

# Database design for Law-Defined Information System evolution support

Hayato Sugimori (510052)

School of Information Science,  
Japan Advanced Institute of Science and Technology

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## 1 Background and Purpose

Recently, information system has come to be used in any scene of society. Among these, information system which follows rules which are provided by organization is called "Law-Defined Information System". It is suggested at "Verifiable and Evolvable e-Society" 21st Century COE Program of JAIST that Law-Defined Information System has to satisfy five requirements for safe nature. Validity, Accountability, Ease of Evolution, Security, and Resistance Failure are those.

Within these, software accountability is defined as : "Be able to explain the act and the judgment that Law-Defined information system did for the question from one or more stakeholders. "

Stakeholders contain the person who enacted rules, who is restricted by rules, and who wants to examine or to revise present rules. It is expected that some questions from the person who are restricted by rules is like "Why has this rule been enacted?". Similarly, it is expected that some questions from the person who wants to examine or to revise present rules is what purpose of enactment.

For those, it is necessary to be able to store enactment purpose by the person who enacted rules and to extract these by others.

In this research, therefore, we design the database that can manage information that of enactment purpose, rules, and these relations.

## **2 Expression of relations between enactment purpose and rules**

To express enactment purpose, rules, and relations between those, we use Goal Tree in Goal Oriented Requirements Analysis(GORA) methods and Theory of Law by Eckhoff.

To acquire system requirements, at GORA, goals are resolved to subgoals. (Here, goals are state of organization which is hoped.) Also subgoals are resolved subsubgoals, and it is repeated till system requirements are defined. Goal Tree is a model of goals, subgoals, and more. It can extract the purpose of requirements by tracing processes of resolving goals. To use Goal Tree to express enactment purpose, it is possible to trace what is the purpose of the enactment.

According to Theory of Law, norm is classified into duty norm, character decision norm, and authority norm. Duty norm shows what is ordered to the person. It implies instruction, prohibition, permission, and exemption. Character decision norm categorizes the person, the thing, or the state. Authority norm gives the person the ability to order to another person, or to categorize the person, the thing, or the state.

To use those classification of norm to express rule, it is possible to treat rules from the standpoint of the person who enacted rules. As a result, how the goal achieved by which norm is clarified.

## **3 Abstract of the Database and Inputing Rules of Studying**

We design the Database which can contain goals and norms along concepts of GORA and Theory of Law.

Goals are divided business goals and rule requirements. Business goals are goals, subgoals and also. Rule requirements are bottoms of Goal Tree,

and are connected with norms. The business goal table and the rule requirement table record these content.

Norms, as described ahead, are distributed to the duty norm table, the character decision norm table, and the authority norm table.

To trace the enactment purpose, we make relationships between norm tables and rule requirement table, rule requirement table and business goal table, and business goal table and themselves.

For the evaluation of this database, we input goals and rules of studying at JAIST. It is confirmed that it can extract the enactment purpose by *ceri*.

## 4 Conclusions and Future Works

In this paper, we design database which can explain some questions from some types of stakeholders. However, it is not like "How do I become if violation?", but "Why the rule is enacted?" at present,

In the future, it is necessary to elaborate the structure of rules to explain other questions.