Knowledge Based System for Indian Legal Domain with Specific Reference to Consumer Protection Act

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Abstract
The objective of this research is to develop a legal expert system for consumer protection act, a domain within the Indian legal system which is often in demand. The motivation of this research is significant as it will provide a facility for common man with a representation of the legal world in a form, which he/she can understand. We propose an expert system for Consumer Protection Act for common man who does not know the proceeding of the court. The Consumer Protection Act, 1986 is an act of Parliament of India enacted in 1986 to protect interests of consumers in India. It makes provision for the establishment of consumer councils and other authorities for the settlement of consumers' disputes and for matters connected therewith. The proposed work may help public as well as lawyer and Judge in taking decisions. It can also provide awareness in public regarding consumer Acts and help nonlaw-literate people to understand the proceeding of consumer act.

Keywords
Knowledge based system, expert system, consumer protection act.

I. Introduction

A Knowledge Based Systems / expert system whose aim is merely to provide advice and guidance to the user and not autonomously to provide reasoned solutions is essentially a Knowledge Based System.

A. Statement of the Problem

In this research work law is regarded as knowledge. The problem statement for the present work can be stated as follows: "The overall objective of the research is to develop rule based knowledge expert system of legal reasoning for Consumer Protection act of the Indian Legal domain.

B. Purpose

The main aim of the study is building a prototype which is rule based in nature, with specific reference to Consumer laws. The prototype is first phase in the development of comprehensive Rule Based Expert System which will be of great help in process of consumer cases.

C. Significance of the Study

It is difficult to develop a system which is capable of duplicating the intellectual process of a human legal expert. Law requires that we understand and experience through analogy. It is possible to only create a computer logic which appears to simulate aspects of this process. The 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 goal of study is not to replace a human advocate. However it will be of great help to common man who intends to file a case in consumer court.. Once he is satisfied with these aspects, he can approach the advocate for final confirmations. This saves a lot of time and money. Hence, we feel that the study will provide help to common man and as well provide tool for a human Legal Expert for making better productive decisions.

II. Definitions

A. Knowledge Based Expert System

In the present times, research work is going on in context of knowledge-based systems and expert system development in the field of law. Knowledge-based systems are computer programs that are designed to emulate the work of experts in specific areas of knowledge limited number of laws or axioms was too weak to be effective in solving problems of any complexity. This realization eventually led to the design of what is now known as knowledge-based systems. AI systems marked the turning point in the development of more powerful problem solvers. Since this realization, much of the work done in AI has been related to KBS, including work in vision-learning, general problem solving, and natural language understanding. This is in turn has led to more emphasis being placed on research related to knowledge representation, memory organization, and the use and manipulation of knowledge.
A simple knowledge-based system is represented in figure.

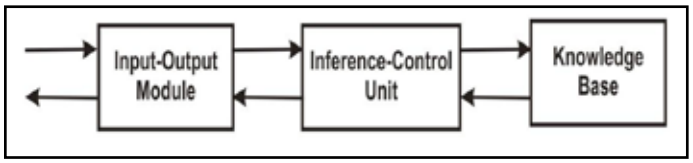

Fig. 1: Components of Knowledge Based System

Thus knowledge-based systems in principle facilitates the human problem solver capable of performing the task by himself, either completely or more commonly by allowing less skilled workers to perform the same task assisted by the KBS. The KBS for instance is capable of handling the great bulk of law applications without any human intervention, a stage that has already been reached in countries like United States of America, Italy, Sweden to name a few. As a result the experts in the legal administration will get to spend more time on complicated and suspect cases. Scarcity of expertise seems inescapable in the legal field in the foreseeable future as any increase in efficiency of the legal system will presumably be cancelled by increasing demand. The argument for this observation is simple, if the legal system is the expensive last resort solution for maintaining normative order in a society, as is often argued, any reduction in the costs of this solution generates increased demand. It is reasonable to expect that the use of KBS increases the quality of jobs in the legal field, while making the legal solutions more accessible. Expert systems in the domain of law have not only been used as prototypes, but they also act as an important venture in testing theories and in the assistance in legal decision-making.
Despite the mechanistic power of computers, they have certain limitations that impair their effectiveness in implementing human-like decision processes. Expert systems offer an environment where the good capabilities of humans and the power of computers can be incorporated to overcome many of the limitations discussed

in the previous section. Expert systems increase the probability, frequency, and consistency of making good decisions; facilitate real-time, low-cost expert-level decisions by the non-expert and thus free up their mind and time to enable him or her to concentrate on more creative activities Although the expert system technology has progressed substantially, it would be a mistake to overestimate the abilities of the technology, as it also serves us with a some deficiency like they expert system lacked casual knowledge of the causes and effects in a system and hence they are unable to generalize their knowledge in order to reason about new situations in the way that people can.

Knowledge representation in expert systems may be rule-based or encapsulated in objects. The rule-based approach uses IF-THEN type rules and it is the method currently used in constructing expert systems. IF-THEN rules take the following form: IF there is a flame THEN there is a fire. The modern rule-based expert systems are based on the Newel and Simon model of human problem solving in terms of long-term memory (rules), short-term memory (working memory) and cognitive processor (inference engine). Some of the expert systems may be based on rules in thousands (e.g. XCON/R1 system from Digital Equipment Corporation, used for configuring computers) and surpass a human expert in a particular field. However, even smaller sized expert systems may be based on several hundred rules which may be extremely efficient in much specialized areas. While a knowledge-based system may be dependent on the knowledge commonly available, a true 'expert' system will be based on unwritten expertise, acquired from a human expert. In the conditions where no algorithm is available to solve a particular problem, a reasonable solution is the best we can expect from an expert (system or human). The expert system will infer a solution from the facts provided by the user and the rules in the knowledge base. Therefore, it should be able to explain the reasoning employed to achieve the solution. The explanation facility is an important feature of the rule-based expert systems, since it provides a mechanism for a human to follow and check the correctness of the solution achieved by the expert system. A further enhancement to this facility is the availability of what-if scenarios (employing hypothetical reasoning questions), where the user may examine the outcomes of several possible situations.

The structure of a rule-based expert system is shown in figure.

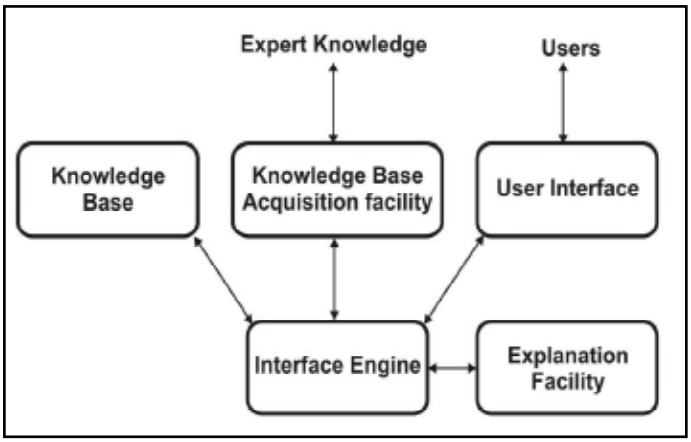

Fig. 2: Structure of a Rule Based Expert System

The domain knowledge needed to solve problems is contained in the knowledge-base in the form of rules. Components of the rule-based expert system:-

1. User Interface

It is the user means of communication with the expert system;

2. Explanation Facility

Explains the expert system reasoning to the user;
Working memory: a global database of facts used by the rules;

3. Inference Engine

Decides which rule is satisfied by the supplied facts, priorities the rules and execute the highest priority rule;

4. Agenda

The prioritized list of rules whose patterns are satisfied by facts (or objects) in the working memory;

5. (Optional) Knowledge Acquisition Facility

A way for the user to directly enter knowledge in the system, without the need for explicit knowledge coding

B. The Consumer Protection Act, 1986

The industrial revolution and the development in the international trade and commerce has led to the vast expansion of business and trade, as a result of which a variety of consumer goods have appeared in the market to cater to the needs of the consumers and a host of services have been made available to the consumers like insurance, transport, electricity, housing, entertainment, finance and banking. A well organized sector of manufacturers and traders with better knowledge of markets has come into existence, thereby affecting the relationship between the traders and the consumers making the principle of consumer sovereignty almost inapplicable. The advertisements of goods and services in television, newspapers and magazines influence the demand for the same by the consumers though there may be manufacturing defects or imperfections or short comings in the quality, quantity and the purity of the goods or there may be deficiency in the services rendered. In addition, the production of the same item by many firms has led the consumers, who have little time to make a selection, to think before they can purchase the best. For the welfare of the public, the glut of adulterated and sub-standard articles in the market has to be checked. Inspite of various provisions providing protection to the consumer and providing for stringent action against adulterated and sub-standard articles in the different enactments like Code of Civil Procedure, 1908, the Indian Contract Act, 1872, the Sale of Goods Act, 1930, the Indian Penal Code, 1860, the Standards of Weights and Measures Act, 1976 and the Motor Vehicles Act, 1988, very little could be achieved in the field of Consumer Protection. Though the Monopolies and Restrictive Trade Practices Act, 1969 arid the Prevention of Food Adulteration Act, 1954 have provided relief to the consumers yet it became necessary to protect the consumers from the exploitation and to save them from adulterated and sub-standard goods and services and to safe guard the interests of the consumers. In order to provide for better protection of the interests of the consumer the Consumer Protection Bill, 1986 was introduced in the Lok Sabha on 5th December, 1986.An Act to provide for better protection of the interests of consumers and for that purpose to make provision for the establishment of consumer councils and other authorities for the settlement of consumers' disputes and for matters connected therewith.

III. Methodology

There are different types of cases in legal domain, among them any cases can be broadly divided among criminal, civil or consumer case. As objective of this research work is to develop an expert system for Consumer Protection Act, hence it mainly focuses consumer related cases and the expert system will help to solve consumer related cases. The Consumer Protection Act, is an Act to provide for better protection of the interests of consumers and for that purpose to make provision for the establishment of consumer councils and other authorities for the settlement of consumers' disputes and for matters connected therewith. The first level in the research work will be to identify the case whether it is consumer case or not. A consumer case can be further divided into N number of sub cases for e.g. consumer cases related to some purchasing of an item or services provided by companies.

Further the consumer cases can be identified by set of Knowledge Base (using Rule Based System). Here basically five modules and four knowledge database will develop. Each knowledge database consists of set of questionnaires corresponding to it module. For e.g. knowledge database 1 consist of set of questions like "is the commodity purchased is for personal use or not?" in order to find out whether user is a consumer or not. The first level expert system will check the answer available by Knowledge Database1 and after processing it a solution for first level will be provided to the consumer.

The first level result will help the consumer to decide whether the case is reported to District Forum, State Commission or National Commission. Again a knowledge Database2 is created for submodule2 using some set of questionnaire a help consumer to decide the type of services. Further the proposed Expert System may conclude the cases by helping judges, lawyers & public regarding the decision of the case

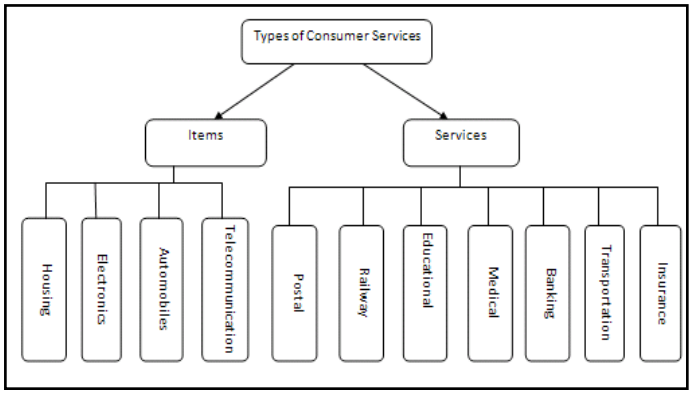

Fig. 3: Types of Consumer Services

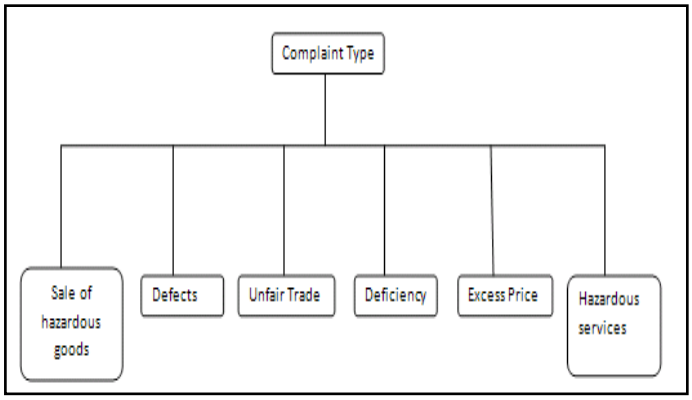

Fig. 4: Types of Complaints

Work flow can be understood by the following figure:

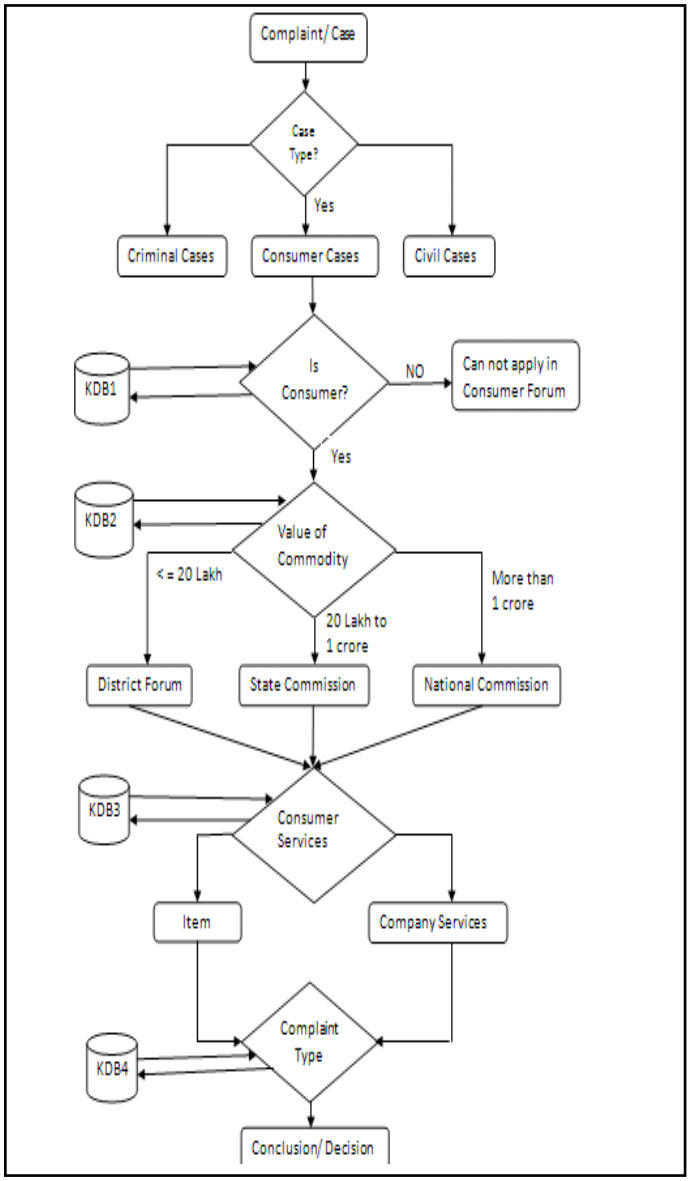

Fig. 5: Flow of Proceeding of Consumer Case

A number of KDB are created at different levels, they are:

A. Consumer Type KDB1

The first level Knowledge Database contains questions for deciding whether the case come under Consumer Protection Act or not.

B. Jurisdiction Type KDB2

The second level Knowledge Database contains questions for deciding type of jurisdiction according to the sections defined in Consumer Protection Act. It have questions like price o the commodity, branch or office o the company from where product has been purchased or services has been take. For e.g if the product price is up to 20,00,000 Rs than proceeding will be in the District Forum, if it ranges between 20,00,001 Rs to 1,00,00,000 Rs. than in State Commission and if it is 1,00,00,001 to above than in National Commission

C. Service Type KDB3

IN this level set of rules are generated in the form of question to conclude whether the case is related to some purchasing of an item or services provided by companies.

D. Complaint Type KDB4

:- In the next level Knowledge Database contains question to decide whether type of complain according to consumer problem it may be any among unfair trade practice, defects, efficiency, excess price, sale of hazardous good, practice of hazardous services

IV. Proposed Plan of Research

Law and Artificial Intelligence seem to be two disciplines very far apart. One can be traced back thousands of years and the other not past 1950. Nevertheless both disciplines have a lot to learn from each other. The legal domain is very well suited for the application of Artificial Intelligence. In contrast to other disciplines like medicine, law is not a natural but a normative science. Therefore reasoning is explicit and in most cases exists in written form. .

The problem statement for the present work can be stated as follows: "The overall objective of the research is to develop an expert system for Consumer Protection Act, 1986 of the Indian Legal domain which will guide the process of proceeding of case in Consumer Forum. In order to explicate traditional approach, we proceed as follows.

Firstly, we will introduce cases and decide whether it will come under consumer act or not .Using a set of rule based system a knowledge base is created to resolve the consumer type. If the complaint lies in consumer Act then the second level starts. In second level the proposed Expert system can suggest or guide the user the procedure of filing case in Consumer Forum or State Commission or National Commission. In the next level type of services will analyze by the set of rules defined in third level knowledge Database .By analyzing the complaint with existing sections the next level of suggestion can be proposed to the complainer at last we will conclude with the decision including the penalties and compensation. We can further add more modules and questions according to the amendments of the law

V. Expected Outcomes of Research Work

This system can be used by the non-law literate to understand the proceeding of a case and what are the necessary documents required to file a case in a Consumer Forum. When the user is satisfied with these aspects, he can approach the advocate for final confirmations. This saves a lot of time and money. The expert system can be used by the lawyers to make decision faster. The expert system generating for Consumer Protection Act will not for replacing lawyers, the motivation of this study is significant as it will provide the common man with a representation of the legal world in a form which he/she can understand.

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