# A Research of Mechanism to Attach Software Accountability Functions to Law Enforcing Information System

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## 1 Background and Purpose

Recently,information system is used in any scene of society. Most of the information system is constructed according to the rule that the country and the local goverment provide. We need to confirm that the information system is made satisfying the corresponding social rule correctly to live our being relieved. And,Information system should evolve immediately after the chage of a social rule. We call information systems that have the features mentioned above Law Enforcing Information Systems(abbreviated as LEIS)

The software accountability function of LEIS is a function LEIS should answer the question from the stakeholders of LEIS who have the same doubts about the decisions or value of calculation made by LEIS. For example, citizens may have a question that "We have done the e-application and e-registration of same information using an e-society system,but I have a doubt to the result shown by the system. How does the system get these results based on what regulations and computation?"

The purpose of this research is realization of the accountability function. The software module with the mechanism to attach the accountability function is called accountability module.

In this research,I proposed explanation model and realized the accountability module. We developed course registration system as a research case.This system is LEIS.The accountability module is attached to this system and is realized.

## 2 Realization method of Software Acountability Function

I proposed the explanation model to answer questions from the user.

This method is realized by using execution log data base and social rule data base.

The explanation model is realized in the following steps.

1. The interceptor proxy records the execution log.

2. Information on the calling sequence of the execution logs is converted into the question list by using the class definition book.

   The class definition book is used to take the following correspondences.

   - Correspondence between text of social rule and process of call of function etc. that the text is implemented.
   - Correspondence between One question of question list and process of call of function etc.

     The action of the user who uses system can correspond to the processing of the call of the function etc.

     The system can uniquely decide the rule from one question chosen from the question list. The class definition book is information written by the developer of the legacy system.

3. The question list consists of a lot of questions.and,The user of the system can choose one question.

   One question is user's act such as "The registration button is clicked".

4. A social rule necessary for the explanation is specified by the class definition book.

5. A logical expression is expressed as a leaf of accountability tree.

6. The value etc. of the argument of the execution histories are used to explain as data that shows questioner's situation.

   It thinks log information that is necessary from the viewpoint of 「Making of question list」 and 「getting user's situation」. The execution log that is necessary is information of which processing outputs the execution result and information of Situation of user used while processing it.

   I selected Jboss Seam of the web application framework, and implemented.Jboss seam corresponds to EJB3.0. The execution log is collected from the component of Session Bean and Entity Bean.

# 3 Evaluation

When the execution logs are collected, the overhead of the performance is a problem. I did the performance evaluation experiment of course registration system that attached the accountability module.

I compared the following three case:Case where execution logs are collected by using interceptor mechanism;Case where execution logs are collected by using explanation model;Case where execution logs are not collected.

# 4 Conclutions and Future Works

In this research, I proposed the realization of the software accountability function.and I designed the accountability module and realized.Morever,I did the performance evaluation experiment of CourseRegistrationSystem that attached the accountability module.

As a result, it is understood that the system developed by this method causes the decrease in about ten times the processing speed.

It is necessary to apply to system other than crs as future works.