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# A FRAME-WORK FOR LAW COMPARISON

Paolo Guidotti and Fabrizio Turchi

## *Summary*

*This paper illustrates a system to handle legal knowledge bases by using techniques that have recently been introduced in the field of logic programming, such as modularization and meta-programming. In particular, it will show how the modularization, i.e. the representation of single statutes in theories and the use of meta-programming techniques allow a comparison of norm and statutes and also permit different interpretation of the same statute to be made.*

## **1. Introduction**

In recent years many legal expert systems have been developed by using rule-based formalisms of various kind to represent statutes so that the legal decision-making process is mechanically reproduced by an inference procedure. Usually, in these systems a limited segment of a normative system can be modelled by a consistent set of logic sentences<sup>1</sup> which represent a selected unambiguous interpretation.

The most known project using this approach has been developed at the Imperial College of London on the British Nationality Act [Sergot et al., 1986]. The success of this application must be ascribed to the use of the Prolog as formalization language, therefore the implementation of the inference procedure is not necessary.

It has been recently pointed out in some papers the need of 'deep' models in the representation of the norms, see [Bench-Capon, 1989], and [Routen and Bench-Capon, 1991], but also the demand to deal with the dynamic evolution of a normative system [Bratley et al., 1991].

In fact new laws are enacted so as to regulate new situations created through social evolution so as to innovate existing regulation. This may create anomalous situations in the normative system and, in particular:

- redundancy, where a new norm is nothing but a duplication of an already existing norm or when a norm subsumes or is subsumed by an existing norm;
- conflict between norms.

Conflicts are particularly important, as only one of the norms in conflict can be applied to a specific concrete case, and the norms must be compared to determine the applicable norm. Amendments to the normative system should be established in order to avoid incompatible conclusions being inferred. The problems arising out of identifying the residual normative system after a process of abrogation, i. e. the elimination of pre-existing norms, have been analysed in [Alchourron et al., 1985] and [Gardenfors, 1989]. This is a very interesting problem for the legal world, mainly, for the purposes of rationalising normative systems through action by the legislator. However the practising lawyer, who has to apply the law, is not authorised to eliminate a norm from the normative system only because it conflicts with other norms in a concrete case, but he uses specific rules, supplied by the normative system, to solve the conflict. The lawyer carries out in advance a series of operations such as: searching for pertinent norms dislocated in different statutes and identifying and solving any conflicts between them.

The simulation of this process, in our opinion, provides an effective method for managing a wide legislative knowledge base (KB), identifying tools for processing normative changes, as well as permitting deeper simulation of legal reasoning.

The comparison of the legislation carried out in this way, with a goal driven method, enables us to analyse the overlapping of a new statute on prior legislation and to obtain

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a list of conflicting norms that may not be expressly abrogated by the new norm that has just been passed.

Furthermore, this method may be used for comparing solutions deriving from legislation in different countries. It, therefore, seems proper and interesting to us to directly represent conflict-solving criteria provided by the legal order in the information system, at meta-level.

Recently in some projects a meta-level representation has been used, see e.g. Prolexs [Walker et al., 1991], an expert system developed in The Netherlands, in which the process of identifying the norm seems as not modelled, or the work done in Sweden, at Uppsala University [Hamfelt and Barklund, 1989].

Finally, we illustrate possible developments of a system at meta-level which allow us to make a comparison of different interpretations of the same statute. As an example, we are shown how the analogy deriving from precedents can be introduced thereby giving different interpretations of the same piece of legislation.

## 2. The conflict between Norms

In civil law order, the lawyer, to identify the set of norms applicable to a given situation, uses meta-norms, i. e. norms that have other norms as their object. In fact legal theory, even if defined under different principles and names, is generally in agreement with the distinction between norms and meta-norms: or, following Hart, between primary and secondary rules<sup>2</sup>. To identify the applicable norms the lawyer uses secondary rules in order to have criteria about temporal limits, spatial limits or, when there is a conflict between norms<sup>3</sup>.

Accepting a conditional structure of norms, let us call the antecedent, the condition of a norm, *facts of the case* or simply *facts* and the consequent *legal effect*. Therefore two norms are in conflict if and only if they provide for incompatible legal effects and their facts are compatible. Let us say that the facts of two cases are compatible if and only if they can both be fulfilled in the same situation, that is, in the same concrete case.

The concept of incompatibility, can be broadened to include:

- logical inconsistency, in the traditional sense;
- "indirect" incompatibility occurs when two norms provide for consequences, that without being contradictory exclude each other: incompatibility that may have legal origins, e.g., an act cannot be void and voidable at the same time, or pragmatic, e.g., two kinds of behaviour that cannot coexist;
- "normative" incompatibility that takes into account the relations between normative modalities.

For the time being, "normative" incompatibility is not taken into account in the current prototyping activity, this problem has been taken into account in the design of the prototype [Guidotti et al., 1992].

### 2.1. The order induced by meta-norms

A lawyer solves normative conflicts by applying meta-norms based on the following criteria: the hierarchical criterion (*lex superior legi inferiori derogat*), the temporal criterion (*lex posterior legi anteriori derogat*) and the criterion of speciality (*lex specialis legi generali derogat*). These criteria are set out in the Italian legal order in the Civil Code (CC) under General Legal Provisions (art. 1-15).

*The hierarchical criterion.* The various kinds of normative acts are ordered in a hierarchy corresponding to principles on the basis of which the system of sources is structured. For example, constitutional law, in the Italian legal system, is hierarchically superior to instruments having the force of ordinary legislation, legislative decrees and decree laws, the latter are hierarchically superior to government regulations, which, in turn, prevail over regulations of subordinate authorities.

*The temporal criterion.* On the basis of the temporal criterion, later normative acts prevail over those prior to them. The relationship between norms existing in time is regulated in the Italian legal system by art.15 of the preliminary provisions of the CC: "Laws are not abrogated except by later laws expressly made by the legislator, or due to incompatibility between the new and prior provisions or because the new law regulates the entire subject matter previously regulated by the earlier law".

The hierarchical criterion prevails over the temporal criterion, so that *the application of these two criteria leads legislative instruments to have a strict partial ordering*, because they are enacted on a certain date by a well defined authority.

The *criterion of speciality* needs to be discussed more closely than the preceding criteria, because it subverts the ordering induced by the two previous criteria.

The criteria of speciality is explicitly defined by the legislator in the art. 15 of the Criminal Code (CrC), but this is of general use in the Italian legal system. The modern concept of speciality has been defined by the Italian Supreme Court, which has pointed out that, if a speciality relationship is to exist, it is indispensable that the structure of the specific norm has all the elements belonging to the more general norm, as well the elements characterising its specific nature. The criterion is, therefore, applied to individual norms and not to statutes.

In discussing the application of the criterion, we need to analyse how the legislator specifies the cases of a norm. Two kinds of exceptions can be seen in legislation:

- a) the exceptions which provide that *a particular norm*, that has been *unambiguously identified*, does not apply in a given situation. They may be expressly introduced by expressions such as "with the exception of...", "unless...", "provided that...", "except...".
- b) the exceptions which lay down that, in a given situation, a particular legal qualification preclude the application of *a class of norms*. Examples of these legal qualifications are: the lack of legal capacity, lack of capacity to act, mental incapacity, self defence, etc.

The second exceptions cannot be formalised like the first. A part of legal authority, furthermore, see these legal qualifications as lack of *preconditions* for applying legal norms.

*We will insert type b) exceptions in developing our model at the meta-level, while we will only deal with type a) exceptions at the level of primary rules. Furthermore, we can focus our attention, on formalising the KB, only with type a) exceptions within a single normative text. To exceptions found in other preceding texts, the temporal criterion can be applied. We will apply the criterion of Speciality in a strict sense (lex posterior generalis non derogat legi priori speciali).*

It has been affirmed that a criterion of criteria does not exist, see [Bobbio, 1958], however, usually, *the hierarchical criterion prevails over both the temporal and speciality criteria and the speciality criterion prevails over the temporal criterion*. The criterion of speciality does not prevail over the temporal criterion in the case where the subsequent general norm is an exhaustive enumeration that explicitly excludes every exception.

The introduction of new norms in conflict with those existent in the system can determine the elimination of a norm from the system, called abrogation, or the coexistence of both norms, that is, derogation or partial abrogation. Both result in *a decrease in the sphere of applicability of the norm that, where it is abrogated, it is circumscribed in time, being applicable to cases occurring before the act of abrogation; with derogation the sphere of applicability of the derogated norm is limited to the facts of the case that cannot be subsumed in the derogating norm.*

In conclusion, from our foregoing analysis we need to pin point the following segments of the KB as essential for identifying the applicable norms:

- a series of statutes containing the substantive norms (i.e., primary rules), each one separate from the others but including exceptions to norms and references to other

legislative instruments. Furthermore, a date and an hierarchical level is associated to each text;

- some sets of legal preconditions that are general or specific to a given normative sphere, for example, of civil or criminal law;
- a set of legal effects where a relationship of indirect incompatibility exists. For example, void and voidable.

### 3. The system

Therefore, a normative system can be seen as an "ordered" set of statutes, each one having its own force and its own temporal application domain. The natural representation of such a system is obtained through a set of theories, each one formalising a single normative text of primary rules. The knowledge required for identifying and solving the conflict will be coded at meta-level.

The basic knowledge representation language used for the primary rules is standard Prolog, i.e., Horn Clauses logic extended by negation as failure. We adopt a formalization of the norms based on research done at Imperial College, see [Sergot et al., 1986], but we will use, for each theory, the e-answer set semantic [Kowalsky and Sadri, 1990], as a semantic model for processing the negative information required for identifying conflicting norms.

For a detailed description of the formalization, see [Guidotti et al., 1992].

To answer the question "*given a set of facts what norm is applicable for reaching the legal effect X?*", the meta-interpreter performs the following actions:

- 1) looks to see whether there is any incompatibility between X and some other predicate Y. Should this be the case, goal Y will also have to be verified;
- 2) identifies the theories in which it is possible to deduce the given legal effect, that is, it will have to consult the dictionary of defined predicates among the primary rules;
- 3) queries the individual theories in order to get a set of answers, collect those answers, and order them by temporal and hierarchical criteria:

[ X, ↓X, Y, X\*, ..... ].

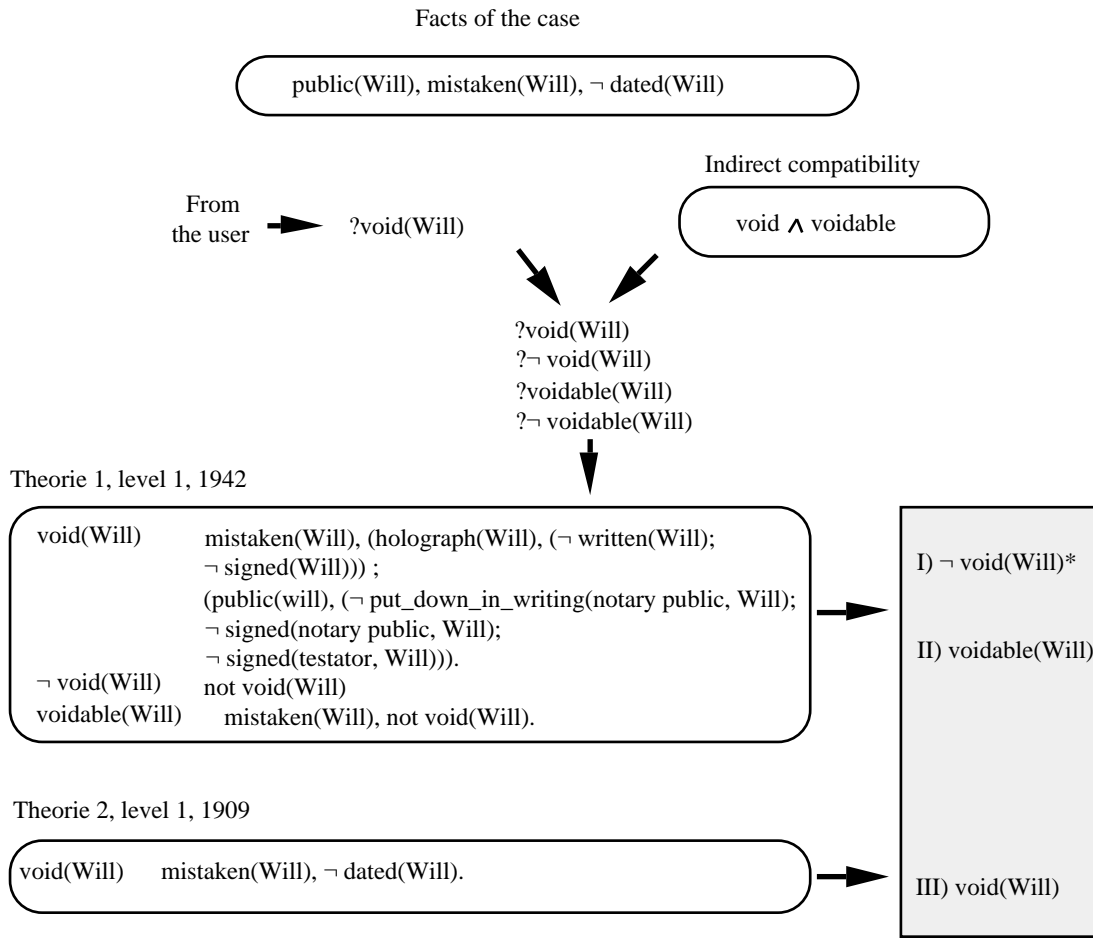
We mark a exhaustive enumeration with an asterisk.

- 4) applies the criterion of speciality following the elements of the list for sorting the norms. In order to do this, the meta-interpreter selects the first element in the list and looks for the first element that is incompatible with it. By applying an unfolding procedure to both legal effects it verifies whether the antecedent norm contains all the facts of the former as well as other specific facts; if the antecedent norm is more specific, it is selected.  
The process continues until all the elements in the list have been covered.
- 5) verifies whether there is any evidence that the preconditions for applying the primary rules have not been obeyed.

#### An Example

Let us give one example to illustrate how the meta-interpreter works, dealing with exhaustive enumerations and indirect incompatibility.

The example concerns wills made before a notary public<sup>4</sup> which, under the Law on Notaries Public of 1913 are null and void where the date and information about the municipality are missing. This norm is derogated by the article in the Civil Code containing an exhaustive enumeration of the cases when a will is considered void.



**Figure 1**

art. 58 Law No. 89 of 16 February 1913 : "The notarial deed is void: ... if the date is missing and it fails to contain any information about the municipality in which it was made".

art. 606 CC 1942 : " The will is void when it is not in writing or signed in the case of a holographic will, or when the testator's wishes have not been put down in writing by the notary public or when the signature of one or the other is missing in the case a will made by notarial deed. In any other case of error or mistake the will may be voidable ...".

Then let us take as example the case of a will made by a notary public with the date missing. We want to know if the will is void so we put the query to the meta-interpreter:

*? void(Will).*

From the theories it obtains the answers listed in figure 1.

#### 4. Towards a Comparison between Different Interpretations

The structure of the system also enables us to transfer to the meta- level the representation of some normative principles that have been the inspiration for the legislation and may give rise to different interpretations of it. Dworkin [1977] argues that the difference between legal principles and legal rules is of a logical nature. One and the other lead to certain decisions, in particular circumstances, on questions of legal

obligations, but are distinguished by the kind of orientation they suggest. He states that rules are applicable in the all-or-nothing form. But this is not the way that principles mentioned above by way of example work. Even those that are most like rules do not indicate the legal consequences that automatically follow when the conditions provided for are given.

For the sake of brevity, we shall only mention here how reasoning by analogy can be simulated.

In the General Legal Provisions of the Civil Code 1942 articles 12 13 14 lay down the meta-norms regulating the application of analogy to the Italian legal system. The concept of similarity is introduced into it which constitutes the central element on which reasoning by analogy is based.

The concept of similarity must be understood as the *rationis* on which the principle is based that where due cases have common elements they must both be guaranteed the same treatment.

Article 12 also provides that in the case where resort is made to more general and abstract principles that those that inspired the individual norm we are talking about *analogia iuris*.

As this analogical process is based on the similarity relationship, we can express analogy relations through relations between predicates.

In doing this it is useful to take up the proposal made by Davies and Russel [1987] whereby identifying the relevant element for the purposes of determining the relationship of similarity is based on explaining the rules of determination.

*The work of Davies and Russel suggests that the making of rules and their analogical projection are best seen as guided by a domain of knowledge of a superior level that establishes which types of generalisations may be inferred.*

We shall not take into consideration here the process of determining analogy between two cases, because it would be necessary to represent extremely abstract semantic concepts in the system such as the *ratio legis* and the *ratio juris*. We shall, instead, assume that we have such analogical relationships at our disposition, taking them from judicial decisions and the meta-norms. In fact, the judge applies analogy by identifying equivalence in the case he is examining, based on a general principle, between the facts of the case and the conditions of a specific norm.

For every relationship of analogy, inferred from a decision or a meta-norm, we must, therefore, insert a clause codifying this relationship in the knowledge base.

Let us look, for example, at art. 1153 of the Civil Code:

Art. 1153 CC: "A person who has had personal property transferred by someone who is not the owner of it, acquires property in it through possession, as long as he is in good faith at the time of delivery and a proper title exists for transferring the property".

Let us consider the case where Mario buys something, for example, a book, from Giuseppe, who is the owner of it on the basis of a contract subject to a resolutive condition (if the condition occurs, the contract comes to an end); Giuseppe may sell the book on the basis of art. 1357 of the Civil Code:

"A person who has a right subject to a suspensive or resolutive condition may act in accordance with this..."

The difference between the case we are examining and the provisions of art. 1153 lies in the fact that Giuseppe is the owner (even though under a condition) of the book, while the article talks about a "non owner" (for example, a receiver of stolen goods). Therefore, to decide the case, we need to ascertain the analogy between these two conditions.

This relationship may be represented by the fact:

analogous(non\_owner(X), owner\_under\_condition(X), 1153\_CC).

which establishes the analogy between a person who is not an owner of certain personal property and one, rather, who is an owner under a condition (that is, his property right is subject to a suspensive or resolutive condition), in relation to the rule in art. 1153 of the Civil Code. As it may be noted, we have added the reference to the specific norm whereby the analogy was applied.

We can see, however, that, because the equivalence between the two goals is subject to certain conditions (so-called "determinative conditions"), we are able to specify these conditions in the following way:

analogous(A, B, Norm) :- Conditions.

For example, the relationship of analogy we saw earlier would become:

analogous(non\_owner(X), owner(X), 1153\_CC) :- has\_contract(X,Y),  
under\_condition(Y).

As we can see, the relationship of analogy is referred to the names of the atoms, therefore resulting in being a meta-level relationship.

By using reflective Prolog, a new language developed by Costatini and Lanzarone [1989], it is possible to clearly distinguish the object-level part of a program from its metalevel part through its naming mechanism.

The definition of a theory of the relationships of analogy, possibly based on case law, can be said to represent the *ratio iuris* of the law and this enables us to add cases resulting from the interpretation of cases analogical to the comparative list of the system we described earlier.

## 5. Conclusion

The use of theories and meta-programming allows a knowledge base to be built and updated, taking into account the actual development of the normative system and, by introducing the concept of modularity into the construction of the knowledge base, should allow broader knowledge bases to be planned. Furthermore, by inserting conflict-solving mechanisms at meta-level, we have deeper and more articulated legal knowledge representation.

Furthermore, the system is open to further developments such as the processing of reasoning by analogy.

The system based on a goal driven mechanism does not automatically provide the list of eventual consequences but the user queries it about individual cases. This is a limitation that may be overcome by clearly limiting and knowing the number of goals permitted in each theory.

Performance issues are considered to be crucial in our approach. Further effort will, therefore, be devoted to coping with performance requirements, for instance by defining and using automatic techniques in the generation of specialised versions of the normative meta- interpreter for the organisation of single normative KBs, in which conflict-solving is carried out as far as possible at "compiling time".

## Notes

1. A set without any contradiction.
2. "Thus they [secondary rules] may all be said to be on a different level from the primary rules, .....; in the sense that while primary rules are concerned with the actions that individuals must or must not do, these secondary ..... specify the ways in which the primary rules may be conclusively ascertained, introduced,



eliminated, varied and the fact of their violation conclusively determined", Hart, [1961].

3. We do not take into account geographic limitations.
4. According to Italian law the "notary public" is a legal professional similar to a of solicitor in English law.

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