The Use of Meta-Rules in Rule Based Legal Computer Systems

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Abstract

Rule-Based Systems in the legal domain are often obtained by formalizing legislation. We consider the addition of meta-knowledge in the form of meta-rules to such a system. Such an approach has many advantages both for control and for dealing with the intrinsic vagueness of legal rules. Legal computer systems of different kinds have been proposed and built over the years. In this paper we shall present a legal reasoning system which uses concepts discussed in this paper. The system consists of a knowledge base, obtained by formalizing legislation, and uses a meta-rules mechanism for deduction and legal reasoning.

1. Introduction

It is not our object to consider this process of formalization and its problems (see, e.g. [Sergot86], [Bench87], [Routen89]). We are interested in the *application* of such rule-based systems. As legal computer-experts are aware this is not straight-forward because of the intrinsic vagueness that the rules exhibit. Our aim is to examine how the use of meta-knowledge in rule form may help overcome some of the problems that arise.

Our motivation is two-fold: On one hand it is worthwhile to examine methods that may improve legal computer systems of the mentioned kind, especially as such methods have a solid foundation in jurisprudential theory, as described below. On the other hand, use of meta-knowledge in rule form has already been made in the 'classical' expert systems (like MYCIN). We believe it is of wide interest to examine methods and tools from 'general AI' in order to test and analyze their applicability in the legal domain.

The layout of this paper is as follows: Section 2 is a brief introduction to meta-knowledge and meta-rules in general. Sections 3 and 4 discuss applications of meta-rules for control-purposes. Sections 5-7 address the use of meta-rules in order to overcome problems of vagueness. While the approach mentioned in section 6 has been discussed elsewhere, section 7 describes a new approach to semantic vagueness (open texture). Section 8 deals with vagueness of the meta-rules themselves and section 9 discusses the possible advantages of the meta-rule paradigm.

2. Knowledge and Meta-Knowledge

We define meta-knowledge as knowledge about knowledge, while basic knowledge will be called object-level knowledge. As already mentioned in the introduction, we assume the object-level knowledge is obtained by formalization of legislation (and perhaps also of rationes decidendi).

It has been observed that in the 'classical' expert systems the source of meta-knowledge derives from an incomplete understanding of the phenomena (see [Hayes83], p.221). An expert describing a domain will often offer three levels of information: factual, heuristic and meta-level:

Knowledge at the last level is sometimes added by the expert as an afterthought based on his experience with the rules, but without actually being properly founded in theory.

This observation cannot be directly transferred to the legal domain. However, it makes sense if we substitute 'vagueness of rules' for 'incomplete understanding of phenomena'. Law is a weak-theory domain and very deep object-level systems are not feasible. The situation of someone who attempts to build a system in the legal domain may therefore be compared to that of an expert with an incomplete understanding of his domain, and the inclination to consider meta-knowledge separately thus arises in a natural manner.

In principle both object-level knowledge and meta-knowledge may be formulated in many different forms. They may not necessarily be represented as two distinct bodies, i.e., the rule-space may be flattened. However, there are many advantages to such a structuring of knowledge. Argumentation to that point may be found in [Walker89] and [Routen89]. Within the rule-based paradigm we shall discuss the advantages in section 9. In the following we shall consider both knowledge and meta-knowledge in rule-form only: Thus meta-knowledge will be rules (meta-rules) about object-level rules.

Much theoretical work has been published on meta-reasoning since [Weyhrauch80]. For a newer treatment of theoretical issues see [Brazdil90].

3. Meta-Knowledge for Control

In the classical expert systems, e.g. MYCIN and TEIRESIAS (see [Davis77] and [Davis80]) meta-rules are used for control: If there are several relevant object-level rules, the meta-rules will indicate which rule to invoke. In these classical systems it often happens that there are many applicable rules. Functioning of the system is possible only if some kind of control is imposed, as unguided invocation of all rules is unrealistic. The introduction of meta-rules acts as a refinement component, as shown in the following example ([Davis80], p.191), which relates to an expert system giving advice about stock market investments:

IF [1] the age of the client is greater than 60
[2] there are rules which mention high risk
[3] there are rules which mention low risk
THEN it is very likely (0.8) that the former should be used after the latter.

The number in parenthesis (0.8) relates to the likelihood of the conclusion of the meta-rule. As Davis observes ([Davis80], p.192):

"...meta-level knowledge and inexact reasoning - are quite independent, and meta-rules could have employed standard binary logic"

In the next section we shall see how meta-rules may be used for control also in the legal domain. We shall assume that both rules and meta-rules employ standard binary logic. Nevertheless, one of our major concerns is how to deal with inexact reasoning (i.e. vagueness) as it appears in the legal domain. We shall consider the vagueness of meta-rules in section 8. Approaches relating to probability theory will not be considered.

An important motive for using meta-rules was supplied by Clancey ([Clancey83]) who reconfigured the MYCIN rule-base, including its meta-rules for the NEOMYCIN system. He asserts that strategic principles implicit in rules and meta-rules must be made explicit for teaching purposes. This argument is of course also true in the legal domain. Furthermore, such principles could actually be used by a lawyer to convince a judge to apply a certain rule. Thus a computer system which applies appropriately formulated meta-rules not only points to a decision, but also automatically supplies legal argumentation.

The use of meta-reasoning for control purposes is also discussed in [Bundy81] and [Bundy83].

4. Control Applications in Law

An approach to the use of meta-rules in statutory law

is found in [Hamfelt89]. The authors propose a hierarchy of meta-rules. Secondary rules (meta-rules) would be created to operate on the basic, primary rules (object-level rules). Tertiary rules (meta-meta-rules) would operate on secondary rules, and it might even be possible to define yet another level with quaternary rules.

The authors give an example of this approach, related to the Swedish legal system. The primary rules are taken from the (Swedish) Sales of Goods Act. As an example of a secondary rule (meta-rule) they quote the legal rule: 'lex specialis legi generali derogat', i.e. a specific law abrogates the more general law. In other words, if a case may be judged according to a rule R_1 in a legal domain D (say the Swedish Sales of Goods Act) and also according to a legal rule R_2 in a subdomain D' of D (say the Swedish Consumer Sale of Goods Act), then R_2 (the more specific law) applies.

As an illustration of the tertiary level the authors consider the legal maxim: 'odia sunt restringenda', i.e., burdensome rules should be restrictively interpreted. Let us again consider an example. Let us assume that rules R_1 and R_2 impose burdens upon their addressees (e.g., restricting the operations of vendors). Let M be a meta-rule stating conditions for the substitution of R_2 for R_1. Then the above cited maxim is a tertiary rule stating the following: M may be applied only if the applicability of R_2 is not more extensive than the applicability of R_1.

It is assumed that the problem here is to make an appropriate selection among several relevant rules. The problem of *interpretation* of the selected rule is not addressed. A meta-rule may here be defined as a rule selecting one of a given set of object-rules according to given criteria. This application of meta-rules is similar to the use of meta-rules in the classical expert systems.

5. Meta-Knowledge for Dealing with Vagueness

Legal rules have an intrinsic vagueness and must be interpreted according to various criteria. This section will discuss the formulation of such criteria as meta-rules. We distinguish between two kinds of vagueness: structural and semantic. A meta-rule approach to structural vagueness has been described before ([Schild90]) and will briefly be surveyed below. The handling of semantic vagueness is new.

Actually the meta-rule approach to vagueness is fundamental in jurisprudence. In [Hart61] law is characterized as the union of primary rules of obligation with secondary rules ([Hart61], p.91). The secondary rules are about the primary rules, i.e. they are meta-rules:

"They specify the ways in which the primary rules may be conclusively ascertained, introduced, eliminated, varied and the fact of their violation conclusively determined " ([Hart61], p.192).

A different approach to vagueness is proposed in [Rissland89]. The authors deal with the problem of interpreting statutory predicates using a combined (hybrid) approach of traditional rule-based reasoning with case-based reasoning (CBR).

Both approaches are justified, as they express complementary aspects of legal reasoning. The problem is what to do when the (primary) rules run out or conflict (as has been expressed in [Gardner87]). Lawyers will sometimes reason about rules with cases (CBR) and sometimes reason about rules with other rules (meta-rules).

Thus [Rissland89] mentions [Llwellyn50] and [Llewellyn60] as sources for the meta-knowledge of their system. These references may equally well be considered sources of meta-rules. Consider, e.g., rule 21 on p.81 in [Llewellyn60]:

"A simple positive rule (or concept) has a negative twin attributed to it which is then duly 'applied' as if the negative implication had been considered, announced and held."

This may obviously be formalized as a meta-rule.

Llewellyn has compiled 28 (meta-)rules in the first paper and an additional 64 in the book. To compile all

secondary rules in the legal system of a particular country will not be easy, and must of course be carried out by legal experts. Some meta-rules are of general applicability, while others relate to a particular area of law. We have collected some basic rules of accepted validity in the Israeli courts. Their sources are either widely accepted maxims, statutory laws or case-law.

6. Structural Vagueness

[Schild90] proposes the use of a set of meta-rules operating formally on legal rules in a given domain. These rules may arise from statutes or be deduced from previous cases in the domain where the system is applied. On each object-level rule one can apply various meta-rules and obtain *new* rules. A weighting scheme for these new rules is also proposed.

The basic idea is that rules in the legal domain always have a certain structural ambiguity whatever their source is. Thus the rule: "A is allowed to do B" may be interpreted as also meaning: "Only A is allowed to do B", or "A has an obligation to do B", etc. [Allen91] gives an example of a list of rules which could be derived from a single, basic one and describes the problems relating to structural ambiguity. One may consider each of these derived rules as having arisen from the application of a meta-rule to the original rule. [Schild90] gives six such general meta-rules and discusses their applicability in various areas.

Consider, e.g., the area relating to the advisory activity during student registration in a computer-science department. Assume that a student who belongs to a special study scheme (let us call it scheme_1, e.g. an Honours Course) wanted to register for the course: Theory of Algorithms (called algorithms for short) without having passed the prerequisite course: Data Structures (called structures below). Let us further assume that the advisor permitted this. The obvious rule to be extracted from this case is that any student (say S) belonging to scheme_1 would also obtain a similar permission with respect to the same course. Expressed in clause-form this rule becomes:

permit(S, algorithms, structures) **if** belongs(S, scheme_1)

Assume now that another student were to make the same application to an advisor (possibly the same one) at a later stage. If the student does not belong to scheme_1 the advisor *may* deny him permission citing the above case and arguing that the correct rule to be extracted from it is:

not permit(S, algorithms, structures) **if**
not belongs(S,scheme_1)

From this example we derive the meta-rule:

p -> q => **not** p -> **not** q

which should be interpreted as follows: If a rule p -> q is know to exist, then one should also consider the validity of the rule: **not** p -> **not** q.

The actual application is as follows: Whenever a certain rule is found to be relevant for a given case, the meta-rules are applied to it, all possible *new* rules are created and are also considered relevant. The meta-rules may be re-applied to the newly created rules, and so on until the confidence in the new rules decreases below a certain threshold according to the given weighing scheme.

While some of the created rules may be of dubious validity, the method ensures that all possible interpretations of the original object-level rule are covered. The human user (advisor or judge) will make the decision which interpretation is the most appropriate for the case at hand.

7. Semantic Vagueness

7.1 An Example: In order to illustrate the idea behind our approach, we shall give an example. The Israeli "Law of Compensation in Traffic Accidents (1975)" ensures compensation for all victims of traffic accidents. A particular insurance company has been established in order to pay out such compensation regardless of fault. Obviously a good many people who have been injured in some accident would be very keen to prove that their

accident was a 'traffic accident' according to the above mentioned law. Over the years some rather strange accidents have actually been recognized as 'traffic accidents' (usually with a subsequent closing of loop-holes through legislation).

To give but one example: An explosion of a cooking-gas container in a parked camping-car with subsequent fire was considered a 'traffic accident'.

The following theoretical case should therefore not be considered as exceptional neither in facts nor in argumentation.

The owner of a yacht had an employee, who one day attempted to steer the yacht. He was rather unexperienced, slipped several times on the deck and hit his head. The next day it became apparent that the injury was actually severe, including internal cranial bleeding, which lead to partial lameness. The doctors could not assign the injury to one particular fall, but determined that it was the result of the combined accidents.

The employee then applied for compensation according to the above mentioned law, stating that his accident had been a 'traffic accident'. As the insurance company refused to pay out any compensation the employee considered taking it to court.

In addition to sails the yacht also had a motor, but on the day of the accident this motor had not been used at all. The yacht had sailed under the force of the wind only.

The formalization of the relevant part of the law looks as follows:

traffic-accident **if**
accident **and** bodily-injury **and** motor-vehicle **and**
injury-through-use
motor-vehicle **if** vehicle **and** motor

Obviously the plaintiff's lawyer must check whether all the antecedents are true before initiating the proceedings.

(I) Antecedent 1: Was there an accident?

The facts of the case state that there were several accidents, and that no particular one could be determined as the source of the injury. One may apply a meta-rule stating that "words in the singular include the plural". This meta-rule is probably included in the Interpretation Act of most countries.
Conclusion: It may be argued that the antecedent is valid.

(II) Antecedent 2: Was there bodily injury?

Known from the facts of the case. Conclusion: The antecedent is valid.

(III) Antecedent 3: Is a yacht a motor-vehicle?

Track 1: We apply a meta-rule derived from a well-known and accepted legal maxim: "From *yes* you understand *no*". This means that given a series of specific rules:

motor-vehicle **if** automobile
motor-vehicle **if** motorcycle
motor-vehicle **if** tractor

which do *not* mention yachts, one may conclude:
not motor-vehicle **if** yacht
Conclusion: It may be argued that this antecedent is not valid.

Track 2: We attempt to apply the second rule given above, defining a motor-vehicle as a vehicle with a motor.

(i) Antecedent 1: Is the yacht a vehicle?

Subtrack 1: We apply the meta-rule "in pari materia", which states that the meaning of a concept in another law dealing with the *same* matter or subject may be applied in the present case.

According to the Israeli traffic law (which is not the same as the traffic-accident-compensation law) only a land-vehicle can be a vehicle, and thus a yacht is not a vehicle

with respect to that law. Hence, it may also be argued here (with respect to the compensation law) that a yacht cannot be a vehicle.
Conclusion: It can be argued that a yacht is not a vehicle, and therefore not a motor-vehicle, and the antecedent is not valid.

Subtracks 2-3: Two additional meta-rules which relate to "common usage" and "scholarly usage" also indicate that a yacht cannot be a vehicle.
Conclusion: It can be argued that a yacht is not a vehicle and therefore not a motor-vehicle, and the antecedent is not valid.

(ii) Antecedent 2: Does the yacht have a motor?

This is known from the facts of the case. Conclusion: This antecedent is valid, but its conjunction with the antecedent 'vehicle' is of doubtful validity.

(IV) Antecedent 4: Is it possible to speak about injury-through-use?

The problem is here that the yacht only used sails and not its motor. We apply a meta-rule relating to "things not being essential or indispensable", which is an accepted part of case-law. According to this meta-rule it is not significant that the motor was turned off.
Conclusion: The antecedent is possibly valid.

This completes the analysis of this cases, at least with respect to the given meta-rules. We note that there is a strong indication that the rule is not satisfied, and the employee should be advised to reconsider his decision to sue the insurance company.

7.2 The Proposed System: We shall view a legal rule as an and/or tree that describes the conditions that must be satisfied for the rule to applicable. When queried about a rule, the system will examine each such condition. As long as the conditions are satisfied, the tree-traversal proceeds. A problem arises when the system cannot decide whether a *leaf*-condition is satisfied or not. Such an event triggers the potential application of a meta-rule.

We can describe this application in the following way. Let us asume that the leaf in question is x. The system searches for a meta-rule that will enable the creation of anobject-rule with x as the consequent. In other words: The system will attempt to apply a meta-rule, which will extend the and/or tree from the leaf-node x downwards. If this is possible, the system proceeds (recursively) with the examination of the newly added nodes below x.

The process of descending in the and/or tree and applying meta-rules is automatically terminated when satisfaction (or non-satisfaction) of all relevant condition has been determined, or a certain confidence-threshold is reached, according to some weighing procedure. We are not dealing with this issue here. In the latter instance the case is declared unsolvable.

Finally the system summarizes the legal situation by stating the conclusions following each attempt at proving validity, explicitly mentioning the legal source of the applied meta-rule. In other words, the system prepares a report which is very similar to a lawyer's brief.

7.3. Implementational Details: The approach described above has been implemented in Prolog in a system running on a PC. The system consists of: (1) A rule-base, (2) a meta-rule base,(3) a solution engine, (4) a legal reasoning engine, and (5) a common-sense knowledge-base.

The use of Prolog is extremely convenient, as both rules and meta-rules may be expressed in the same manner and applied at the same level, i.e., use the same theorem-prover (see [Bowen82]).

The legal area chosen for the implementation is the Israeli "Law of Compensation in Traffic Accidents (1975)". We have concentrated on cases dealing with the definition of the concept 'traffic accident'.

The user inputs the basic facts of the system, according

to the pre-established concepts (predicates) relating to the area. The *solutions* are output in the form of a legal analysis, including the appropriate legal sources, which have been applied, as pointed to in the meta-rules. Also a weight is attached to each solution.

We have tested our system using twenty seven *real* legal cases in this field. These cases were chosen as key cases for the domain. We got several (but less than 10) different solutions (i.e. different tracks, each obtained by using a meta-rule) for every one of these cases. This is very natural, as the system is planned to generate every solution that might be a legitimate legal solution). In all of the twenty seven cases one solution was the same solution that was actually used by the court and the others were quite legitimate (in the opinion of one of the authors, who is a lawyer). We also considered several hypothetical cases, with the system again yielding legitimate legal solutions.

7.4 Knowledge Representation and Reasoning: In [Schild90] the meta-rules have a straightforward explicit representation. The notation:

M: $r_1 \Rightarrow r_2$

means that M is a meta-rule which transforms the rule r_1 into the rule r_2. Thus for example the meta-rule:

p -> q => **Q**p -> **Q**q

means, that if a rule p -> q is know to exist, then one should also consider the validity of the
rule **Q**p -> **Q**q. This rule is actually created and applied. The situation is similar for the other meta-rules.

[Hamfelt89] uses the well-know DEMO formalism of [Bowen82]. Thus 'lex specialis legi generali derogat', which we explained in section 2.1 will have the following formulation:

commercial_demo(Case, Decision) **if**
csga(Theory_1), sga(Theory_2),
[demo(Case+Theory_1, Decision) **or**
[**Qu** Decision' [demo(Case+Theory_1,Decision'],
demo(Case+Theory_2, Decision)]]

Here Theory_1 is the set of rules arising from the Consumer Sale of Goods Act (csga), and Theory_2 is the set of rules arising from the Sales of Goods Act (sga). The above clause should then be interpreted as follows: A given Case should be decided according to Decision if this Decision follows from Theory_2, and either it also follows from Theory_1 or there is no Decision' that follows for this Case from Theory_1.

The basic knowledge structure in our present work is a predicate called concept of the form:

concept(Context, Instance, Qualities)

Here Context denotes the name of the legal concept we are dealing with, Instance denotes the legal domain and Qualities denotes a list of properties of the concept. Thus for example:

concept(vehicle, compensation, [obiter]).

means that the concept 'vehicle' appears in the Compensation law interpreted by a judge as part of the 'Obiter Dictum' of his judgement.

The and/or tree-structure is obtained through a predicate depends, which links a node with its sons. Thus:

depends(Con, [Son_1,..,Son_n], Id_no, Weight)

expresses the fact that the node Con (which is of the form concept given above) has a list of and-sons Son_1,...,Son_n.

In order to show the representation of meta-rules, consider the following simplified example:

meta(concept(Context, Instance, Q1), Meta_fact, 0) **if**

```
Wh = 0.7,
(Wh*Meta_fact > 0.4),
replace( [obiter], Q1, Q2),
Q1 \= Q2,
add_rule( concept( Context, Instance, Q1),
[concept( Context, Instance, Q2)], Wh).
```

This meta-rule should be understood in the following way: If a legal concept (Context) is vague and does not clearly apply in a given Instance, look for an interpretation given to the term in the obiter dictum parts of some judgement, and create a new rule using this new interpretation. This is done by adding a son to (what was formerly a leaf-node) Context. The numerical aspects of this meta-rule relating to the weight Wh will not be discussed here.

8. Vagueness of Meta-Rules

Meta-rules may be formulated according to the following scheme.

```
IF    'condition involving one or more object-level rules'
THEN  select (or create new) object-level rule
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In most cases this is not the original formulation, and rewriting may be necessary. This formalization of meta-rules shall not be considered here. In the case of control an existing object-level rule is selected. In the case of vagueness a *new* object-level rule is created. As vagueness is our central concern it is important to consider the question of vagueness of the meta-rules themselves.

Let us first observe that besides the division into primary and secondary rules (i.e. object-level rules and meta-rules) there exists another classification of legal knowledge, which defines primary and secondary knowledge sources. A primary source is statutory law (legislation) or case-law. Everything else is a secondary source (often also called legal doctrine). A more detailed discussion of this classification is found in [Oskamp89] (see, e.g., p.200-203).

Primary rules (object-level rules) should in our opinion be derived from primary sources. Secondary rules (meta-rules) may sometimes be obtained directly from primary sources, but may also have their origin in secondary material. Yet another source for meta-rules is proposed in [Routen89]. Routen notes that legislation often exhibit a multi-layered logical structure. The formalization should then reflect this structure, i.e. give rise to both object- and meta-rules.

Thus the authority of meta-rules may sometimes be questionable (if they are derived from secondary sources). Additionally, the meta-rules may themselves have intrinsic vagueness similar to object-level rules. Dealing with these problems through meta-meta-rules etc. as discussed in section 2.2 becomes rather unwieldy. Instead we propose what is essentially equivalent to a basic idea first proposed in [Bench88] for dealing with open texture.

We may formulate an approach to the concept of vagueness (both structural and semantic) thus: When given a case it is not clear whether a certain rule (or meta-rule) applies or not. Let us therefore both apply it and not apply it, and repeat this process for all relevant rules and meta-rules. A computer system implementing a meta-rule approach would therefore not give a single answer when given a new case. It would suggest several tracks of argumentation obtained by applying (and not applying) the various relevant meta-rules. The user could consider the results and weigh them himself, or apply a built-in weighting system.

9. Evaluation of the Meta-Rule Paradigm

The use of meta-rules is not the only possibility for addressing issues of control and vagueness within the rule-based paradigm. One could, e.g., flatten the two-tiered rule-space, and consider all knowledge as object-level rules. Another approach could be to formalize rules in modal logic. One must therefore compare the meta-rule approach with these other possibilities from two perspectives: Epistemology and Implementation.

(1) We have already argued that expressing legal knowledge

through rules and meta-rules has a solid foundation in Jurisprudence. Hence, computer systems based on these structures should have appeal to legal experts.

(2) The legal reasoning process is not only simulated in a convincing manner through the use of meta-rules. Explanatory facilities are automatically supplied by tracing the actual application of the meta-rules.

(3) The previous argument also shows that the paradigm is appropriate for teaching purposes.

(4) It has been argued that separation into rules and meta-rules during formalization allows for easier understanding of complex definitions, making the law comprehensible and learnable ([Routen89], p.245 citing [Gordon88]).

(5) Meta-rules offer the same potential for flexibility as a knowledge-base of object-level rules: They may easily be added, removed or changed.

(6) One is painfully aware of the limitations of present-day legal computer systems. They have only very restricted capabilities with respect to common-sense knowledge, socio-economic arguments, etc. The formulation of the appropriate meta-rules is (arguably) a promising method of *gradually* adding such knowledge to a legal computer system.

(6) The use of more than two levels of rules seems complicated. Nevertheless, the option of a multi-layer structure may facilitate the design of control.

(7) The central importance of meta-rules in the 'classical' expert systems relates to efficiency. The problem is the selection of one rule out of a large number of applicable rules, for reasons that do not seem so important in the legal domain:

"The conclusion of a meta-rule concerns the *utility* of some object-level rules, not their *validity*" ([Davis80], p.192)

The situation is somewhat different in the legal domain. Firstly, the number of potentially relevant rules that could possibly be applied to a legal case at a given moment does not seem so great. Secondly, we have argued that owing to vagueness *all* of these rules should actually be applied.

(8) The above arguments relate the meta-approach to an approach using object-level knowledge only. To our knowledge actual implementation of systems using modal logic as such do not exist. For a discussion of the meta-level approach vs. modal logic see [Brazdil90], p.113-114.

10. Conclusions

In this paper we have considered legal computer systems which make use of a meta-reasoning paradigm. In the 'classical' expert systems (like MYCIN) this approach was used for control purposes, and inexact reasoning was implemented through the use of probability theory. The need for inexact reasoning arises in strong theory domains (like medicine and geology), simply because the rules (formulated by experts) are of limited belief-value and validity. The picture is different in the legal domain, which is a weak theory domain. The rules here always have an intrinsic vagueness (structural and semantic), and we have argued for a meta-rule approach to this vagueness.

A legal practitioner has several tools in his tool-box: Sometimes he will argue from a rule and apply other (meta-)rules to it, sometimes he will argue directly from cases. Similarly, the issue of vagueness of rules in a legal computer system may be addressed in more ways than one. Those methods, whether rule-based or case-based should be considered complementary.

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