Automation of Indian Legal Domain with Specific Reference to Consumer Protection Act

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Abstract

The basic aim of research, described in this paper is to develop a knowledge based expert system for Indian legal domain with specific reference to the consumer protection act which is often in demand. Most legal expert systems attempt to implement complex models of legal reasoning. But the utility of a legal expert system lies not in the extent to which it simulates a lawyer's approach to a legal problem, but in the quality of its predictions and of its arguments. A useful legal expert system should be capable of producing advice similar to that which one might get from a lawyer, so it should operate at the same pragmatic level of abstraction as does a lawyer. The aim is to automate a Indian legal with specific reference to Consumer Protection Act.

Keywords: *Knowledge Based System, Consumer Protection Act, Rule based Expert System, Naive Bayes Technique*

1. Introduction

Knowledge-base systems (KBS) are computer based systems which support, or perform automatically, cognitive tasks in a narrow problem domain which are usually only carried out by human experts.

1.1. Knowledge Based Expert System

Knowledge-based systems in principle replaces 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 introduction of a KBS is typically intended to take boring routine tasks out of the hands of scarce experts so that they can spend more time on the hard problems. 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 case, THEN there is a solution*. Components of the rule-based expert system are user interface, explanation facility, working memory, inference engine, agenda, and knowledge acquisition facility.

1.2. Legal Aspects of Consumer Protection Act

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. According to this act following three-tier system has been provided under the Act to deal with consumer complaints; District Forum- It operates at the district level and deals with consumer complaints pertaining to the value of goods or services and compensation not exceeding Rs. 20 lac, State Commission- It operates at the state level and deals with complaints of the value exceeding Rs. 20 lac but not exceeding Rs. 100 lac and National Commission- It functions at the national level for the complaints of the value exceeding Rs. 100 lac.

1.3. Rule Based Expert System For Consumer Protection Act

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. Knowledge base is created on the basis of rules and regulation implemented for Consumer Protection Act.

2. Expert System For Consumer Protection Act

2.1. Designing of Expert System

Expert systems require special approaches to systems analysis, especially to the collection of the data (or rather knowledge) on which the system is based. The process of gathering the knowledge to stock the expert system's knowledge-base & knowledge acquisition has proved to be the most difficult component of the knowledge engineering process.

2.2. Implementation of Expert System for Consumer Protection Act

The detail procedural analysis was carried out. After going through the analysis we arrived at the Procedure which should be adopted to develop a prototype. The work was carried out under the heads-discussion with legal experts in field and academicians in law, the framing of rules using Legal Knowledge and incorporation with expert system, and testing and implementation of rules.

3. Automation of Rule Base Technique For Consumer Protection Act

Here basically five modules and four knowledge database are developed. 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

Work flow can be understood by the following Fig1:

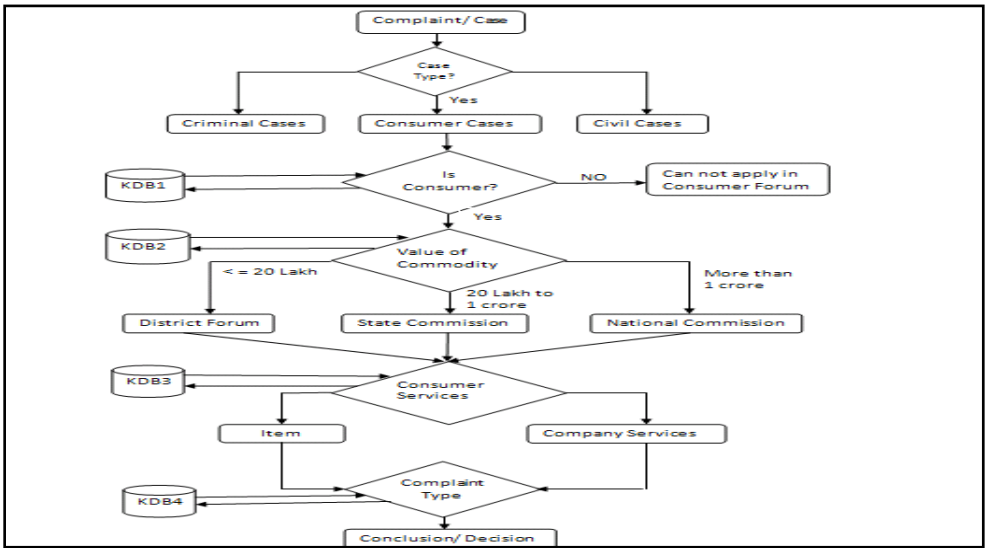

Figure 1. Flow of Proceeding of Consumer Case

3.1.Defragmentation of Cases

Here a first level knowledge database is generated in order to defragment the cases. Cases will be defragmented according to the question generated in KDB-1 in civil, criminal or consumer case. Defragmentation of different types of cases on the basis of YES/NO questions:

1. Is case is related to dowry?
2. Is case is related to robbery?
3. Is case is related to violence against /woman/sexual offence/ rape?
4. Is case is related to cheque bounce?
5. Is case is related to self/private defense?
6. Is case is related to abatement (encouraging for crime)?
7. Is case is related to murder?
8. Is case is related to criminal conspiracy?
9. Is case is related to any offence against state?
10. Is case is related to public nuisance?
11. Is case is related to false evidence?
12. Is case is related to any offence related to coins & government stamps?
13. Is case is related to miscarriage of unborn child?
14. Is case is related of hurt?
15. Is case is related to kidnap, abduction, slavery or forced labor?
16. Is case is related to fraud/cheating matter?
17. Is case is related to criminal trespass?
18. Is case is related to criminal force assault?
19. Is case is related to divorce?
20. Is case is related to service issue (Government/Private)?
21. Is case is related to possession of property?
22. Is case is related to recovery of money?
23. Is case is related to succession issue?
24. Is case is related to execution of order?
25. Is case is related to compensation claim?
26. Is case is related to postal services?
27. Is case is related to railway services?
28. Is case is related to educational services?
29. Is case is related to medical services?
30. Is case is related to banking services?
31. Is case is related to transportation services?
32. Is case is related to insurance services?
33. Is case is related to housing items?
34. Is case is related to electronic items?
35. Is case is related to telecommunication items?
36. Is case is related to automobiles?
37. Is case is related to electricity board?

If the answer of any question from 1-19 is YES than it will consider under CRIMINAL CASE, else if the answer of any question from 20-25 is YES than it will consider under CIVIL CASE, else if the answer of any question from 26-37 is YES than it will consider under CONSUMER CASE.

3.2. Jurisdiction Type Knowledge Database

Following are the rules designed for determining where the Consumer Cases will proceeds:-

a) Is the value of the goods or services and the compensation, if any, claimed is less than or equal to 20 lacks?

b) Is the value of the goods or services and compensation, if any, claimed is greater than 20 lacks but less than or equal to 1 crore?
c) Does the appeal is against the orders of any District Forum within the State?
d) Is the value of the goods or services and compensation, if any, claimed is greater than 1 crore?

If the answer of Rule-1 is YES than the District Forum shall have jurisdiction, if the answer of Rule-2 or Rule-3 is YES than the State Commission shall have jurisdiction and if the answer of Rule-4 or rule-4 is YES than the National Commission shall have jurisdiction

3.3. Consumer Service Type Knowledge Database

In this database we will design the set of rules which will determine the type of consumer services
a) Is the complaint related to items?
b) Is the complaint related to services?

3.4. Item Purchased Knowledge Database:

If the answer of Rule-a) is YES than it can be further classified into types of item purchased according to the following rules:-

i) Is complaint related to housing?
ii) Is complaint related to electronics?
iii) Is complaint related to automobiles?
iv) Is complaint related to telecommunications?

Knowledge Database for Housing Cases:-

In this database we will design the set of rules which will determine the type of issues related to housing cases.

a) Is the case is related to not giving physical possession issues?
b) Is the case is related to deficiency in service issues?

Knowledge Database for Electronic Cases:-

In this database we will design the set of rules which will determine the type of issues related to electronic cases.

a) Is the case is related to manufacturing defects issues?
b) Is the case is related to deficiency in service issues?

Knowledge Database for automobiles Cases:-

In this database we will design the set of rules which will determine the type of issues related to automobiles issues.

a) Is the case is related to manufacturing defects issues?
b) Is the case is related to problem during warranty period Issues?

Knowledge Database for Telecommunication Cases:-

In this database we will design the set of rules which will determine the type of issues related to telecommunication services.

a) Is the case is related to inflated bills/ overcharging/Unfair deduction issues?
b) Is the case is related to disconnection without notice/intimation Issues?
c) Is the case is related to call drops/network problems Issues?
d) Is the case is related to delay in activation of desired service issues?

3.5. Service Type Knowledge Database*:*

If the answer of Rule-b) is YES than it can be further classified into types of services opted according to the following rules:-

i. Is complaint related to banking?

ii. Is complaint related to educational issues?
iii. Is complaint related to postal issues?
iv. Is complaint related to medical issues?
v. Is complaint related to railway issues?
vi. Is complaint related to transportation?
vii. Is complaint related to insurance?

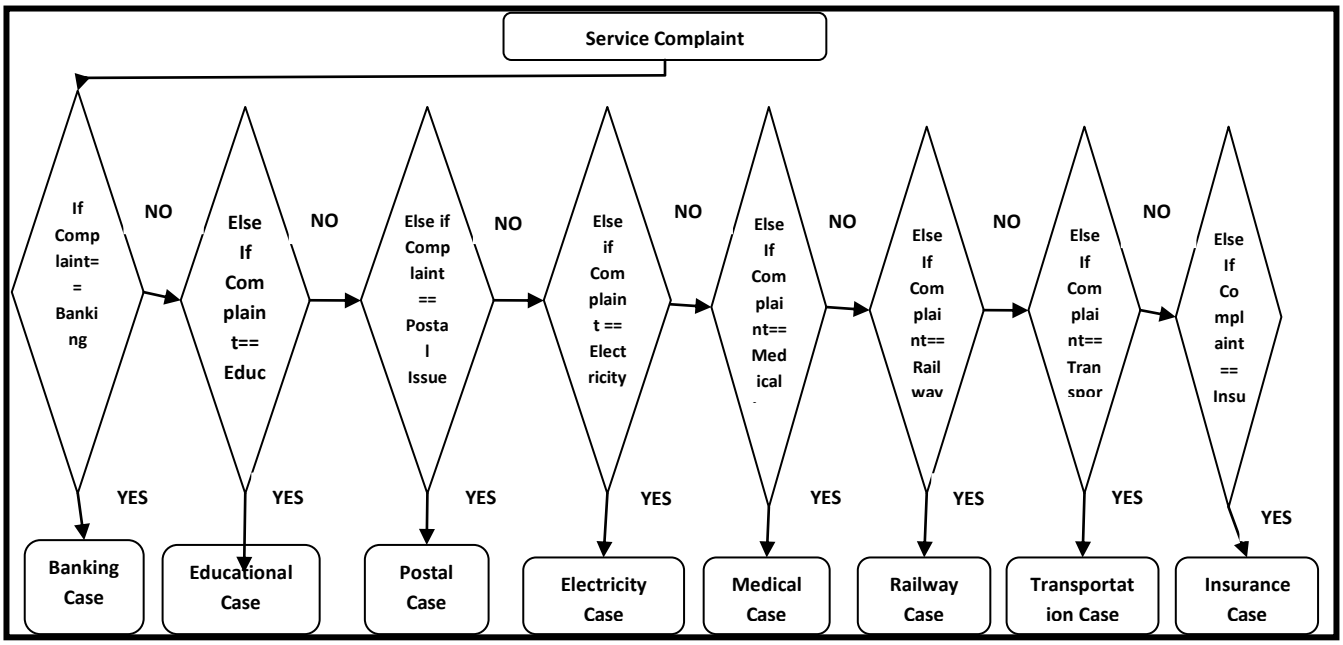

Figure 2. Flow of Service complaint in Consumer Cases

Knowledge Database for Banking Cases:-

In this database we will design the set of rules which will determine the type of issues related to banking services.

a) Is the case is related to Cheque issues?
b) Is the case is related to M-Banking Issues?
c) Is the case is related to Loan Issues?
d) Is the case is related to Credit Cards/Debit Cards/ ATM?
e) Is the case is related to General Issues?

Knowledge Database for Educational Cases:-

In this database we will design the set of rules which will determine the type of issues related to educational services.

a) Is the case is related to Fees Refund issues?
b) Is the case is related to False advertisement issues?
c) Is the case is related to Affiliation issues?
d) Is the case is related to Caution Money issues?
e) Is the case is related to Others issues?

Knowledge Database for Postal Cases:-

In this database we will design the set of rules which will determine the type of issues related to educational services.

a) Is case is related to Late Delivery issues?

b) Is case is related to Not delivered issues?
c) Is case is related to Delay or non receipt of money order issues?
d) Is case is related to undelivered of registered letter issues?
e) Is case is related to Delay or non receipt of speed post issues?

Knowledge Database for Electricity Cases:-
In this database we will design the set of rules which will determine the type of issues related to electricity services.
a) Is case is related to Reduction/Addition of load issues?
b) Is case is related to meter billing issues?
c) Is case is related to Meter related grievances issues?
d) Is case is related to Others issues?

Knowledge Database for Medical Cases:-
In this database we will design the set of rules which will determine the type of issues related to medical services
a) Is case is related to damage of organ due to negligence issues?
b) Is case is related to wrong treatment due to wrong diagnosis issues?
c) Is case is related to issues in which any instrument left in the body?
d) Is case is related to a wrong part removed issues?
e) Is case is related to other issues?

Knowledge Database for Railway Cases:-
In this database we will design the set of rules which will determine the type of issues related to railway services
a) Is case is related to ticket issues?
b) Is case is related to theft during journey issues?
c) Is case is related to deficiency in services?

Knowledge Database for Transportation Cases:-
In this database we will design the set of rules which will determine the type of issues related to transportation services
a) Is case is related to order not received in time issues?
b) Is case is related to order received in damage conditions?

Knowledge Database for Insurance Cases:-
In this database we will design the set of rules which will determine the type of issues related to insurance services.
a) Is the case is related to Motar Insurance issues?
b) Is the case is related to Life Insurance Issues?
c) Is the case is related to Health Insurance Issues?
d) Is the case is related to Travel Insurance Issues?
e) Is the case is related to Accidental Insurance Issues?

4. Implementation of Naive Bayesian Technique on Motar Insurance

Here Naive Bayesian Technique is implemented in different issues of consumer case. This technique generates the result which predicts whether consumer can claim a case or not. The set of rules generated for different issues is taken as attributes and different cases related to the particular issue are considered. These cases are already being either claimed or not claimed depending upon the set of answers generated by the corresponding rules.

In this section number of pre decided cases stored in Knowledge Database is ten. These ten cases are taken as test case and the success or failure of eleventh new case is predicted by the Naive Bayesian Prediction Technique.

Table 1. Parameters for ten Consumer Case on Motar Insurance Issue

CASE NO.	INSURANCE_CLAIM	REGISTRATION	REGISTRATION_ PERIOD	PREMIUM_PAID	VALID DRIVER_LICENSE	CONSUMER_CASE
1	YES	TEMPORARY	YES	YES	YES	YES
2	YES	PERMANENT	YES	YES	YES	YES
3	YES	PERMANENT	YES	YES	NO	NO
4	YES	TEMPORARY	NO	YES	YES	NO
5	YES	TEMPORARY	YES	YES	YES	YES
6	YES	PERMANENT	YES	NO	YES	NO
7	YES	TEMPORARY	YES	YES	NO	NO
8	YES	PERMANENT	YES	YES	YES	YES
9	YES	TEMPORARY	YES	YES	YES	YES
10	YES	PERMANENT	YES	NO	YES	NO

Let X: (INSURANCE_CLAIM=YES, REGISTRATION=TEMPORARY, REGISTRATION_PERIOD =YES, PREMIUM_PAID=YES, DRIVER_LICENSE=YES).

We need to maximize P(X|Ci)P(Ci), for i = 1, 2. P(Ci), the prior probability of each class, can be computed based on the training tuples:
P(C1)= P(CONSUMER_CASE=YES) = 5/10 = 0.5
P(C2)= P(CONSUMER_CASE=NO) = 5/10 = 0.5

To compute P*(*X|Ci), for *i* = 1, 2, according to equation (2), we compute the following conditional probabilities:
P (CLAIM=YES/CONSUMER_CASE=YES) = 5/5 = 1
P (CLAIM=YES/CONSUMER_CASE=NO) = 5/5 = 1
P (REGISTRATION=TEMPORARY/CONSUMER_CASE=YES) = 3/5 = 0.6
P (REGISTRATION=TEMPORARY/CONSUMER_CASE=NO) = 2/5 = 0.4
P (REGISTRATION_PERIOD=YES/CONSUMER_CASE=YES) = 5/5 = 1
P (REGISTRATION_PERIOD=YES/CONSUMER_CASE=NO) = 4/5 = 0.8
P (PREMIUM=YES/CONSUMER_CASE=YES) = 5/5 = 1
P (PREMIUM=YES/CONSUMER_CASE=NO) = 3/5 = 0.6
P (LICENSE=YES/CONSUMER_CASE=YES) = 5/5 = 1
P (LICENSE=YES/CONSUMER_CASE=NO) = 3/5 = 0.6

So, multiply all the probabilities for CONSUMER_CASE=YES such as:
P(X/ CONSUMER_CASE=YES) = P (CLAIM=YES / CONSUMER_CASE= YES) ×
P (REGISTRATION=TEMPORARY / CONSUMER_CASE= YES) ×
P (REGISTRATION_PERIOD=YES/ CONSUMER_CASE= YES) ×
P (PREMIUM=YES / CONSUMER_CASE= YES) ×
P (LICENSE=YES / CONSUMER_CASE= YES)
= 1 × 0.6 ×1 × 1 × 1
= 0.6

Similarly, multiply all the probabilities for CONSUMER_CASE=NO such as

P(X/ CONSUMER_CASE=NO) = P (CLAIM=YES / CONSUMER_CASE= NO) ×
P (REGISTRATION=TEMPORARY / CONSUMER_CASE= NO) ×
P (REGISTRATION_PERIOD=YES/ CONSUMER_CASE= NO) ×
P (PREMIUM=YES / CONSUMER_CASE= NO) ×
P (LICENSE=YES / CONSUMER_CASE= NO)
= 1× 0.4 × 0.8 ×0.6×0.6
= 0.1152

Now, To find the class, Ci, that maximizes P(X|Ci)P(Ci) according to equation (3), we compute

P (X/ CONSUMER_CASE=YES) * P (C1) = 0.6 * 0.5 = 0.3
P (X/ CONSUMER_CASE=NO) * P (C2) = 0.1152 * 0.5 = 0.0576

This implies that -

P (X/ CONSUMER_CASE=YES) * P (C1) > P (X/ CONSUMER_CASE=NO) * P (C2)

Therefore by Naive Bayes Prediction Technique it is clear that probability of filing and winning case as per given condition is maximum then not filing. Hence consumer can file and win the case for tuple X. Predictions are also useful for lawyers to decide the success rate of any new case registered. It helps the consumer to have prior knowledge of consumer case before filing it in Consumer Forum. Similarly there are four more types of considered insurance cases like life insurance, health insurance, travel insurance and accidental insurance and the cases related to these issues can be also calculated by the above defined method.

5. CONCLUSION

This research can be of great help to both the non-law-literates and also for experts in the field of consumer law for productive and rapid decision making. The proposed work will be helpful to lawyers, general public and judges. It can increase public awareness about consumer rights as well help them to know about the proceedings of the cases. It helps in reduction of registered cases on daily basis which are not required at all by providing prior knowledge about the case to the consumer. Indirectly it helps judges and lawyers for just to reduce the number of pending cases in the court. Proposed methodology will help the general public to check in advance the possibilities of success rate before filing any case to court and paying the proceeding fees. Proposed method uses a knowledge base and helps to predict the success rate of a new case. In this way it is helpful to general public as well as to court officials. General public is least aware of Indian legal rules, thus the proposed methodology helps public a lot. The proposed knowledge base is flexible in nature. As few legal rules are modified or amendment then this can be easily upgraded as per the new amendments.

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