

The case of case law vs statutory law, a uniform formalization of legal information†

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A legal knowledge based system should represent both case law and statutory law to be a valid model of the information involved in legal decision making. Case law and statutory law are often represented on the basis of different formalizations of the information involved, respectively as specific cases and general rules and case based and rule based reasoning. The integration of the formal representations of case law and statutory law in AI and Law systems can take two forms. The most common is maintaining the different representations and adding a third integrating procedure (hybrid representation). Integrating these three formalizations is complex and until today not very successful. In this paper we argue that lawyers and judges do apply both forms of information in a uniform way. We will show that case law and statutory law can be represented with one integrated rule based formalism (uniform representation). The specific characteristics of this formalism are discussed and references are made to earlier work on labelled logical varieties, especially the extended Logic of Reasonable Inferences and its application and empirical test.

Case law and statutory law in common law and civil law systems

Statutory law is written law passed by a body of legislature. It consists (mainly) of general rules and principles. *Regulatory law* refers to law decreed by an executive branch agency under a delegation from a legislature. It consists of general policies and specific decrees. *Common law, precedent law or case law* refers to law of the judiciary. It consists of specific judgements.

Formal representation of case law and statutory law

Traditionally case law and statutory law are represented and used separately, respectively as case based reasoning and rule based reasoning, based on case based and rule based formalizations. In a few publications a hybrid representation (integrating the two representations by a third procedure) is advocated, but not very successful [e.g. Bruninghaus, S., Ashley, K.D. (2003). Predicting Outcomes of Case-based Legal Arguments. ICAIL '03: Proc. of the 9th international conference on Artificial intelligence and law June 2003, 233–242 successfully predicts 70% of the cases with a case based system and 90% with a hybrid system]. As far as we know no uniform representation has been proposed [cf. Zheng, H., & Verheij, B. (2021). Rules, Cases and Arguments in Artificial Intelligence and Law. Research Handbook on Big Data Law (ed. Vogl, R.), 373-387. Cheltenham: Edgar Elgar Publishing].

Rule based reasoning is commonly formalized as a logic that can make inferences based on facts of a specific case and general rules. Case based reasoning is commonly formalized as reasoning by analogy, and thus also based on a logic.

The main reasons for this practice are:

- (1) The idea that because case law is the main source in common law systems and statutory law the main source in civil law systems, the representation of these systems must be different;
- (2a) The assumption that case law has another function in legal reasoning than statutory law. (2b) The assumption that judges and lawyers do not apply case law and statutory law in an integrated and uniform way. (2c) The assumption that case law is specific, whereas statutory law is general by nature;
- (3a) The assumption that *analogous cases* probably have the same outcome (without taking general knowledge into account). (3b) The assumption that *analogous cases* with different outcomes only can be analyzed quantitatively, i.e. that their semantics only can be reconstructed by the probability of a certain outcome in a lot of cases. (3c) The assumption that an inconsistent representation of *analogous cases* is ineffective, because the knowledge system can only come to a final conclusion if the inconsistency is resolved (e.g. by quantification or by using a (non monotonic) logic that considers the inconsistency as a flaw based on incomplete knowledge).

From a perspective aimed at formalizing and representing case law and statutory law this practice and the reasons, esp. the second reason, for maintaining it, give rise to the conviction that the knowledge structure of case law and statutory law fundamentally differs. In the next paragraph we will disprove these reasons, which opens the way to a uniform representation of case law and statutory law.

Case law and statutory law have the same knowledge theoretical structure

As we have seen commonly representations of case law are based on the perceived need for separate case based reasoning (as opposed to rule based reasoning), which is presented as a form of analogous application of the case law to a new case. This common practice is based on a series of assumptions (1-3 above) which can be proven incorrect.

Ad 1 The first flaw is the assumption that because case law is the main source in common law systems and statutory law the main source in civil law systems, the representation of these systems must be different. Actually (in legal practice) both systems incorporate all essential characteristics of the other.

Ad 2 The second flaw is the assumption that there is a knowledge theoretical difference between statutory law and case law in legal decision making: *Case law has another function in legal decision making than statutory law, so judges and lawyers do not apply them in an integrated and uniform way and statutes are general whilst case law is specific.* As we have seen above under ad 1 judges and lawyers use both case law and statutory law. A statute is always a class norm in that it addresses the behavior of a certain class of subjects or the interpretation of a certain abstract concept that represents an extension (a class) of phenomena described by the concept. The same holds for case law used as precedent. It can address the behavior of a class of subjects (in equal and analogue cases) or the extension of a concept (an interpretation).

Ad 3 The third flaw is the assumption that analogous cases probably have the same outcome (without using general knowledge) and that analogous cases with different outcomes only can be analyzed quantitatively, i.e. that their semantics can be reconstructed from the probability of a certain outcome in a lot of cases. The probabilities however have many possible explanations that do not necessarily coincide with the underlying information.

The conclusion is that reasoning using precedents vs using statutory rules is a false contrast. Only the knowledge source is different, the knowledge structure is the same, general statutory rules (defining properties of the class of cases that lead to certain conclusions) and general rules of analogy (defining properties of classes of cases that lead to certain conclusions) are used. A consistent formalization and representation of all these arguments using a labelled logical variety is possible as we will describe in the following paragraph.

Formalization of case law and statutory law in a uniform way

Case law and statutory law have the same knowledge theoretical structure. They can be represented by the same formalism. Since the knowledge in case law and statutory law are rules and the way of applying rules to cases is a form of reasoning/argumentation, the formalism can be a logic that accommodates rules. However as we have seen there are some other conditions based on the qualitative way judges make their decisions:

1. The logic should be able to handle case law and statutory law that represent opposing opinions in a reasonable way, i.e. not resolving the contradiction in the way of for example statistics (selecting the strongest predictor) and non monotonic logics (adding knowledge until the conflict is resolved), but preserving the contradictions for qualitative processing in the current and future cases;
2. For further processing of opposing opinions in a qualitative way the logic should accommodate *metarules* that can compare the opposing arguments by their components (case facts and rules from case and statutory law) and by their *source characteristics*. Judges and lawyers apply metarules to make a temporary decision about the opposing opinions of the parties in the case, based on case law and statutory law.

To formalize these essential properties of the application of legal information we developed the Logic of Reasonable Inferences (LRI). The LRI is a logical variety that handles inconsistency by preserving inconsistent positions and their antecedents using as many independent predicate calculi as there are inconsistent positions [Burgin, M., de Vey Mestdagh, C.N.J. (2011). The Representation of Inconsistent Knowledge in Advanced Knowledge Based Systems. Knowledge-Based and Intelligent Information and Engineering Systems; Koenig, A. et al Eds.; Springer Verlag; Volume 2, pp. 524-537][Burgin, M., de Vey Mestdagh, C.N.J. (2013). Consistent structuring of inconsistent knowledge. Journal of Intelligent Information Systems, Springer US, pp. 1-24]. The original LRI was implemented and proved to be effective as a model of and a tool for knowledge processing in the legal domain (implemented as the expert system shell *Argumentator* and tested as the expert system ESM) [Vey Mestdagh, C.N.J. de (1998). Legal Expert Systems. Experts or Expedients? The Law in the Information Society, Proc. of the Fifth International Conference of the Italian National Research Council, Florence, Italy, 2-5 December 1998; Ciampi, C., E. Marinai, Eds.; Istituto per la documentazione egi uridica del Centro Nazionale delle Ricerche, Firenze, 8 pp]. It predicted 425 (99%) of 430 decisions successfully using knowledge from case law and statutory law, both represented as rules in a single information base. In order to be able to make inferences about the relations between different positions (e.g., make local and temporal decisions), labels (representing source- and meta-characteristics of the rules) were added to the LRI. [Vey Mestdagh, C.N.J. de; Burgin, M. (2015). Reasoning and Decision Making in an Inconsistent World: Labeled Logical Varieties as a Tool for Inconsistency Robustness. Intelligent Decision Technologies; Neves-Silva, R. et al Eds.; Springer; Smart Innovation, Systems and Technologies, Volume 39, 411-438]

Conclusion

An analysis of the way judges and lawyers apply case law and statutory law shows that the structure of the legal information they use is identical (consists of class statements or rules) and that they therefore can be formalized and represented in a uniform way. The rules lawyers use to construct cases and the metarules they use to decide cases can be formalized and implemented. Earlier research has shown that the extended *Logic of Reasonable Inferences* and its implementation *Argumentator* are effective rule based models of legal reasoning and decision making including both case law and statutory law. A rule based formalization and implementation of legal information is not only realistic (uniform like the practical application by judges and lawyers) but also more effective (predicts 99% of the tested cases) than a separate (70%) or a hybrid formalization (90%).