Representational Complexity in Law

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ABSTRACT

Computationally represented laws should accurately model their real-world counterparts in rules-based legal compliance systems. Legal theoretical considerations, however, often complicate the task of faithful representation. One approach to this problem has been to create sophisticated models capable of representing rules of arbitrary legal complexity. An alternative approach, which we advocate in this paper, is to focus on a subset of individual legal rules which are more amenable to simplified computational representation from a legal theoretical perspective. We propose a measure of such a tendency that we term the *representational complexity* of a legal rule. Our approach involves a systematic examination of particular legal rules along all of the relevant dimensions of legal theoretical complexity identified by the legal scholarship. In this way, we suggest that is possible to identify discrete legal rules which are likely to be, from a legal theoretical standpoint, amenable to simpler computational representation.

Categories and Subject Descriptors

I.2.4 [**Artificial Intelligence**]: Knowledge Representation Formalisms and Methods

1. INTRODUCTION

In rules-based Computer Assisted Legal Compliance (CALC) systems, legal constraints are represented in computational form. In order to usefully function, computational models of legal rules must accurately represent their real-world counterparts.

Certain laws have proven more difficult to represent and apply in computable contexts than others [1]. Although numerous factors contribute to this problem, in many cases, legal theoretical considerations – fundamental issues emanating from the creation, use and application of laws – create disparities between the computational representation and the law as it operates in practice. One response has been to develop sophisticated conceptual models aiming to

represent laws of considerable operating complexity [9], [10]. In this paper, we advocate an alternative approach, focused primarily upon those legal rules that are relatively less complex from a legal theoretical perspective.

1.1 Representational Complexity

Earlier researchers attempting to model laws computationally, encountered representational difficulties related to the text, structure, and consistent application of these laws [1], [10]. These earlier efforts primarily discussed issues of complexity in passing. In this paper, we outline a more systematic procedure for evaluating the impact of issues stemming from the creation, operation and structure of laws upon computational modeling.

Drawing from several disparate bodies of research from the legal scholarship, we propose an evaluative process in which individual legal rules are examined along the major dimensions of legal theoretical complexity. Using this approach, we suggest that it is possible to identify legal rules that are more likely to be amenable to simplified representation in computable form. This measure, which we term the *representational complexity* of a rule, offers a guide to the degree to which legal theoretical issues are likely to complicate the task of computationally modeling a given legal rule. The less representationally complex a rule is, the more likely it is that a simplified computational representation can accurately model the law as it operates in practice.

We believe that there are a non-trivial number of existing legal rules which exhibit tractable degrees of representational complexity. By focusing upon discrete legal rules that are the least representationally complex within a given body of law, rather than aiming to model all of the legal rules within the body, we expect that useful, but narrower projects - for example statute of limitations calculators or building code compliance testing systems - can be developed. In following this pragmatic approach, and relying on the rules as they exist in practice, we believe that we can pursue a series of small, but important milestones towards the long-term goal of deeply integrating computational law into the work of practicing lawyers.

2. SOURCES OF REPRESENTATIONAL COMPLEXITY

In this section, we summarize our approach. In evaluating legal rules for representational complexity, we use a simplified rule life-cycle model as an organizing framework. In this model, there are four phases: 1) ideation, 2) encoding, 3) interpretation, and 4) application. In the first phase, the

rule-maker - for the purposes of simplicity we will assume a legislature - identifies an issue to address and a desired goal. In the second phase, the legislature instantiates this "intended purpose" in the form of an explicit, written legal rule. In the third and fourth phases, consumers of the legal rule - for example, citizens, judges, police, lawyers, interpret the text of the rule and apply the rule to a given factual situation.[1]

We have collected the theoretical issues deemed most significant by the legal literature. The life-cycle model that we employ facilitates the *systematic* consideration of each issue for a given legal rule. By organizing each issue based upon its theoretic source, this framework permits one to classify and evaluate a legal rule separately along each dimension of complexity.

2.1 Representational Complexity Applied

Although space constraints do not permit us to present our approach in its entirety in this paper, we will illustrate its essence with some examples. Conceptually, our method proceeds phase by phase, with the evaluation of a particular legal rule in light of each theoretical issue from the phase under consideration. For example, several distinct theoretical issues which are extra-textual in nature - notably those relating to the role of the "purpose" – originate in the ideation stage.

We can illustrate this in more detail by exploring a particular issue along which a legal rule can be representationally complex. The legal literature emphasizes that laws are animated by specific goals or policies in their creation. Therefore, the impact of articulated or unarticulated purposes upon interpretation can be substantial. To the extent that a purpose of a particular legal rule is discernable and plays a role in its real world application, such a legal rule can be considered representationally complex. The implication of this is that a symbolic model of a legal rule with a focus *primarily* on the text of the rule may not provide an accurate account of the law as it operates in practice. Interestingly, rules-based computer systems frequently focus upon modeling the *text* of legal rules. The corollary to this observation is that a legal rule for which a primary intended purpose is sufficiently clear or which rarely affects its literal interpretation in practice, can be considered *less* representationally complex. Examples of discrete rules of this nature abound in application oriented bodies of law such as the building codes. Therefore, under our approach, a legal rule whose representation is not bound by "extra-textual" interpretive considerations is likely to be more amenable to a simplified computational model.

Another example of a complexity consideration, drawn from the encoding phase, will help illustrate the scope of our approach. A written rule, even if precisely drafted, is almost always an imperfect proxy for the rule-maker's intended purpose. For administrability reasons, the purpose of a rule usually stated at a higher level of abstraction than the resulting written rule.[2] However, administrable rules tend to be over or under inclusive in their application relative to the intent of the rule. This dichotomy creates another potential source of discrepancy between the rule as it oper-

ates in practice, and the rule as it is likely to be represented computationally. Our method would therefore suggest a focus upon those administrable legal rules in which the rule and the intended purpose are well aligned in its usual applicatory context. These examples are illustrative of our overall approach.

3. CONCLUSION

We have offered a brief outline of our approach to evaluating discrete legal rules for their amenability to simplified computational representation. It is important to emphasize that discrete rules within large bodies of law may be amenable to simplified computational representation even if the other rules in the body of law, or the body of law as a whole, is not. The examples given in this paper are not exhaustive. In a complete evaluation, the representational complexity analysis of the rule would have continued through each theoretical issue associated with the initial phase until that list had been exhausted, and then would have proceeded to issues conceptually related to the next stage. Once completely evaluated, it would then be possible to make an estimate as to the legal theoretical complications that would likely arise in a computational application of the legal rule.

Because a complete analysis of each legal rule is likely to be time-consuming, we are developing a series of heuristics for more rapidly identifying rules which are relatively less representationally complex. These are legal rules which we have termed as *strongly specified, literally applied,* and *administrable.* Although such rules represent only a small subset of legal rules in general, we believe that their widespread prevalence across many areas of law, and their frequency of applicability, suggest that their automation could result in a significant source of efficiency in the legal system.

4. REFERENCES

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[1] We will confine our discussion to explicit statutory or regulatory legal rules.

[2] A legal rule is administrable to the extent that it can be easily and consistently applied in practice.