

Study on the Structure of Argumentation in Case Law

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Abstract. This paper investigates natural-language argumentation in the case law domain. The starting point is a study on the discursive and argumentative characteristics of ten legal documents from the European Court of Human Rights (ECHR). Then, a generalization of this study allows to formalize the structure of argumentation in the ECHR documents as a context-free grammar. The paper concludes with the evaluation of the grammar and a discussion of its main limitations.

1. Introduction

Different books on technical writing in legal argumentation have been published [15,8], however, legal professionals not always follow these recommendations when presenting their arguments. Furthermore, legal argumentation is a natural-language discourse that focuses on interpreting the meaning of general concepts in light of specific facts. Therefore, there is no unique way to present a legal argument.

There have been studies on specific problems of natural-language argumentation, such as the matter of unexpressed premises [16]. Tools to teach or visualize natural-language argumentation have been developed [1,3,20] and argumentation theorists have focused on logical models [17,9,12], where the main aim is to apply argumentation formalisms to knowledge bases to produce automatic reasoning systems [2].

However, there is, to the best of our knowledge, little work on how natural-language argumentation is used in real courts. There have been some studies where the different rhetorical roles of real case law sentences have been studied in order to improve legal summarization [10,11]. These studies have focused more on determining if the sentence introduces a new fact, an argumentative step or background information. Our focus is, however, to know the function of the sentence inside the argumentative process, i.e. does it support a conclusion? is it a conclusion? Moreover, do legal experts follow explicit methodologies when presenting their arguments? Can this ease the argumentation detection? The aim of this paper is (a) to explore the main linguistic and structural characteristics of case law argumentation and (b) to develop a grammar to automatically detect the main argumentation process of a case law document. The output of the grammar allows to differentiate between critical information (i.e. what justifies the final decision) and other information.

The structure of this paper is as follows. In section 2 some basic knowledge of case law is presented together with a justification for the selected documents on this study. Section 3 analyzes the structural, linguistic and argumentative characteristics of the chosen texts. Section 4 gives the definition of our grammar. Section 5 discusses the grammar limitations and problems. In section 6 some conclusions are drawn and speculations are given about the future of legal argumentation grammars.

2. Case law, legal cases and the ECHR

Case law is that body of reported judicial opinions in countries that have common law legal systems, e.g. Australia, USA, UK or Canada, and also in special courts, e.g. the European Court of Human Rights (ECHR), the Inter American Court of Human Rights (IACHR) or the International Criminal Court (ICC). Legal cases are the main decision tool of case law. A legal case may be either civil or criminal. However, all legal cases are premised on the idea that a dispute will be fairly resolved when a legal procedure exists by which the dispute can be brought to a *factfinder*¹, not otherwise involved in the case, who can evaluate evidence to determine the truth with respect to claims of guilt, innocence, liability, or lack of fault.

In this paper we focus on the case law from the European Court of Human Rights (ECHR). The ECHR maintains a recorded institutional memory of all cases, divided in judgments, decisions, resolutions and reports. All this legal documentation is stored in an online database². Resolutions and reports contain non-argumentative information, while judgments and decisions are argumentative documents. Therefore, we study ten examples of these two last types of documents.

The choice of these documents was based on their well structured format, both discursive and argumentative. Furthermore, some of these structures are also found in other case law documentation, such as the judgments from the Inter American Court of Human Rights (IACHR), the South African Supreme Court or the UN High Commissioner for Human Rights (UNHCHR). Therefore, the ECHR seems to provide a good starting point to understand the argumentation structures of real case law.

3. Analysis of the documents

3.1. Structural analysis

As textual units, case-law documents are typically organized into hierarchically structured sections [14]. There are different initiatives to formalize legal structures, e.g. MetaLex an open format and a generic and extensible framework for the XML and RDF encoding of the structure and contents of legal documents [22]. However, these formaliza-

¹A *factfinder* is the person or persons in a particular trial or proceeding with the responsibility of determining the facts. For example, in the ECHR decisions the *factfinder* it is a *Commission*, in the ECHR judgments it is a *Court* and in other documents it is a *Judicial Responsible*, a *Committee* or a *jury*.

²<http://www.echr.coe.int/ECHR/EN/Header/Case-Law/HUDOC/HUDOC+database>

Table 1. Structures of *The Law* section in the ECHR judgements

Option A	Option B	Option C	Option D	Option E	Option F			
The Court’s assesment of the evidence and establishment of the facts	General Approach	Preliminary observation	-	Scope of the case	The Court’s assessment of the facts			
					The Government’s preliminary objection			
Alleged violation of article X								
The merits								
Alleged violation of article X								
Application of article X								

tions are not yet used by all legal professionals. Even so, legal documents usually contain clearly separate sections, e.g. the facts, the complaints or the factfinder's decision process. A study on American case law structure [6] shows that legal experts can arrive to a consensus on the fundamental components of the case law and the importance of each component on the judicial decision.

The ECHR judgments and decisions, thus, present a more or less fixed section structure. Most ECHR decisions have the following five sections, where sections 3 and 4 may be omitted:

1. *Introduction*: The application number, names of plaintiff, defendant and the members of the ECHR involved in the case are presented. Furthermore, some details on previous submissions and the related article of the "Convention for the Protection of Human Rights and Fundamental Freedoms" are given.
2. *The Facts*: This section presents a summary of the main facts of the case. All the facts are presented in chronological order.
3. *Proceedings before the Commission* This section contains previous decisions of this court on the current case and previous applicant's steps in front of this court. There are no justifying reasons for each court decision and all the steps are presented in chronological order.
4. *Complaints*: The applicant complaints are presented on this section. More than one complaint can be presented in front of the court.
5. *The Law (sometimes called: Reasons for the Decision)*: For each complaint presented in the previous section the reasons exposed by the applicant are presented, together with all the court's deductive procedures to arrive to a final conclusion. The final conclusion may have different subconclusions.

On the other hand, the ECHR judgments rename the *Complaints* section to *Final Submission to the Court* and allow to add different *Partly Dissenting Opinion of Judge X* sections after *The Law* section. In both structures the registrar of the case can, at any point, introduce a note. These notes are always clearly marked with a distinctive title.

Not all the sections of a legal document are equally relevant for the argumentative process. In fact, in case law it is expected that most of the argumentation is concentrated on *The Law* or the *Dissenting Opinions* from the judges. Even if *The Law* section is common in both types of ECHR documents, its internal structure is not fixed and is dependent on the writing style of the judges or on the type of case at hand (see Table 1).

3.2. Argumentative analysis

We present an argumentative analysis based on argumentation schemes [21]. In the past, other formalisms, e.g. Toulmin [13], have been used. However, argumentation schemes work with presumptive reasoning, which supports inference under conditions of incompleteness by allowing unknown data to be presumed, and defeasible conclusions can be withdrawn or modified if known (but uncertain) data turns out to be flawed [7]. Therefore, presumptive reasoning can deal with two fundamental problems of real argumentation, uncertainty and incompleteness.

3.2.1. Methodology

Having established a formalism for the analysis we asked two lawyers to independently annotate the ECHR documents. They were asked to identify the different arguments, the schemes they followed and how they interact. To ease this process different documents describing the argumentation schemes formalism and guidelines on the output format were given to the annotators. Once the task was completed, their annotations were compared, given an agreement of around 58% measured with the kappa measure [4]. Therefore, the annotations were analysed by another legal expert, who studied the source of the differences. We do not have the space here to discuss this study, however, most of the disagreements were due to a different demarcation of argument boundaries or the ambiguity of some argumentative sentences. With the information analysed, a new set of guidelines, comments and recommendations was specified. These guidelines were given to a fourth legal expert who annotated again the documents. This final annotation was again analysed, obtaining around 80% agreement, and minor modifications were done until an annotation was agreed between the annotators.

3.2.2. Discussion

The study of the annotated text confirms the assumption that in legal cases the argumentation is mainly done in *The Law* and *Dissenting Opinion* sections. Moreover, the annotators agreed that the argumentation used in any *Dissenting Opinion* has no influence on the final decision of the case and it has therefore an independent argumentation structure. In conclusion, *The Law* section has been proved to be developed around the final decision of the case and to contain the critical information on the argumentation of the case, and thus is the focus of the current study.

Any argument in *The Law* can come from the applicant (or plaintiff), the defendant or the factfinder. The arguments from the applicant and the defendant are *reported arguments*, as they have been previously filed to the factfinder. These reported arguments are written in the past tense and are seen as facts by some lawyers, because they reflect argumentation that cannot be attacked by the current process (see Table 2). On the other hand, arguments analysed by the factfinder are the ones that defend or refute the current decision. Therefore, they are part of the current process and they are mainly written in the present tense, with few uses of past tense to refer to decisions mentioned in previous sentences of the document. These arguments are named *non-reported arguments*. In conclusion, the arguments from the factfinder are the core of the argumentative process from the ECHR legal cases and are the most important arguments to detect.

The argumentative structure of the *factfinder's* arguments has its ending in the case's final decision. Therefore, it can be said that the whole argumentation of the case branches

Table 2. Examples of *Reported* and *Non-reported* arguments in the ECHR corpus

Reported	Non-Reported
(CONCLUSION) The applicant complained of having been ill-treated in different ways. (PREMISES) He referred to medical evidence from Dicle University Medical Faculty which showed that he was suffering from a bilateral brachial plexus injury at the time of his admission to hospital see paragraph above. This injury was consistent with Palestinian hanging.	(PREMISES) The Court considers that this treatment was of such a serious and cruel nature that it can only be described as torture. (CONCLUSION) In conclusion there has been a violation of Article of the Convention art.7.

from the final decision. This final decision can be easily identified by the sentence "*For these reasons, the factfinder*". Following this sentence the different parts of the decision are presented. There are mainly three formats, where the text between square brackets is optional: (a) *holds* [by *X* votes to *Y/unanimously*], (b) *dismisses* [by *X* votes to *Y/unanimously*] and (c) [by a majority /unanimously] declares [the application] *admissible/inadmissible*. To arrive to each of the parts of the decision different arguments have been presented in the report. In fact, there is a group of arguments related to each part of the decision, i.e. each part of the decision is a standpoint that is justified with these interrelated arguments. For the current study we will treat this structure as a whole unique argumentative process ending in a main coordinative conclusion.

3.3. Linguistic analysis

We have conducted a linguistic analysis based on the findings from the previous argumentative and structural analyses. Our study reveals recurrent patterns of semantic and lexico-grammatical choices in the argumentative discourse from the *factfinder*. The analysis of these patterns help to clarify the multi-layered functions that argumentative discourse serves.

Theoretically, any legal argumentative discourse has two main layers of reasoning: First, the reasoning whereby a conclusion leading to the decision is inferred from the supporting premises; Second, the reasoning which supports the premises that make up the first reasoning. That is clearly visible in the ECHR documents, where the decision, stipulated by the expression "*For these reasons the factfinder*", is supported by different conclusions such as "*There is a violation of Article*" that are, in turn, supported by one or more premises, possibly supported by other subarguments. There are rhetorical markers that can help to identify this discursive structure, e.g. *however, therefore, although* or *in particular*. Furthermore, many premises and conclusions found in *The Law* section have explicit linguistic expressions that clearly identify them as being part of the argumentative process (Table 3). Most of them are common in all kind of argumentative texts, e.g. "*as a consequence*". However, there are few that are more restricted to the legal field, e.g. "*under the terms of article*". Gathering these characteristics allow drawing up rules such as: $\forall_x [isPremise(x_i) \wedge startsHowever(x_{i+1}) \rightarrow isPremise(x_{i+1})]$ and therefore, we can develop a context-free grammar.

Table 3. Typical expressions in the ECHR corpus

Conclusions	The <i>factfinder</i> [A/B] <Verb-Conclusion> [C] The <i>factfinder</i> <Verb-Aux> [NOT] [A/B] <Verb-Conclusion> The <i>factfinder</i> [A/B] <Verb-Premise> There has been a violation of It [A] follows that There has [A] been a breach of Having reached this conclusion [C] In conclusion,
Premises	The <i>factfinder</i> [A/B] <Verb-Premise> [C] The <i>factfinder</i> <Verb-Aux> [NOT] [A/B] <Verb-Premise> [C] The <i>factfinder</i> [B] has/is [A] <Verb-Premise> [C] In the <i>factfinder</i> 's view In the view of the <i>factfinder</i> See, mutatis mutandis
[A]	therefore / , firstly / accordingly / clearly / also / further / thus
[B]	like the xxxx and the xxxx, / , like the xxxx,
[C]	in the light of the partie's submissions / , in the light of all the material before it
<Verb-Conclusion>	accepts / concludes / holds / decides / rejects / declares / dismisses / sees no reason / examines / strikes
<Verb-Premise>	considers / notes / recalls / agrees / disagrees / reiterates / acknowledges / is of the opinion / points out / emphasises / stresses / is of the view / is satisfied / endorses / observes / takes into account / convinces
<Verb-Aux>	must / can / does

4. Grammar

4.1. Theoretical aspects

A grammar is a precise description of a formal language. It describes which of the possible sequences of symbols in the language constitute valid statements, but it does not describe their semantics. The symbols can be terminal (represented with non-capital letters), i.e. symbols that form the parts of the statements, or non-terminal (represented with capital letters), i.e. symbols that generate statements by substitution of either other non-terminals or terminals or some combination of these. A context-free grammar is a grammar where non-terminals symbols can be rewritten without regard to the context in which they occur.

There exist top-down grammars (LL) and bottom-up grammars (LR). LR grammars focus on piecing together statements to give rise to grander statements, thus making the original statements substatements of the emergent statement. This easily maps our idea of argumentation structure, where different arguments are grouped together to justify a new standpoint, thus they are considered subarguments of the new argument. Therefore, we chose to develop a LR grammar to describe the argumentation language.

4.2. Our approach

A LR version of the argumentative grammar is presented in this section. The language of the grammar for real case law argumentation is all the possible argumentative structures

Table 4. Terminal and non-terminal symbols from our grammar

T	General argumentative structure of legal case
A	Argumentative structure that leads to a final decision of the factfinder $A = \{a_i, \dots, a_j\}$, each a_i is an argument from the argumentative structure
D	The final decision of the factfinder $D = \{d_i, \dots, d_j\}$, each d_i is a sentence of the final decision
P	One or more premises $P = \{p_i, \dots, p_j\}$, each p_i is a sentence classified as premise
C	Sentence with a conclusive meaning
n	Sentence, clause or word that indicates one or more premises will follow
r_c	Conclusive rhetorical marker (e.g. therefore, thus, ...)
r_s	Support rhetorical marker (e.g. moreover, furthermore, also, ...)
r_a	Contrast rhetorical marker (e.g. however, although, ...)
r_{art}	Article reference (e.g. terms of article, art. x para. x, ...)
v_p	Verb related to a premise (e.g. note, recall, state, ...)
v_c	Verb related to a conclusion (e.g. reject, dismiss, declare, ...)
f	The entity providing the argumentation (e.g. court, jury, commission, ...)
s	Sentence, clause or word different from the above symbols

of a case law document, in this case from the ECHR documents. However, the grammar could be generalized further to also accept texts from other courts. The grammar works on a sentence level. The symbols used for describing the grammar are shown in Table 4. The resulting grammar is presented in Figure 4.2.

$$T \Rightarrow A^+ D \quad (1)$$

$$A \Rightarrow \{A^+ C | A^* C n P^+ | C n s | A^* s r_c C | P^+\} \quad (2)$$

$$D \Rightarrow r_c f \{v_c s | \cdot\}^+ \quad (3)$$

$$P \Rightarrow \{P_{verbP} | P_{art} | P P_{sup} | P P_{ag} | s P_{sup} | s P_{ag}\} \quad (4)$$

$$P_{verbP} = s v_p s \quad (5)$$

$$P_{art} = s r_{art} s \quad (6)$$

$$P_{sup} = \{r_s\} \{s | P_{verbP} | P_{art} | P_{sup} | P_{ag}\} \quad (7)$$

$$P_{ag} = \{r_a\} \{s | P_{verbP} | P_{art} | P_{sup} | P_{ag}\} \quad (8)$$

$$C = \{r_c | r_s\} \{s | C | P_{verbP}\} \quad (9)$$

$$C = s^* v_c s \quad (10)$$

Figure 1. Generalized argumentation grammar

Table 5. Results over 20 documents from the ECHR

	Size (# of sentences)	Precision	Recall
Premises	430	59%	70%
Conclusions	156	61%	75%
Non-argumentative information	1087	89%	80%
Final decision	63	100%	100%

5. Evaluation

Our grammar has been tested to identify the argumentative structure of twenty new documents, annotated with the same procedure than the training documents, from the ECHR corpus. We have implemented the grammar using java and JSCC³. The main results can be seen in Table 5. It is observed that all final decisions (D) are correctly identified. Therefore, the limitations of the grammar are due to the structure of A, i.e. the justification given by the *factfinder*. In this aspect, there are two main problems:

(a) **The detection of intermediate conclusions, specially the ones without rhetorical markers.** More than 20% of the conclusions are classified as premises of a higher layer conclusion. On the other hand, premises tend to be confused with non-argumentative information. Thus, around 30% of the premises are classified as non-argumentative. Most of these premises are descriptions of principles or statements with no clear speaker.

(b) **The ambiguity between argumentation structures.** We would like to note that this problem, i.e. to choose between premise→conclusion→conclusion or (premise & premise)→conclusion, is also one of the main causes of human disagreement. Even so, the argumentative structures obtained with the grammar were able to detect simple structures, such as premises→conclusion→conclusion, with 60% accuracy.

Moreover, the average compression range of the *The Law* section is 65% and only 10% of the information presented is non-relevant for the final decision, i.e. non-argumentative information classified as argumentation. This means an average lawyer interested on those cases will have to read around 35% of the document when looking for the different standpoints of the *factfinder* during the argumentative process.

Finally, we graphically represent the information extracted from the case (see Figure 2). Graphical representations of argumentation have been studied for a long time and their importance in argumentation understanding well-proved. Different authors [18,19,5] have developed systems to visualize those structures. In contrast to these complex systems and due to the current inability of our grammar to take into account complex relations inside an argument (i.e. only premise-conclusion relations are studied), we decided to use a simple tree-structure. However, once the grammar is extended to more complex relations, it would be needed to accordingly adapt the graphical representation.

³<http://jscc.jmksf.com/>


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T
|--D
| |--x: for these reasons, the Commission by a majority declares the
|      application admissible, without prejudging the merits.
|--A
| |--c: it follows that the application cannot be dismissed as
|      manifestly ill-founded.
| |--A
|     |--P
|           |--p: it considers that the applicant's complaints raise serious
|           |      issues of fact and law under the convention, the
|           |      determination of which should depend on an examination
|           |      of the merits.
|           |--p: the Commission has taken cognizance of the submissions
|           |      of the parties.
|--A
| |--c: in these circumstances, the Commission finds that the application
|      cannot be declared inadmissible for non-exhaustion of domestic
|      remedies.
|--A
|     |--P
|           |--p: the Commission recalls that article art. of the convention
|           |      only requires the exhaustion of such remedies which
|           |      relate to the breaches of the convention alleged and at
|           |      the same time can provide effective and sufficient redress.
|           |--P
|                 |--p: the Commission notes that in the context of the section
|                 |      powers the secretary of state has a very wide discretion.
|                 |--P
|                       |--p: the Commission recalls that in the case of temple
|                       |      v. the united kingdom no. x dec. x d.r. p. the Commission
|                       |      held that recourse to a purely discretionary power
|                       |      on the part of the secretary of state did not
|                       |      constitute an effective domestic remedy .
|                       |--p: the Commission finds that the suggested application
|                       |      for discretionary relief in the instant case cannot
|                       |      do so either.

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Figure 2. Tree Structure of an argument

6. Conclusion

Our study is a valuable approach to an automatic tool to detect argumentation in natural-language case law. Furthermore, this study is a starting point to clearly distinguish the different sources of problems when dealing with natural-language argumentation, e.g. linguistic problems, such as the definition of conclusive verbs, or structural problems, such as the distinction between possible argumentation structures. Future work will integrate the findings in more advanced machine learning techniques, e.g. kernel methods or conditional random fields, in order to automatically encode the structure of the data.

Finally, we would like to notice that the grammar was developed only over the generalization of ten documents. The study of further documentation could imply the addition of new rules and an improvement of the results. Furthermore, we have not used the article information, i.e. articles numbers, to find the connections between premises and conclusions. This together with co-reference resolution could help to detect more premises and improve the distinction between different argumentation structures.

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