Abstract

To build knowledge-based systems / expert systems is an attempt to capture rare or important expertise and embody it in computer programs. It is done by talking to the people who have that expertise. In one sense building expert systems is a form of intellectual cloning. Expert system builders, the knowledge engineers, find out from experts what they know and how they use their knowledge to solve problems. Once this debriefing is done, the expert system builders incorporate the knowledge and expertise in computer programs, making the knowledge and expertise easily replicated, readily distributed, and essentially immortal. Knowledge-based system is a research sub-domain of Artificial Intelligence (AI). The knowledge-based systems have found their way into many application domains such as medicine, law, geographical mappings to name a few. The expert system was historically, the first term coined. The earliest AI systems were intended as general problem solvers. Later on the emphasis was shifted to research intended to mimic the performance of a human expert in a narrow, well defined domain. Thus successful outcome of the research were first expert systems, such as DENDRAL (an expert system for molecular chemistry) and MYCIN (an expert system for which diagnoses microbial infections and recommended appropriate medical treatment), ANAPRON, EMYCIN, HYPO, CABAERT and many others.

The field of artificial intelligence and law is born as an application of the larger discipline of artificial intelligence. Artificial intelligence, at its very beginning, has favoured the legal domain for its applications. The idea is that legal rules and reasoning are integrated in a system (Knowledge-based systems) which would help human beings make decisions. In the field of AI & law today some of applications which are being used in real time are ESM an expert system for Environmental Permit Law (in Dutch), e-Laws Advisors Online legal expert systems of the US Department of Labor, family law implementation in Australia. In the Indian context today, a change is seen through the introduction of Information Computer Technology (ICT), in form of computerization of high courts and supreme courts. The application such as “e-courts”, an expert system called to help the agricultural field personnel in Kerala. All these applications have been explored in past but the expert system development in Indian legal domain with specific reference to transfer of property act has not been investigated so far.
Hence, the motivation of this study is significant as it will provide a common man with a representation of the legal world in a form, which he/she can understand. The Transfer of Property Act, 1882 is the most important statute that governs all kinds of property transactions taking place within the boundaries of the Indian Territory. This work is aimed at developing a knowledge-based system for the Indian legal domain with specific reference to the transfer of property act.

In the first part of development frame work, a prototype was developed with set of rules and same was validated by the domain experts. The prototype developed has been used as stepping stone in the implementation of comprehensive rule based system with addition of many rules and modules.

A rule-based system is designed and implemented in VisiRule with more than eighty plus rules. The rule-based system was then validated for consistency in firing of the rules by the domain experts. The case-based reasoning part was designed and developed in Java Net beans, which consists of searching of related cases stored in database and on internet, based on keyword. In case-based reasoning part it is also possible to find maximum occurrences of keyword in a case and relate it to particular domain of transfer of property act. The case-based reasoning part has been tested to find the related cases.

The rule-based and case-based system is integrated such that related cases could be searched for the case in hand, depending on the question asked and conclusion of rule-based system. The domain experts have also validated this system.

A web-based tutoring system is developed for a common man so that he can get the relevant information related to transfer of property act which he can use to understand concepts related to buying and selling process.

The performance of the knowledge-based system / expert system has been tested by the domain expert in the field of transfer of property act by taking cases and comparing the expert opinion with results obtained from the system. As the knowledge (rules and cases) is dynamic, addition of new knowledge and deletion of redundant knowledge can be easily done.
Acknowledgements

My personal quest for a doctoral degree would have led a very lonely path if I haven’t had the support from my family. I thank my family for their continuous trust, encouragement and belief in me through the ups and downs of my research work. I am forever indebted to my wonderful partner Mrs. Asha Nitin Bilgi who has inspired me always in all my endeavors. She also has taken good care of me and my daughters Anusha & Arundhati during these times. I would like to thank my brother Mr. Amol. Bilgi and his family for giving moral support at all times. I am also indebted to my in-laws for their support.

I would like to express my deep and sincere gratitude to my supervisor Dr. R.V Kulkarni, for his selfless sharing of knowledge in research and life in general. I thoroughly enjoyed the nurturing experience under his guidance. I would also like to thank Administrative Supervisor Dr. Rayan.Goudar Faculty Department of Computer science Graphic Era University for all his support. I thank Dr. Praveen Patil Dean Research for all the support.

I will be failing in duties if do not acknowledge the help and guidance of Dr. R.C. Joshi Chancellor, Graphic Era University Dehradun. Dr. Joshi Sir has transformed me into new human being by his simple, critical and great humane approach. It was indeed a great privilege for me to have known him and worked under him, though for a short period of time.

I am indebted to Mr. Clive Spencer of Logic Programming Associates London for being kind enough to give the Licensed Version of WinProlog for the research and also for helping technically. I am also grateful to Prof. G.M.Wagh, lawyers Mr. Sangram. Kulkarni, Mr. Praduyman Bhate for helping me to understand the legal terminologies. The academic discussions with Dr. S.A. Kulkarni and Dr. M. M. Nadakatti have helped me in preparing thesis work. I thank Prof. S.B. Halbhavi for helping me to edit the figures. I also thank Prof. Asha Bilgi for being a critical reviewer and helping me in English grammar. I must thank my students Suraj Vernekar, Santosh Pawshe and Miss. Shruti Kelkar for their help. I thank Management, Principal Dr. A. S. Deshapnde and Mrs. Rashmi Jogdand, Head department of MCA of my parent Institute, Gogte Institute of technology, Belgaum for supporting me through my research work. Special thanks go to Chairman, management and faculty of Graphic Era University for their support and facilities provided. I must thank Mr. Mahantesh. Pattanshetti for his logistic support and help.