

On "Development of Legal Expert System"

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I would like to introduce you the present project on Legal Expert System. The name of this project is Development of Legal Expert System - Clarification of the Structure of Legal Knowledge and Realization of Legal Inference. The Abbreviation is "Legal Expert". This project is funded as the Area Number 109 of Grant-in-Aid for Scientific Research on Priority Areas, by the Japanese Ministry of Education, Science and Culture. The project is scheduled from 1993 to 1997.

Legal knowledge information is becoming more enormous and compli-

cated as laws, precedents and theories have accumulated. Nevertheless the application of scientific method to legal field has not always made progress in comparison with other fields. On the other hand, with advance of Artificial Intelligence researches, the field of laws has become the most favorable field for applied researches. It has become possible that we introduce scientific and technological method dealing with knowledge to the legal field to clarify the structure of legal knowledge and establish scientific method of legal study. Moreover we can develop Legal Expert System as Artificial Intelligence assisting legal

education and legal practice. Legal Expert System is a system which is loaded with the knowledge of lawyers and can infer legally and output what legal judgment should be done under the contemporary law system when a case in question is input. The task of this research is to realize the possibility of Legal Expert System.

In this study, law is regarded as knowledge. The first purpose of this project is to analyze structure of the legal knowledge. The second is to develop a prototype of Legal Expert System in order to realize legal reasoning. The first and second purposes are interrelated with each other closely. The interdisciplinary group research by law study, logic, linguistics and intelligence and information technology and so on will enable this research to get more excellent results.

0. General Group

I would like to explain the study groups of this project and their task below. The general, integrated group deals with integrated research on "Development of Legal Expert Sys-

tem". It integrates the studies of the Group A0 through A4. Its special task is as follows.

1. to participate in the planning of researches of each group.
2. to control the process and integrate the results of each group towards the construction of Legal Expert System.
3. to design Legal Expert System as a whole.
4. to order programming to companies and control their work.
5. to experiment the system.
6. to evaluate it.
7. to possess and regulate the outcome of the research
8. to summarize and publish the whole results of the studies of this project.

A01 "Clarification of the General Structure of Legal Knowledge"

This research does not deal with a concrete positive law but law in general which is common to every positive law. Attempt to clarify the structure of law in general will help to clarify the structures of a certain positive law and *vice versa*.

As the task of this research, the followings are listed.

(1)The Structure and Function of Legal Propositions.

(2)The Structure of a Legal System .

(3)The Structure of a Legal Inference.

These are subjects of basic legal studies such as legal philosophy or legal sociology. Conceptual jurisprudence, general jurisprudence, interest jurisprudence, analytical jurisprudence, pure theory of law, realistic jurisprudence, empirical jurisprudence and so forth have ever approached these subjects from each viewpoint as the theories law. It seems important for this research to reexamine the results of the studies above mentioned from new points of view. And it is also important to approach these subjects by applying the viewpoints and methods of basic disciplines concerning human thought such as modern logic, linguistics, psychology and so on. In order to make those applications more effective, we can expect that the methods of the disciplines themselves will be examined by the researchers of the basic disciplines. And what is more, there also can be approaches from "new concep-

tual jurisprudence" or "new analytical jurisprudence" , referring to the results and trends of recent "Law and Artificial Intelligence" research.

A02 "Clarification of the Knowledge Structure of Positive Laws"

This research clarifies in detail the concrete knowledge of a certain positive law. As mentioned above, law is regarded as knowledge here. The content of the knowledge of each positive law has ever been ascertained by positive law study such as civil law study or criminal law study. In this study, we will confirm the knowledge of the positive laws from the viewpoint of and through the method of conventional positive law study and describe the content. Here, interpretative and legislative argument is important. It is necessary, however, to make the classification of the legal knowledge (laws, precedents, theories, legal common-sense and so on) and also make clear the time, place and person applied and to clarify the systematic structure of the knowledge.

Legal knowledge can be described, on the one hand, as a rule which has a structure of "legal condition and legal effect", on the other hand, as a dictionary of legal concepts.

This research aims to analyze the knowledge structure of positive laws; mainly private laws, especially contract laws such as Civil Code, international private law, CISG, consumer contract laws and so on.

A03 "Construction of Legal Knowledge-Base"

The purpose of this study is to load the knowledge of the positive laws analyzed in detail into computers and to construct legal knowledge-base.

In this study we construct legal knowledge-base, regarding the results of the analysis of the knowledge structure of above laws by the group A03. In the process, we reexamine the general and concrete structure of legal knowledge from the viewpoint of constructing legal knowledge-base. We examine the way of expression of the

knowledge and the structure of the knowledge-base. It is a hard work, both technically and practically, to acquire legal knowledge and to equip the knowledge-base with it. Therefore an assist system to acquire and control the knowledge is needed. We examine the style of this assist system. On this way, the knowledge-base is to be installed.

Legal knowledge is installed, on the one hand, as a rule with the structure of "legal condition→legal effect", on the other hand, as a case and as a dictionary of legal concepts.

As to the variety of precedents and theories, we decide the unific standpoint as a system, on the one hand, while put in all important theories and precedents and construct the legal knowledge-base so that we can infer legally differently in accordance with each view on the other hand. The system should be also able to express the relative effect of the knowledge so as to infer flexibly in accordance with the difference of the time and place.

A04 "Construction of the Software of Legal Expert System"

This research deals with the construction of the software of Legal Expert System. As basic softwares of Legal Expert System, we can list, (1)Legal Inference Engine,(2)A System to Control the Legal Knowledge and Assist the Acquisition of Legal Knowledge and (3) Users' Interface.

I would like to explain the tasks of this study.

1. To decide a model of legal inference and install the legal inference engine. At the same time, to realize such functions as deductive proof for inference of legal justification, legal analogy as inference of legal discovery, interpretation inference and fuzzy inference in accordance with ambiguity of legal words.

2. To install a system by modeling a system for the expression and the control and acquisition of legal knowledge in cooperation with Group A03. The keywords are large-scale knowledge-base, acquisition of knowledge from cases and discussion system.

3. To study mainly natural language interface. To make out the limited language of legal sentences and to construct a system for the transfer-

ence and reverse transference from the limited language of legal sentences to the internal expression of the system. This system is used for the system numbered 2 for supporting acquisition of knowledge and for constructing legal knowledge-base by Group A03.

Finally, I would like to emphasize that this research could, on the one hand, contribute to scientification of legal study by introducing the method of information and knowledge technology into legal field, on the other hand, unfold new possibilities towards knowledge science and technology through law.

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