The Systematization of Law in Terms of the Validity

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ABSTRACT

In legal practice, it is important to decide what legal relations exist in a legal problem-event on the one hand and to decide what legal rules are applicable to decide it in terms of the validation by contract through constitution or convention on the other hand. These dimensions are strongly related with each other. This paper clarifies the logical structure of a legal system to decide the above two dimension in unified reasoning in terms of the validity of legal sentences. It provides a logical model of reasoning the validity of legal sentences for a unified legal reasoning system, in which legal relations according to the time progress of legal problem-events are decided and at the same time the applicability of relevant legal rules to decide them is decided. We demonstrate the legitimacy and efficiency of this model by applying it to concrete examples and showing how legal meta-sentences and legal meta-inference work in this model.

Keywords
Legal Reasoning, Validity of Law, Meta-rule, Meta-inference. Legal System, Systematization of Law, Basic Norm, Contract, CISG.

1. INTRODUCTION

Legal scholars have long since endorsed systematize law as a united order. The systematization of law has been an important goal of legal science. That is the case for not only modern natural law theorists but also legal positivists theorists as well as analytic legal philosophers. According to the author’s opinion, it is necessary for such a systematization of law to deal with law regulating legal relations and law regulating the application of the law in unified framework.

In legal practice, it is important to decide what legal relations exist in a legal problem-event on the one hand and to decide what legal rules are applicable to decide it on the other hand. The legal practice requires dealing with the above two substantial and procedural dimensions of reasoning not separately or independently and requests a legal theory that makes it possible to deal with them in incorporation.

The systematization of law in this sense must be also an important goal for artificial intelligence studies to construct a tool legal reasoning system to decide legal (right and duty) relations by the application of law to a case and to decide the law which is to be applied to the case in unified framework from contract law through constitution or convention.

This paper clarifies the logical structure of a legal system to reason the above two dimension of legal state of affairs in terms of the validity of legal sentences. It provides a logical model of reasoning the validity of legal sentences for a unified legal reasoning system, in which legal relations according to time progression of legal problem-events are decided and at the same time the applicability of relevant legal rules to decide them are decided.

2. THE CONCEPT OF LEGAL SENTENCE

2.1 Types of legal sentences

Legal sentences are composed of three alternative types: legal rule and fact sentence, legal elaboration, and complex sentence and legal object and meta-sentence. Legal rule sentences have the syntactic structure of rule as a hypothetical proposition, for example: "CISG Article 1(1): A offer becomes effective when it reaches the offeree."

Legal fact sentences have syntactic structure of fact as a categorical proposition, for example: "A's offer reaches offeree B at time April 8th, 2010."

A legal elementary sentence is the smallest unit of legal sentence, for example: CISG Article 1(1) above cited.

A legal complex sentence is a group of legal sentences which has a unique name. For example: CISG

A legal object sentence describes obligations of a person, for example: "It is obligatory for A to deliver B the goods."

A legal meta-sentence describes a legal sentence more precisely, the validity of a legal sentence, for example: "It is obligatory for A to deliver B the goods." is valid on 2010-03-01."

1 CISG is common used abbreviation for The United Nations Convention on Contracts for the International Sale of Goods.

1 Cf. Fulenfurf (1984, p. 208-206). In our opinion the systematization by modern natural law theorists is not logically correct.


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3.3 The Validity of Legal Meta-sentence

The proof of a legal meta-sentence can be done through logical deduction from other valid legal sentences. In this legal reasoning, legal meta-facts and/or rule sentences are used.

A legal meta-rule-sentence, which is used to prove that a legal meta-fact-sentence is valid, must be also valid. How can the proof of the validity of the legal meta-rule-sentence be done? This can be done through the deduction, starting from a legal meta-fact-sentence declaring that the legal meta-rule-sentence is valid or by the application of other legal meta-rule-sentences. Therefore, it is most important to have a well-organized system of logical deduction in order to prove legal meta-fact and rule sentences which make such deduction possible.

An inference to decide the validity of the legal rule sentence applied is called as a legal meta-inference. Legal meta-inference controls the logical reasoning to design an appropriate conclusion by deciding the validity of legal rule sentences which are to be applied in a legal inference.

3.4 Fundamental Legal Meta-Rule Sentences

We have found several fundamental legal meta-rule sentences, which decide the validity of law sentences, as implicit legal common sense through the study on constructing legal knowledge base. Some of legal meta-rule sentences are explained below.

Whether a legal sentence is valid is to be decided applying the following legal meta-rule sentence.

\[ (\alpha) \quad \text{A legal sentence is valid at time } T, \text{ if and only if a legal sentence is valid at time } T \text{ and it is the case that the sentence is terminated before } T. \]

This meta-rule sentence is considered as the most fundamental legal meta-rule of all and it is used by all legal systems which are composed of legal rights and obligations. All other legal meta-rule sentences are based on this meta-rule sentence, which is valid for granted by all regulations. Without this rule, statutory legal sentence can be successfully applied. This rule enables us to know how the system is created and it is the case that the sentence is terminated before it.

One should note that the meta-rule sentence is used to prove the validity of several legal sentences which belong to it. In order for a complex sentence to be valid, the following legal meta-rule sentence is applied.

\[ (\beta) \quad \text{A complex sentence becomes valid at time } T, \text{ if the complex sentence is formed at time } T \text{ and it is the case that the complex sentence is valid and the time for the complex sentence to enter into force and the time has come at } T \text{ or the complex sentence is not valid at time } T \text{ and the time for the complex sentence to enter into force and the time has come at } T \text{ or the complex sentence is not valid at time } T \text{ and the time for the complex sentence to enter into force and the time has come at } T. \]

4. KNOWLEDGE REPRESENTATION OF LEGAL SYSTEM OF THE VALIDITY

4.1 Compound Predicate Formula

We take a logical representation method of legal knowledge, which is oriented to the application of Prelog for the implementation. As such a method, we developed CPF (Compound Predicate Formula) and we have applied this representation method to legal knowledge.

4.2 Representation of Legal Sentences

In our knowledge base, a legal rule and fact sentence in the case of the most fundamental meta-rule and the relevant fact sentence are represented as follows:

\[ \text{sentence}(\text{is_valid}(\text{R})) \]

\[ \text{sentence}(\text{is_valid}(\text{R})) \]

\[ \text{sentence}(\text{is_valid}(\text{R})) \]

\[ \text{sentence}(\text{is_valid}(\text{R})) \]

Below, the shell "sentence" is represented, but only sentence id and content are represented.

4.3 Meta-Ifference Engine

We develop a logical representation method of a legal inference engine written in Prelog.\(^1\) The following is the extracted listing of the legal meta-inference engine written in Prelog.

```prolog
1:1 get_time_of_event(A,I)
1:2 demo(s(A), s0(s(A,I))
1:3 demo(s(s0(I)), s(S))

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1:2 demo(s(A), s0(s(A,I))
1:3 demo(s(s0(I)), s(S))
```

At every step of the procedure of the application of the rule to a goal, the meta-inference engine calls meta-goal \( \text{is_valid}(\text{R}) \).

This goal matches with the most fundamental legal meta-rule-sentence \( \{\text{R}\} \) to solve whether the sentence \( \{\text{R}\} \) is valid at time \( T \) of the goal \( A \).

Another meta-rule-sentence is applied step by step to realize the fulfillment of the requirements of \( \{\text{R}\} \).

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1. "That an obligation exists in the legal world means that the relevant legal object sentence is valid."
5. LEGAL PROBLEM AND RESOLUTION

Let's suppose that law students are asked to solve the following problem, case 8 to continue legal relations at a designated time.

5.1 Case 8b

1) On April 1, A New York manufacturer of agricultural machines A, dispatched the Tsuka branch of a Japanese trading company B, a letter containing the following proposal: A will sell B a set of agricultural machines comprising of a tractor and a plow; the price of the tractor is $50,000; A will deliver the machinery to B by May 10; B must pay A the price of the machinery by May 25; the machinery will be transferred to B by freight vessel.

2) The proposal reached B's letter box on April 8. On April 9, B telephoned A to say, "Accept your offer. However, I want the machinery transported by Japanese container ship."

3) A delivered the machinery to its Osaka branch on June 11. B examined the machinery on June 15. B paid A $58,000 on May 20. (The market price of the tractors was $58,000 at that time). A, on August 7, the machinery malfunctioned because of a defective connecting gear. 9) B notified A of the malfunction immediately. 10) On September 1, B required A that A repair the malfunction within 30 days. A did not repair the defect by October 1. 12) On October 16, B declared the contract void.

5.2 Queries

What kind of legal relations exist between A and B on the basis of the facts of the case 8b at the following time point? (1) April 5, (2) April 15, (3) May 15, (4) June 5, (5) August 15, (6) September 15, (7) October 5 and (8) October 15.

5.3 An Example of Resolutions

One of the answers to question (6) is: "It is obligatory for A to remedy the lack of conformity of goods 'Agricultural Machinery' with the contract requirements of the connecting gear of the machinery at time 2010_09_15."

6. INFERENCE PROCESS TO PROVE THE VALIDITY OF LEGAL SENTENCES

6.1 The Proof of the Validity of a Legal Meta-sentence Describing the Validity of a Legal Object Sentence

To prove that the legal object sentence is valid at time 2010_09_15, the meta-rule [r0] is applied.

\[ \text{is_valid}(\text{meta-rule}[r0]) \]

This judgment is made using the meta-rule [r0] at time 2010_09_15.

6.2 The Proof of the Validity of the Legal Meta-rules Applied to Solve the Problem

When the goal is proved, our inference engine tries the meta-goal whether the legal meta-rule applied is valid at time of event: [is_valid(\text{meta-rule}[r0], \text{time} 2010_09_15)].

The validity of the most fundamental meta-rule [r0] cannot be deducted by application of additional meta-rules. The validity must be presupposed as a priori. In our knowledge base, the general goal of the rule is declared as a fact sentence: [r0]: [is_valid(\text{meta-rule}[r0], \text{time} 2010_09_15)].

This sentence states that rule [r0] is valid at any time. The meta-goal matches with the above fact, so the proof of the validity of rule [r0] is succeeded.

6.3 Figurative Representation of Whole Meta-inference Process

The outline of the process of legal reasoning to justify the validity of law for the above query (6) in the case 8b is represented in figure 1. In rectangles, names of legal sentences and in ellipses, their contents are given. Thick allow lines designate the deduction. In the ellipse at the bottom, the final resolution, "It is obligatory for A to repair the machine" is valid at time 2010_09_15 is represented. The thick vertical arrow line connected to this rectangle shows that this sentence is deduced from the premises of meta-rule [r0], the deduced sentence "B may require A to repair the machine" is valid on 2010_08_16 * and the fact (8) "B required A to repair the machine". This figure as a whole outlines the overall deductive process through the application of relevant legal meta-rule sentences and positive legal rule sentences from the contract through CSG up to basic legal rule sentences to the relevant legal fact sentences.

9. REFERENCES


8. ACKNOWLEDGMENTS

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