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## **An ICT Platform to Support Cultural Heritage in Rural Communities: The Viv@vó – Living in the Grandma's House Case Study**

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## Abstract

Tourism and mainly experience and cultural heritage tourism are growing in tourist's interests. Rural regions have an untapped potential for this slice of tourism industry. Also, rural regions have an enormous collection of ancestral knowledge. Unfortunately, all this knowledge typically is elders-centered and it lacks effective processes of digitalization, storage and providing systems for that all this heritage can be perpetuated through future generations. From this base-thinking it was created a project case study limited to the Portuguese Northeast region, named Viv@vó – living in the grandma's house. This paper presents this project and what it has been achieved during the project development process.

**Keywords:** Tourism, Immaterial Heritage, Rural Regions, ICT, Case Study

## Introduction

Tourism is “a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non residents) and tourism has to do with their activities, some of which involve tourism expenditure” (UNWTO, 2017). It's one of the greatest attractions of modern times, bringing together people, places and an interaction with different cultures. It's one of the most important economic activities for the communities and can play a decisive role in the development of the regions, especially the most demographically depressed. It is growing at a global level and Portugal has followed this trend.

Data from the Portuguese National Statistics Institute (INE) and the Bank of Portugal (BP), show that tourism increased exponentially in 2017, in all regions of the country, about 335 thousand jobs (more than 44 thousand than in 2016), (18% of total shares in 2017), contributing to 7.8% of Gross Domestic Product (GDP) (INE, 2017; BP, 2017).

The Northern Region of Portugal, including the sub-regions of Porto, Minho, Douro and Trás-os-Montes, has been growing as a tourist destination. In fact, the number of overnight stays per 100 inhabitants, between 2001 and 2016, and accommodation capacity of hotel establishments, between 2009 and 2016, had a significant growth, being superior of the Portuguese average growing rate. Despite all the advantages, this can represent a risk to the consumption of natural, cultural, ethnographic, patrimonial resources, among others, (Aall, 2011; Buckley & Araújo, 1997). Hence the need for all this growth to be strategically based on the sustainability pillars of the territories, according to the principles adopted by UNWTO in 2004. The Tourism must take full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities. This concept incorporates three dimensions: 1) environmental (responsible use of environmental resources and conservation of heritage and biodiversity); 2) sociocultural (preserving cultural heritage, community values and promoting intercultural relations); 3) economic (contribute to alleviating poverty, and promoting socio-economic benefits for all stakeholders). In this sense, it is extremely important to promote tourist destinations in this premise, especially the North region, given the unique characteristics, offering different tourist products, to retain and attract visitors. There is currently a search for experiences authentic and contextualized as a way of escaping copies and banality (Kolar & Zabkar, 2010; Naoi, 2004; Yeoman et al., 2007).

Tourists are looking for connections and experiences that are rooted in destination (Boyle, 2004). Among the many characteristics that generate authenticity for a destination, we can highlight the products, food and all local knowledge about their cooking (Bessière, 1998; Ray, 2000; Simpson, 2001; Hjalager e Richards, 2002; Yeoman et al., 2007). Typical dishes produced with local ingredients, with knowledge coming from traditions and shaped by the historical conditions that make each dish unique and impossible to be carried out in other regions (Bessière, 1998; Groves,



2001). However, consumers look not only for the finished product but also for all the social and cultural conditions under which the product was generated (Littrell et al., 1993).

## Tourism Experience

Tourism experience is, by definition, the way in which, unlike traditional tourism, the tourist is the protagonist of the trip, experiencing the production of typical products, accompanying and / or participating in the crops, experiencing the local culture, according to table 1:

**Table 1: Differences between traditional tourism and experiences tourism**

Traditional tourism	Experiences tourism
Focused in the functional characteristics	Focused on consumer experience
Focused on the product and competition	Focused on offering experiences in an integral and exclusive way
The consumer decisions are rational	The consumer is rational and emotional
The tools used are quantitative and verbal	The tools are multidisciplinary and quite varied

Source: (Sebrae, 2015)

The concept of experience demonstrates the possibility of a unique, special, extraordinary moment that occurs during particular experiences at different moments of life. The experience happens when a company intentionally uses the “services as a stage and the products as support to attract consumers in order to create a memorable event” (Pine II & Gilmore, 1999). This new approach reflects that the economic value of the “relationship” is not only based on customer acquisition or loyalty, but prioritizes the dimension of the experience: Entertainment, Learning, Evasion and Aesthetics. Experience is an individual event that occurs in response to a stimulus, involving five distinct phases, table 2:

**Table 2: Five stimulus in an individual experience event**

Sense	It appeals to the senses of consumers.
Feel	It appeals to emotions and inner feelings.
Think	It evokes the rational side and involves consumers in cognitive experiences.
Act	Stimulates physical behaviors, lifestyles and interactions.
Relate	It develops experiences that stimulate consumer desires to participate or belong to a specific social or community context.

Source: (Schmitt, 1999)

The new tourist wishes to “travel to destinations where, more than visiting and contemplating, it is also possible to feel, live, move and be a character of his own journey. Participation takes place in a commitment to co-creation, a collaboration that innovates and adds value, generating return for all stakeholders and the unique and memorable experience for tourists. “A tourism experience of co-creation is the sum of the psychological events that a tourist crosses when actively contributing through physical and / or mental participation in the activities and interacting with other subjects in the surroundings of the experience” (Campos, Mendes, Valle, & Scott, 2016, p. 1311).

We are faced with a new paradigm because “societal changes and trends are reflected in the behavior of consumers, who are seeking more and more authentic and deep cultural tourism experiences” (Richards, 2012). The tourism of experience, also called as creative tourism, happens through the transformations and the evolution of the times, in which the interests of the tourist turn out to be more diversified and, above all, selective. The Creative tourism is “driven by experiences in co-creation, in an unforgettable and unique journey of discovery, learning and experience, revalorizes traditions and

enhances the sustainability of destinations, representing an integrated, interrelated and interconnected vision between "culture itself" (Ashton et. al, 2014).

In order to respond to the increasing demand of new and innovative ways to satisfy visitors needs before, during and after the tourism experiences, and upmost their information and easy services-access that tourists want; new Information and Communication Technologies (ICT) approaches and needed. Also, ICT can be a valuable resource to support the creation of immaterial heritage repositories, helping that the cultural human-centered knowledge can be perpetuated through future generations.

### **Viv@vó project – living in the grandma's house case study**

The Viv@vó – living in the grandma's house case study, have been developed to generate authentic and contextualized experiences for visitors, valuing the local singularities of popular culture, human heritage and contributing to the preservation of the cultural heritage of the regions. It was developed in a rural community, in two towns located in Trás-os-Montes, a northeast region of Portugal.

The project has developed a system for surveying, selecting and disseminating the cultural heritage of the villages, allowing visitors to enjoy a contextual experience, listening to stories while sharing a meal at their grandmother's house. The figure of the "Grandmother" appears as guardian of the immaterial cultural heritage, legacy holder and connoisseur of the traditions transmitted through orality. This project presents also an important social function of aggregating and valuing the elderly as a legitimate source of knowledge, giving tourist visibility to rural areas and concomitantly contributing to the increase in income, since the grandmother earn a monetary contribution for the service provided and sale of local products.

The project also brings challenges and social functions in the fight against the isolation of grandmothers who in this way interact and periodically socialize with visitors. It was also one important objective of the project, one ICT platform for promote, support and disseminate the project and the visitors needs. It was also very important that the ICT platform could create a repository with grandmother's testimonials – an immaterial heritage valuable contribute for future generation and the preservation of ancestral knowledge.

### **Methodology**

In order to respond to the objectives defined in the project, have been used primary and secondary sources. The secondary sources served as a theoretical apportion to the ethnographic diagnosis, and the following phases were performed:

Phase 1: Theoretical and scientific framework on the ethnographic field, including a brief approach to the concepts of ethnography and its field of action. This phase included the survey of the local cuisine and gastronomy with a strong ethnographic propensity involving all the senses: touch, smell, sight, smell and taste. It was tried to feel the idea of the experience, so that others can imagine the sense of the place. To do this, it was necessary to:

- (a) organize and conduct interviews with local individuals who fit into the project experience;
- (b) capture ethnographic testimonies, through audio visual means - image and sound - about family contexts, family and local life and their gastronomic experience, the local landscape, the social dynamics of the space and the artifacts that establish relationship with the local cuisine of Trás-os-Montes.

Phase 2: Observation and analysis with the objective of identifying potential sites and individuals that fit the project. Definition of selection criteria for project participants. The criteria established were:

- a) Residing in small rural villages and being over 60 years old.

b) Cultivate regional products and cook traditional recipes with local ingredients and know the associated traditions.

c) Own a house with adequate conditions for the reception of tourists and like to interact with new people.

Once the criteria were defined, the search began for potential participants. Two participants were found to serve as pilot models.

Phase 3: Implementation of tourism experience and critical analysis. The experience involved the grandmother and the communities that received the tourists confectioning regional dishes.

After this process, it was designed and developed an ICT platform combining a web based application and a mobile devices Android application for support the digitalization of cultural heritage knowledge, promotion and sell of cultural services and create a regional platform of traditional cultural heritage for serve tourists/visitors demand of cultural traditional experiences.

### **Developed ICT Platform**

In order to respond to the challenges of create a repository of immaterial heritage human-centered knowledge, implement effective support for promotion, during-experiences tourists needs and, after experiences fruition expectations, an ICT platform have been developed. The platform has two main modules: A web based application, made to support the promotion of events and and to be a knowledge repository; and, and mobile application developed to support the visitors needs during the fruition of the cultural heritage experiences.

### ***Web Based Application***

We started the work with the concern of the architecture of the application where MVC (Model View Controller) technology was given more importance as programming architecture, this structure makes use of three layers providing easy handling and allowing the reuse of classes and parts of the project. The MVC is wide used in many web-based applications (S.S. Hasan & R.K. Isaac, 2011; Veerabhadra & Vatsavayi, 2014; Neven et. al, 2018; Lee &Wang, 2019). We define the platform and how the system components will organize.

Laravel is a framework in PHP language for web development that uses the MVC architecture, was the choice for the implementation of the application. LARAVEL needs a Web Server running PHP5 or higher.

The servers:

- Apache, IIS, or Nginx report the message. XAMPP for Windows and Linux, MAMP for Mac OSX were used for our work environment.
- As previously stated, Laravel is written in PHP language. Version 5.6 was used, it needs at least version 7 of PHP.
- For the development of an application, it is also necessary for a database installed in the system. Laravel supports MySQL, MS SQL, SQLITE and PostgreSQL. We use the MySQL installed together with XAMPP. XAMPP is a small package with software that allows emulation of an Apache server on a personal computer and capable of processing the PHP language. As a result, from the installation of this package, we can operate as if the client (the computer that accesses the website) and the server (the computer that processes the PHP instructions and stores the database for queries) are two distinct points, although both on the same machine.

Model-View-Controller Programming using MVC separates the application into three main parts:

### ***The Model layer***

The Model layer represents the part of your application that implements business logic. This means that it is responsible for obtaining the data by converting it into meaningful concepts for its application, as well as processing, validating, associating and any other data processing task.

At first glance, Model objects can be seen as the first layer of interaction with any database that you may be using in your application. But in general they represent the key concepts around which you implement your application.

In the case of a social network, the Model layer takes care of tasks such as saving user data and relationships between friends, storing and retrieving users' photos, finding new friends for suggestions, and so on.

### ***The View layer***

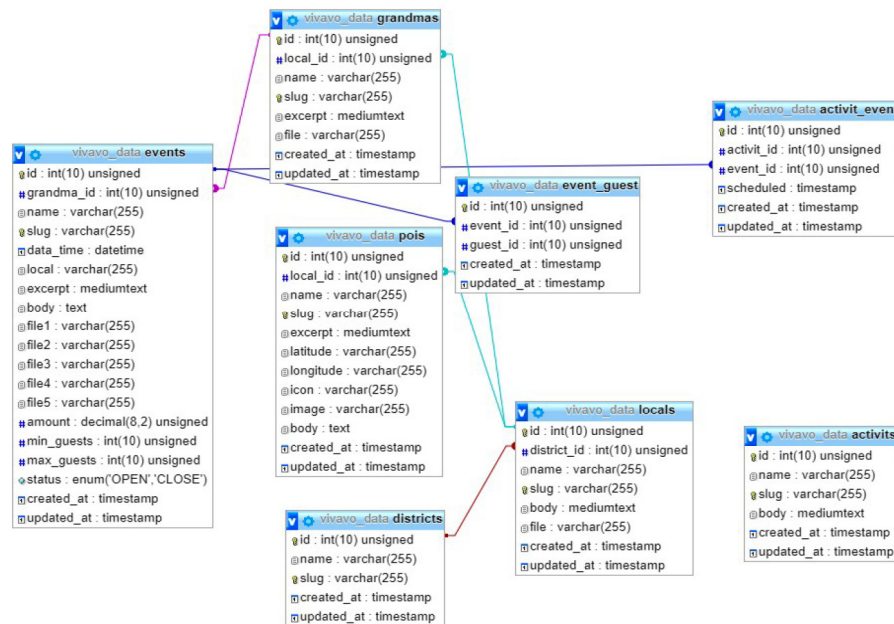
A View displays a representation of the modelled data. Being separate from the Model object, you are responsible for using the information you provide to produce any presentation interface your application may require. For example, because the Model layer returns a dataset, the view can use them to display an HTML page or return the result in an XML format for others to consume. The View layer is not limited to representations of data in HTML or text format and can be used to deliver a variety of different formats depending on what you need such as videos, music, documents and any other format you can think of.

### ***The Controller layer***

The Controller layer handles user requests. It is responsible for returning an answer with the help of the Model and View layers.

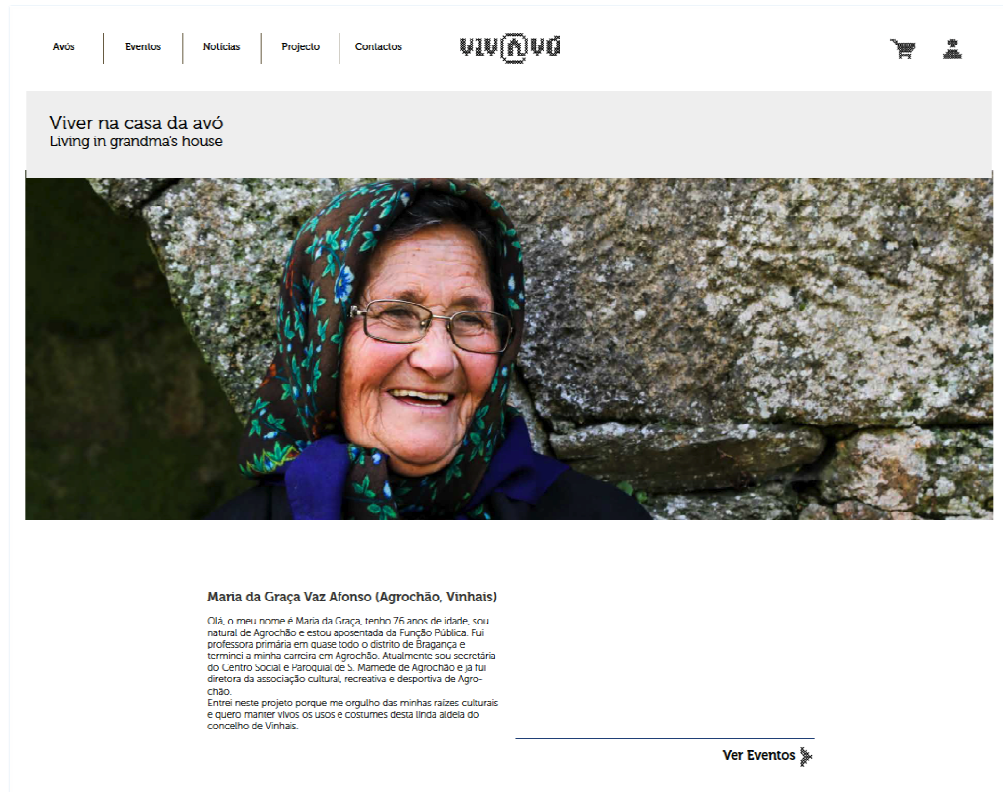
Controllers can be seen as managers taking care that all the resources needed to complete a task are delegated to the right workers. It waits for customer requests, verifies the validity according to the authentication and authorization rules, delegates data to be obtained or processed by the Models and selects the correct type of presentation of the data that the customer is accepting to finally delegate the work to the render layer.

The development process began with the survey of requirements where it was important to raise information and understand the demand of the project. Several meetings were held with the members involved in the project where some key words relevant to the project theme were discussed. A waiting time was agreed for those responsible for the graphic aspects such as corporate identity, visual model of the application among others. After this process, was achieved a database data-model, presented in figure 1.



**Figure 1: Database Tables, main tables, for supporting the Web application main features.**

The developed Web application have support the promotion of the grandmother's cultural heritage offer that were materialized by cultural events in rural-natural environment. Figure 2 shows some screenshots of the developed web application.



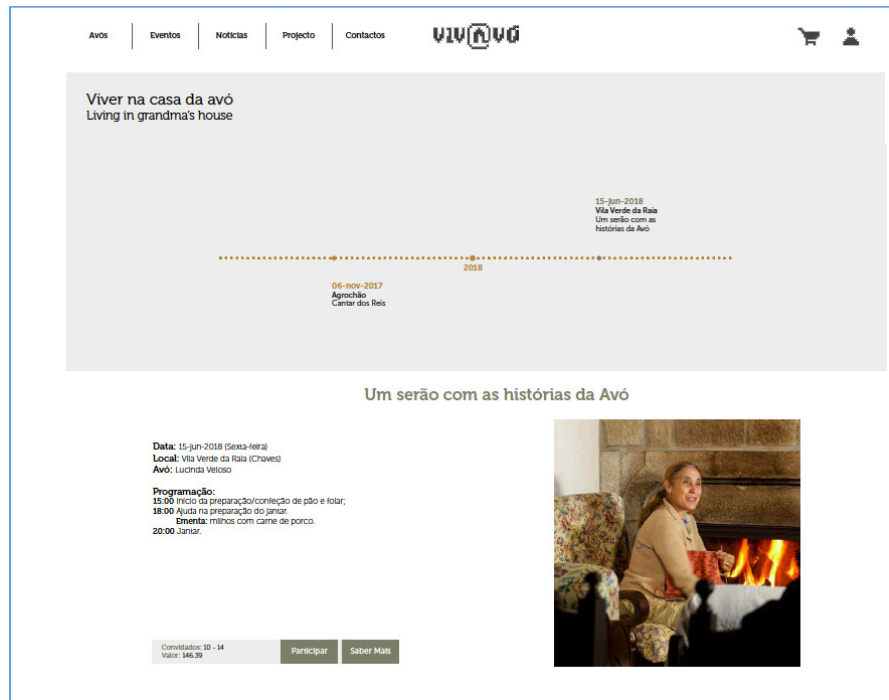


Figure 2: Web application screenshots

### Mobile Device Android APP

According to the study, a set of functionalities were defined as well as the structure of the mobile application to be developed. Among several feature that have been developed we next explain some main ones. Also a data model has been developed to support the information-feature needs. Figure 3 show some main database tables that exists in our database (some tables has shared with the web application).

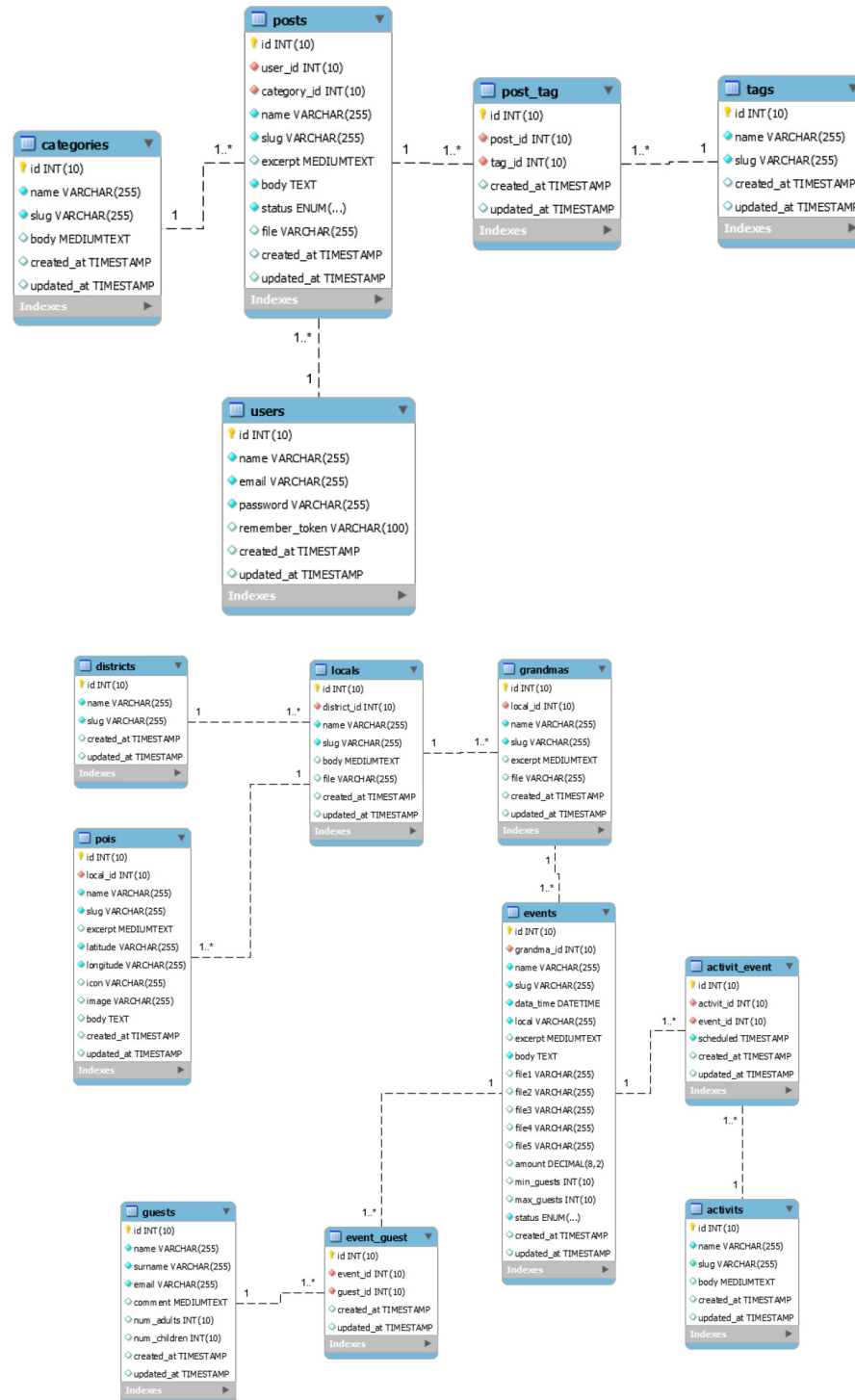


Figure 3 : Some main database tables that exists in our mobile application database

### ***Notifications***

The application sends a notification of type "push notification" so that when an user is at a distance of 1000 meters from a point of interest is warned and forwarded to that landmark on the map, obtaining detailed information about it. In the application settings, you can change the range of notifications, namely 5000, 7000 and 10000 meters. You can also disable notifications. The user can also consult in the side menu warnings of new events that will take place, being forwarded to the details of the event and its reservation.

### ***Authentication by social network***

Users log in through their Google or Facebook account, and only after authentication can they enter the application. For this was integrated into Facebook Login API in the project of Android Studio as well as Google Sign in API. These allow for faster authentication without the need for registration.

### ***Event Listing***

The application lists the past and future events that will or will be followed, followed by a page of event details and, if it is a future event, the link to the reservation on the project page for registration. The details screen has a gallery of the event, description and programming of the same event, future or past.

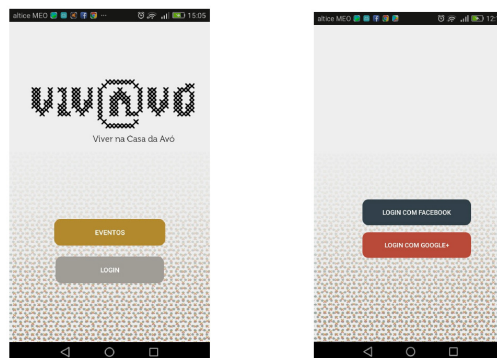
### ***Grandmother's Listing***

The application lists the grandmother's who entered the project with the name and description of each grandmother.

### ***Points of Interest***

It was carried out a survey of the points of interest of the villages where the grandmothers inhabit, these coordinates being stored in the database and shown on the map. For this purpose, Google Maps API was integrated into the Android Studio project. The map has zoom tools and user location. For the user to be guided to the point he wants to visit, he is directed to Google Maps Navigation where he can navigate to the place he wants. There will also be pedestrian paths.

Figure 4 show some screenshots of the Android mobile application that have been developed.





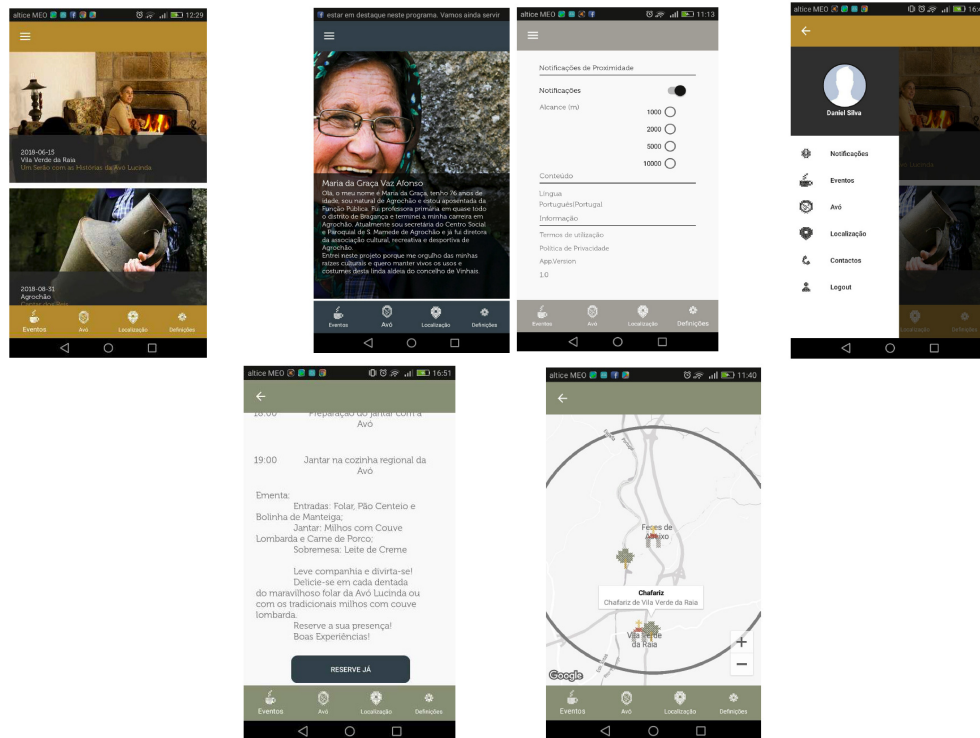


Figure 4: Android application screenshots examples

## Conclusion and Final Remarks

For more than a century there was a deep marked hermetism between the cultural patrimony and the public, especially for expressing itself in a language that it did not dominate and consequently rarely expressed interest in knowing it. However, in the last decades, there was a paradigm shift very influenced by new tourists with the need to experiment and experience new situations. This new tourist profile requires the implementation of new communication and advertising strategies capable of capturing the attention of visitors. For this equation work, there is a greater concern of the offer-agents to adapt the interpretative discourse to the dynamics of the tourists. Also, knowing that it is of utmost importance to perpetuate the cultural heritage elders-based knowledge, ICT can and must drive new and effective ways of promote, disseminate and democratize the access to future generations of the ancient knowledge that define who we are and the heritage of regions and its people traditions. The presented paper focus manly the ICT component of the Viv@vó Project – Living in the Grandma's House. Its presented the developed infrastructure, both Web and Mobile applications, that have allowed to support the digitalization and storage process of the grandma's immaterial heritage knowledge, supporting the creation and promotion of the grandma's-centered knowledge and the wide world promotion of a rural communities where exits precious's ancestral heritage.

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