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Verification of Legal Knowledge-base with Conflictive Concept

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Abstract

In this paper, we propose a verification methodology of large-scale legal knowledge. With a revision of legal code, we are forced to revise also other affected code to keep the consistency of law. Thus, our task is to revise the affected area properly and to investigate its adequacy. In this study, we extend the notion of inconsistency besides of the ordinary logical inconsistency, to include the conceptual conflicts. We obtain these conflictions from taxonomy data, and thus, we can avoid tedious manual declarations of opponent words. In the verification process, we adopt extended disjunctive logic programming (EDLP) to tolerate multiple consequences for a given set of antecedents. In addition, we employ abductive logic programming (ALP) regarding the situations to which the rules are applied as premises. Also, we restrict a legal knowledge-base to acyclic program to avoid the circulation of definitions, to justify the relevance of verdicts. Therefore, detecting cyclic parts of legal knowledge would be one of our objectives. The system is composed of two subsystems; we implement the preprocessor in Ruby to facilitate string manipulation, and the verifier in Prolog to exert the logical inference. Also, we employ XML format in the system to retain readability. In this study, we verify actual code of ordinances of Toyama prefecture, and show the experimental results.

Key Words: abduction, argument, extended disjunctive logic program, conflict, inconsistency, taxonomy