Online Mediation Consumer Tools: MediWeb and MediApp

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Abstract: Nowadays, the Spanish administration of justice is in crisis. The increase of lawyers, the workload of the administration staff and the current economic crisis are some reasons for the emergence of relational justice as an alternative. Therefore, Alternative Dispute Resolution (ADR) and particularly Online Dispute Resolution (ODR) have become a relevant issue for both citizens and governments. In this work we introduce two different applications that are included in the Ontomedia project, whose main target is to allow users and professionals to meet in a community-driven web platform. The first one is called MediWeb and is implemented to run in classical browsers; the second application is called MediApp and is implemented to run in a Smartphone. Both applications are devised to: 1) the user would be able to consult the regulations, both soft and hard law rules that are in force in Spain; 2) offer different services to the platform users taking advantage of the smartphone devices; and 3) consult a Frequently Asked Questions repository.

1. Introduction: Relational justice in the consumer field

Today, the administration of Justice in Spain is in crisis. As stated in the White Book on Mediation in Catalonia [1], in the last thirty years, the Spanish legal culture has suffered a profound change in which it has dropped from a non litigation culture to a litigation culture [2]. One of the reasons may be the sharp increase of lawyers in Spain: from 1980 to 2009 the number of lawyers multiplied by four. Following the sharp increase in litigation, the workload of judicial secretaries and judges has become unaffordable. Furthermore, some endemic deficiencies related to the work of clerks and judicial secretaries have not been solved yet. (Ibíd) And on the top of it, the current economic crisis has stressed the difficulties that the administration of justice will have to recover from this situation.

In this scenario different initiatives within the so-called relational justice [3] appear as an ideal solution for both citizens and governments. Indeed, Alternative Dispute Resolution (ADR) processes and mechanisms are being fostered by institutions, universities and governments and some of them are being implemented. Certainly, the EU Directive 52/2008 on certain aspects on mediation in civil and commercial matters represents a milestone in the consolidation of this movement in Europe, and now Member States must proceed to its transposition[1]. Furthermore, there is quite a consensus among scholars

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[1] In fact, since the transposition deadline was for May 2011, the Spanish Government is already late.

regarding the introduction of ADR procedures as these may partially alleviate the economic costs incurred by the administration of justice [4].

Alternative Dispute Resolution (ADR) processes and Online Dispute Resolution (ODR), that is ADR where Information Technologies (IT) play a significant role, seem a convenient and efficient solution to implement a bottom-up approach to justice. In fact, ODR may work well in the area of consumer law. This is an area specially suited for the implementation of IT tools and ODR mechanisms since, on the one hand, complaints quite often affect many consumers against one company (e.g., telecom and utilities companies) and complaints are usually of a low value [5]. This means that complaints may be easily standardised and therefore managed online. Indeed, some public authorities such as the Consumer Catalan Agency are already implementing consumer complaints systems where complaints may be dealt with exclusively online.

According to the Flash Eurobarometer 2010, in Europe almost a 46% of consumers that presented complaints to their sellers or providers and were not solved satisfactorily took no further action. On the other hand, 15% of consumers asked for advice from a consumer association or a consumer help desk and 9% complained to a public consumer authority or regulator. This shows that these type of entities are considered trustworthy by consumers. It is interesting to note that in Spain these entities handle consumer conflicts and provide mediation services. However, only 3 % of those consumers brought the matter to an ADR body providing arbitration, mediation or conciliation services [6]. This shows that either consumers are not fully aware of these services or that they do not rely yet in these independent ADR bodies. Finally, also 3% of those consumers brought the matter to a court proceeding.

Actions taken after complaints were dealt with in an unsatisfactory manner

You took no further action	46
You asked for the advice of a comsumer association/consumer help desk	15
You complained to a public authority (consumer authority, regulator or local/regional authority)	9
You asked for the advice of a lawyer	8
You brought the matter to court	3
You brought the matter to an arbitration, mediation or conciliation body	3
Other	26
DK/NA	2

Q7. How did you proceed further?
Base: those who were not satisfied with the way complaints were dealt with , % EU27

Table 1: Actions taken after complaints. Source: Flash Eurobarometre 2010

As to the regulatory consumer field in Spain, most autonomous regions in Spain have exclusive competence on mediation. For one thing, the Catalan Statute of Autonomy states that consumer affairs are a matter of competence of the Catalan Government and this includes regulation of bodies and procedures of consumer mediation. This also applies to other statutes such as those of Aragón (Article 71.26) or Andalucía (Article 58.2.4). Therefore, these regional entities already provide for some legislation on mediation and they will certainly continue to do so. Thus, the new Code of Consumption in Catalonia fosters the use of alternative dispute resolution means as an effective way to solve conflicts in the consumer field. Article 131-1 states that: "Public Administrations in Catalonia shall

promote in collaboration with consumer organisations operating systems of conflict resolution in the consumer area".[2] Beyond the scope of consumer law, the central Government is due to introduce the draft bill on mediation in Parliament. However, also in a generic scope of application, other regional entities have legislated on mediation. For instance, Catalonia also regulates mediation in civil matters (Law 15/2009 of mediation in the scope of private law).

The aim of this work is to develop one application for Personal Computers (PC), named as *MediWeb*, and one mobile application (app) named as *MediApp*. The main idea of both applications is to assist consumers in their search process of useful information specially needed when a conflict arises. Thus, for instance, these applications provide with information regarding available Consumer Information Offices in Spain as well as their contact information. They also provide with a list of normative dispositions applicable in their territorial domain of residence. Both applications will be integrated in an overall mediation platform developed by the Ontomedia framework. The Ontomedia project [7, 8] allows users and professionals to meet in a community-driven portal where contents are provided by users and semantically annotated. Figure 1 highlights the information process about the consumer claim and the later submission through either Internet or the corresponding consumer office. Later, when the claim is submitted the Ontomedia framework is able to help in the mediation process. The main target of these applications are: 1) the user would be able to consult the whole set of rules, both soft-law and hard-law dispositions that are in force in each Spanish region; 2) taking advantage of the smartphone devices, the applications would be able to offer different services to the platform users; 3) both applications will contain a Frequently Asked Questions (FAQ). In order to improve the search process to find relevant FAQ in a repository, a semantically model is suggested (see [9]).
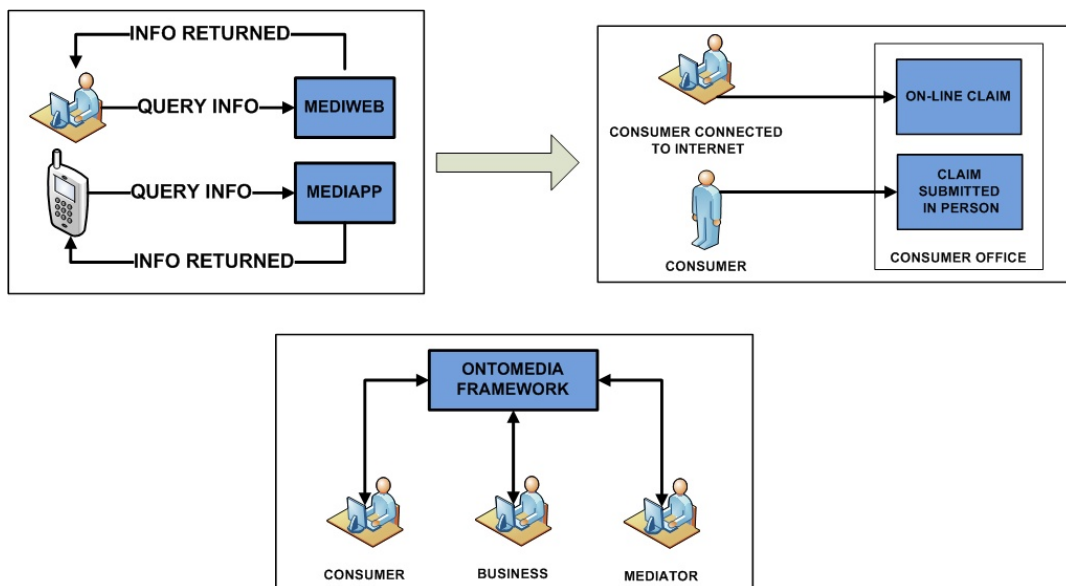

Figure 1. Top Left: Consumers are able to obtain information needed about their claims through MediWeb and MediApp. Top Right: Then, a consumer submits the claim by either Internet or in person at the nearest consumer office. Bottom: After the claim submission the Ontomedia framework helps the parties in the process.

This work is organized as follows: Section 2 is an overview of the Ontomedia project and briefs the mediation process and the main ideas; Section 3 introduces the MediWeb and

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[2] Free translation from Catalan.

MediApp applications and explains the applications' features, the technology used and the given benefits; finally, Section 4 summarizes the work and points out some conclusions.

2. Mediapp & Mediweb: a follow up from the Ontomedia Project

The platform we present here, MediWeb and MediApp, as to the means employed, either for PC or for mobile technologies is intended to help both consumers and governments in the management of consumer complaints. This is the follow up of a project funded by the Spanish Ministry of Science and Technology with the aim to design a web platform for consumers (Ontomedia). Ontomedia will particularly create a web service platform where mediation may take place online. It pretends to allow the implementation of relational justice and thus giving an opportunity for dialogue with the parties in conflict, before the dispute escalates to the courts, and therefore encouraging the "culture of mediation."

This Section is composed of two different points. The first one is an overview of the Ontomedia project, and the second one describes how multimedia content is analyzed within the Ontomedia platform.

2.1 The Ontomedia project

The Semantic Web enables machines to understand the meaning of information on the World Wide Web (W3C). It extends the human-readable web pages by inserting machine-readable metadata about pages and how they are related to each other. The term was coined by Tim Berners-Lee, who defines the Semantic Web as "a web of data that can be processed directly and indirectly by machines". The main idea is to allow data share and reuse across applications, enterprises and communities.

The Ontomedia project combines some of these trends and technologies to provide a set of functionalities to a broad community of both professionals of the mediation domain and end-users of mediation services. The main target of this project is to allow users and professionals to meet in a community-driven Web Platform where contents are provided by users and annotated by the ODR Web Platform. These services will be described, stored and made accessible through a bus of services that will ensure end to end communication between consumers and providers. In Ontomedia we also make an effort to enhance mediation services enabling semantic capabilities. In order to provide semantic features, ontologies are necessary to formally describe the process. Ontologies will be used to annotate all kind of contents as well as to help to analyze multimedia content (see Section 2.2). All types of metadata will be automatically extracted and stored to be further used within the mediation process. In addition to the defined ontologies, in this project we also define the mediation process in a formal manner obtained from different interviews to senior mediators.

2.2 Multimedia Analysis

The multimedia analysis is devoted to enhancing the information mediation process during a mediation session, capturing mood changes of the parties and any other psychological information inputs that can be useful for mediators, just if they were in a room with the users of the mediation service. This is done through a facial expression analysis of the parties and the inclusion of visual cues that present the obtained information intuitively.

The technology used is based on three modules: face detection, facial features extraction and classification. The first module consists of the application of the well known Viola & Jone's face detector [10]. Once the face has been extracted, appearance and geometrical characteristics are used to detect the facial features that encode a facial expression [11]. The detected facial features are represented as a set of points (known as

facial points). Finally, the position of the detected points is used to classify between three previously defined and learned emotions: anger, happiness and neutral. This classification step is achieved using Support Vector Machines [12].

3. MediWeb and MediApp

As we stated above, the Ontomedia [7, 8] project aims at developing a mediation service platform. Citizens, and specifically consumers, should be able to access these services through different devices at any time. These non-functional requirements of accessibility, which imply multiple end-user interfaces, must be met. The MediWeb and MediApp applications cover different segments of consumers in two scenarios: 1) the first one, MediWeb accessing the platform from a PC; and 2) the second one, MediApp accessing the platform through a smartphone.

MediWeb interacts with users through browser navigation. This means that the client interface is only composed of a web browser that is usually available in most PC operating systems. The cycle of execution of this application is composed of three different steps. The first one sends the whole interface information and contents to the client's browser, the second consists on the consumer interaction and dispatching of this information to the platform, and in the third step the platform generates the results and sends them to the consumer. On the other hand, MediApp takes advantage of sensors that smartphones usually have. For instance, the GPS (*Global Positioning System*) provides location-awareness functionalities such as routing to mediation institutions or geo-localization of complaints. The MediApp application is specifically devised to Android devices. In contrast to MediWeb, it runs as a standalone application. It means that some components of the client interface, such as screens and forms, are not sent from the server platform to the client interface in every interaction. Furthermore, some user data can be stored into the Smartphone memory. These features are important in mobile devices to save battery and bandwidth usage. Nevertheless, an Internet connection is required for both applications. Although MediWeb and MediApp are focused on covering similar scenarios, the main idea is different. MediWeb is devised to run in PC whereas MediApp lies in the paradigm of the full mobility for the user.

This Section is composed of three different points. The first point describes the methodology and architecture used for the development of both applications. The second point briefs the technology performed. The last one points out some benefits provided by our applications and the Ontomedia project to the consumer field.

3.1 Methodology and architecture

The methodology followed to develop MediWeb and MediApp applications was influenced by Agile Software Development (ASD) [13] strategies, particularly eXtreme Programming (XP) [14], which prones to improvisation. ASD techniques state that stakeholders interactions, software prototyping and quick response to changes are more important than tools, processes, exhaustive documentation or a strictly defined plan. Nevertheless, some architectural design decisions had been previously made to ensure that the final system guarantees independence between the platform that implements the mediation services and the client interfaces. The architecture is depicted in Figure 2.
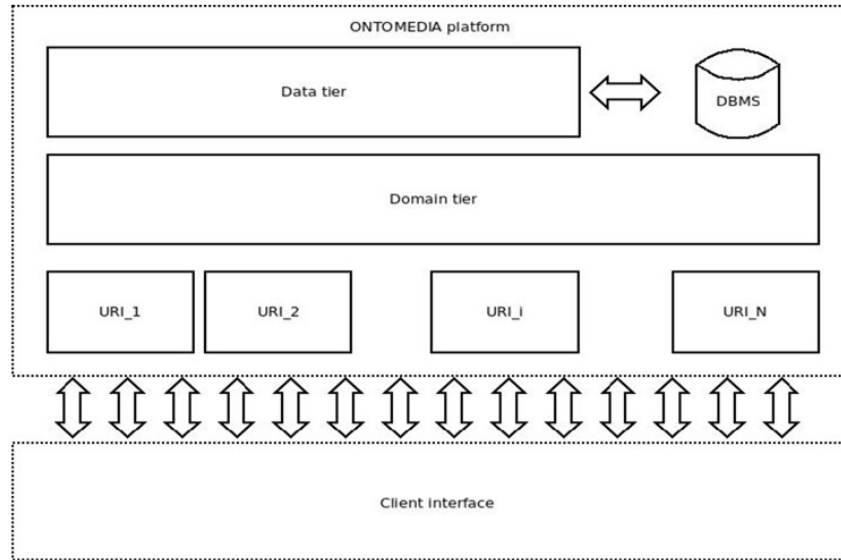
Figure 2: Architecture design for the Ontomedia mediation service platform. MediWeb and MediApp client interfaces plug themselves in the lowest level, accessing services through URIs.

MediWeb and MediApp reach Web Services through the bus of services of the platform. Therefore, in order to make petitions to services and get a result, inner logics of both applications need to access a set of previously defined endpoints. These endpoints are represented with URIs (Uniform Resource Identifiers), which are the external accesses to the functionalities of the platform, providing an API (Application Programming Interface) as shown in Figure 2. In our scenario, the invoked URI depends on the requested functionality. Since one URI corresponds to one service, in order to obtain the user demanded information, it is necessary to join several services. For instance, when the user demands some information through MediApp, the application must check if the user is logged in the system or has enough permission to call the operation.

The domain tier runs the business logic involved in the operation, possibly accessing the data tier. The data tier manages the platform databases, which are switched between 1) a Database Management System (DBMS) holding a relational database; and 2) a self-made library that internally manages the mediation ontologies pointed above. Then, the result is returned to the client interface from the requested service.

3.2 Technology

The described platform requires several technologies in order to be built appropriately. These technologies can be grouped in two sets: technologies that implement the platform server and technologies that implement the client interfaces.

The platform server is divided into three tiers or layers: the API composed of URIs, the domain tier, and the data tier (see Figure 2). In the first tier, which contains the API, a mechanism for accessing the URIs of services must be provided. Usually, this is achieved with a web server, which in this case is the Apache web server due to its popularity [15] and features [16]. Additionally, the API requires a language to encode the exchanged data between the server platform and the client interface, and JSON (JavaScript Object Notation) is the choice because of its simplicity and comprehension. The second layer, the domain tier, needs a programming language in order to implement the services and deploy them. In this case, PHP (PHP: Hypertext Preprocessor) is suitable due to its Apache compatibility, service orientation and the vast number of functionalities in its built-in library. Furthermore, some external APIs, such as the Google Maps API, are also required to compute distances, locate places and generate routes. Finally, the data tier consists of two

components. The first component lies on relational databases covered with the MySQL DBMS. The second component consists of OWL ontologies [17] which do not have an equivalent management system capable to maintain repositories, query information, or create, update and remove instances. Therefore, a dedicated library built on the OWL API [18] is also placed in the data tier to provide these capabilities.

The technology requirements for MediWeb and MediApp client interfaces are also an important topic. MediWeb requires the Apache plus PHP combination on the server side, but just for the convenient presentation of screens and forms. These contents are usually managed by a Content Management System (CMS) as Joomla!. An updated browser in the client side is a requirement, too. For instance, Mozilla Firefox, Microsoft Internet Explorer and Google Chrome are supported. On the other hand, MediApp runs in a particular Smartphone platform. The selected target is Android (Android powered devices), because of its market share, the current growing rates [19] and the free development tools. Thus, Android SDK library is absolutely necessary in the MediApp release.

3.3 Solution benefits

MediWeb and MediApp have three main benefits for consumers. The first benefit is that the consumers are able to consult the whole set of rules, regulations and soft-law codes of conduct that are in force in Spain. This is particularly important since they may retrieve the information specifically to those dispositions which are applicable in their Spanish region. They are also able to retrieve information as to the particular place, either a consumer public office or a private consumer information office where they can address to either get advice of or present a claim. And precisely, the second benefit relates to the Smartphones functionalities such as the GPS or the Google Maps API. For instance, these may address the consumer to the nearest consumer information office. Furthermore, the FAQ repository may help users obtain information suitable for their complaint which may have been stored by other users in a similar situation.

On the other hand, MediWeb and MediApp could be integrated with the Ontomedia project in order to improve the provided features. For instance, Smartphone devices could enrich the claim: the GPS could store the location of conflict; the user could take a picture of the product involved in the complaint or footage of the conflict situation. Furthermore, the integration allows the management of electronic complaint and the assessment of mediation process. Nevertheless, these topics are considered as further work and a future line of research. Another future line of research is to increase the system's scalability to new use cases involving extensive conflict areas, covering mediation needs in disaster and crisis mapping platforms such as Ushahidi, FrontineSMS, RapidSMS, SwiftRiver or Geochat [20].

4. Conclusions

Today the endemic deficiencies of the administration of justice in Spain are on the spot for both universities and governments. This is specifically true in the area of consumer law where ADR procedures such as mediation are starting to be implemented by some public institutions. Indeed, some of the characteristics of consumer complaints such as their low cost and the possibility to standardize a vast amount of complaints, indicate that IT and ODR procedures are specially suited for employing relational justice tools that enhance access to justice for consumers. This is the main idea of MediApp and MediWeb: enhancing the position of consumers and deliver to them the appropriate information as for the nearest consumer information office as well as to the applicable dispositions (either hard-law dispositions or soft-law codes of conduct). So, it is a tool which pretends to help consumers in managing and defending their rights.

MediWeb and MediApp are both applications devised to the consumer field. However, the main idea is different. MediWeb is focused on PC and MediApp is focused on the full mobility paradigm through smartphone devices. These applications have three main benefits for consumers: 1) both applications are able to consult the whole set of concerning rules, regulations and soft-law codes of conduct; 2) MediApp offers different services taking advantage from the smartphone devices; and 3) both applications are able to consult a Frequently Asked Questions.

Future work will be related to two different aspects. The first one is the integration of MediWeb and MediApp in the Ontomedia platform. In addition, we are planning to enable the on-line submission of claims through the Ontomedia framework. Finally, the second one is to study the viability of implementing mobile versions for most of the services offered in the Ontomedia platform.

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