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"Research Aspect of Expert system of Indian judiciary of crime against women."

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--*A B S T R A C T*--

Expert System is nothing but knowledge based system. It is Software package that encodes the knowledge and decision rules of human expertise. This helps us to make our own decisions in problem of particular domain. In simple terms; it is a computer program that uses a direct encoding of human expertise knowledge i.e. processed knowledge to solve any complicated problem .A number of methods can be used to simulate the performance of expert is actually called as knowledge based system. In expert system domain, particular knowledge is combined with inference engine, it processes knowledge encoded in the knowledge base to respond to users request for advice or decision making. This research paper introduces introduction, structure, applications or review of expert system. This paper also discusses the advantages, new tools and various research aspects in expert systems. This paper intends to outline current research trends which are found in expert system in judiciary with special reference to crimes against women in Indian penal code.

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I.   INTRODUCTION

Expert knowledge is valuable and scarce. Expert systems are computer programs that capture some of that knowledge and allow its dissemination to others. It is intelligent system developed to solve problems in a particular domain. It is a part of computer sciences i.e. artificial intelligence system. An expert system or knowledge based system is a problem solving and decision making system based on specific knowledge, its task and rules. Both the knowledge and the logic are obtained from the experience of a specialist in the particular area. It simulates the judgment of human or organization that has expert knowledge and experience in particular field. It is a program that interacts with the user with a human expert to solve a problem. The end user provides input information by selecting one or many options from list or by entering data. Depending on that data, program check knowledge base, simulates data and takes decision.

II.   STRUCTURE OF EXPERT SYSTEM

The knowledge which is used by expert system for decision making must be organized in an easily accessible format that distinguishes among data, knowledge and rules. Structure of expert system consists of 3 levels or parts.

A. Knowledge base (Rule base)
[1]   Consists of problem solving knowledge
[2]   Rules are IF(condition)THEN(action) format

B. Working memory: It refers to task specific data or that data of interest to the system for the problem under consideration.

C. Inference Engine: It is a general problem solving control mechanism or method. It analyses and processes the rules, searches next portion of rule base and arrives at some solution or conclusion. These three parts together form expert system. The knowledge base may be a specific diagnostic. Knowledge compiled by a consulting firm and the problem data may be given by user. The knowledge base is the nucleus or heart of expert system. A knowledge base is not data base but it is rule in IF-THEN format created by knowledge engineers, who translate the knowledge of real human experts into rule and strategies. These rules and strategies can change; they depend upon the problem of domain. It constitutes the rules, facts or intuition that human expert might use in problem solving in particular domain. Inference engine organizes problem data and searches knowledge base for applicable rules.

III. ADVANTAGES OF EXPERT SYSTEM

[1]   **Reliable**:-Human experts are not 100% reliable or consistent. But with expert system similar transactions can be handled in the same way and in many times as it is reliable.
[2]   **Documentation**:-Human experts may not be good at explaining decisions for some time but expert system can provide permanent documentation of the decision process.
[3]   **Faster:**-It is faster than human expertise.
[4]   **Consistency**:-It has consistency in decision making.
[5]   **Reduce risk**:-It reduces risk of doing business.
[6]   **Completeness**:-An expert system can review all transaction.
[7]   **Timeliness:**-Fraud can be prevented. Information is available sooner for decision making.
[8]   **Breadth**:-The knowledge of multiple human experts can be used to give system more breadth than
[9]   Single person.
[10] **Cloning or reproductively**:-Many copies or clones of expert system can be made rather it is affordable or   possible but cloning of expertise person is not easily possible. The training to new human is time consuming and expensive.
[11] **Permanence:-**Expert system does not forget the way human expert does.
[12] It is cost effective.
[13] It provides high potential.
[14] It provides expertise needed at a number of locations at the same time.

3.1) Expert system application–

A review an expert system is
[1]   MYCIN – First expert system used in 1979 for diagnosing blood diseases.
[2]   Dendral – Used to identify structure of chemical compounds.
[3]   Prospector – Used by geologists to identify sites for drilling or mining.
[4]   PUFF – Diagnosing respiratory conditions.
[5]   Design Advisor – Give advice to designers of processors.

3.1.1) Legal Expert system application (review)

        In 1987, according to Boston, Boulogne 1989,Vancouver 1989, expert systems in law are generally built for only lawyers and are produced by researchers from theoretical perspectives (bench – capon T.J.M. and A 1987,1989 Gardner van der Lieth A 1987,Martino A.A, 1987, Mac Carty L.T. 1977,1989, smith J.C. and Deedman G.S. 1987, sprowl J.A. 1984, Susskind R. 1987). Research into artificial intelligence applied to law is now opened for practical applications in administration and implementation of criminal justice.   In 1988, the phoenix police department acquired twenty million dollars of bond funds to upgrade its information processing capabilities for next five years. It includes computer aided dispatch, computerized record management and fingerprint identification. After this national and international level use of computer or expert system in criminal justice is increasing day by day. A large number of systems used with redundant and conflicting information of varying quality some examples are;

[1]   CAPRI– (Computer Aided Police Records Index) manages criminal history at a local and regional level.
[2]   PACE (Police Automated Computer Entry) evolved from the recognition of growing burden of paperwork of Phoenix Police Department. PACE will automate the access and update the offense reports, arrest records juvenile referrals and interrogation cards.
[3]   AFIS - (Automated Fingerprint Identification System) provides automated searches of 10 print cards and fingerprints and generate ranked candidate list.
[4]   WIN – (Western Identification Network) WIN is a regional network designed to access AFIS in eleven western states.
[5]   NCIC (National Crime Information Center) A National Information system which uses a telecommunications network to store and retrieve wanted person and stolen item data (Vehicles, guns etc).
        In 1988, another system EXILE (Expert System in Legal Evidence) was well known. It was used to explore the issues involved in building a legal decision making adviser. EXILE was expanded with its knowledge base, it becomes advisor. A new module known as WASP i.e. Wise Advisor on Suitable Procedure. Again after some time WASP itself was expanded with increasing ability to advice on related issues of the jurisdiction under Federal and Queens land State rules. The EXILE shell has been revised and upgraded which is MASTER.   At this level, legal expert system for non-lawyers does not exist. D- Expert, LOGE-Expert is legal expert system for non - expert users. In 1991, ESPRIT project was developed KADS-II expert system for a library. Thus expert systems are used for lawyers and non-lawyers.

3.2) Expert system used in India –

National Institute of Agricultural Extension Management in Gujarat has developed an expert system. This system is used for diagnosis of diseases and pests for rice crop.TDP Technologies Pvt. Ltd., In Chennai is using MYCIN technique for diagnosing blood disorders.   Center   for   Informatics   Research   and Advancement, Kerala has prepared an Expert System called AGREX to help the agricultural field personnel to give timely and correct advice to the farmers. Tata Memorial Hospital in Mumbai is using PUFF for diagnosis of respiratory disease.

3.2.1) Legal Expert System in India-

In India, crime branch used software in 1997. The main objective of this branch is to implement and monitor the progress of the software applications for use of state police.CIPA (Common Integrated Police Application aims at automation of all functions carried out at the Police Stations. CIPA has been designed and developed by NIC in English language with multilingual interface developed for Indian languages. To bring awareness among senior police officers at   Guwahati in 2007,pune in 2008, Shimla in 2008, Patna in 2008, Motor Vehicle Coordination System (MVCS) has been implemented in all states. It provides information to public and other agencies regarding the recovered /lost motor vehicle. In India Talash software are used in overall states. Kerala, A.P., Punjab etc. Use criminal software maximum for monthly crime preceding. The personnel information system CCISMLE, crime in India, IPS etc. most of systems are used in police station but maximum police stations get do not use such systems.

3.3) New Tool used in ES –

ES/KERENZ is latest Japanese tool currently used. It gives the application developer's choice in the use of reasoning method - rule based, object oriented etc.

3.3.1) Characteristic of ES/KERNELZ

It provides graphics for developing applications. It helps knowledge engineers in modifying the knowledge base.

4) Research Aspects of Expert system
4.1) Decision making agent:-

Expert system acts like decision making agent. An ES is a problem solving computer program that achieves good performance in a specialized problem domain, i.e. considered difficult and requires specialized knowledge and skill. It is used to improve the quality of the decision. The decision making facilitates the building of the knowledge base by subject matter expertise persons and knowledge engineers. It develops a capability that will subject matter experts and typical computer users to build and maintain knowledge base.
This research aims to develop a legal expert system to emulate the decision making abilities of human expert in the field of law, especially crimes against women in Indian penal code.

4.2) Judiciary Growth Expert System:-

Expert System Technology has become available from the field of artificial intelligence that would enable "Intelligent" access and use of existing data stores to increase the effectiveness of the any domain subject. Legal expert systems are being developed for burglary, murder, forensic science etc. The FBI also considers artificial intelligence technique to be valuable for effective law enforcement through the next decade up to 1986. CAPRI, PACE, AFIS, WIN, NCIC, EXILE, WASP, MASTER etc. are various expert systems but for only lawyers. After 1987, legal expert systems for non-lawyers were developed. Computer researchers expected that a legal expert system would be a good for people and provide safe, accurate information about their legal rights and also give its solution at any time and in accessible places even at home, ALEX, MINITAL are such type of expert system. LOGE-EXPERT I, LOGE-EXPERT II was developed. LOGE- EXPERT I was succeeded in modelizing leading legal concepts from theory of obligations of residential leases. After that LOGE EXPERT II give solution of termination of the residential lease for the landlords use after analysis of most of residential lease conflicts. In Australia SAL system for Asbestos Litigation which advises on the settlement figure for product liability cases. In 2001 a survey of IT support in six different European countries like Italy, France, UK, Belgium, Netherlands and Norway was made. In 2004 followed report on Singapore, Venezuela, and Australia etc. In US from 2001 Law Enforcement Information Systems (LEIS) use expert system to solve crimes. Five of LEIS are COPLINK, SHERPA, MATRIX, ViCAP and ViCLAS. COPLINK an integrative information and knowledge management system developed at the Arizona University.

4.2.1 National Center for the Analysis of Violent Crime (NCAVC) –
    It is FBI's center. It is organized into three components that include Behavioral Analysis Unit (BAU) Child Abduction, Serial Murder Investigative Resources center (CASMIRC) and Violent Criminal Apprehension program (ViCAP) cases in ViCAP database.

[1]   Homicides (solved or unsolved) especially abduction appears random or sexually oriented or appear to be part of series.
[2]   Missing persons
[3]   Unidentified deceased bodies
[4]   Sexual assault cases

    CUPLINK is used in2001 developed at Arizona's University. Artificial intelligence lab. With collaboration with Tucson and phoenix police departments ("Issues in information systems volume" VIII No. 2, 2007 329 DATA MINING and E.S. INLAW ENFORCEMENT AGENCIES Monica (Holmes central Michigan University).   In 2005 violent crimes were 45.5% cleared or solved and 16.3% of property crimes were solved. The estimated number of violent crimes was 1,390695. This means that 6,32,766 violent crimes were solved. Big Blue organization has deployed Criminal Reduction Utilizing Statistical History (CRUSH) software for police departments abroad. Recently hybrid expert system is developed in Australia. Shyster-MYCIN is a legal expert system combining two other expert systems-SHYSTER (a Legal expert system) SHYSTER legal system and MYCIN (Medical Expert System) is case based reasoned. To test SHYSTER-MYCIN, the SHYSTER part used a case law specification of meaning of term authorization (SHYSTRMYCIN-A Hybrid legal expert system. Thomas A, O Caliaghan, James People Dept. of Comp. Sci, Eric, I Mccreath, Dept. of Comp sci. Australian National University Australia).

4.3) System Development in State Crime Report Burro:-
    In 2008, the computerized system was developed by State Crime Report Burro of Chennai, Tamilnadu. This was named as Court Cases Monitoring System (CCMS). Its main aim is a for speedy disposal of cases pending in the courts. It is used to Judiciary, prosecution and police successfully. It acts as an interface between judiciary and police. It can be used by prosecutors to evaluate their performance. With increasing crime rate, it was difficult to keep all information manually .Hence a software tool is necessary or needed to record pending cases which needs to be sorted and analyzed scientifically to highlight factors in pending case. Expert system is used as a software tool to progress disposal cases pending.

4.4) Future Work:-
    Research is being done to develop such an expert system, which can understand the problems of people depending on law specially crimes of women. It can create decision itself and can judge like intelligence of human being. System that must be understood from environment and it is essential to make such expert system to maintain itself and update itself. For expert system to perform successful task, it will be given more knowledge. It required large knowledge bases. And research is being done on making expert system of judiciary of crimes against women mentioned in Indian penal code.

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V. CONCLUSION
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    From the study of review literature, the legal expert system is used in worldwide countries. Today use of legal expert system is very common in all countries but for getting information of various journals, internet, magazines & discussions with number of lawyers &judges. It recalls that, in India there is no development of any legal expert system used in courtroom and police station. There is basic need to use the legal expert system for faster access & legal Process in court. Due to that speedy disposal of pending cases in the courts are possible. With Expert system productivity and performance increases. Expert system is enlightening about laws of crimes against women knowledge to common people also. Hence, researcher intends to do subject to research in this area to develop legal expert system of crimes against women.

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