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A General Theory of Artificial Intelligence and Law

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Abstract

The paper addresses the relation between AI–theory and legal theory. The focus is set on future developments of a general theory for the joint field of AI and law. It is suggested that further explorations of pure AI-theory, as well as extensive investigations of legal theory are less profitable approaches. Instead, it is argued, future developments are depending on the formation of a more elaborated theory of a true interdisciplinary nature. In addition, some general criteria for such a theory are proposed. The discussion is illustrated with references to a theory of legal reasoning developed within the framework of these criteria.
Keywords: AI, law, general theory, interdisciplinary approach, general criteria.

1 Introduction

The interaction between artificial intelligence (AI) and legal theory may be looked upon in different ways. A common assumption is that formalisms and models developed in AI may provide a new dimension to legal theory. Simultaneously it has been suggested that legal theory may contribute to the development of a sound basis for further attempts to construct intelligent machines [Buchanan & Headrick, 1970; McCarty & Rissland, 1987]. There has also been a continuous debate about whether AI or law is to gain the most from the meeting of the two disciplines, e.g. [Niblett, 1981; Susskind, 1987; Gardner, 1987; Smith, 1993].

From a critical point of view, however, it may be argued that the discussion about which topic that will benefit the most from the other is a reflection of the fact that the field of AI and law lacks a general theory of its own. Such a hypothesis is also strengthened by a number of other indications.

Most important in this respect is the fact that the underlying theoretical basis for activities in this area is of a vague nature. In many contributions theoretical aspects are not addressed at all and, as mentioned in the invitation to this gathering, there exist few –if any– in-depth investigations focusing on the theoretical relationships between AI and law.

Noticeable is also that several contributions in the field of AI and law appear to be incompatible with respect to the understanding of the law and legal work. A number of diverging perspectives exist and although many of the studies focus on various aspects of the law it is not always clear how these aspects relate to each other and to the process of legal reasoning. For instance, [Jones & Sergot, 1992 at 63] suggests that "[D]eontic logic – in one form or the other – will have a key role to play." Other contributions, e.g. [Rissland & Ashley 1987; Ashley, 1990] reflect case-based theories. A large number of researchers, e.g. [Smith & Deedman 1987; Capper & Susskind, 1988] rely on rule-based models, and in several studies, e.g. [McCarty, 1983; McCarty, 1989], it has been argued that the law is best reflected in deep conceptual structures, and so forth.

Likewise, various AI-paradigms are being employed. Some researchers – [Karpf, 1991] provides an overview – prefer to make use of inductive methods, others, e.g. [Sergot *et al.*, 1986] find logical models best suited, still others, e.g. [Routen, 1989; Hamfelt, 1992] utilise findings from research in meta programming. [Warner, 1990] relies on neural networks, and [Gelbart & Smith, 1993] employ statistical methods, etc.

Furthermore, from the practical point of view, it is obvious that the development of AI and law so far has been relatively slow and problematic. Despite great efforts surprisingly few successful projects and actual system implementations have been reported. In the Scandinavian countries, for instance, few systems based on any significant AI-technology have succeeded in the implementation phase, despite considerable resources and numerous ambitious projects, initiated e.g. by special development groups within the public authorities. A general understanding of how to overcome these difficulties is however lacking.

From all this follows that it becomes more and more apparent that the simple juxtaposition of AI and legal theory, or more precisely, of various elements from AI and legal theory that so far has been predominant is an insufficient and too simple approach. The task of developing machines that are able to mimic legal reasoning has turned out to be a far too complicated project for such a strategy. The consequence of this is that it appears obvious that the field of AI and law must develop a general theory of its own.

2 A General Theory of AI and Law

The task of developing a general theory of AI and law is a challenging and long term enterprise. The exercise should not, however, pose unsolvable problems. Various approaches may be discussed. In addition, it is possible to make some comments on the previous suggestions concerning the potential value of further investigations of AI-theory and legal theory.

Starting with the latter, it should be explicitly stated that the task of developing a general theory of AI and law is not a problem that can be solved solely by means of importing more AI-theory into the field. Problems concerning law and legal reasoning has yet not been extensively investigated in the AI-community and in this respect AI-theory is inadequately developed. To illustrate this it is sufficient to refer to the present situation for AI-applications in the legal domain. It is no secret that very few systems have been accepted by the legal community. The problems, however, are not primarily of a technical nature. With little doubt, the difficulties are more closely related to a too

shallow understanding of the requirements of the domain taken as a whole.[1] Accordingly, it is not realistic to believe that further explorations of pure AI-research will solve the problems.

On the other hand, it is evident that it is not possible to form a general theory of AI and law only by means of articulating aspects that are well known from legal theory. At present, traditional legal theory may provide illustrations of how certain aspects of the law and legal reasoning have been understood and managed in previous times, but legal theory does not contain answers to computational problems or AI-system development strategies. The explanation for this is simple – legal theory has never been concerned with these questions.

Consequently, AI-theory must be adjusted and complemented in order to coop with the distinct features of the law and legal reasoning. Likewise, in order to have something to contribute to the topic of AI and law, traditional legal theory must be re-examined, transformed, and interpreted in a new way so that the computational perspective with its distinct notions and problems becomes included.

This means that a general theory of AI and law cannot only be based on theoretical findings originating from the original topics. Equally important is that such a theory must reflect also a large number of domain dependent and unique characteristics. Thus it can be concluded that the field of AI and law requires a more adequately elaborated theory of an interdisciplinary nature.

The conclusion that the discipline of AI and law is in need of a general theory of an interdisciplinary nature may seem trivial and obvious. Nor is it very helpful. In order to make something out of such a presupposition it is necessary to define some substantial elements of a more detailed nature and in the following section of this paper some desirable criteria for a general theory of AI and law are discussed and motivated in a tentative manner.

2.1 General Criteria

i) Overall structure. Perhaps the most important aspect of any future theory in this field will be the ability to reflect an overall structure, incorporating the basic elements, relations and research problems of the discipline. In this respect the present situation within AI and law is surprisingly fragmented and diversified.

The existing differences concern basic components as well as methodological aspects. Reflections of this can easily be found. It is for instance obvious that it does not exist any general agreement about the nature of the major research problems – the enumeration of research approaches given in the introduction of this paper can easily be extended. Likewise it is clear that it does not exist any general consensus concerning the most feasible research methods [Susskind, 1990; Berman, 1991; Bing, 1992; Smith, 1993].

The different nature of the various contributions makes it difficult to utilise previous findings and, of course, also has a hampering effect on the way in which knowledge is aggregated. That is to say that without a common ground it is very laborious to compare

[1] A quotation from [Berman, 1991, at 307], discussing AI models of case-based reasoning, may illustrate: "[A]uthentic case-based models employ frame-based structures, transition nets, semantic networks, discrimination threes, connectionist models, etc.... To legal scholars well versed in the subtleties of legal reasoning these particular representations of legal cases, though seminal works of considerable scientific importance, constitute a mere simulacrum of legal thought." See, also [Susskind, 1989].

the various contributions. It is also difficult to learn from previous experiences.

How does for example deontic models of the law relate to deep structure models of the law? How are case-based and rule-based models related to each other and to the concept of legal reasoning and, furthermore, how can they be tied up to theories of e.g. non-monotonic and adversarial legal reasoning? Which are the basic building blocks in the various theories of legal realism and legal positivism? How is it possible to combine these components with theories concerning e.g. *open texture, stare decises, ratio decidendi, sub silentio* and *opinione necessetatis*?

The scattered picture does not only concern legal matters. A large number of approaches, which at present struggle for acceptance, can also be seen within AI-theory. Here the discussion, among other things, concern such basic matters as the nature of intelligence, the understanding of language, adequate means of representation, etc.

The situation becomes even more confused when the various theories and components are to be combined. Is it, for instance, appropriate to utilise inductive modelling in order to represent intricate aspects of case-based legal reasoning? Alternatively, is it a better approach to combine meta programming with theories concerning analogical legal reasoning? Which type of formalism should be used in order to represent deep conceptual models, teleological structures, normative positions and agent theories, and so forth?

Furthermore, it is clear that many undertakings in this field have very different objectives. Contributions may, among other things, be initiated for practical, experimental, theoretical, economical, or educational reasons. Practical system development activities, in turn, demonstrate very different levels of ambition, ranging from e.g. enhancements of administrative systems and information retrieval to experiments with autonomous reasoning systems. In this respect the need for an overall structure is mirrored in the fact that discussions on how these various objectives ought to be reflected in different types of research approaches, implementation strategies, etc. are more or less lacking.

The suggestion that the field of AI and law should strive towards the development of a theory reflecting an overall structure must not be misunderstood. The fact that a research area is diversified and multifaceted is not necessarily a negative aspect. On the contrary, in many cases the existence of a large number of various activities is a sign of vitality and broadness.

In the field of AI and law, however, it may be argued that at present there exist very little counterbalance to the multiplicity of the approaches that have been presented. And, if this issue is not confronted, there is an obvious risk that AI and law in the near future will be looked upon as a general label with little or no substance of its own.[2]

ii) Generality. A theory of AI and law must reflect a certain level of generality. The reason for this is similar to the one underlying the need for an overall structure. That is to say that a feasible theory must not only relate a large number of different entities to

[2]Difficulties related to multiplicity is not unique for the discipline of AI and law. It is probably a common situation for novel, less developed fields of research. An illustration is given by [Kuhn, 1970, pp. 13–14] who recalls that "The history of electrical research... provides a... concrete... example of the way a science develops before it acquires its first universally received paradigm... [T]here were almost as many views about the nature of electricity as there were important electrical experimenters... Yet though all the experimenters read each other's work, their theories had no more than a family resemblance."

each other, it should also make it possible to describe various components in a more or less general and uncontroversial manner. In this respect, a theory of AI and law should facilitate the evaluation of various research findings.

To find a level of description that is general and uncontroversial is not a trivial undertaking. Legal theory is not one single theory. It is a general concept embracing a large number of theories concerning various matters. The number of existing theories is vast, it is not far from the truth to claim that almost every legal philosopher has his own interpretation of some basic legal matter. It is also clear that these theories often contradict each other. The differences in opinion may concern anything between moral aspects and ontological or epistemological assumptions of a basic nature.

Likewise AI is a very diversified topic. The notion of AI encompasses many activities focusing on various problems. It is not difficult to find controversial aspects and competing theories. In addition to the previously mentioned topics of interest it is possible to find a large number of various submissions, based on, e.g., hermeneutical theories, psychological studies, cognitive science, and so forth.

An important factor to take into consideration is also that the controversial nature of the components reflected in this area is nothing that can be expected to be resolved within the disciplines of AI or law respectively. Within legal theory many of the issues that presently are being discussed have been debated for several hundred years. [Susskind, 1987, p. 35] is often quoted for stating that "It would indeed be embarrassing for all concerned with jurisprudence if it transpired that we [in the legal domain] had to admit to computer scientists that, though we have been speculating about the nature of law and legal reasoning for well in excess of two thousand years, no matters of controversy have been settled, no agreement attained, in consequence of which legal theory has little to offer to the development of legal knowledge engineering." It has recently been suggested, nevertheless, that the situation referred to by Susskind is "just the situation that legal theory is in." [Smith, 1993, p. 249].

In a similar way, although for natural reasons during a much shorter period of time, it is possible to see a continuous debate over basic matters in the AI-domain [Graubard, 1988].

If the criteria of generality is not meet, any contribution in the field of AI and law based on some specific AI- or legal theory will have very little to offer to those who do not share the presuppositions of the specific theories reflected in the contribution. The number of existing theories, however, make it reasonable to suspect that in many cases this will be the majority of those potentially interested.[3]

To illustrate this point it may be claimed that it is not very interesting to learn, for instance, that some intricate paradox of deontic logic has been resolved as long as the relationship between this paradox and some aspect of legal reasoning has not been addressed. In a similar way it may be questioned whether novel findings in, e.g., neural network research may be of any relevance as long as the underlying implications for AI and law remain completely tacit.

[3][Susskind 1990, pp. 227–28] discussing the vastness of the material in the field, suggests that "the problem here is rooted not simply in the amount of data, information and knowledge.... There is the further question of perspective: the history, styles, and epistemological bases of writings on law and computing are diverse." Susskind also raises the question of "whether academic offering in the field should not best be made in the tradition of one or other but not both disciplines."

The strive for generality, of course, does not mean that more detailed studies should be abandoned. A theory encompassing general accepted notions is important as a complement. Generality is however nothing that can replace other types of research activities, focusing, for example, on deontic paradoxes or neural networks. The argument posed here is merely that contributions that are submitted to this area should be possible to relate to clearly defined research goals, accepted methods, and basic components of a general, uncontroversial nature.

iii) Transparency. A general theory of AI and law must be transparent, i.e. it should be possible to understand and evaluate also for those who are not trained in some specific method of formalisation. Among other things transparency is crucial due to the fact that the various persons active in the field have very different backgrounds. Transparency is however also necessary if the notion of AI in law should gain any acceptance outside the field of research, e.g. among potential users, administrators responsible for rationalisation, financial contributors, etc.

Shortcomings related to transparency raises a number of problems. The most common difficulty, no doubt, is the fact that studies focusing on knowledge representation problems often confront the lawyers without special training with vast problems; i.e. without a skill in reading and understanding symbolic or graphic notations it is difficult to evaluate the usefulness of formal representations [Dupuis *et al.*, 1993].

Similar problems may also originate, e.g. when system developers make references to some more or less obscure acronym concerning computer system design strategy, or when legal theorists utilise various unusual categories of rights and obligations. From this point of view, to a large extent problems of transparency are possible to relate to language barriers, and to the use of a non-uniform and biased terminology.

It is important to mention, however, that extensive use of, for instance, symbolic representations is not always a hindering factor in this respect. In some contributions formal representations are being employed in a cautious manner, combined with elaborated explanations of the advantages and the disadvantages of a more formal language, and studies based on formal languages may be, of course, extremely valuable and provide novel research findings of great importance. To underline the need for transparency is not a way of questioning this. On the contrary, it is obvious that the use of formal representations, as well as the access to an elaborated and specific terminology, always will be crucial for undertakings in this field.

Thus the quest for transparency is simply a reflection of the assumption that the field of AI and law as such is better served if the various theoretical assumptions are made as clear as possible. In addition, it may be argued that in this respect so far the quality of the contributions vary.[4] It may be therefore suggested that this aspect should be given much more attention.

iv) Explicitness. The aspects of transparency are closely related to the criteria of explicitness. That is to say that a theory of AI and law must not only be possible to evaluate for those who are not trained in some specific method of formalisation and

[4]See, e.g. [Wood, 1990, p. 9]: "This [communication problem] has had the unfortunate consequence of creating incommensurable vocabularies and misunderstanding, a 'tower of Babel' which has cut researchers off from each other and from the worlds of legal practice an legal scholarship. The failure to communicate has afforded some researchers the opportunity of shrouding their work in mystery and of avoiding criticism."

those not familiar with some highly specialised terminology. A theory of this kind must also be of a very well-defined and open nature.

Explicitness is a necessary presupposition for several reasons. Most important is the fact that the computational aspect of AI and law makes it obligatory to describe all parts of the underlying models and the various theories in a form that to some extent can function as –or be the basis for– process specifications. Automation by means of logic programming and other forms of knowledge representation –which at out present level of understanding constitute the tools for practical undertakings in this area– presupposes that all aspects of the issues that are going to be represented are made explicit.

In practice, this means that all components of the law that are to be reflected in any computational formalism must be included. Likewise, any theory of legal reasoning must be elaborated in a careful manner so that no part is left out and tacit assumptions are avoided.

The criteria of explicitness is general – it does not matter whether the submitted theories aim for isomorphism (i.e. the authentic reflection of the original material) or are based on some other assumption, e.g. the statistical manipulation of encountered elements. All techniques which at present are available for practical experiments presupposes that the theories can be transformed into explicit representations reflecting more or less step wise processes. From this point of view explicitness is a critical aspect determining the practicability of any theory in this field.

Explicitness is not, however, only a criteria concerning process specifications. The complicated nature of the topic also make it desirable to describe aspects of context, theoretical and legal foundations, as well as research goals in a straightforward way. The latter is important not only because there often is very little common ground among the persons involved, but also because any theory on AI and law must be open for evaluation, discussion and criticism. Contemplating over the development so far it is obvious that this aspect has not always been given sufficient attention and that the intricate nature of the topic makes it very easy to misunderstand and overlook crucial aspects.[5]

v) Particularity. Research problems related to the issue of automating legal reasoning are extremely complex issues. Of crucial importance is therefore also that a theory of AI and law must describe components at a very detailed nature or, at least, must be possible to elaborate in such a way that they reflect a high level of specification.

Also in this respect considerations related to computational feasibility are important factors. Particularity is therefore, just like explicitness, closely related to practicability – any theory that should be able to contribute to practical undertakings with AI-systems must be of a very specific kind and if the aspects of particularity are not meet, it will not be possible to develop applications reflecting any authentic characteristics of the law or legal reasoning. This in turn obviously will lead to that AI-applications will have very little chance of being accepted by the potential users.

This is not to say that pure theoretical enterprises of a general kind cannot be of great value, only to point out that practical implications must not be ignored.[6]

[5]See, e.g. [Leith, 1986, p. 31]: "Professionals should send the AI researchers back to their keyboards, requesting them to study real law, rather than this simplified pseudo-law which they present."

[6]Cf. [Susskind, 1989, p. 19] who suggests that"[b]linkered pragmatism and detached purism are the Scylla and Charybdis of the murky and substantially uncharted waters of AI and law. A safe channel through requires purism as the vessel within pragmatism can be contained."

The requirements originating from the criteria of particularity are sometimes satisfied, sometimes not. Particularity is, for instance, a necessary presupposition for the effective modelling of legal reasoning but, at present, elaborated theories reflecting the complexity of the legal reasoning process are comparatively rare. This is simply to say that the common suggestions that legal reasoning is e.g. case-based, rule-based, non-monotonic, etc. are almost without exceptions all to unspecified. It appears obvious that a theory with the ambition to contribute to any deeper understanding of the process of legal reasoning, and thus to the development of the field of AI and law, must incorporate also extensive specifications of such claims.

To suggest that almost all submissions concerning legal reasoning are too unspecified is, of course, a provocative statement. Exceptions exist and it is also possible to perceive a distinct shift towards more elaborated explorations in these matters. See, e.g. for a recent example, [Poulin *et al.*, 1993]. What is suggested here is nevertheless that future advancements in this domain are likely to be depending on our ability to form even more specified theories.

Particularity is not only of relevance for the development of process specifications reflecting the legal reasoning process. Carefulness and extensive elaboration of details are also necessary in order to reflect the more subtle aspects following from assumptions concerning the nature of the law. It is, for instance, not very helpful to learn that the law has a deep conceptual structure as long as the components of this claim remain unspecified. Nor is very elucidating to find out that some researchers state that the law is of a hermeneutical nature and that it therefore is adequate to employ a certain computational formalism. On the contrary, if such arguments are to be of any significant theoretical or practical value, then the nature of each basic building block, as well as the relations between these elements, must be defined in a very extensive manner.

Of relevance as regards particularity is also that AI-system implementations in any realistic legal work situation may have a more or less far reaching influence on substantial legal matters. A general theory of AI and law must therefore also acknowledge the necessity to develop detailed models of the existing substantial law, case-based or rule-based as it may be. This, in turn, makes it necessary to recognise the importance of in depth investigations of legal rule-systems, the functions of the legal order, the requirements of potential users, and similar things.

Finally, it should be explicitly pointed out that the need to include highly specified components in no way is in conflict with the above mentioned criteria of generality. The combination of these two aspects is merely a reflection of the fact that usable theories of AI and law must be able to reflect a large number of components at various levels of generality.

vi) Flexibility. The law changes all the time and any theory concerned with automation must take this dynamic aspect into consideration. In practice this means that useful systems in this field must be able to manage various forms of modifications and that system maintenance strategies, control structures and similar aspects must be given considerable attention.

To be able to coop with changes of the substantive law is however not the most important aspect of flexibility. In the long term perspective there is little doubt that our present understanding of legal reasoning will be looked upon as being of a very primitive kind. Following the terminology of [Kuhn, 1970, p. 24], it appears rather clear

that the field of AI and law has not yet reached the stage of a 'normal science' where knowledge is aggregated in a steady way and where "scientific research is directed to the articulation of those phenomena and theories that the [accepted] paradigm already supplies." A consequence of this is that it is obvious that our current theories will have to be adjusted in various ways as our understanding of the processes involved increases.

To predict the future pace of the development or to foresee the nature of the changes is not possible. At some stages of the development novel research findings may call for elaboration and refinements of the existing assumptions. Thus, changes may be the result of e.g. practical experiments, evaluations of realistic system implementations, etc. and, to some extent, in the control of the research domain. In this respect the prospects appear to be considerable, i.e. "when the paradigm is successful, the profession will have solved problems that its members could scarcely have imagined and would never have undertaken without commitment to the paradigm."[Kuhn, 1970, p. 25].

However, it is important to notice that changes may be also initiated by a large number of 'external' factors, e.g. of a sociological, economical, or political nature. External factors may initiate changes of various kinds. Ideally, they facilitate the development, for instance, by means of providing increased computer readiness, changes in educational policies, investments in computer based rationalisations, etc.

On the other hand, external factors may also give rise to problems and provide obstacles of new kinds. Noticeable is furthermore that the changes may be of a very drastic nature and that predominating theories, as well as feasible technical solutions may have to be rejected as new insights emerge.

A recent debate on the mass media in Sweden on the elaboration of an existing, nation-wide computer system for social security offices may serve as an example. The debate was related to the issues of personal integrity, security, and vulnerability in relation to the possible misuse of the intended knowledge-based extension of the system. In this debate various political arguments were submitted but technical aspects were given relatively little attention. The discussion ended with a governmental decision (1992) according to which the project had to be abandoned.

Events like the one just described clearly indicate that flexibility, as well as the ability to include various types of non-technical and non-legal factors in the theories, is a crucial aspect. Likewise it is obvious that there can be very little room for dogmatism.

2.2 An Illustration – A Theory of Legal Reasoning

It is relatively unproblematic to argue that criteria like the ones outlined above should be the basis for any general theory of AI and law. The task of developing a theory reflecting all these aspects is nevertheless an ambitious, long term project. The ongoing development and the need for flexibility also makes it reasonable to suggest that it is a more or less continuous undertaking. Therefore, from the practical point of view, it is clear that the majority of the work undertaken in this field must be of a more limited nature.

This is however not necessarily a contradiction - a general theory of the kind discussed above need not only be the result of extensive philosophical investigations. On the contrary, such a theory may also evolve through practical efforts on a smaller scale basis. That is to say that if the criteria outlined above, or criteria of a similar kind, are

utilised and referred to in practical research in a systematic way, the understanding of these matters will increase in a generic manner.

A theory of legal reasoning [Wahlgren, 1992] developed at *The Swedish Law and Informatics Research Institute* in which the criteria discussed here are reflected, may illustrate:

The theory exhibits an *overall structure* by means of forming a distinct model based on a decomposition of the legal reasoning process into six different, more or less parallel, sub-processes. The 'identification process' in which the objective is to be able to compose a legally relevant description of the issue, a 'law-searching process', in which the lawyer must find a description in the legal system that will reflect the current situation, an 'interpretation process' during which the lawyer may perform transformations and adaptations of legal notions, a 'rule application process' wherein a large number of methodological rules determine and explain how rule applications ought to be completed, an "evaluation process" in which the potential effect of the intended rule application is scrutinised, and, finally, a "formulation process" whereby the lawyer must formulate the decision. The aim of this approach being that such a decomposition –defining the basic components and its relations– will facilitate a more systematic research.

The theory is *general* in the sense that reflects components that should be possible to accept by scholars of various traditions. It is, for instance, illustrated that although on the surface huge differences exist in the way the legal order is perceived, a crucial *function* of the substantive law –disregarding whether its origin is e.g. case-based legal realism or rule-based legal positivism– is to provide effective fact recognition and fact classification assistance in the identification phase.

The theory is *transparent*, i.e. the components are described in a non technical way and all legal and technical terms are explained as they appear. In addition, various forms of graphical illustrations are employed. The ambition being that the theory should be understandable for lawyers and technicians without special training.

Explicitness is reflected in the fact that all the relevant aspects the selected jurisprudential paradigm makes it possible to identify have been included. The theory thus provides a basis for the elaboration of more or less step wise process specifications.

Moreover, with respect to *particularity*, the theory incorporates the important characteristics as well as the modus operandi of each sub-process. Likewise various forms of relations (e.g. sequences, hierarchical orders, etc.) between the various sub-processes and different legal components are described in a detailed manner.

Finally, the theory is *flexible* by means of being modularised in such a way that one or several components can be changed, elaborated, omitted, etc. without disturbing the overall order of the model.

The theory of legal reasoning referred to here is merely a tentative example of how general criteria can be utilised in order to discuss research approaches in the field of AI and law. It is in the same way possible to relate undertakings concerning, e.g., the nature of the law, processes of interpretation, methods of representations, etc. to criteria of this kind –and– if this is carried out on a regular basis, there is little doubt that the possibilities of forming a general theory of AI and law will be affected in a positive way. It is for instance noticeable that many of the most influential contributions in this area satisfy these criteria in a significantly high degree. The best examples in this respect are perhaps the well known works of [Susskind, 1987] and [Sergot *et al.*, 1986] on *The British*

Nationality Act in which each criteria that has been addressed in this contribution is clearly reflected – although for natural reasons in varying degrees. Reviewing some of the standard projects in the field it is equally clear that although the works of e.g. [Gardner, 1987] and [Ashley, 1990] demonstrate a high degree of particularity and reflect several other aspects, they do not satisfy the criteria of overall structure and generality, as they have been outlined here.

3 Summary and Future Work

This paper addresses the relation between AI and legal theory. The focus is set on future developments of a general theory for the joint field of AI and law. It is suggested that further explorations of pure AI-theory, as well as extensive investigations of legal theory are less profitable approaches. Instead, it is argued, future developments are depending on the formation of a more elaborated theory of a true interdisciplinary nature. In addition, some general criteria for such a theory are proposed. The discussion is illustrated with references to a theory of legal reasoning developed within the framework of these criteria.

It is by no means suggested that the criteria for a general theory of AI and law that are outlined here are the only possible ones. Nor is the model of legal reasoning that is referred to intended to be of a conclusive nature. On the contrary, a basic presupposition for this discussion is that all theoretical assumptions should be debated and revised in a continuous manner. Likewise any theory should be tested and its elements scrutinised.

Thus, the important notion in this paper is of a more general kind, namely that future advancements in the field are depending on our ability to develop more adequate theories, reflecting the unique characteristics and requirements of the combined discipline of AI and law. In addition, it is suggested that such theories may be developed in a generic manner by means of systematically relating research efforts to standard components such as overall structure, generality, transparency, explicitness, particularity and flexibility.

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