A simple scheme to structure and process the information of parties in online forms of alternative dispute resolution

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Abstract

An essential problem in online forms of alternative dispute resolution is that it is difficult to structure and process the information that is exchanged between negotiating parties.

This paper offers a simple scheme according to which users can enter claims and justify them with other claims. Claims can also be conceded, questioned and contradicted. Based on the information that is entered into the system, principles of computational dialectic are applied to compute which claims are established (accepted by all parties) and which are not. The scheme thus presented ensures that users are confronted with the consequences of the various claims made, which makes them hopefully more aware of the relative positions they occupy in the negotiation. The theory in the paper is illustrated with the help of a concrete business-to-consumer dispute and a partially implemented ODR client.

Key-phrases: alternative dispute resolution, online dispute resolution, computational dialectic.

1 Introduction

Since internet reached maturity, online dispute resolution (ODR) has become an attractive alternative to litigation. Like other (offline) forms of alternative dispute resolution (ADR), it is cheap, fast and especially suited to parties that wish to preserve their relationship in the presence of a conflict. Parties that turn to ODR are typically interested in finding a solution, and less interested in the law that is possibly relevant to their case. At the same time, they are often aware that they operate in the shadow of the law, and that they can be thrown back to an expensive and time-consuming trial if their negotiations fail [11, 12].

Because ODR is relatively new, there are a number of problems that are yet to be solved. Among the most urgent we find authentication, data integrity, independency of mediators, the language barrier, mechanisms to build trust, publicity of outcomes and enforcement of outcomes [5, 23, 32]. Still, many of these issues are not specific to ODR and can studied in a more general setting. (As indeed they are.) What remains is the core of ODR itself, namely the art of settling a dispute with a remote adversary.

Essential to ODR is that parties will almost always have to exchange some sort of arguments to explain their position. The problem with arguments in a dispute, however, is that they are a necessary evil. Even more so in an ODR environment, where possibly impolitic writing cannot be softened by a qualifying smile or intonation. (Even worse, the nature of the medium brings it about that all

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messages, including blunders, are archived automatically.) Arguments can inflame a dispute beyond control, yet they are often needed to make progression. Arguments can drive a wedge between parties, but they can also foster goodwill and create sympathy for a position. If used properly, they can justify a position, and can explain circumstances that are relevant to the case at hand. Arguments can clarify, explain, elucidate, illuminate, and illustrate. In sales, arguments can also be used to advance, advice, advocate, recommend, plug, praise, propose, or persuade. In bargaining, arguments are used to barter, haggle, or beat down prices. Thus, argumentation is not only important but also indispensable to ODR.

An enormous amount of research has been done on argumentation, all more or less relevant to ODR. A problem specific to ODR, however, is that it is difficult to design a mode of argumentation that is fair as well as effective, simple to use, transparent and logically adequate. These are conflicting issues that are obviously hard to combine.

Taking the validity of other requirements for granted, I will briefly argue why simplicity and transparency are vital requirements.

- Simplicity is important, because research on the usability and design of human-computer interfaces has pointed out time and again that users often do not have the time or the intellectual energy to come to grips with the peculiarities of a new system [9, 26]. This requirement of simplicity applies even more to users of ODR platforms, since such users are by definition involved in a non-trivial, demanding, and (often) annoying dispute. Cf. [17].
- Besides being simple, an ODR system must also be transparent. This is really an issue, because research in computer-supported collaborative argumentation (CSCA) has proven that parties may quickly loose track of the consequences that may arise as a result of their claims made, and even may continue their dispute while a solution is already lurking in the background [13]. These observations are fortified by research in cognitive psychology, in which it is observed that humans find it difficult to maintain a comprehensive view of conceptual configurations of even moderate size [1, pp. 116-142].

Solutions to this problem may be expected from roughly four approaches to argumentation theory, namely, "classical" argumentation theory, computer-supported collaborative argumentation (CSCA), "artificial intelligence theories" of legal argument, and computational dialectic (CD).

1. Classical argumentation theory is a research culture rooted in ancient philosophy, language and logic, and deals with norms and values of proper argumentation [30, 34]. But since it is less concerned with visual and computational aspects of argumentation, it does not (pretend to) provide ready-made solutions to the problems of ODR.

2. Compared to "classical" argumentation theory, computer-supported collaborative argumentation (CSCA) is more concerned with practical problems. Its objective is to design software tools for collaborative sense-making in virtual environments, such as educational groupware, internet forums and online discussion groups. A major difference of interest with ODR, however, is that CSCA is primarily interested in the enhanced of a common understanding of the problem at issue, and less interested in steering towards a material solution. For more differences I refer to Table 1 on the following page.

3. As a third approach to argumentation, there is the area of AI & Law, where the application of artificial intelligence techniques to the legal domain led to a new and technically oriented approach to the use of argument in legal theory. Cf., e.g., [22, 10, 6, 25, 7, 29]. Research has been done here, among other things on legal expert systems, intelligent document processing, intelligent computer-assisted instructional systems, evaluation and auditing techniques for legal AI systems, and the development of tools and theories that make legal cases more manageable

	ODR	***CSCA***	***Computational dialectic***
Ideal	Justice	Understanding	Truth
Goal	Settling a case	Making sense out of a case	Inferring the ramifications of a case
Atmosphere	Material interest	Collaborative sense-making	Introspection
Character	Procedure	Representation	Calculus
Means	Fair and effective	Clear and comprehensible	Consistent and complete
Approach	Practical, solution-oriented	Theoretical, problem-oriented	Theoretical, problem-oriented
Method	Pragmatic	Descriptive	Normative
Area	Law	Teaching	Logic

Table 1: Different approaches to argumentation.

and explicit. Although the AI & Law approach to argumentation naturally comes closest to the concerns of ODR, there is presently less consideration for computing with arguments, or argument-like structures, in online environments.

4. Finally, computational dialectic (CD) is a line of research with an ideal that is reminiscent of Leibniz' *calculus ratiocinator*, namely, a system of algorithmic instructions that should make it possible to derive new knowledge out of existing knowledge (facts) in a purely mechanical manner [14, 20, 19]. Similarly, CD is concerned with the construction of formal argument calculi that should make it possible to *compute* which arguments defeat which other arguments. Computational dialectic branched out of work in artificial intelligence and nonmonotonic logics. Influential articles are [18, 4]; recent surveys are [2, 24].

Computational dialectic definitely addresses ODR issues, but the two fields are currently two worlds apart (Table 1).

In this paper we present a simple scheme for ODR that offers a computational framework to structure and process the information between two negotiating parties. In this scheme, users can enter claims and justify claims with other claims for as long as the negotiation continues. Claims can also be conceded, questioned and contradicted. Based on the information that is entered into the system, it is computed which claims are established (accepted by both parties) and which are not. The scheme thus presented ensures that users are confronted with the consequences of the various claims they made, which makes them hopefully more aware of the relative positions they occupy in the negotiation. For the sake of clarity I mention that my scheme is not designed to compete with

platforms such as SmartSettle, OnlineResolution, Square Trade, or iCourthouse (to name a few). Still, the problem of integrating my scheme in such platforms is addressed in Section 9.

The entire paper is organized as follows. Section 2 introduces a case about a consumer who filed a complaint because her new stove burnt the cabinets. This case will serve as an aid to explain the ODR scheme. In Section 3 I sketched a face-to-face version of a dispute on this complaint. In Section 4 this informal dispute is analyzed with a naive speech act theory in order to identify the various components of the dialogue. Section 5, then, proposes a scheme based on the various components identified. Section 6 sketches a possible implementation of the theory, Section 7 discusses the usability of that implementation, and Section 8 relates the paper with two existing approaches to ODR. Finally, Section 9 discusses some open ends and indicates directions for further research.

2   A sample case

Because the theory presented in Section 5 is somewhat abstract, I think it will help to illustrate it by means of some storytelling and "normative handwringing". Hence, the following sample case.

The case we will elaborate on is taken from the New Jersey department web site of law & public safety, division of consumer affairs [3]. It is a fictitious case that is used to inform consumers how alternative dispute resolution might help in business-to-consumer conflicts, and reads thus:

> "After having a new kitchen installed in her home, a consumer filed a complaint because the new stove burnt the new cabinets. The mediator assigned was able to resolve the case to the satisfaction of all parties."

I selected this case to elaborate on because it deals with a practical matter and can easily be extended to a more detailed story that accommodates certain nuances and trade-offs which can (hopefully) adequately analyzed and dealt with by the scheme for ODR that I am going to propose. A description of what happened is displayed in Table 2 on page 16.
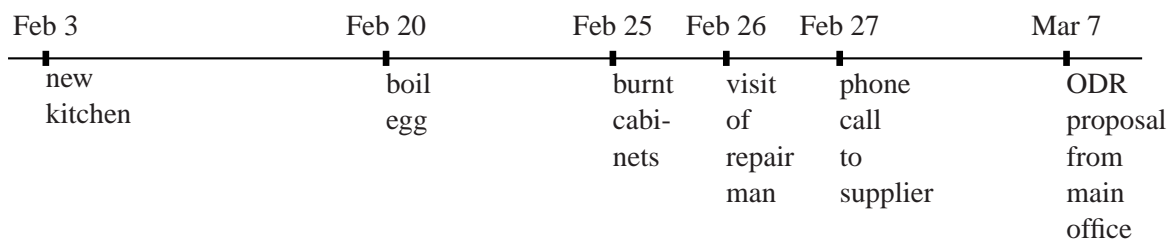
Feb 3	Feb 20	Feb 25	Feb 26	Feb 27	Mar 7
new kitchen	boil egg	burnt cabinets	visit of repair man	phone call to supplier	ODR proposal from main office

Figure 1: Time line.

For the reader's convenience, a time line is depicted in Figure 1. The flow of interaction is depicted in Figure 2 on the following page.

3   Free format negotiation

A problem in settling the matter is that the main office of J. Brown's Kitchen Co., Inc. is a considerable distance away from Ms. Redfield's home. (Cf. Figure 2 on the next page.) This is unfortunate because had Ms. Redfield's home be in the vicinity of J. Brown's main office, she could
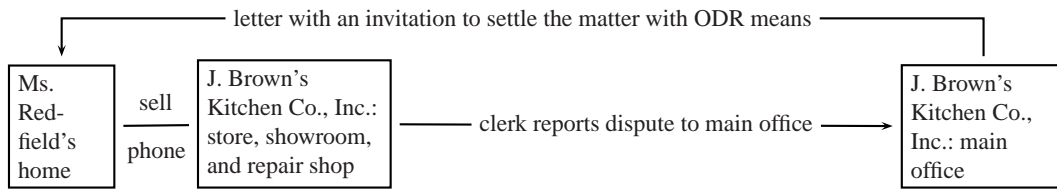
Figure 2: Flow of interaction and an impression of the relative geographic distances.

have been invited to arrange a settlement. Alternatively, J. Brown's could have sent a representative to sort things out. Suppose the latter happens. Then an attempt to reach an agreement might proceed as indicated in Table 3 on page 17. (I disposed of informal dialogue fragments for the sake of brevity.)
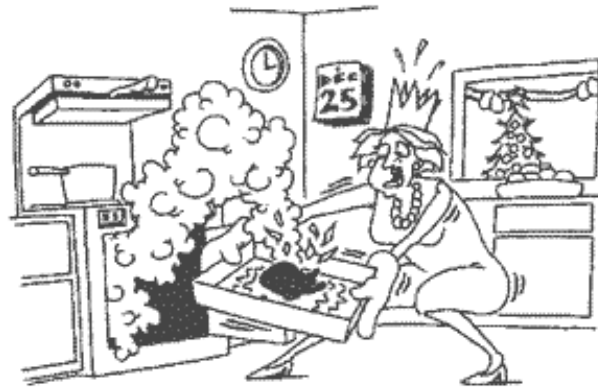
4 Analysis

What made Ms. Redfield receive a full compensation of the damage? The goal of this section is to answer this question by analyzing Table 3 on page 17. The approach we will take is to label (or categorize, or type) the various utterances of the participants so as to create the conditions that make it possible to attach a logical meaning to the individual statements and give the dialogue a formal structure. The labeling of different utterances is reminiscent to Searle's so-called *speech act theory* [28, 31, 33]. What I propose here, however, is much simpler and less ambitious—call it the "poor man's speech act theory".

In contrast with Searle's theory, our set of speech acts is single-layered. However, it knows of several types of "speech acts". For example, the first non-ceremonial utterance that is related to the contents of the case is from the customer, when she claims that the supplier should fully compensate her for the damage that has occurred. Thus, the customer stated a claim. Cf. the first row in Table 4 on page 18. Next, the sales representative questions that claim by asking "what makes you think so?". Cf. the second row in Table 4.

The day at which Claim 22 became more plausible.

Not all statements are alike. Besides regular claims (such as 1, 2, 4 and 5) some statements (such as 3 and 6) are used to justify or "back up" other claims. Still other claims (such as 7) are made that contradict other claims. (In this case Claim 1.) Claim 8 can be seen as a deprecation, i.e., inverted justification, of Claim 7. For a more refined classification of argument attributes I refer to [30].

Besides the two "speech acts" of stating and questioning claims, there is also the possibility of conceding claims. Concessions are not made explicitly, but implicitly, for example by not responding to a request for justification. Thus, claims are stated (and sometimes restated), questioned, and conceded.

Apart from the individual speech acts, the present negotiation can more globally be divided in three main arguments: one argument (owned by the customer) for Claim 2, and two arguments (owned by the sales representative) for Claim 7. (Cf. Figure 3.) An important turning point in the conversation is when Ms. Redfield's question to clarify Reason 10 (i.e., the connection between Claim 9 and Claim 7) is left unanswered. This effectively invalidates the two arguments 9-14 and 9,10,15-17, so that the representative starts to explore an alternative justification of 7, viz. 19-22. This argument also yields insufficient support to 7, because Claim 22 is plausible rather than certain. Had J. Brown's stated 22 with certainty, then Ms. Redfield would certainly have neutralized it by means of a question.
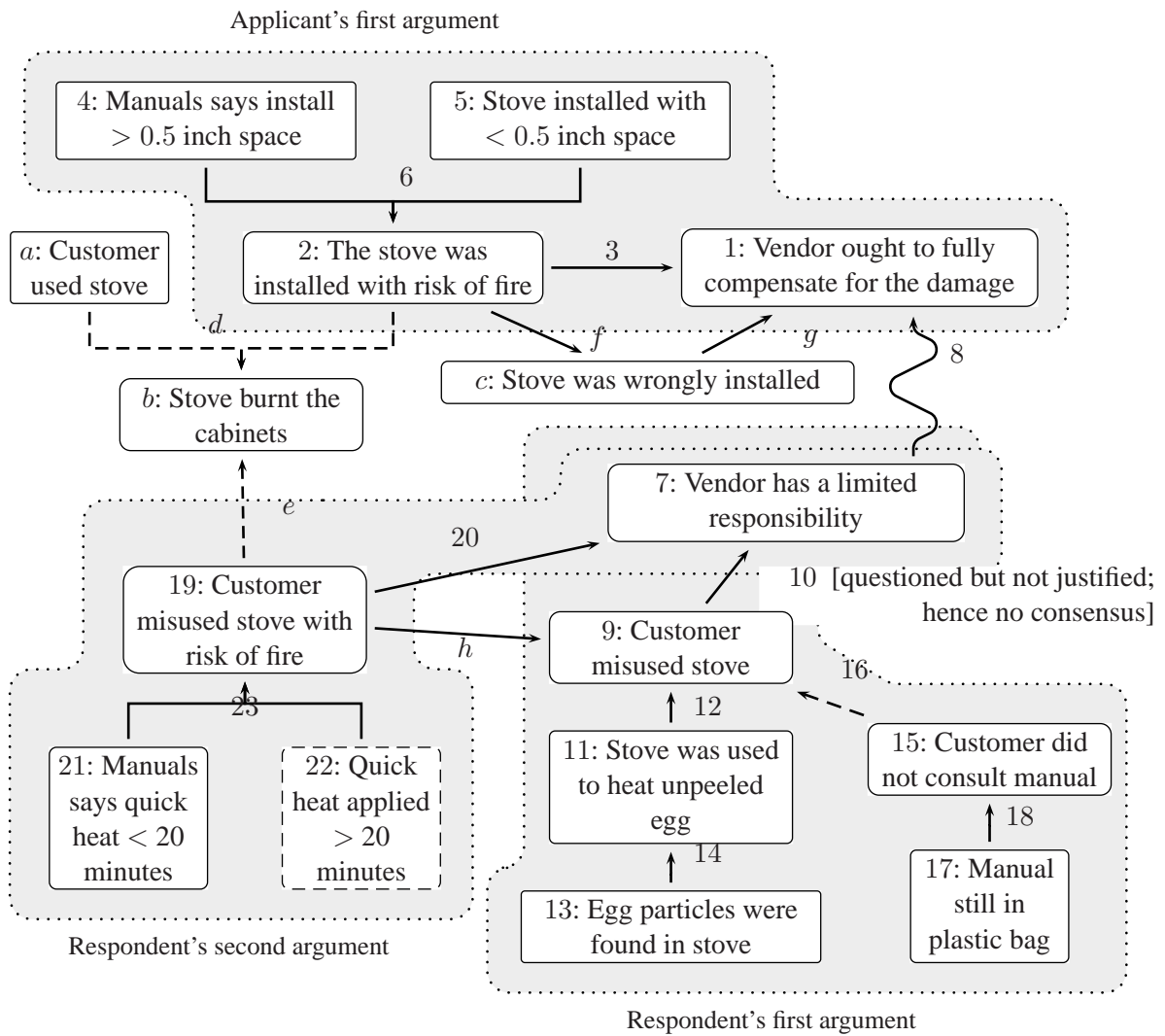

Figure 3: Graphic summary. Dashed claims and reasons are presented by their owner as merely plausible. A zigzag indicates a contradiction.

5   A scheme for ODR

From Table 4 on page 18 we may distill the following essential principles. According to me, these principles hold in every practical dispute, that is, in every dispute in which matters such as time, atmosphere and ease of use are considered important.

i. *Every statement implies, or at least suggests, a commitment.* This means that, if someone states a claim, we may assume that he or she[1] "means what he says," and is willing to explain and/or defend it.

ii. *Silence implies consent.* If someone does not question or challenge a claim we may, in all practicality, assume that he or she accepts it. Hence, by the first principle, there is consensus on that claim. If a claim is questioned or contradicted, there is no consensus.

iii. *A claim that all parties endorse is established.* This means that, if all parties agree on a claim we may assume that this particular claim is established in the dispute, it may considered as fixed in the rest of the discussion.

iv. *A claim that is supported by established claims, is established itself.* This means that established claims may be used as building blocks to establish other claims—without further effort of the parties involved.

Ad (i): Parsons *et al.* say it thus: "an agent should know in advance of making an assertion that its statement may incur obligations to defend it upon contestation by others" [21]. (Cf. also Grice's *conversational maxims* [8].) Violations to this maxim are of course possible, e.g., if participants are dishonest or want to provoke other parties, then statements are made free of engagement. This does not obstruct our ODR scheme but makes the dialogue more difficult to follow.

Ad (ii): Lodder says it thus: "silence implies consent is applied (...) because it saves time (not every statement a player agrees to has to be conceded) and it fits in with daily life discussions (normally someone will let it be known if he disagrees)" [15]. See also Rescher's work on dialectic [27]. In this important work, Rescher assumes that participants make concessions tacitly.

Ad (iii): I have not found scientific support for this, but I think this principle has enough commonsense in it to accept it as a valid maxim.

Ad (iv): this is "logic at work": claims sometimes imply other claims, irrespective of human judgment.

From these principles, we arrive at the following scheme for ODR:

Roles. The ODR scheme I propose knows of three roles: an applicant, a respondent and a mediator. The *applicant* can be seen as the extra-legal (but not illegal!) counterpart of the plaintiff or prosecutor. It is the party that "wants" something of the other party. The *respondent* can be seen as the extra-legal counterpart of the defendant, and is the party that responds to the claim of the other party. Finally, the *mediator* can be seen as a third party that helps the other parties in reaching a satisfactory outcome. The role of the mediator will not be further discussed here because it does not play a formal role within our scheme.

With "extra-legal" I mean that all parties operate outside the law, or at least conduct their negotiations without immediate reference to it. They are aware of the law, and that it can be applied to their case if their negotiations fail. As long as their alternative dispute continues, however, they (more or less) know that their transaction is not burdened with an official legal status. (Then again

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[1]From here on I will use the generic masculine form, intending no bias.

this is not entirely true, because what has been recorded during online negotiations may play a role in subsequent trials.)

Claims. The applicant and the respondent may enter claims for as long as the negotiation continues. Typically, a claim is a statement of which the contributing party thinks it might be important to the resolution process. Once a claim has been entered it cannot be withdrawn. This is to prevent the rest of the discussion of being subverted by the withdrawal of earlier claims.

Possible responses to claims. Parties may respond to each other's claims by either contradicting or questioning claims. A *contradiction* is a claim that contradicts a particular claim of the other party. Contradiction is an asymmetric concept, similar to the notion of attack in computational dialectic [4]. Each contradiction must be formulated anew. Thus, to contradict "vendor ought to fully compensate," for instance, it is not allowed to simply deny it. It is not allowed for example to contradict "vendor ought to fully compensate" by "vendor ought not to fully compensate". This rule is to ensure that claims cannot be contradicted at random by simply denying them. Examples of possible contradictions in this case are for instance "vendor has a limited responsibility," or "supplier is not liable for any damage". There are no strict semantic criteria: a claim turns into a contradiction as soon as its owner qualifies it as such.

A *question* is a request from the other party to further justify a claim. This is done by addressing a particular claim with a simple "why?". A question is not a claim.

Parties are not obliged to respond. Most claims wil in fact remain unchallenged.

Justification and support. A claim C may be justified, or explained, by one or more justifications. A *justification* J is a (special type of) claim of the form $A_1, \ldots, A_n \to C$. The $A_1, \ldots, A_n$ are claims which on their turn may be further contradicted or questioned. Since J is a claim in itself, it can be contradicted and/or questioned as well. The *support* of a claim indicates to which extent it is supported by other justifications and claims. Computational dialectic has rather elaborate criteria for the computation of support, but let us agree here that the support of a claim is computed by taking the maximum of the support of the arguments (independent lines of justification) that support it. Within one argument, then, it is the minimum of the support of all claims and justifications that support it. For example, there are two independent arguments A and B that support Claim 9: $A = 11, 12, 13, 14$ and $B = 15, 16, 17, 18$. (Cf. Figure 3 on page 6.) Then if 16 is plausible and the rest is certain, then A yields certain support, while B yields plausible support for Claim 9. Hence (the degree of support for) Claim 9 is the maximum of the two, viz. certain.

Establishing claims. Establishment is a recursive notion that regresses through claims, contradictions and justifications, to claims on which there is consensus.

If a claim is neither questioned nor contradicted, it follows from the silence-implies-consent principle that there is consensus on that claim. Thus,

1. All claims on which there is consensus are considered as established.

2. A claim can also be considered as established if

   (a) it is not contradicted by another claim that is established and has more support, and

   (b) it is the conclusion of a justification $J : A_1, \ldots, A_n \to C$ such that $A_1, \ldots, A_n$ and J are established.

The present definition is a simplified account of the various definitions to compute defeat among arguments that circulate in the computational dialectic community [18, 4, 2, 24]. Like many such definitions it loops on circular input. A contrived example of circular input is "$A \to B$ justifies B,

and B contradicts C, and $C \to A$ justifies A," cf. Figure 4. Although the concept of circular justification is (extremely) interesting from a theoretical point of view, it turns out that all practical input is non-circular. In the exceptional case that (a part of) the input is circularly dependent, this can be revealed by a simple loop detection mechanism that administers which nodes have been visited already. Mature implementations always have such loop detection mechanisms.

Examples of the scheme currently presented will be given shortly, but let me conclude this section on a more theoretical note. The most characteristic property of the ODR scheme currently proposed is that, due to Clause (2), a claim can be established while there is no consensus on that claim. This reflects the earlier described human shortcoming that participants of a dispute sometimes do not foresee the consequences of their statements to other statements in the dispute. Since these consequences are non-deductive and cannot be described with standard logical means, the present scheme for ODR offers a computational framework in which the different parties involved can be confronted with the consequences of the various claims they made.
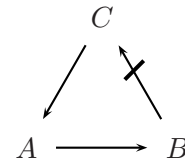
Figure 4: Contrived example.
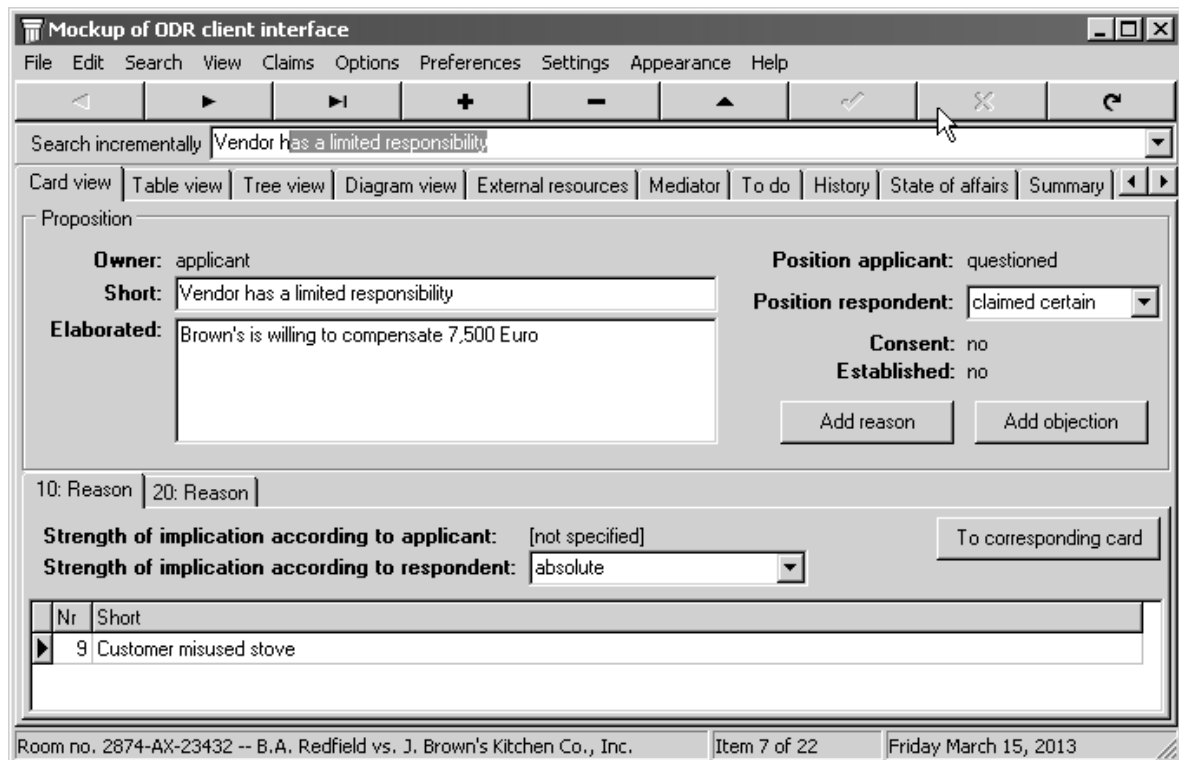

Figure 5: Mockup of ODR client interface — screen to enter individual claims.

6 Implementation

To show how the above case may be dealt by the average (non-technical) user in compliance with the ODR scheme I proposed, I created a mock-up (faked implementation) of an ODR client. The idea is that parties use clients with which it is possible to (asynchronously) exchange and store data on a

Mockup of ODR client interface

File Edit Search View Claims Options Preferences Settings Appearance Help

Search incrementally | Vendor has a limited responsibility

Card view | Table view | Tree view | Diagram view | External resources | Mediator | To do | History | State of affairs | Summary | Provisional conclusion

Nr	Short	Position applicant	Position respondent	Consensus	Support	Status	Justification
1	Vendor ought to compensate	claimed	questioned	no	certain	established	2, 3, 4, 5, 6
2	The stove was installed with risk of fire	claimed	questioned	no	certain	established	4, 5, 6
3	2 implies 1	claimed		yes	certain	established	
4	Manual say install > 0.5 inch space	claimed		yes	certain	established	
5	Stove installed with < 0.5 inch space	claimed		yes	certain	established	
6	4 and 5 imply 2	claimed		yes	certain	established	
7	Vendor has a limited responsibility	questioned	claimed	no			
8	2 contradicts 1		claimed	yes	certain	established	
9	Customer misused stove	questioned	claimed	no	certain	established	11, 12, 13, 14, 15, 16, 17, 18
10	9 implies 7	questioned	claimed	no			
11	Stove was used to heat shelled egg	questioned	claimed	no	plausible	established	13, 14
12	11 implies 9		claimed	yes	certain	established	
13	Egg particles were found in stove		claimed	yes	certain	established	
14	13 implies 11		claimed	yes	plausible	established	
15	Customer did not consult manual	questioned	claimed	no	certain	established	17, 18
16	15 implies 9		claimed	yes	plausible	established	
17	Manual still in plastic bag		claimed	yes	certain	established	
18	17 implies 15		claimed	yes	certain	established	

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Figure 6: Mockup of ODR client interface — first round.

remote server. This is a technical matter that will not be discussed further here.

Card View

From the theory above it follows that all parties may adduce claims for as long as the negotiation continues. As an example, Figure 5 on the preceding page shows a screen in which the respondent edits a particular claim, in this case the claim that the vendor has a limited responsibility. Since in this case the respondent owns the claim he may edit certain fields of it. In this case, he may edit the fields "Short" (crispy one-liner), "Elaborated" (exhaustive description), and "Position respondent" (one of: claimed certain, claimed plausible, claimed possible). In addition, he may add reasons that support, justify, or explain the claim viewed, by pressing the button "Add reason". In this case, there are two reasons that support Claim 7, viz. Reason 9 and Reason 19. For every reason added, the owner of the reason has to add at least one and possibly more claims that constitute the body of the reason. In this case, Claim 8 is added as the body of Reason 9. The conclusion of Reason 9, then, is Claim 7.

Parties that do not own the claim, in this case the applicant, cannot edit these fields, but may edit certain other fields. In this case, the respondent may edit the fields "Position applicant" and "Strength of implication according to applicant". The default value of "Position applicant" is blank (which in this case implies that the claim is conceded) but this may be changed by the applicant into "questioned". Finally, the non-owner of the claim may oppose to Claim 7 by pressing the button "Add objection". (Thus, each party may press either "Add reason" or "Add objection," but not both.)

Nr	Short	Position applicant	Position respondent	Consensus	Support	Status	Justification
1	Vendor ought to compensate	claimed	questioned	no	certain	established	2, 3, 4, 5, 6
2	The stove was installed with risk of fire	claimed	questioned	no	certain	established	4, 5, 6
3	2 implies 1	claimed		yes	certain	established	
4	Manual say install > 0.5 inch space	claimed		yes	certain	established	
5	Stove installed with < 0.5 inch space	claimed		yes	certain	established	
6	4 and 5 imply 2	claimed		yes	certain	established	
7	Vendor has a limited responsibility	questioned	claimed	no	plausible		
8	2 contradicts 1		claimed	yes	certain	established	
9	Customer misused stove	questioned	claimed	no	plausible	established	11, 12, 13, 14, 15, 16, 17, 18
10	9 implies 7	questioned	claimed	no			
11	Stove was used to heat shelled egg	questioned	claimed	no	plausible	established	13, 14
12	11 implies 9		claimed	yes	certain	established	
13	Egg particles were found in stove		claimed	yes	certain	established	
14	13 implies 11		claimed	yes	plausible	established	
15	Customer did not consult manual	questioned	claimed	no	certain	established	17, 18
16	15 implies 9		claimed	yes	plausible	established	
17	Manual still in plastic bag		claimed	yes	certain	established	
18	17 implies 15		claimed	yes	certain	established	
19	Customer misused stove with risk of fire	questioned	claimed	no	plausible	established	21, 22, 23
20	19 implies 7		claimed	yes	certain	established	
21	Manual says quick heat < 20 minutes		claimed	yes	certain	established	
22	Quick heat applied > 20 minutes		claimed	yes	plausible	established	
23	21 and 22 imply 19		claimed	yes	certain	established	

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Figure 7: Mockup of ODR client interface — second round.

Table View

All claims may be viewed together in a so-called table view. Figure 6 on the page before shows the table view of the case after the first round, when both parties have advanced one argument. We see that every row complies with Principles (i-iv) on page 7. For example, for every row there is consensus on a claim if and only if it is claimed (Principle i, commitment) and not questioned by the other party (Principle ii, silence implies consent). Further, a claim is established as soon as all parties endorse it (Principle iii), or if it is supported by established claims (Principle iv). The justification of a claim are the claims that support it either directly or indirectly through reasons. For example, the justification of Claim 9 focuses on the the lower-right corner of Figure 3 on page 6: Claim 8 is justified by two lines of reasoning, viz. 11 through 14 and 15 through 18. Hence the justification 11 through 18.

The difference between the first and second screen (Fig. 6 vs. Fig. 7) is that the second screen is a snapshot of the negotiation after the second round, in which the respondent has advanced his second argument, consisting of Claims 19-23. Although respondent's second argument has made Claim 7 more plausible, it still lacks conclusive force to defeat applicants main claim, viz. Claim 1.

7 Usability

A problem with the occasional use of specialized software is that users are often incapable or unwilling to spend much time into the system and its user interface. I think this attitude towards new software is normal and understandable. Usability engineering research has pointed out that difficult systems, i.e., systems with a high cognitive workload, simply will not be used [26]. Again, this is understandable: if one has a problem, one does not want to go through additional pains by trying to come to grips with the peculiarities of a new system.

This observation of course fully applies to ODR software. Many users do not have the time or the intellectual energy to handle difficult protocols for ODR. This applies even more to users that are engaged in a non-trivial, demanding, and (sometimes) annoying dispute. Below I try to indicate why the ODR scheme proposed here nevertheless has a low threshold to new users.

A first argument for the usability of the ODR scheme proposed here, is that (new) users do not have to be aware of the logics behind it in order to engage in a negotiation. Of course, they will have to agree to it, but once they exclaimed their trust in the procedure, they do no longer have to worry about bookkeeping issues that are involved with the computation of defeat among arguments. The only thing users have to do is to enter claims, and to connect them with other claims. In the present mock-up these connections must be entered as plain text, but it is not hard to imagine how a more elaborate version of this tool enables users to connect their claims graphically by means of click-and-drag techniques.

A second argument for the usability of the scheme proposed here is that it is designed such that users are encouraged to enter their data on demand. This kind of "lazy data entrance" ensures that users enter their data just in time, when they feel called upon. For example, a user may choose to contradict or question a claim only when it becomes crucial to the outcome of the negotiation. An alternative (and according to me less favorable) approach would be to organize some sort of preparatory stage in which all issues are entered prior to the dispute proper. (See below.)

8 Related work

This paper is inspired by much other work. Because reasons of space, I selected two approaches for discussion. First I will a discuss scientific prototype. Then, I will discuss a commercial ODR tool.

A system close in spirit to the one presented here is that of Lodder. The basis of his system (Lodder calls it model) is that "previous models that aimed at presenting argumentation in a simple way (...) are still too complex to be really useful for online application" [16, p. 121]. They also remark that their model is not meant to replace existing ODR procedures, but to supplement them. Like our scheme, Lodder's model involves two parties (called the complainant and the respondent) that make statements, such that some of these statements support or attack other statements. Unlike my scheme, however, an ODR session in Lodder's model exists of separated rounds in which statements are made, supported and attacked, respectively. The order thus introduced is rather strict and it remains yet to be seen whether this is an advantage. Unlike Lodder's system, my scheme has a notion of support that recursively flows through the various claims made, irrespective of "rounds" and ownership. Whether this is an advantage remains to been seen as well.

A well-known practical approach to ODR is SmartSettle.[2] The SmartSettle process goes through six different stages. After a preparation phase, the parties designate and qualify their interests which then become the dimensions along which they will negotiate. After this phase, the parties quantify

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[2]www.smartsettle.com

their interests by identifying their best and worst expectations as to define a bargaining range for each issue. In the fourth and fifth phase the parties bargain on the complete package by varying the values of the different dimensions (interests). In case of an impasse, SmartSettle can offer suggestions by sampling the negotiation space that both parties have in common. If an agreement is found it is sealed in the sixth phase.

Although I like SmartSettle's solution concept a lot, it has little room for textual justification, persuasion, or argumentation. This is most vividly demonstrated by the 45 files (9MB) of documentation that ships with Build 1282 of SmartSettle. A case-insensitive search with the string "argu" produced all-in-all one hit, namely, the sentence "Arguments between Ted and Amy have flared up frequently" within the file `T14_TV_Divorce.doc`. (A search with similar strings, such as "justif" and "explan" yielded nothing.) Although SmartSettle has places and stages in which parties can utter their motivations and can confer about their preferences and desires, none of these places are formally incorporated in the software. When brought back to its essentials, SmartSettle is a (sympathetic, fair and effective) utility-maximizing concept, rather than a place where parties can textually underpin their various motivations. In sensitive cases such as divorce this might be a good idea but in other cases I think some mutual explanation is desired. Although I do not immediately see how the ODR scheme proposed here can be integrated within SmartSettle concept, I maintain that any mature ODR platform must provide facilities in which users can explain and clarify their negotiation behavior.

9   What is next . . .

Again, I emphasize that the work proposed here is not designed to compete with practical ODR platforms. Rather, it is designed as a proof-of-concept, to show that information that is exchanged must be framed, structured and processed in order to maintain overview and to confront the participants with the consequences of the various claims they made.

Much remains to be done. First of all, Section 8 does not suffice as a comparison of related work, so that the most important point of research now is to investigate how the scheme presented here relates to other ODR solution concepts. In particular, a more detailed comparison with, e.g., [16, 11, 12] is in order.

It is also important to investigate how the scheme presented here can be fitted in practical ODR solutions. Argumentation is one thing, but users also need to know when they should stop arguing (i.e., filling out claim forms) and should proceed to the next phase. In a final phase, parties could for example draw up the balances and be led to a tentative agreement form. How this should be done and how and when this should follow up to the argumentation process is a matter of further research.

On the more practical side, I would like to see the various "blind spots" of the current mock-up to be filled in. A large number of screens and menus await completion, in particular screens that make the dispute convergent and steer it towards a settlement. As a concrete example, I think of a screen at which a tentative agreement based on all arguments is suggested. How users can enter claims and connect them with a minimum of (cognitive) effort needs also to be investigated, but then by researchers specialized in usability engineering and computer-supported collaborative argumentation.

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Date	Event
Februari 3	The supplier installs a kitchen at the customer's home, including a microwave. The client pays the entire amount after which the supplier leaves.
Februari 20	The customer uses the microwave to try to boil an unpeeled egg, and the egg explodes. (Eggs explode when heated within microwaves.)
Februari 25	The customer uses the so-called "quick-heat" feature of the stove, but accidently forgets to switch it off. The quick-heat remains operational for more than 10 minutes. As a result the cabinets get burned. The manual (which is at this point not consulted by the customer) explicitly advices against leaving the quick heat on for longer than 10 minutes due to risk of overheating and fire. Because the cabinets are damaged and must be replaced, the customer calls the supplier and explains what has happened. The supplier promises to send a mechanic.
Februari 26	A mechanic visits the customer and notices (besides the burned cabinets) that tiny egg-particles are distributed all over the microwave's interior. He also notices that the manual of the microwave is still wrapped in plastic. He concludes that the situation is the consumer's own fault and explains this to the customer. Because the mechanic does not exactly know what happened at Februari 25, he does not mention the quick-heating incident. After his explanation he offers to return with a new microwave and new cabinets, but informs the customer that the supplier is not willing to pay for any of the new gear due to customer's misuse and negligence. The customer agrees, signs an order to replace the cabinets after which the mechanic leaves. That evening the customer consults the manual to find out why eggs can't be boiled in a microwave. She finds no answer but in the back of the manual she reads in the installation instructions that the microwave must, except for the floor plate, be surrounded by 0.5 inch free space. She notices that this is not the case, and concludes that the mechanic who installed her microwave was at fault.
Februari 27	The customer calls the supplier and tells what she discovered. It takes some time to convince the supplier that he cannot remain passive and must come across with a solution. She casually refers to friends and the consumers bond, bringing in the media, and the existence of an internet-blacklist of kitchen vendors. The supplier eventually promises to discuss the matter with his superior.
March 7	The customer receives a letter in which the supplier proposes to settle the matter by ODR means.

The damage occurred is estimated at an amount of 10,000 Euro.

Table 2: Description of what happened.

Speaker	Text
Representative	Good morning, my name is ... I am sent by J. Brown's and I am here to arrange a financial agreement with you on the replacement of kitchen parts.
Customer	Come in, please.
⋮	⋮
Representative	What can we do for you?
⋮	⋮
Customer	..., mmm, well so I think your company should fully compensate for the damage that has occurred.
Representative	What makes you think so?
Customer	Well, you know, I discovered the stove is installed with risk of fire.
Representative	Why is that?
Customer	If look at the oven you will see that it is installed with less than 0.5 inch free space. However, the manual says that the oven should be surrounded by at least 0.5 inch free space on all sides, on danger of fire.
Representative	[Takes a look at the oven.] I see. We are willing to pay you 7,500 for reasons which I am going to explain you now. Our mechanic reported that you used the stove in a way that is not prescribed in our manual. [Explanation follows, about egg particles and manual wrapped in plastic.]
Customer	That's right, but that does not explain why the stove burnt the cabinets. So maybe J. Brown should take its responsibility for the faulty installation and pay me the full 10,000.
Representative	Well, there is a passage in the manual that forbids leaving the quick-heat on for longer than 10 minutes. The problem is that in a phone-call with our sales-desk on Februari 25, you said that you accidently forgot to switch off the quick-heat...
Customer	mmmm...
Representative	... which to us indicate that you misused the stove with risk of fire.
Customer	I see.
Representative	Although we don't know for how long you did leave it on, we believe that this indicates that you also have some share in what has happened. I propose we pay you 7,500.
Customer	I am sorry, but I think I can't accept this offer. I do not want to pay for damage that occurred because of a wrong installation.
Representative	That is allright with me. I understand. I will go back to the main office and discuss this case with my boss.
⋮	⋮
Representative	Goodbye Ms. Redfield.
Customer	Goodbye, sir.

Two weeks later, J. Brown's Kitchen Co., Inc. adds 10,000 Euro to the account of Ms. Redfield. Case closed.

Table 3: Hypothetical scenario of a face-to-face settlement.

Party	*ID*	*Speech act*	*Content*
Customer	Claim 1	Statement	I think the supplier should fully compensate for the damage that has occurred.
Representative	Claim 1	Question	What makes you think so?
Customer	Claim 2	Statement	Well, you know, I discovered the stove is installed with risk of fire.
Representative	Claim 2	Question	Why is that?
Customer	Claims 4 and 5	Statement	If look at the oven you will see that it is installed with less than 0.5 inch free space. However, the manual says that the oven should be surrounded by at least 0.5 inch free space on all sides, on danger of fire.
Representative	Claims 4 and 5	Concession	[Takes a look at the oven.] I see. We are willing to pay you 7,500 for reasons which I am going to explain you know. Our mechanic has established that you used the stove in a way that is not prescribed in our manual. [Explanation follows, about egg particles and manual wrapped in plastic.]
Customer	Claim 9	Concession	That's right, ...
Customer	Reason 10	Question	... but that does not explain why the stove burnt the cabinets, ...
Customer	Claim 1	Restatement	... so maybe J. Brown should take its responsibility and pay me the full 10,000.
Representative	Claim 21 and 22	Statement	Oh well, there is a passage in the manual that forbids leaving the quick-heat on for longer than 10 minutes. The problem is that in a phone-call with our sales-desk on Februari 25, you said that you accidently forgot to switch off the quick-heat...
Customer	Claim 21 and 22	Concession	mmmm...
Representative	Claim 19	Statement	... which to us indicate that you misused the stove with risk of fire.
Customer	Claim 19	Concession	I see.
Representative	Claim 22	Qualification	Although we don't know for how long you did leave it on, we believe that this indicates that ...
Representative	Claim 7	Statement	... you also have some share in what has happened. We estimate this at 5000.
Representative	Proposal	Statement	I propose we pay you 7,500.
Customer	Proposal	Denial	I am sorry, but I think I can't accept this offer ...
Customer	Claim 1	Restatement	... I do not want to pay for damage that occurred because of a wrong installation.

Table 4: The negotiation dialogue, more formalized.