Modeling legal norms with computer programs

Abstract

The thesis is about the possibilities how to model programmable parts of law with computer. The goal was to create a working prototype of a computer model of a defined section of law. For this purpose the thesis set down a theory that included an analytical model of a legal system, compilation of the existing approaches in the computer domain focused on expert systems and representation Rules as Code and the factors to consider during the selection of a suitable domain to model. Based on that a custom logical model at the level of grammatical sentences was created, which was then transformed into a computer program. The thesis is concluded with the proposal to incorporate Rules as Code in the context of Czech legal and judicial system.

In the theoretical framework the concept of a legal system is defined as a fundamental normative system, which *claims* itself to be both legitimate and enforceable. The thesis presents a model of legal domain usable for versatile legal systems, which covers phenomena such as collision of legal systems, metanorms, legal pluralism and finding of law by judges. It also describes how the content of law can be captured in a textual representation for modeling purposes in a legal commentary. A logical model of law based on grammatical sentences is proposed. This model is followed by formalism to represent the logical structure of norms at the level of sentences using a structural and functional formula, procedure to construct the chain of inferences, and description of the argument form. The subject of the model was a part of the substantive law of the Czech Act on Free Access to Information. The thesis has shown that the hypotheses of legal norms composed of several conditions are so extensive that their compilation is time-consuming and intellectually demanding. Based on a prototype, it has reached the conclusion that the logical model can be converted into a computer representation of legal norms, the so-called automated legal commentary. After that it is demonstrated that the prototype, including a tool for evaluating the logical function, actually works.

In the thesis it has been shown on a few examples that machine-readable rules can be the basis of a modern, digitized legal and judicial system. It is recommended that the future developments in this area be focused on user-friendly features, argument generation, data provision using interfaces and, in particular, connections with forms and information systems.

Keywords

Rules as Code, legal modeling, legal system, digitization of law