CHAPTER 7

CONCLUSIONS

With the recent advances in Microtechnology and Artificial Intelligence techniques the thrust has begun to swing from hardware to software for knowledge processing and data manipulation. By developing knowledge-based systems in any domain one can now view the computer as a new agent for carrying encoded domain specific knowledge and making it available for problem solving or analyzing through conversation.

Escalating expectations of the human beings, the hopes extended by welfare state, diminishing work ethics and the ascending political activism in all walks of life have all resulted in surmounting of a very large number of litigations year after year. This has made the 'legal realm' as one of the appropriate fields that needs automation to improve its productivity and the quality of its product. Development of knowledge-based systems in the legal realm that assist the legal practitioners in analyzing various fact situations hold a lot of promise in achieving the much required automation.

Any attempt to develop a knowledge-based system in the legal realm has to primarily deal with the representation of the domain knowledge. The selection of an appropriate knowledge representation technique is crucially influenced by the characteristics of the domain knowledge. Changing political and social set ups, inability of the legal draftsmen to anticipate all the possible combinations of circumstances which the future may bring etc., have made the legal knowledge
dynamic. This dynamic characteristic of the legal knowledge demands a representation technique that permits the development of a system incrementally as well as modularly. As discussed in chapter four, the production rules having many of its features comparable with the legal rules and enabling the building of systems incrementally and modularly tempts one to select 'production rules' as most appropriate technique to represent the legal knowledge. This opinion has also been corroborated by the fact that majority of knowledge-based systems that have been developed in the legal domain till date have employed production rules [64]. However, the legal profession uniquely expects the citation of the source from where the knowledge that is used during the reasoning process is taken from. This need is an established and wonted practice of the lawyers as well as the want of the courts. This unique demand of the legal realm has necessitated the modification of the production rules. Production rules have, therefore, been modified by the fact, by subjoining a third part called ASPER part. Addition of the ASPER part has provided an additional advantage; that it could be used as index for on-line retrieval of the citation information. Information retrieval itself is another very important activity of the legal practitioners. Knowledge-based systems that employ only production rules predominantly get involved in the recognize-act process. As a result, particularly with large knowledge bases, the system efficiency decreases, the responsiveness diminishes, as well as the distinction between different types of knowledge (like inferential knowledge, procedural knowledge, control knowledge, etc.) gets blurred. These disadvantages have resulted in the need of another construct using which the production rules can be properly organized. In general, as discussed in section 4.6, the legal knowledge is available in an organized manner (Figure 4.7), in the form of chapters, sections and parts of sections. The work reported in this thesis has treated these chapters, sections etc., as objects or concepts, identified by their
headings or titles and has organized the domain knowledge (encoded in the modified production rules) in an analogous manner. Every such object or concept has been represented by a frame like structure called FORM. It has been shown that various FORMS form an hierarchical structure among themselves (figure 4.9). The use of FORMS has extended all the advantageous traits of Frame type knowledge representation technique viz: providing default values, property inheritance procedure attachment. Thus, the proposed method of representing the legal knowledge i.e., "modified production rules and FORMS", provides the advantages of both the Production rules and Frame type of knowledge representation techniques. Also, it has allowed the process of legal reasoning to focus only on relevant issues, as is done by the lawyers and the judges.

Apart from the knowledge representation technique the success of a knowledge based system in the legal realm depends upon the jurisprudential theory that has been complied with. As pointed out in chapter two, among many divergent jurisprudential theories that exist, Legal Positivism and Legal Realism are the two common jurisprudential beliefs. In positivism decisions are dictated by deductive logic, in some form or the other, and in realism the decision making process is arbitrary, with judicial opinions as mere rationalization. It has been observed that the realism approach is in direct opposition to the positivism approach and thus has an "weakening effect" on the positivists paradigm. Also, it has been observed that the realists have suggested nothing which is pragmatically tangible instead of positivism. Further, the discussions in this chapter have pointed out that either the legal realism or realists arguments has offered nothing much to the computer scientists or A.I. personnel involved in developing computational formalisms. On the other hand, as pointed out by Dworkin [33] and as revealed by Suskind's [37] "inquiry into the jurisprudential approaches to A.I. and legal
reasoning', "the law" has been considered as a system of rules and the decision making process as a rule guided activity in practice. With this consideration most of the fact situations or cases can be resolved by employing the deductive logic in some form or the other. The stand taken by this work is that the deductive logic is used in decision making process and only when certain propositions seem to have rival possibilities and are to be properly ascertained, a thorough introspection of the relevant facts is done with the assistance of professional as well as academically acquired knowledge of the user. Also it has been pointed out that use of methods like approximations, probability theory, fuzzy logic and analogical reasoning to avoid the situations at which "rival possibilities" may arise are not applicable to the legal realm.

Analysis of any facts situation needs a proper understanding of that facts situation. Problem understanding is a process that receives an initial problem description from the environment and constructs an internal representation of the problem. In the legal realm the input data will be in textual form having certain established mode of words combinations. The processing of any textual form data in order to sift the facts that lay abstrused in it needs handling of fairly large amount of syntactic, semantic, pragmatic and world knowledge. In the work reported in this thesis the emphasis has been on the over all understanding of the legal briefs by taking care of the natural language aspects in a broader sense. As most of the required information will be available in the noun phrases it has been demonstrated that noun phrases processing of input data is sufficient. Also, it has been demonstrated that pre-processing of the legal texts for names, dates and periods information reduces the number of constituent words that are to be taken care of by the noun phrase processor. This pre-processing of names etc., extends an advantage by reliving the
user from the burden of manipulating the lexicon as and when a new facts situation is taken up for the analysis. Another important point that this work has pointed out is that the legal practitioners involved in the analysis of a specific facts situation do not sift all the facts that lay abstrused in the legal brief at one hand but do so as and when the need arises during the course of the case analysis process. The SIFTER program that has been developed to retrieve the facts from a case on hand behaves in an analogous way.

A system called TIDA has been developed employing the "FORMS and modified production rules" type of knowledge representation technique. The implementation has been done in LISP culling the required domain knowledge from chapter V of the Industrial Disputes Act of India that deals with the lay­off and retrenchment compensations.

Like all other professions the legal profession also needs automation to improve its productivity and the quality of its product. The legal profession cannot afford to ignore the potential that technology offers. The required automation can be achieved by developing knowledge-based systems, like TIDA, which will have legal knowledge, drawn from different sources, embedded in them and utilize recent developments in the fields of both the micro-technology and the Artificial Intelligence.