Opportunities of computer-mediated legal argument in education

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Abstract

Argumentation is a key activity of lawyers. Therefore in law school teaching argumentation is essential. Information technology can provide useful support in argumentation courses. New opportunities come from a recent topic of research in the field AI & Law, viz. computer-mediated legal argument (e.g., Gordon, Lodder, Loui).

The starting point for the research on computer-mediated legal argument is that a computer system can support lawyers by mediating the process in which they draft and generate arguments: the system can administer and supervise the argument process by keeping track of the reasons adduced and the conclusions drawn, and by checking whether the users of the system obey the pertaining rules of argument, e.g., those related to the division of burden of proof.

Computer-mediated legal argument poses a new problem: how should an argument be presented to the users of the mediating system? Especially with regards to recently developed logical tools (e.g., Hage, Prakken, Sartor, Verheij), there is little experience with argument presentation. There is a natural division of approaches to argument presentation in two classes: the verbal and the visual approaches. In the verbal approach, the argument is mainly presented in a verbal style, for instance in the form of a text or a written-out dialog. In the visual approach, the argument is mainly presented in a visual style, for instance in the form of a tree of sentences.

In the paper, we reconstruct elements of a Dutch Supreme Court case on tort law (March 20, 1992) and its sequel at the Court of Justice of The Hague (September 15, 1994) in two prototypical systems for the mediation of legal argument. The first system takes the verbal approach; the second system takes the visual approach.

We discuss the opportunities of the two approaches for teaching legal argument. Our conclusion is that neither approach is fully satisfactory for teaching legal argument if it is taken to its extreme, but that a hybrid combination of verbal and visual elements should be striven for.

1 Introduction

Argumentation is a key activity of lawyers. Therefore in law school teaching argumentation is essential. Information technology can provide useful support in argumentation courses. For instance, recently Aleven and Ashley [1997] have shown that instructing case-based argumentation skills by their CATO system and by an experienced legal writing instructor led to comparable improvement in students' basic argumentation skills.

One could also think of systems teaching classical logic, such as first-order predicate logic. Several systems are available. An example is the acclaimed Tarski's World by Barwise and Etchemendy,[2] that teaches the meaning of the language of first-order predicate logic by depicting a block's world on screen, in which sentences can be interpreted.

Notwithstanding their availability, systems meant for teaching classical logic are hardly used in law school, since only the basic elements of classical logic are considered essential for lawyers. Certainly, classical logic can be used to analyze the argument structure of legal texts and discourse. However, the resulting analysis is (by the very nature of classical logic) rather limited. Probably, the main reason for teaching elements of classical logic in law school (if taught at all) is that it serves the purpose of training general analytical skills, which is useful for anyone.

Recently, much research has been devoted to *legal logic*.[3] In this research program, attempts are made to include legal argument forms into logic. Some of the topics addressed are exceptions, the weighing of

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[2] See http://csli-www.stanford.edu/hp/.

[3] See, e.g., the work of Freeman and Farley [1996], Gordon [1995], Hage [1996, 1997], Lodder and Herczog [1995], Loui and Norman [1995], Prakken [1997], Prakken and Sartor [1996], Verheij [1996], and Yoshino [1995]. Verheij, Hage and Lodder [1997] give an overview.

conflicting reasons, rule applicability and the division of burden of proof. Arguments using these have long been adopted by lawyers, but in an intuitive way and without a systematic basis. Legal logic attempts to provide this basis. Verheij, Hage and Lodder [1997] provide an overview of the recent research on legal logic with examples from Dutch tort law.

Supposedly, legal logic has more to offer that is readily useful for law school than classical logic,[4] since the argument forms that can be analyzed by legal logic, occur regularly in actual legal argument. The question arises how the findings of legal logic could be taught in an effective way.

New opportunities come from a recent topic of research in the field AI & Law, viz. *computer-mediated legal argument* (e.g., Gordon, Lodder, Loui). The starting point for the research on computer-mediated legal argument is that a computer system can support lawyers by mediating the process in which they draft and generate arguments: the system can administer and supervise the argument process by keeping track of the reasons adduced and the conclusions drawn, and by checking whether the users of the system obey the pertaining rules of argument, e.g., those related to the division of burden of proof.

A difficulty for such systems is the presentation of arguments. Two approaches to the presentation can easily be distinguished: verbal and visual. The first presents arguments in a verbal way. The chosen language can be natural language (or a fragment of natural language) or a formal language, for instance, that of predicate logic. Gordon's Pleadings Game [1995] is an example of the verbal approach, using a formal language. The second approach presents arguments in a visual way. The structure of arguments is somehow reflected in its visual layout. An example is Loui *et al.*'s Room 5 (1997), where sentences are shown in boxes. If one box is inside another box, the sentence in the first box expresses a reason for the conclusion in the second box.

In this paper, we discuss two systems that have been developed at the Universiteit Maastricht. We will be brief about the argumentation theory behind the systems. The interested reader is referred to the work of Hage [1996, 1997], Lodder [1998], and Verheij [1996].

The first system takes the verbal approach. It is a Prolog implementation of the dialog game for legal justification DiaLaw [Lodder & Herczog, 1995; Lodder, 1998]. The second system takes the visual approach. It is a Delphi implementation of the procedural model of argumentation with arguments and counterarguments CumulA [Verheij, 1996]. Both systems are prototypes for the mediation of legal argument, and suggest opportunities of the systems for teaching legal argument.

In the following, we discuss a Dutch case of tort law (section 2). The case is used to illustrate the two prototypical systems for the mediation of legal argument. First the system that takes the verbal approach is described (section 3), then the system that takes the visual approach (section 4).

2 A Dutch case of tort

In this section, we give a brief overview of the regulation of torts in the Netherlands, and discuss an interesting case: the 'bussluis' case.

2.1 Dutch tort law

In civil law systems, the liability for damages is amongst others related to the notion of a tort, or wrongful act. For instance, if someone clumsily parks his car, thereby damaging another already parked car, he commits a tort against the owner of that car and has to compensate for the damages. In Dutch civil law, the essence of the relation between the liability for damages and a tort is regulated in the articles 6:162 and 6:101 of the civil code.

Art. 6:162.1 of the civil code states that a person who commits an unlawful act toward another which can be imputed to him, must repair the damage which the other person suffers as a consequence thereof. Art. 6:162.2 contains the three forms of unlawful acts in Dutch law: a violation of a right, an act or omission violating a statutory duty, and an act or omission violating a rule of unwritten law pertaining to proper social conduct.

Art. 6:101.1 of the civil code states (in synopsis) that, if the damages are partially caused by a circumstance that can be imputed to the party that suffered the damages, the duty to repair the damages is diminished, relative to the amount of imputability of the party that suffered damages and the party that has the duty to repair the damages.

As a result of the Dutch regulations, there are two steps that determine the duty to compensate damages. First, the general duty to compensate damages is established on the basis of art. 6:162 of the civil code. Second, the relative amount of imputability determines the portion of the damages that have to be compensated for.

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[4] *Supposedly*, since most effort has been spent on theoretical research.

2.2 The 'bussluis' case

In the eighties a new phenomenon to regulate traffic in inner cities was introduced. The so-called 'bussluis', which is nowadays well-known, was shortly after its introduction rather unknown. The 'bussluis' is an obstacle in the road that can only be passed without problems by buses. Ordinary cars get stuck in it, or if they nevertheless pass through the 'bussluis' the car is damaged. The latter happened to a cab-driver in the mid eighties who ruined his car by driving into a 'bussluis'. The cab-driver could be blamed, because he was driving a one way street in the wrong direction, and had ignored warning signals.

The Dutch Supreme Court (March 20, 1992) decided that the local authorities were guilty of tort and therefore had to compensate for the damages. Since the Supreme Court in the Netherlands only decides legal matters and not factual matters, the case was referred to a Court of Justice in order to determine the amount of damages that had to be compensated. Rather surprisingly, the Court of Justice of the Hague (September 15, 1994) determined that the amount damages that had to be paid was nil. In their opinion, the damages were caused by the cab-driver's own fault for the full 100 %. So although the local authorities were guilty of tort, they did not have to pay for the damages after all.

The arguments the Court used to justify that the amount of damages that had to be compensated was nil, were the following:

1. The cab-driver had trouble to find his way. This had to be reason for him to drive with exceptional care, and to pay attention to signs and to follow the rules of traffic. Since he did not act as he was supposed to, the cab-driver is to blame. Moreover, he is also to blame because he violated a rule of traffic law.
2. The Supreme Court decided that in order to establish guilt, it suffices that someone is to blame. Therefore the cab-driver has guilt.
3. The Supreme Court decided that in case of violation of a traffic norm the violator has responsibility for the damages, if without the violation the damages would not have arisen. This is even true if the way the damages originated were beyond what one could have expected. Therefore the cab-driver is responsible for the damages.
4. Without violation there would not have been damages, the cab-driver has guilt, and under the current circumstances the Municipality cannot be held responsible for the damages. Therefore the cab-driver is fully responsible for the damages.

In summary, the unexpected character of the 'bussluis' case was that, although the Municipality had committed a tort against the cab-driver and therefore had the general duty to repair the damages (on the basis of art. 6:162 of the civil code), the thereafter determined portion of the damages to be compensated for (on the basis of art. 6:101) was nil because the damages were fully imputed to the cab-driver.

In the following, the case of the cab-driver is used to illustrate both the verbal and the visual approach to mediating legal argument.

3 The verbal approach to legal argument mediation

The verbal approach is demonstrated by an example in the dialog game for legal justification DiaLaw [Lodder & Herczog, 1995; Lodder, 1998]. After introducing DiaLaw, a sample dialog based on the 'bussluis' case illustrates the opportunities of the verbal approach for education.

3.1 Introducing DiaLaw

In the AI & Law-community a wide range of dialogical models have been developed [e.g., Gordon, 1993; Loui *et al.*, 1993; Hage, Leenes & Lodder, 1994; Lodder & Herczog, 1995; Farley & Freeman, 1995; Bench-Capon, 1995; Prakken & Sartor, 1996; Kowalski & Toni, 1996; Nitta & Shibasaki, 1997]. These are all formal or software models. The tradition of informal models is longer. Perelman's rhetorical theory [Perelman and Olbrechts-Tyteca 1958], and Habermas' [1973] consensus theory of truth have influenced most dialogical research. Today's best-known defenders of dialogical models in law are Aarnio, Alexy and Peczenik, who in the beginning of the eighties [Aarnio, Alexy & Peczenik, 1982] integrated their theories that were developed independently in the seventies. DiaLaw has been developed over the last five years.

DiaLaw is a two-person dialog game, in which both players make moves. The goal of the game is that the proponent convinces the opponent of the correctness of his own assertions, or the incorrectness of the opponent's assertions. In their moves the players express an illocutionary act with a propositional content [Searle, 1969]. The illocutionary act is one of the following four:

1. *claim* - expresses that a certain proposition is true;
2. *question* - asks a justification of a proposition claimed by the other;
3. *accept* - expresses agreement on a proposition claimed by the other;
4. *withdraw* - retracts a proposition claimed by oneself.

If a player claims a proposition (act 1) the content of that proposition is in principal free. The only restriction is that the dialog rules allow it. For instance, a player is not allowed to claim a proposition if he is committed to the opposite. The acts 2-4 are referring to a previous claim, so the proposition is the one of this previous claim.

The first move of the dialog is always a claim by one of the players. Suppose the player Bert claims that the cab-driver is liable. At that moment Bert starts a dialog.

Bert: The cab-driver is liable

Ernie can do several things in the second move. He can accept that the cab-driver is liable, ask why the cab-driver is liable (question), or even claim that the cab-driver is not liable at all. In the last case the roles change: now Ernie has the burden of proving that the cab-driver is not liable, so he becomes the proponent and Bert the opponent.

Commitment plays an important role in the dialog. Commitment originates after a proposition is claimed, or after a proposition is accepted. Commitment terminates when a proposition is withdrawn. To avoid that the dialog remains an informal talk, a player needs means to force his opponent to accept a proposition. This is what is called *forced* commitment, and plays a crucial role in the dialog. It occurs when a player is forced to accept a proposition, due to his commitment to other propositions.

The dialog rules describe formally when a move is allowed, and what the consequences of a move for the commitment of the players are. In the Prolog implementation of the game, the levels are initiated, the commitment is settled, and it is indicated who's turn it is. If a player enters a move (speech act and proposition), the program checks whether the move is allowed. If it is, the dialog continues; if it is not the player gets another change.

3.2 An example of the verbal approach

Like in most mediating systems[5], in DiaLaw both roles in the dialog game are performed by humans. Although it is already instructive for law students if their mutual argumentation is monitored by a system, a goal to strive for is a computer in its role as opponent in the debate.[6] The examples show interaction between humans, but probably in the future one of the human-players will be replaced by a computer-player. For the sake of readibility the sample dialogs are informal.

Bert and Ernie, well-aware of damages that can be caused by driving into a 'bussluis', are discussing who should be held responsible for damages.

1. Bert: The municipality has to compensate 50% of the damages
2. Ernie: Why?
3. Bert: The municipality committed tort
4. Ernie: I agree they did
5. Bert: There exists an obligation to compensate
6. Ernie: Sure
7. Bert: The cab-driver is guilty for 50%
8. Ernie: No, the cab-driver is not guilty for 50%
9. Bert: Why?
10. Ernie: The cab-driver is guilty for 100%
11. Bert: Why?
12. Ernie: See the decision by the Court of Justice of The Hague of September 15, 1994
13. Bert: I withdraw that the municipality has to compensate 50% of the damages

For the computer to be helpful as a coach and teacher, a specific domain has to be chosen, for instance that of tort. Another way to restrict the subject of the dialog is to offer students a case description, and a list of statements from which they can select their favorite.

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[5] An example of a mediating system used for educational purposes is [Moore, 1993].

[6] The HELIC-systems [Nitta & Shisabaki, 1997] aim to model argumentation between a human-player and a computer-player.

In the above dialog, several argumentation skills are trained. While explaining and elaborating on the subsequent moves of the dialog, it is indicated which specific skill is trained.

Although the Court of Justice decided differently, Bert chooses a reasonable first statement. He claims that the municipality has to compensate for only half of the damages. In the second move Ernie questions this statement. Questions are a powerful tool to use in education, since Bert now has the duty to defend his statement. Therefore, he is forced to make explicit the reasons why his statement holds. The first reason he claims is that the Municipality committed a tort. Ernie accepts this reason, not surprisingly, because it is a good reason. If someone questions the existence of a duty to compensate, a first step is to indicate the ground on which the duty is based. In the current case the fact that the Municipality committed a tort is the correct ground. If Ernie had been a computer-player, he could have asked for the reasons why the Municipality committed tort.

The next statement claimed by Bert is also a good one. He indicates explicitly that there exists an obligation to compensate. Ernie also accepts this statement, but still is not convinced about the correctness of the first claimed statement. After claiming the necessary preliminary statements, in the seventh move Bert claims a statement essential for the position he defends. Although Ernie could have questioned this statement in order to hear Bert's reasons, he follows another strategy.

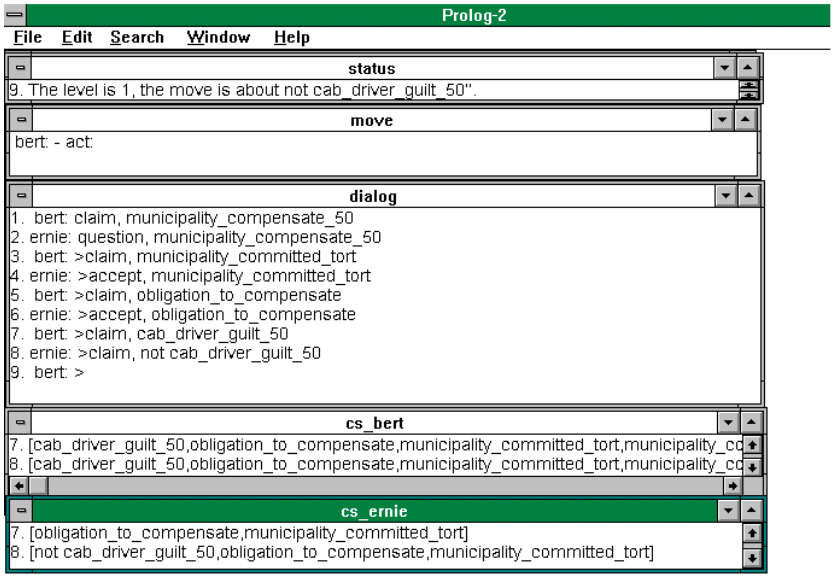
The eighth move is an interesting point in the dialog. In that move Ernie takes over the initiative. He denies that the cab-driver was guilty for 50%. As long as a player just questions and agrees, the opponent holds the initiative. A way to grab the initiative and become the proponent of a statement is by denying. Ernie has become the proponent of the statement that the cab-driver is not guilty for 50%. Bert questions the denial, because he wants to know why Ernie thinks that his 50% is not appropriate. Ernie quotes the decision by the Court of Justice. Bert does not attack this decision by the Court of Justice, but instead simply withdraws his initial statement. Since there are no points left open for discussion, the dialog ends.

In sum, the students were confronted with the following argumentation skills:

- claiming (defensible) statements;
- claiming reasons that justify questioned statements;
- taking over the initiative in the dialog by denying;
- quoting sources like case law.

The mentioned skills are important for any lawyer. For instance, these basic skills are used in legal practice frequently. First, positions are taken. In case the claims of the opponent are reasonable they can be accepted. However, probably not all claims of the other party are accepted, but some will be questioned, others will be denied. In the former case the opponent has to provide reasons for his claims, in the latter case initiative is taken over. Finally, convincing reasons justifying ones position can be based on law books or court decisions.

DiaLaw has been implemented in Prolog as a prototype. While consulting the following screen-dump, one should be well-aware that for use in an educational setting the user-friendliness is for now far too low. One of the necessary improvements is that the players should be offered a list of natural language sentences to choose from.



4 The visual approach to legal argument mediation

The visual approach is demonstrated by an example in an implementation of the procedural model of argumentation with arguments and counterarguments CumulA [Verheij, 1996]. After introducing CumulA, again a sample session based on the 'bussluis' case is used to illustrate the opportunities of the visual approach for education.

4.1 Introducing CumulA

CumulA [Verheij, 1996] is a procedural model of argumentation with arguments and counterarguments. It is based on two main assumptions. The first assumption is that argumentation is a process during which arguments are constructed and counterarguments are adduced. The second assumption is that the arguments used in argumentation are defeasible, in the sense that whether they justify their conclusion depends on the counterarguments available at a stage of the argumentation process.

The goal of argumentation is to (rationally) justify conclusions. In CumulA, the focus is on the process of argumentation, and on the defeasibility of the arguments used in argumentation. Argumentation is a process, in the sense that during argumentation arguments are constructed and counterarguments are brought up. Arguments are assumed to be defeasible, in the sense that if an argument at some stage of the argumentation process justifies its conclusion, it not necessarily justifies its conclusion at all later stages. The defeat of an argument is caused by a counterargument that is itself undefeated.

For instance, if the Municipality has committed a tort against the cab-driver, a conclusion would be that the Municipality has the duty to repair 100 % of the damages. The conclusion can be rationally justified, by giving *support* for it. E.g., the following *argument* could be given:

The Municipality has committed a tort against the cab-driver.
So, the Municipality has the (general) duty to repair the damages.
So, the Municipality has the duty to repair 100 % of the damages.

Recall that in Dutch tort law, the general duty to repair damages and the protion of the damages to be repaired are established consecutively (see section 2.1).

An argument as above is a reconstruction of how a conclusion can be supported. The argument given here consists of two *steps*.

An argument that supports its conclusion does not always justify it. For instance, if in our example it turns out that the damages are fully imputed to the cab-driver (as in the 'bussluis' case), the conclusion that the Municipality has the duty to repair 100 % of the damages would no longer be justified. The argument has become *defeated*. In the example, the argument

The Municipality has the (general) duty to repair the damages.
So, the Municipality has the duty to repair 100 % of the damages.

does not justify its conclusion because of the *counterargument*

The damages are fully imputed to the cab-driver.

CumulA is a procedural model of argumentation with arguments and counterarguments, in which the defeat status of an argument, either undefeated or defeated, depends on:

- the structure of the argument;
- the counterarguments;
- the argumentation stage.

We briefly discuss each below. The model builds on the work of Pollock [1987, 1995], Loui [1991, 1992], Vreeswijk [1993, 1997] and Dung [1995] in philosophy, artificial intelligence, and was developed to complement the work on Reason-Based Logic (see, e.g., Hage [1993, 1996, 1997] and Verheij [1996]).

In the model, the structure of an argument is represented as in the argumentation theory of Van Eemeren and Grootendorst [1981, 1987]. Both the subordination and the coordination of arguments are possible. It is explored how the structure of arguments can lead to their defeat. For instance, the intuitions that it is easier to defeat an argument if it contains a longer chain of defeasible steps ('sequential weakening'), and that it is harder to defeat an argument if it contains more reasons to support its conclusion ('parallel strengthening'), are investigated.

In the model, which arguments are counterarguments for other arguments is taken as a primitive notion [cf. Dung, 1995]. So-called defeaters indicate when arguments can defeat other arguments. It turns out that defeaters can be used to represent a wide range of types of defeat, as proposed in the literature, e.g., Pollock's [1987] undercutting and rebutting defeat. Moreover some new types of defeat can be distinguished, namely defeat by sequential weakening (related to the well-known sorites paradox) and defeat by parallel strengthening (related to the accrual of reasons).

In the model, argumentation stages represent the arguments and the counterarguments currently taken into account, and the status of these arguments, either defeated or undefeated. The model’s lines of argumentation, i.e., sequences of stages, give insight in the influence that the process of taking arguments into account has on the status of arguments. For instance, by means of argumentation diagrams, which give an overview of possible lines of argumentation, phenomena that are characteristic for argumentation with defeasible arguments, such as the reinstatement of arguments, are explicitly depicted. In contrast with Vreeswijk's [1993, 1997] model, we show how in a line of argumentation not only new conclusions are inferred, but also new reasons are adduced.

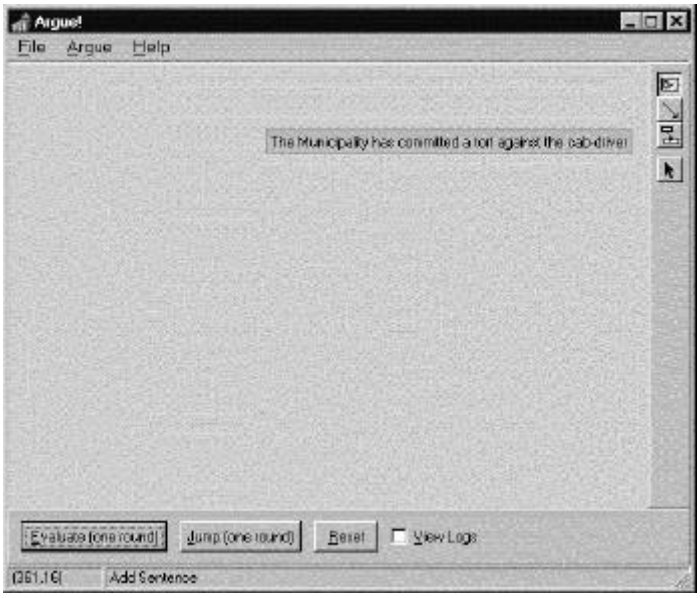
To summarize, CumulA shows

1. how the subordination and coordination of arguments is related to their defeat;
2. how the defeat of arguments can be described in terms of their structure, counterarguments, and the stage of the argumentation process;
3. how both forward and backward argumentation can be formalized in one model.

4.2 An example of the visual approach

The implementation of CumulA is another example of a system for the mediation of legal argument. It takes the visual approach. Students can use the system to construct a line of argumentation. We give an example session, based on the 'bussluis' case.

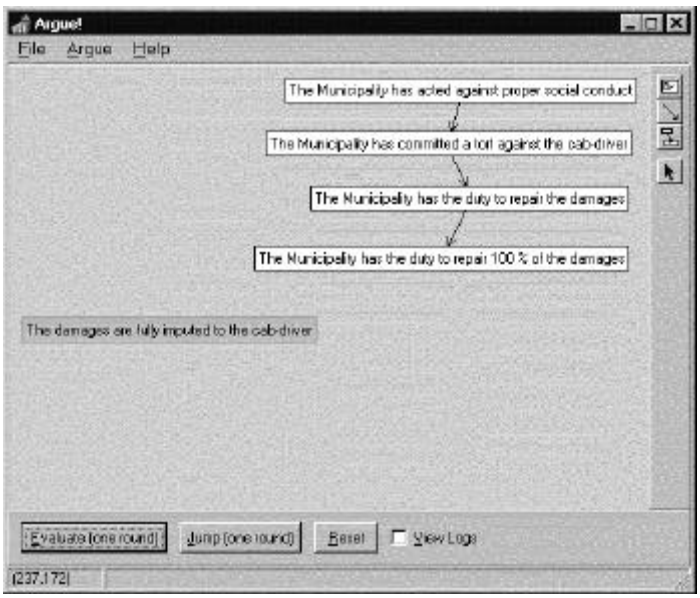
As a start, a statement is typed, 'The Municipality has committed a tort against the cab-driver':



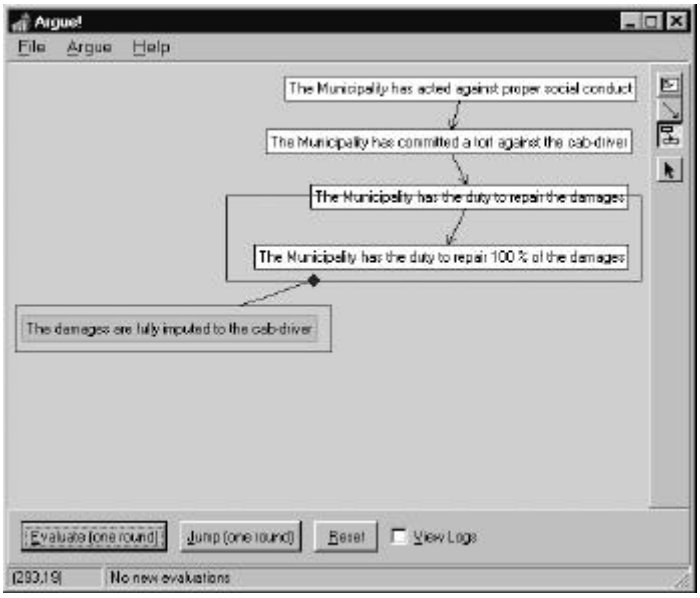
Statements can be justified by adding reasons (in the figure: 'The Municipality has acted against proper social conduct'), and can be used to draw conclusions ('The municipality has the duty to repair the damages'). This is visually depicted in a straightforward way, by arrows connecting the statement-boxes.

The reader may have noticed that the statement 'The Municipality has committed a tort against the cab-driver' was first in a grey box, and now is in a white box. This is due to the different statuses that statements can have: if a statement is unevaluated it is in a grey box, if it is undefeated (i.e., justified), it is in a white box. In the example, the statement 'The Municipality has acted against proper social conduct' is undefeated, since it has been added as an assumption. The other two statements become undefeated since there is an undefeated reason for them.

The line of argument continues in order to determine the amount of damages that the Municipality has to pay. At first, the conclusion is drawn that the municipality has the duty to repair 100 % of the damages. However, the student recalls something about the importance of imputability:

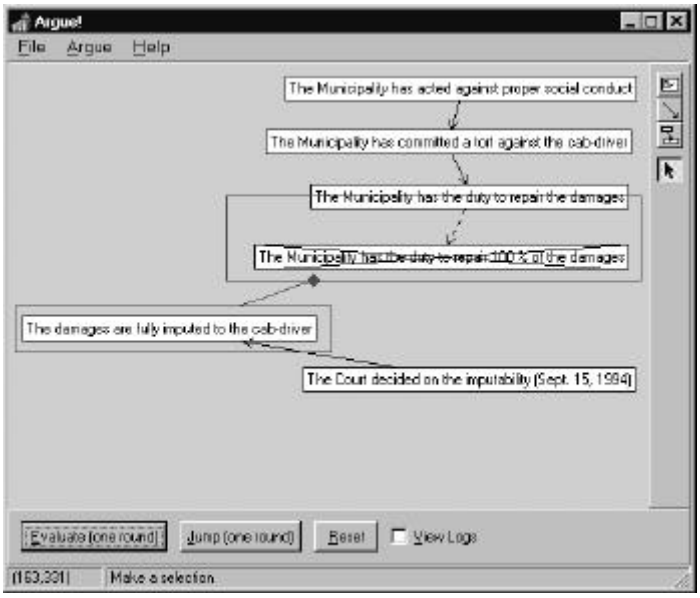


The statement that the damages are fully imputed to the cab driver is a counterargument to the argument that the municipality has the duty to repair 100 % of the damages because the Municipality has committed a tort against the cab-driver. In order to indicate that one argument is a counterargument to another, a special visual structure is used:



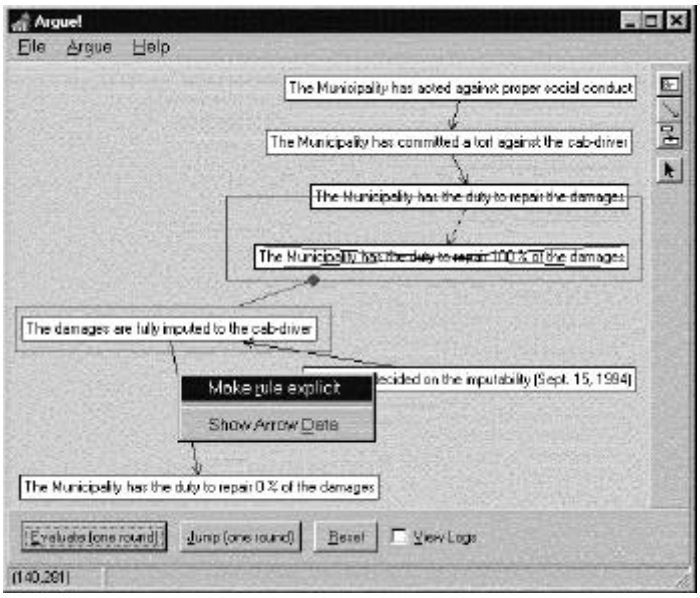
Since the statement that the damages are fully imputed to the cab driver is as yet unevaluated, the statement that the Municipality has the duty to repair 100 % of the damages is still justified.

In order to justify the statement that the damages are fully imputed to the cab driver, the relevant case is cited. Since the corresponding statement that the Court decided on the imputability, is added as a assumption, the conclusion that the damages are fully imputed to the cab driver, becomes justified:

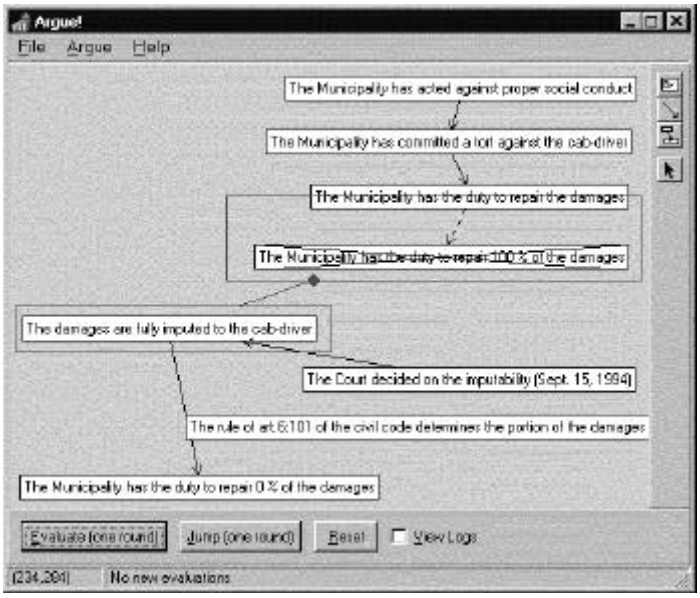


As a side effect, the statement that the Municipality has the duty to repair 100 % of the damages, has become defeated (visually indicated by the cross in the corresponding box), since the argument that the damages are fully imputed to the cab-driver, now is a counterargument.

Now it is concluded that the Municipality has the duty to repair 0 % of the damages, on the basis of the reason that the damages are fully imputed to the cab-driver. If desired, the rule that warranted the connection between the reason and the conclusion, can be made explicit by the user of the system:



When the user has stated that the rule of art. 6:102 of the civil code determines the portion of the damages, the session ends:



4.3 Opportunities of the visual approach

The implementation of CumulA, illustrated above, can be used in legal education for training several types of argumentation skills:

- Students are forced to make arguments in an explicit reason-conclusion structure. For instance, they become aware of the fact that the same statement can be used as the reason in an argument and as the conclusion of an argument.
- Students see that assumptions are needed to justify conclusions and how justified reasons make their conclusion justified.
- Students can train the different ways of using legal rules (as warrants behind reason/conclusion-connections) and legal cases (as support for conclusions) in arguments.
- Students experience how counterarguments can be used to defeat arguments, that were previously undefeated. They undergo the successive changes of status. The relation of counterarguments and argument-structure is also clarified.
- Students get a feeling for the role of process in argumentation by the gradual construction of arguments and counterarguments, and by the occurrence of status changes.

In training these skills the visual approach to the mediation of legal argument can be beneficial, e.g.:

- The visual lay-out gives direct insight in the reason-conclusion structure in a line of argumentation.
- The visual lay-out directly shows which arguments are counterarguments to other arguments.
- The changes of statuses (e.g., from undefeated to defeated) are directly noticeable by visual changes.

The visual approach is not appropriate in all respects. For instance, it partly requires an unusual attitude towards argumentation. People do not necessarily think in visual terms of explicit reason/conclusion-structures. The use and presentation of counteraguments is even less familiar. A more fundamental issue is the limitation of the visual interface. A long line of argument can easily go 'off-screen' and result in a complex and hard to understand structure of statements, reason-arrows, and counterargument-structures.[7]

[7] Loui *et al.* [1997] provide a partial solution to this problem of "pointer spaghetti". Instead of using arrows to connect reasons and conclusions, they use boxes *inside* other boxes.

5 Towards a hybrid approach

We have shown how both the verbal and visual approach to the mediation of legal argument can be useful as tools in teaching legal argument. The verbal approach fits in nicely with legal practice. As a result, students can practice skills they need in their professional career. They are trained in choosing arguments with the right meaning and rhetorical power.

The visual approach has the advantage that it can provide a clear overview of a line of argumentation at a glance.[8] One easily 'gets the picture'. The visual approach also forces students to think of arguments in a new way, namely in terms of pictures.

We think that both the verbal and the visual approach should be combined in one system, in order to profit from the best of each. E.g., the system could provide means to switch between different presentations. In order to encourage students to use the system, a game-like element is essential. In a dialog game they can try to win by beating their opponent, e.g., by drawing a convincing argument.

6 Conclusion

This paper describes opportunities of computer-mediated legal argument in education. Two approaches to the presentation of arguments, the verbal and the visual, have been discussed. Although both approaches have their specific merits, a combination of the two will be most satisfactory as an educational tool. Future research on automated tools for teaching legal arguments should focus on developing systems in which arguments are presented both visually and verbally. By the development of attractive systems, e.g., with a game element, students can be encouraged to train their argumentation skills. Since training these skills does often not receive much attention in the overloaded curricula of legal education, computer-mediated legal argument can be a valuable addition to argumentation courses in legal education.

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[8] In the most recent description of DiaLaw, trees have been used to represent the structure of the dialog pictorially (see Lodder [1998]).

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