Towards Systems for Increased Access to Justice using Goal Modeling

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***Abstract*—Emerging *cyberjustice* systems are in need of relevant requirements engineering approaches, for example, to provide citizens with better access to the judicial system. In this context, this paper proposes the use of goal modeling for developing Online Dispute Resolution (ODR) systems in Canada. With ODR, the use of technology has the potential of increasing access to justice at low cost. We argue that a goal-oriented view is needed to capture early requirements about *who* are the stakeholders, *what* goals and quality criteria they have and *how* the various enabling technologies can be combined to meet these goals. A particular case is made for the use of the Goal-oriented Requirement Language (GRL), which covers the above and enables trade-off analysis as well as the introduction of indicators for measurement activities. GRL also has the potential of being used to guide some run-time decisions in ODR systems.**

***Index Terms*—Analysis, cyberjustice, online dispute resolution, Goal-oriented Requirement Language, requirements engineering**

I. Introduction

In the last decade, the Requirements Engineering and Law (RELAW) community has provided many contributions on how to extract software/system requirements from laws, on how to model and reason about laws, on assessing compliance of software/systems/organizations with laws, and on the impact of the evolution of any of these artefacts. However, we observed a lack of contributions towards providing requirements engineering techniques targeting the improvement of existing judicial systems, as well as their software applications. This short paper attempts to highlight some of the needs of the Canadian judicial system, especially in terms of access to justice by citizens, as well as potential contributions in that domain.

More than twenty years ago, the legal community in the United States called for consolidating *Alternative Dispute Resolution* (ADR) into the federal and state trial courts [1]. This endeavor was highly motivated by the serious challenges facing the legal system, which are also seen in Canada. According to the Chief Justice of Canada, Canada is facing an "access to justice crisis" [2]. The symptoms and causes of this crisis have variously been attributed to the prohibitively high costs of litigation (which make it difficult for most citizens to access the court system), very long delays in case processing and resolution (in some situations, cases take years to reach trial) and the physical inaccessibility of courts (because of issues related to differences in ability and/or geographical remoteness) [3].

ADR is an increasingly accepted component of case management programs of courts and plays an important role in providing litigants with alternatives to adjudicating their disputes in the court. Various groups, including communities, businesses, schools, prisons and families, have shown a certain willingness to adopt ADR, either in a face-to-face with paper-based format, or in some cases in an electronic computer-based format [4]. Paper-based ADR can be more efficient in resolving disputes than traditional court based approaches. However, even paper-based ADR can be expensive, thereby creating cost barriers to achieving resolution.

In this paper, we investigate ways of evaluating the potential of applying technology to support judicial systems and increase access to justice. In particular, we explore elements of a requirements engineering methodology based on the Goal-oriented Requirement Language (GRL) for goal modeling. In addition, GRL models can describe the impact of dispute resolution alternatives on the juridical context.

This paper gives a small sample of technologies that promote access to justice, introduces GRL, and gives an example of usage for an ODR system. Future applications and research topics are also briefly discussed.

II. Increased Access to Justice with Technology

In justice systems, some people consider that functionality (as the logical bases of technology) and legality (as the logical bases of law) have a conflicting relationship. However, the use of technology for the administration and practice of justice has potential benefits, the most significant one perhaps being the *increased access to justice* [7].

In recent years, technology has been looked upon as a lever for facilitating access to justice in a number of ways, including enhancing the physical accessibility of courts, better connecting communities with courtrooms, better distributing information, and reducing labour, transportation and other system costs [5].

Access to justice is an essential human right that must be administered within a certain minimal timeframe in order for that right to be appropriately satisfied [9]. The use of modern technology improves the time it takes for citizens to receive their day in court and expedites the judicial proceedings. Hence, it increases access to justice and decreases the backlog that generally tends to characterize the court system. Accelerat-

ing the judicial process using technology, however, is not the only way to increase access to justice. Technology can also be used to benefit remote citizens (through telecommunications) as well as people with special needs (such as deaf community), and grant them the right to be heard. Video-based technology allows deaf individuals to communicate and express their concerns in a natural and visual language. Such technology, when applied in the context of dispute resolution, is capable to provide the deaf community with additional means of communication, and thus, increase their access to justice.

The *Cyberjustice project* [6], in which the University of Ottawa is involved, essentially targets the use of emerging technologies for the administration of justice by utilizing systems created through "the conjunction of different modules designed to achieve a global purpose" [7]. These modules include various technological services such as courtroom tele-immersion technologies, case management systems, electronic filing, automated court reporting, digital audio and video recording systems. These legal-oriented technologies can efficiently serve the justice system and can be used for Alternative Dispute Resolution, and especially their online versions called *Online Dispute Resolution* (ODR), or in courtrooms themselves.

Cyberjustice defines ODR as "the integration and use of technology in the process of dispute resolution, whether judicial or extrajudicial" [8]. The ODR approach involves three criteria of particular relevance to this paper: i) the availability of a software platform that provides an interface to go through all the steps of the dispute resolution process, automates certain functions and models the relevant procedural framework (e.g. rules concerning domain names), ii) the ability of users to obtain online technical assistance when needed, and iii) the presence of neutral third parties with recognized experience [8]. All three of these are essential to the "electronic migration" of alternative methods of conflict resolution, including negotiation, mediation, arbitration and conciliation.

III. Goal-oriented Requirement Language

GRL is a standard modeling language part of the User Requirements Notation (URN) [10]. GRL provides a graphical syntax to model stakeholders (with actors), their objectives/concerns (with goals and qualitative softgoals), and alternative means to satisfy objectives (with tasks). Goals, softgoals and tasks are examples of intentional elements. Indicators () measure observable values and convert them to GRL satisfaction values (from –100 for denied, to + 100 for satisfied) that can be propagated to other model elements through links. Intentional elements and indicators can be structured through AND/OR/XOR decomposition links (). Contribution links () indicate the impact (qualitative or quantitative) of the satisfaction of one element on the satisfaction of another element. Finally, dependency links () model dependencies between elements, often across two different actors. Figure 1 provides an example where these constructs are used.

IV. GRL Example

We illustrate the use of GRL to model the (simplified) current context of a subset of Canada's judicial system. This model shows some important stakeholders, their goals/softgoals, the various alternatives (tasks) that can be performed to increase access to justice, and the relationships between these elements. Many local alternatives can have various impacts on different concerns of the stakeholders involved, with no obvious global solution that would satisfy everyone. This model was created manually (as an illustrative example) based on our interpretation of the Cyberjustice project literature and its surveys [6,8].

Figure 1 shows that achieving an efficient dispute resolution is a very important goal for each of the disputing parties, where an *efficient* settlement is one that saves disputants' time and money. In addition, increasing access to justice is the most important goal of judicial systems (as indicated by a quantitative importance of 100). Achieving this goal can be done by using technology or applying one of the ADR methods (negotiation, mediation or ODR). The diagram describes the impact of alternatives on access to justice and dispute resolution.

Canadian judicial systems use various technical alternatives (some of which being represented as tasks in the GRL model in Fig. 1) to increase access to justice. The most common electronic legal services that are adopted by these systems include electronic filing, electronic access to court records, electronic discovery, online access to court decisions or the utilization of one of the Cyberjustice technologies. The later in turn also includes several technological alternatives. Moreover, such systems use various alternative dispute resolution mechanisms to resolve disputes faster and at a lower cost.

Note that most technical legal systems make use of a secure, Internet-based connection that allows the litigants or their legal representatives to file or access court documents electronically. However, these systems vary with respect to several aspects such as the program/service provider, the format of the documents that can be filed and the level of security offered. In the GRL model in Fig. 1 (and for simplicity), only the e-filing system was modeled to show its dependence on a secure, internet-based system that is provided by a reputed service provider.

Such models are useful for reaching a common understanding among stakeholders, for enabling trade-off analysis based on GRL what-if strategies and tool-supported satisfaction propagation algorithms, and for documenting decision rationales. For example, the model in Fig. 1 can help analysing the trade-off between using the computer-based or the paper-based dispute resolution as two forms of ADR, and the impact of either alternative on achieving the "increase access to justice" goal. The model analyst does this by defining different GRL strategies (initial satisfaction values) and evaluating their impact.

As these models are compact and analyzable with tools, they often allow stakeholders to *disagree sooner* on parts that are ill-defined or misunderstood than with textual, paper-based descriptions of the same information. In the context of the Cyberjustice project, GRL is being considered as a common language to collect, model, and analyze the concerns of the teams working on the project's four main themes.

V. Further Potential Use of GRL for Judicial Systems

GRL supports different evaluation algorithms to analyze the trade-offs among (often conflicting) goals of stakeholders.

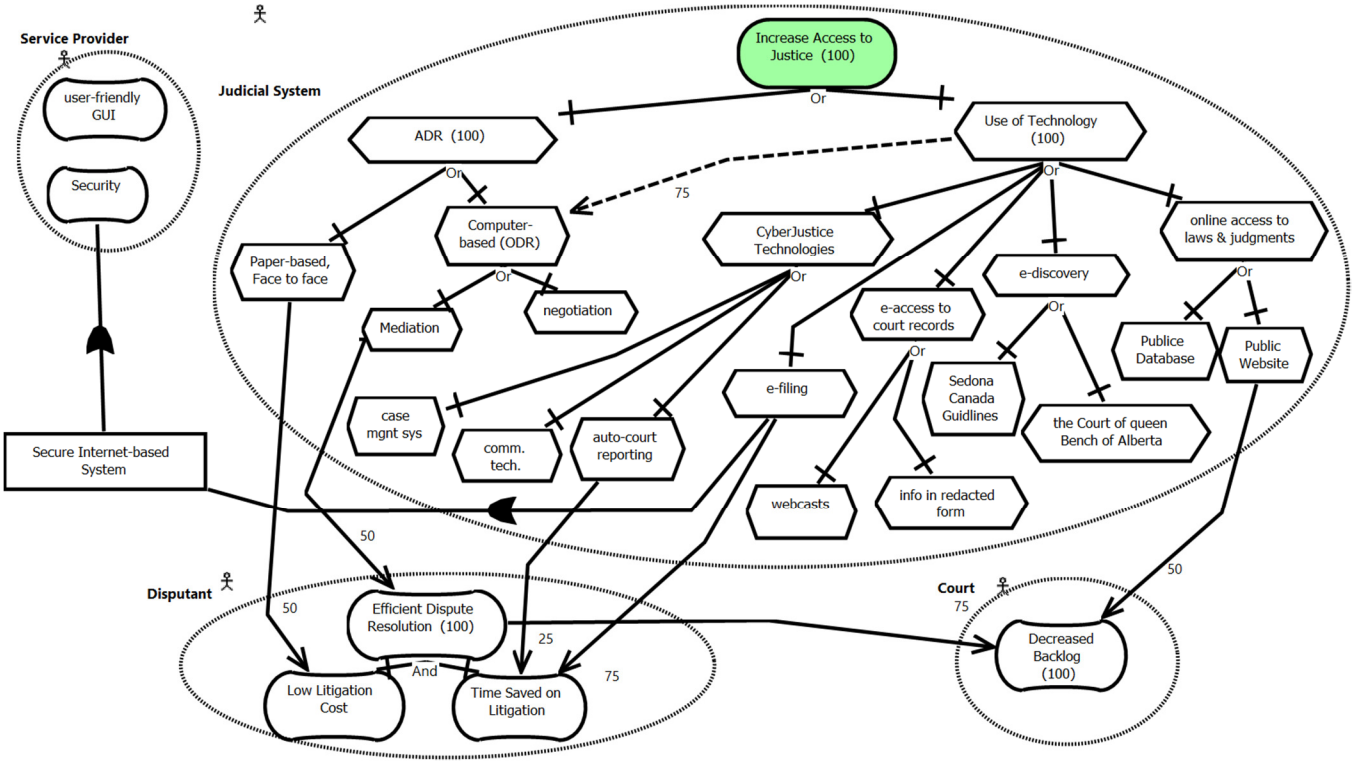

Fig. 1. GRL model of technological alternatives and their impact on the judicial system's stakeholders

Evaluation is done with GRL *strategies*, i.e., initial satisfaction values associated with some of the intentional elements, which are then propagated to the other elements of the model and to the actors through a propagation algorithm. This is automated in the jUCMNav modeling and analysis environment [11]. Initialized values are indicated by a (*) above the intentional element, whereas the other satisfaction values are computed. Colour coding (the greener the better, and the redder the worst) also reflects visually the satisfaction of elements (see Fig. 2 for an example). This enables a global assessment of the strategy being studied to determine the effectiveness of the high-level requirements contained within the strategy. This is hence useful for the selection of appropriate *combinations* of technologies in the design of systems supporting cyberjustice, including ODR (as for the model in Fig. 1).

In addition, using GRL, we may develop an approach to model and analyze combinations of *methods* of judicial systems, which often must be selected manually at this time. For instance, this suggested approach can be applied to mediation, as one of the ADR/ODR methods. Mediation comes in different styles or variants [12]: facilitative, evaluative, transformative, narrative, online and biased mediation. For simplicity, our focus in the illustrative example is on the second style of mediation, namely *evaluative mediation*, because this is a good candidate for benefiting from GRL-based modeling and analysis.

In particular, the evaluative mediation focuses on: i) providing disputing parties with an evaluation of their cases and advising them towards a resolution and settlement alternatives; ii) evaluating the strengths and weaknesses of each side's argument and expressing a view of what might be a fair or reasonable settlement; iii) helping parties and lawyers evaluate their legal position and trade-offs between the costs and benefits of pursuing a legal resolution rather that settling a mediation; and iv) making some predictions or insights about what would happen should the disputants go to the court (i.e., evaluate the level of satisfaction of each side).

In this context, we postulate that the analysis and evaluation capabilities of GRL models could enable the *mediator* to perform the above mentioned tasks in less time, while also minimizing the risk of bias. The essence of this approach is the use of strategy evaluations that illustrate the impact of selecting one settlement alternative over the other on the entire case and to show that many alternatives can have various impacts on different concerns of the actors involved, with no particular solution that would satisfy everyone fully. This is shown in Fig. 2, where one potential strategy is evaluated, illustrating one specific trade-off that favors the plaintiff over the defendant.

We acknowledge that the GRL syntax might be non-intuitive to grasp by non-modelers or by people without a requirements engineering background. We envision however a future application (e.g., on the Web) where a mediator would not be expected to directly create or analyze a GRL model per se; these capabilities would have to be hidden behind usable interfaces where GRL concepts (or potentially a restricted subset relevant in that context) would be represented in a format tailored for mediators and other non-expert users.

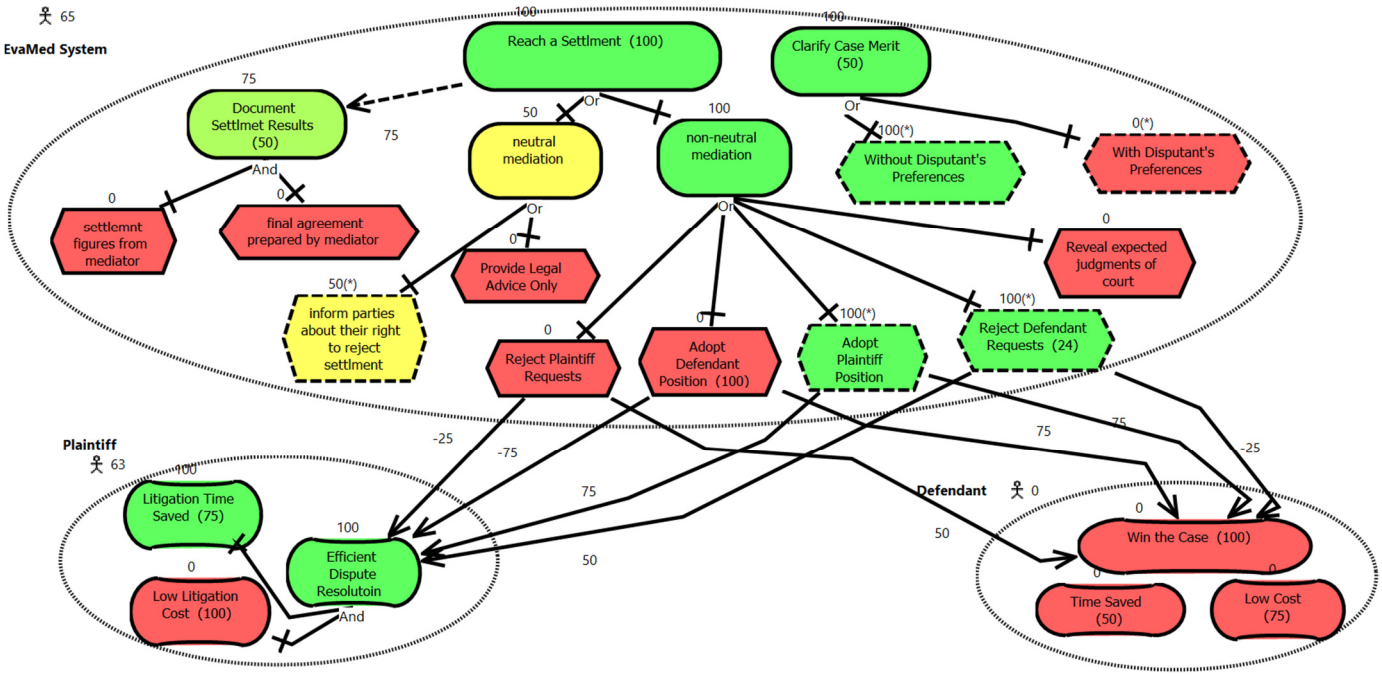

Fig. 2. Quantitative evaluation of the AdoptPlaintiff_RejectDefendant_WithPreference_InformRights strategy

VI. Conclusions

This paper attempts to raise the awareness of the RELAW community about research issues and opportunities for contributions that go beyond the conventional fields explored in the past. There is a need to help the judicial system community find suitable requirements engineering methods to solve their issues. In this paper, we started investigating the use of goal modeling with GRL in order to model alternative technological means of satisfying the needs for improved access to the judicial system, with a particular emphasis on online dispute resolution as part of the Cyberjustice project. Although our work is preliminary and that further validation is required, our example shows that the use of goal modeling in this context goes beyond conventional requirements engineering for technology selection (Fig. 1) as there are opportunities to support mediation method selection (Fig. 2). Many other such opportunities are likely present in that domain. Potentially, a successful approach could also be used for other aspects of access to justice, and for jurisdictions other than just Canada.

It is up to us to start investigating some of the above opportunities (with goal modeling or with other requirements engineering approaches) and make a difference in everyone's life.

VII. Acknowledgment

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