Artificial Intelligence Applications in ODR – Online Dispute Resolution:
The UMCourt Project

Francisco ANDRADE
Law School, University of Minho, Braga, Portugal
fandrade@direito.uminho.pt

Diovana BARBIERI
Faculty of Law, Salamanca University,Salamanca, Spain
diovanabarbieri@usal.es

Davide CARNEIRO, Paulo NOVAIS
Department of Informatics, University of Minho, Braga, Portugal
dcarneiro@di.uminho.pt, pjon@di.uminho.pt

Abstract

The growing use of electronic contracting urges the move of dispute resolution to online environments. Thus being, the technological element has to be considered as the "fourth party". In this sense, software agents may well play an important role. One major issue in dispute resolution is the estimation of BATNA and of WATNA; software agents may become very useful tools in this operation, facing dispute resolution under a risk oriented approach. Having this in mind, it was developed UM COURT – based on which a concrete application, in the domain of Consumer's Law, is presented here.

1 - ODR and the presence of the technological element as the "fourth party"

An alternative way of solving disputes arising out of electronic contracting is ODR – Online dispute resolution, allowing the traditional alternative dispute resolution to be moved "from a physical to a virtual place"[i]. ODR allows the parties an ease of litigation, and a simple and efficient way to deal with disputes, thus saving time and money[ii].

Although quite different ODR methods may be considered "from negotiation and mediation to modified arbitration or modified jury proceedings"[iii], we shall have to consider the existence of legal knowledge based systems, appearing as tools that provide legal advice to the disputant parties and also "systems that (help) settle disputes in an online environment"[iv].

We are taking in consideration the Katsch/Rifkin vision of the four parties in an ODR process: the two opposing parties, the third party neutral and the technology that works with the mediator or arbitrator[v], but we clearly assume a gradual tendency to foster the intervention of software agents, acting these either as decision support systems or as real electronic mediators[vi]. This approach is clearly close to the Second Generation ODR[vii] as it addresses three main characteristics:

      1 – The aim of such systems does not end by putting the parties in contact, but it consists of proposing solutions for solving the disputes

      2 – the human intervention is reduced and the software intervention enhanced

      3 – these systems act through the use of software agents

2 - The possible roles of software agents in ODR

The consideration of this wider role for software agents is based in the use of artificial intelligence techniques such as case based reasoning and information and knowledge representation. Yet, we are aware that merely representing facts and events is not enough for dispute resolution, and that in order to have useful actions performed by software agents it is required that they know the terms of the dispute, but also the rights and wrongs of the parties and to foresee the legal consequences of facts and events[viii]. The issue at stake is whether or not software agents will be able to evaluate the position of the parties and present them proposals "taking into consideration which of the two parties would have more probability of being penalized or supported by a judicial decision of the dispute..."[ix].

One important and mandatory feature for software agents in ODR will therefore be the capacity of consistency, transparency, efficiency and enhanced support for dispute resolution, in order to allow it to replicate "the manner in which decisions are made" and thus letting the parties become "aware of the likely outcome of a litigation"[x], so that the parties may be fully aware of the alternatives to an ODR negotiated agreement. The generalized use of software agents as decision support systems points out to the usefulness of following this path.

3 - BATNA and WATNA and its relevance for dispute resolution

It has been abundantly pointed out in the literature the relevance of BATNA – best alternative to a negotiated agreement for ADR / ODR. It obviously is of utmost importance for the parties to know what the possible results will be in case the dispute resolution fails. "If you are unaware of what results you could obtain if the negotiations are unsuccessful, you run the risk of entering into an agreement that you would be better off rejecting or rejecting an agreement that you would be better off entering into"[xi]. But, besides that, BATNA can also be "a way to put pressure on the other party"[xii] and a relevant instrument in order to make a well informed choice about going (or not going) to Court. In ODR environments, through the use of data-mining techniques, semantic web technology or other techniques used to calculate BATNA, the parties should be able to foresee the possible outcome of the judicial dispute in case of not reaching an agreement through ODR[xiii].

Although BATNA is unanimously considered as a key element in ODR, one must not forget that quite often the parties tend to "develop an overly optimistic view on their chances in disputes"[xiv], leading this either to a tendency to reject generous offers or to stand stubbornly fixed in some positions[xv], up to the actual miscalculation of the possibilities of success in an eventual judicial litigation.

Some criticism could hence be formulated about the usefulness of knowing one's BATNA: the best alternative may not be the most probable one, and parties will often tend to underestimate the probabilities of an undesired result in judicial litigation. It becomes clear that, in many situations, the calculation of the possible outcomes of judicial litigation may become quite complex. And it would be of utmost interest for the parties, besides knowing each one's BATNA, to also consider a WATNA – Worst Alternative to Negotiated Agreement. Only by having these two possible alternatives in mind, will the parties be able to calculate the real risks they would face in judicial litigation. But of course, if we are thinking of a software agent calculating BATNA and WATNA, it would then be important to have the software agent considering the whole space between BATNA and WATNA as an useful element to be taken into account at the moment of making, accepting or rejecting a proposal. Specially because judicial decisions, although based on legal rules and reasoned upon these, actually arise from a process in which it must be determined that some issues are true

or false, or are considered as proved, partially proved, or not proved[xvi]. This characteristic of judicial decisions certainly makes it advisable for parties to consider not just a single value, in case of a judicial litigation, but rather a spectrum of values situated between a BATNA and a WATNA.

4 - Software agents and the risk oriented approach

Of course, this consideration of the values appearing between the BATNA and the WATNA is somehow related to the Zone of Possible Agreement, proposed by Raiffa[xvii], as a zone where an agreement can be met that is acceptable to both parties. The consideration of the space between BATNA and WATNA has a risk oriented approach: the intention is to estimate the risks and thus to avoid them. Of course, this risk oriented approach may well push the possible agreement to a space not exactly coincident with the traditional ZOPA. And even if it can certainly be considered here the existence of a MLATNA – most likely alternative to a negotiated agreement[xviii], it does not matter so much which is the most likely outcome (which might be hard to estimate, although being possible to introduce metrics in order to measure the probabilities of each outcome) but rather to foresee the real risks that the parties are facing – the extreme value presented by WATNA may well force the parties to change their ideas about their BATNA and ZOPA.

5 - UMCourt – aims, architecture and application domains

UMCourt – it is a project being developed at Universidade do Minho in the context of the TIARAC project "Telematics and Artificial Intelligence in Alternative Conflict Resolution". It is an agent based system, therefore flexible, dynamic and expansible, that not only provides help in the management and access of information by the parties, but also produces a range of possible outcomes and provides a better notion of the possible consequences and opportunities that the conflict may bring to the parties[xix].

 Architecture – The architecture of the Online Dispute Resolution platform is often overlooked as it is an aspect that does not directly influence the experience of the user. We however believe that some concepts must be imprinted into the project since the first stages of development. One of these

concepts is the extensibility of the platform. To enhance the capabilities of the platform through extensions, or simply to update some functionality, are common practices of nowadays software developers. To make this task an easier and more stable one, we adopted an agent-based architecture[xx].

The core of the system is the Agent platform, the environment in which agents live. Each of these agents has its own role, expressed in terms of the services it provides or uses. To develop the agents we are following the evolutionary development methodology proposed by Jennings N. et al[xxi]. We therefore define high level agents and high level roles and interactively break down the agents into more simple ones with more specific roles. Between each of these phases tests can be conducted to access the behavior of the overall system. We are also aware of the amount of open standards and technologies that are nowadays available for the development of agent-based architectures that significantly ease the development, namely FIPA standards and platforms such as Jade or Jadex.
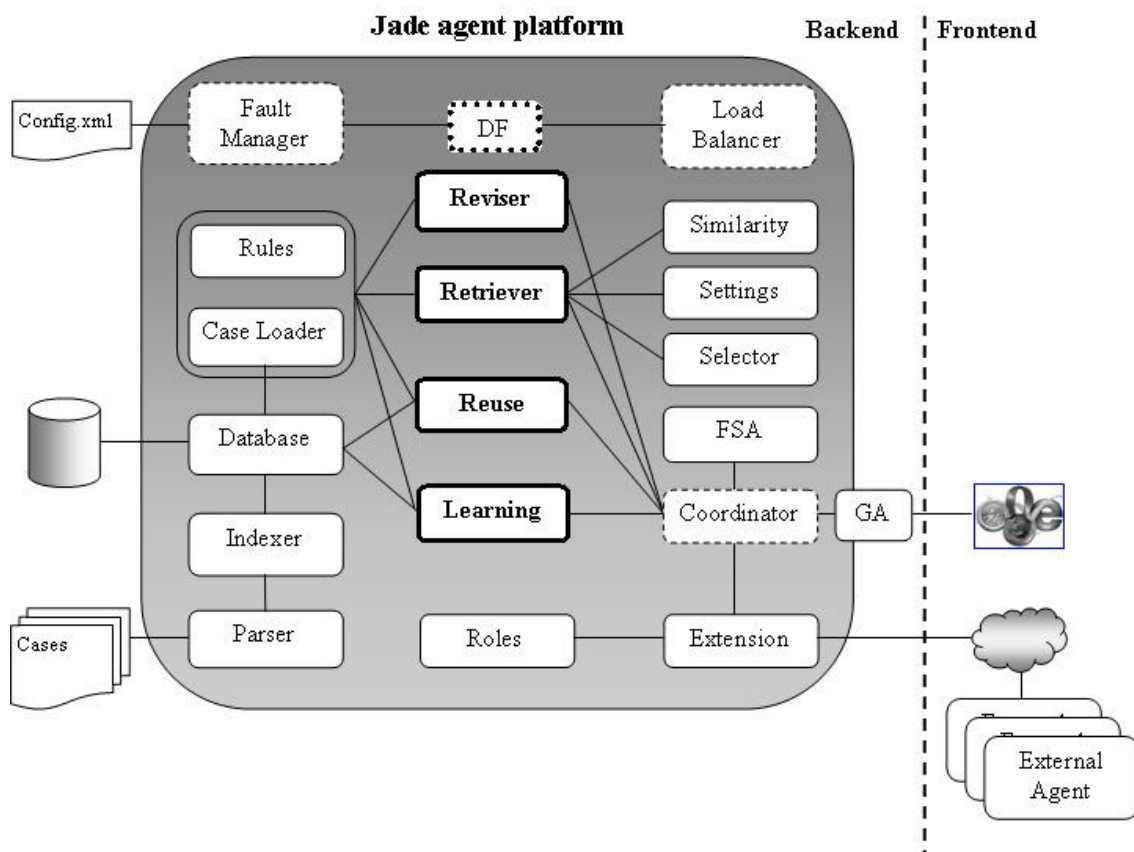

Fig.1: The architecture of UMCourt

The agents that now run in the platform are the result of the break-down of four high level agents responsible for the issues of security, data management, interface and reasoning. These agents, together with the local and remote agent platforms build up the Agent Layer in our architecture. Besides this, the remaining of the architecture is organized as follows. The Data layer provides support for the access to the files and databases. This layer is constituted by the agents Database, Indexer, Parser and Case Loader. The Services layer is composed by the services that are locally provided by the agents and the ones that are remotely requested and the respective service signatures. In this layer, the main agent is the Extension one, responsible for receiving external requests, checking roles and permissions and forwarding the messages to the corresponding agents. The Adaptive Interfaces layer comprises a set of dynamic interfaces that are adapted to each specific user in order to make the interaction with the platform a more intuitive and easier experience. This poses an interesting challenge as we are considering here two very different technologies: web pages and Jade agents. In order to address it, we are using Jade's Gateway Agent. This is a special agent provided by Jade that allows for non-Jade applications to interact with Jade-based ones. This agent basically makes the bridge between web pages with embedded servlets and the agents in the agent platform. These servlets have as main task to gather the information provided by the user, compile it in the appropriate format and forward it to the Gateway Agent, and from there to the correct agents in the agent platform.

At last, in the User layer, the human and agent users are represented, the first ones interacting with the platform through the interfaces and the second ones doing it directly, through the Extension agent. The Roles agent contains the roles of each user and the tasks that can be performed by each role.

As mentioned above, the estimation of the possible outcomes is of great importance for the parties as they may so take better informed decisions. In UMCourt, the software agents are able of informing the users about the most likely outcomes by using a Case-based Reasoning (CBR) approach: determining the possible outcomes of a new case and their likeliness, based on the observation of past known cases, with given sets of characteristics and their

corresponding outcomes. This approach is supported by the concept of legal precedent[xxii]: cases that happened in the past are likely to occur again.

Fig.2: An Online Form (*in Portuguese*).

In order to power this model, a growing number of cases is stored in the form of XML documents with a well defined structure, containing all the significant information about the case. Having in mind the objective of determining outcomes, the most important information of the cases described in the system are the laws addressed by each case and the way that they are addressed (e.g. which party uses which law, with what purpose each law is used, in which context the law is used). The first step in the process of estimating the outcomes consists therefore in analyzing all the past cases and selecting a significant group of the most similar ones. The next step is to sort the cases according to the numeric value of the outcome and how favorable it is to each party. The resulting numerical value denotes the utility that the case has for the respective party. At this point, the parties have an intuitive picture of what may happen, including not only the best and worst case that may happen but also all the intermediary cases that have happened in the past and may happen again, accompanied by the respective likeliness to occur. To determine this likeliness,

the amount of cases in the near area is used, as well as the type of case (e.g. binding or persuasive precedent, decisions of higher or lower court). The parties can also have a notion of the range of possible outcomes and the result of its intersection, the ZOPA – Zone of Potential Agreement[xxiii]. The ZOPA is limited by the BATNA and WATNA values, concepts which denote the best and worst alternative to a negotiated agreement, respectively. Having access to all this information, parties can take supported decisions and engage in better weighted decisions.

The system is being developed in order to be applied to different legal domains: labor law, family law, consumer's law.

6 - A concrete application: a prototype developed to be applied in the legal domain of Consumer's Law

Among the different law domains that could be object of our work we choose consumer's law to develop the prototype. This choice was made after noticing that consumer claims in Portugal, particularly those related to acquisition of goods or services, are not getting, most times, the solutions decreed in the Portuguese law, undoubtedly due to the high costs of judicial litigation versus the value of the product/service and the slowness of the judicial procedure. All this generally leads the consumer to give up on the attempt to solve the conflict with the vendor/supplier.

Having all this into consideration, we believe that an agent-based ODR approach, with the characteristics briefly depicted above, is the path to achieve a better, faster and fairer access to justice.

Because the consumer´s domain is a quite wide, we restricted it to the problematic of buy and sell of consumer goods and respective warranties contracts. In this field there is a growing amount of conflicts arising between consumers and sellers / providers. In this context, the approach was directed to the modeling of concrete solutions for the conflicts arising from the supply of defective goods (embodied mobiles or real estate).

We also thought relevant to consider financial services as well as the cases in which there are damages arising out of defective products, although this is yet work in progress.

Regarding the boundaries that were established for this extension of UMCourt, we have tried to model the solutions for conflicts as they are depicted in Decree of Law (DL) 67/2003 as published by DL 84/2008 (Portuguese laws).

Based upon the legal concepts of consumer, supplier, consumer good and the concluded legal business, established on the above referred DL and on the Law 24/1996 (Portuguese law), we developed a logical conduct of the prototype, having in view the concrete resolution of the claims presented by the buyer. In this sense, we considered the literal analysis of the law, as well as the current and most followed opinions in both Doctrine and national Jurisprudence.

For example, we had to make an option when we dealt with the consumer concept. The general law of consumer protection, Law 24/1996, article 2, defines consumers as "all to whom goods are supplied, services are provided or any rights are transmitted (…)." The DL 67/2003, article 1º-B, a), says that "the one to whom goods and services are supplied or rights are transmitted (…) " According to the legal text, because the mention "all to whom", the consumer could be any person, an individual or a corporate body, to whom a good, right or service is destined. However, the leading doctrine, complying with foreign legal production and with the tendency expressed by community norms, admits as consumers only individuals and excludes corporate bodies from the realm of the norm. Diverging from the major literature, it is believed that if the article did not exclude from its scope corporate bodies, in an express manner, an interpretation in this sense configures a restrictive interpretation. It t is agreed that the aim of consumer protection law is to protect the weak and the vulnerable and that, in many cases, these concepts cannot be applied to corporations, because they possess a strong structure and are better prepared to act in the market. Nonetheless, the presumption of superiority of corporations can not be present in cases where they act outside of their professional field, that is, when they acquire products or services as final addressee and not to use it in their lucrative activity. Under these circumstances they can be on a lower platform technically, informatively and economically, if compared to the supplier. In spite of this fact, the prototype was developed using the concept of consumer adopts by the leading doctrine.

Thus, during the development and assessment of the platform, we realized that the prototype can be useful in cases when the consumer (physical person)

(Almeida T., 2001)[xxiv] is acquiring the good for domestic/private use (Almeida, C. F., 2005)[xxv], or is a third acquirer of the good (Law 24/1996, article 2nd nr.1, and DL 67/2003, article 1st B, a) and 4th nr. 6). Besides these cases, it is also usefully applied in situations in which the consumer has celebrated a legal contract of acquisition, buy and sell within taskwork agreement, or renting of embodied mobile good or real estate (DL 67/2003, article 1st A and 1st B, b)). (Silva, J.,2006).[xxvi]

Still, contracting must take place with a supplier acting within the range of his professional activities, being this one the producer of the good himself, an importer in the European Union, an apparent producer, a representative of the producer or even a seller (Law 24/1996, article 2nd nr. 1 and DL 67/2003, art. 1st B, c), d) and e)). At last, the defect must have been claimed within the delay of warranty (DL 67/2003, articles 5th and 9th), and the delay in which the consumer is legally entitled to claim his rights towards the supplier has as well to be respected (DL 67/2003, article 5th A).

Once the legal requests are fulfilled, the solutions available to the consumer will be: repairing of the good (DL 67/2003, articles 4th and 6th); replacement of the good (DL 67/2003 articles 4th and 6th); reduction of price (DL 67/2003 article 4th); resolution of the contract (DL 67/2003, article 4th) or statement that there are no rights to be claimed by the consumer (DL 67/2003, art. 2nd, nrs. 3 and 4, arts. 5th, 5A and 6th).

An interesting question is posed regarding the issue if there is an hierarchy between the rights contained in the decree-law or if there is the possibility of the consumer randomly choosing among them. The DL 67/2003, article 4, no.1, states that "In the absence of conformity of the good to the contract, the consumer has the right to its restoration, free of charge, by means of repair or substitution, to a suitable price reduction or to rescind the contract." Although the article mentions nothing in this regard, it is understood that the consumer, the vulnerable party, should be free to opt for the most suitable alternative, because it has been realised in practice that this kind of "protection" of the supplier has allowed for abuses and interventions. Although the major doctrine acknowledge that upon verification of vices the consumer has no freedom of decision. That is to say that at the prototype the consumer is forced to firstly

request the repair or substitution of the good and only after this can request a price reduction or rescind the contract.(Silva, J.,2006).[xxvii]

These decrees have been modeled in the form of logic predicates and are part of the knowledge of the software agents, which use these predicates in order to make and justify their decisions.

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