the users can access new levels and unlock new challenges and as rewards they will receive *stars* which define their engagement and reputation. The answers they propose are not directly used for completing the information present in the data model, but they are stored by the application for evaluation. To accept the data as trustworthy and push them into the data model, the platform uses the same policy applied in section 4.2.1 for correcting conflicting information. The data are considered trustworthy once at least 10 people, while playing, provided data about a missing information and if 70% of users provided the same value for this information. Users who provided a trustworthy information will increase their experience level and will be rewarded with real rewards, such as free access to museums.

4.2.3 *Inserting New Information*

Inserting new information is a more demanding task than correcting conflicting information and completing information because it involves also the integration of this new information. This is due to the fact that more people could insert information regarding the same thing and their data need to be integrated. To provide users with option to add new information, we collaborated with the Social Computing Group [10] of the Idiap Research Institute. This group created a collaborative platform called Civique [11] that allows people to share information they possess on data that matter. The platform is based on the concept of challenges that can be created by requesters, i.e. the platform Cityzen plays the role of requester. A challenge is a mobile data collection initiative created to ask people for participation on gathering data. Together with them, we defined a survey which covers all information mapped in the data model, and by following it, they created a challenge called *Cultural Heritage Portraits* (Document cultural heritage interest points in Switzerland) which allows users to share their knowledge about cultural heritage. Figure 5 shows the starting screen of this app and a second screen for categorizing the cultural interests. The Civique mobile app pushes the data provided by users into the Civique platform where the data get stored. Later on, we can download the collected data for our challenge as database dump in JSON format and after that, we can integrate and align them with our data model.

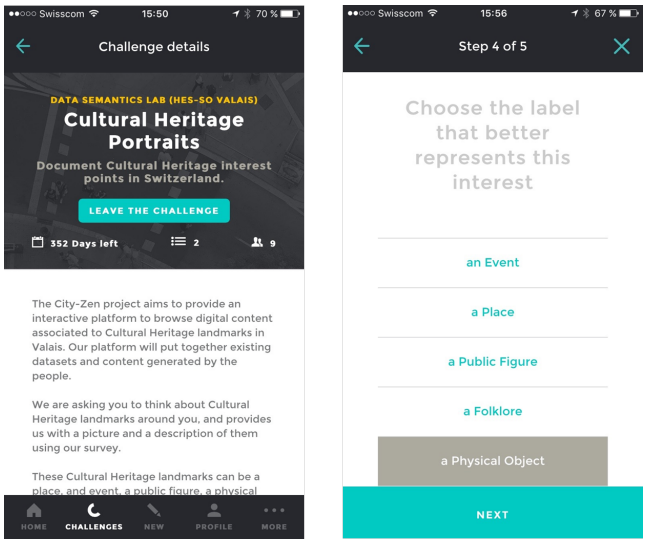

Figure 5: Cultural Heritage Portraits App

5. CONCLUSIONS

In this paper we described the Cityzen social platform, which provides users with an environment for organizing their travels at the discovery of cultural heritage interests and which supports them during their sightseeing. We showed how this platform uses the social media to improve the information management by letting users correcting and completing existing information and also sharing their knowledge about new information.

Cityzen is an ongoing project and currently only the platform with the integrated data are accessible online. At the moment the applications Cityzen Touring and Cultural Heritage Portraits are in a testing phase, thus not downloadable from mobile app repositories. Nevertheless students are involved in the testing process and we are seeing interesting outcomes as a result of using social media for improving the knowledge base.

In future, once the test phase will be finished, we will perform experiments in order to study the percentage of users who will use the Cityzen Touring also for the information management, and the percentage of conflicts and missing information they will help to manage.

Appendix

- Link for the data model: https://www.dropbox.com/s/0x5onyusd4d7cwp/CityZenDataModel.owl?dl=0

[10] http://www.idiap.ch/scientific-research/research-groups/social-computing

[11] www.civique.org

- Link for SPARLQ endpoint:
  Link for the data model: http://ec2-52-39-53-29.us-west-2.compute.amazonaws.com:8080/openrdf-sesame/repositories/CityZenDM

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