【Grant-in-Aid for Scientific Research (S)】

Integrated Disciplines (Informatics)

Title of Project : Advanced Reasoning Support for Judicial Judgment by Artificial Intelligence

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Research Project Number : 17H06103 Researcher Number : 00271635
Research Area : Logical Foundation of Artificial Intelligence, Juris-informatics
Keyword : Artificial Intelligence、Judicial Judgement、juris-informatics

【Purpose and Background of the Research】

In the trial process, the intellectual tasks that the judges are carrying out are roughly divided into the fact finding process, the subsumption process, and the judgement process. The fact finding process is a process of recognizing facts actually occurred in the case from evidence, the subsumption process is a process of making the facts correspond to legal concepts, and the judgement process is a process of making a judgement according to the legal concepts corresponding the facts based on legal rules. Furthermore, in court cases, there are conflicting structures of plaintiffs and defendants, and prosecutors and an accused. Therefore, in the trial process, various complicated high-order inferences are executed, and more accurate and prompt high order inference should be realized by support by artificial intelligence.

For this research, we aim to develop a system that supports advanced reasoning by using the following fundamental technologies and a system that analyzes argumentation in each process (Figure 1) .

1.Fact finding process support system using evidence reasoning based on Bayesian network
2.Subsumption process support system by acquiring subsumption rules based on natural language processing
3.Judgement process support system by extending the existing civil code reasoning system PROLEG to handle criminal cases and administrative cases
4.Argumentation analysis system based on argumentation theory

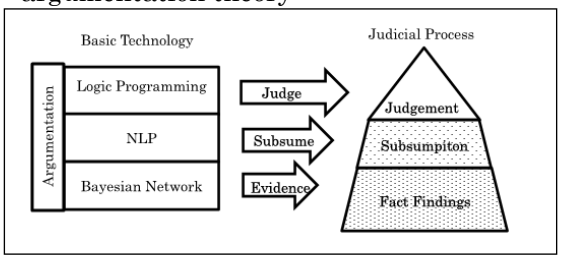

Figure 1 System Configuration

【Research Methods】

In FY2029, we investigate technologies of each trial process and argumentation analysis and the law scholar group considers the virtual judicial cases which can be used commonly in each process . In FY2030, we construct a prototype system and confirm each process execution using the above virtual judicial cases. In FY2031, we integrate each system and verify whether we can comprehensively solve the entire virtual judicial case, and the legal school group will evaluate the result. In FY2032, this system is applied to actual cases (including both civil and criminal). In FY2033, we ask the attorneys to use this system to verify applicability.

【Expected Research Achievements and Scientific Significance】

If this research is succesful, we can improve the accuracy and the efficiency of the judicial system using AI technology and increase the trust for the judicial system. This allows the public to access the judicial system easily, and it can be expected that a proper society (legalized society) will be created in which dispute resolution by law is properly considered.

【Publications Relevant to the Project】

Satoh, K., et al.,"PROLEG: An Implementation of the Presupposed Ultimate Fact Theory of Japanese Civil Code by PROLOG Technology", New Frontiers in Artificial Intelligence: JSAI-isAI 2010 Workshops, Revised Selected Papers, LNAI 6797, pp. 153-164 (2012).
Satoh, K., ``Logic Programming and Burden of Proof in Logic Programming'', New Generation Computing, Vol. 30, No.4, pp.297-326 (2012).

【Term of Project】

FY2017-2021

【Budget Allocation】

113,600 Thousand Yen

【Homepage Address and Other Contact Information】

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