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Hybrid Technique for Data Scrutiny using Artificial Intelligence

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Abstract: ***Today's time is of artificial intelligence. We are trying to reduce the search space by some methods as uncertain data is also used in the system to solve problems. To manage our database we use hybrid techniques. Like Fuzzy expert system, fuzzy genetic system, in this paper we will see how can we use such system in solving an application.***

Keywords: Knowledge base(KB), DataBase(DB), RuleBase, Genetic, Fuzzy Logic

I. INTRODUCTION

AI maps the human behavior with the intelligence in the system. AI has 3 components: 1. Neural networks, 2. FL-fuzzy logic, 3.GA-genetic algorithm. They are having dynamic nature. So, for solving such problems either we use heuristics or choose a better abstraction.AI uses heuristic approaches to reduce the search space. Heuristic Approaches uses an evolutionary concept. It does not give certain solutions, so we need to use some methodology. The expert system and the knowledge based systems is designed to intelligently assist human experts and people who otherwise might not have access to the expertise. These have proved to be extremely useful in diverse areas such as medical diagnosis, chemical analysis, geological exploration; business management etc [1].The knowledge base of the expert system is created by acquiring the knowledge from human experts. The working memory stores the user submitted facts and the facts generated at an intermediate stage of the inference process

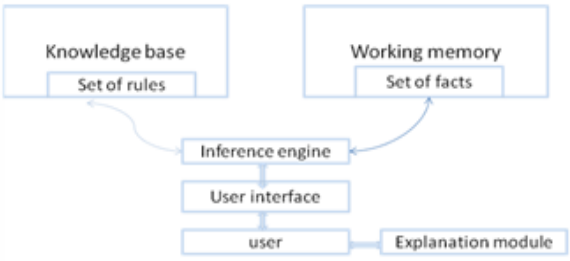

Fig1 Basic structure of an expert system:

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The inference engine taken out the logic of the knowledge centre. The explanation module provide ample opportunities to the user to know how a specific result or conclusion has been carried out and why should it required a specific fact. The user interface is the bridge between a user searching for the solution and the system. Humans in their expressions use imprecise terms such as may be high, low, etc.

Fuzzy logic is an excellent tool to represent such expressions and thus enable designer of an expert system to handle uncertainty. A fuzzy expert systems uses fuzzy production rules such as: If A then B where A and B is fuzzy states.

Fig2 A block diagram of fuzzy systems

The inference mechanism of the expert system has to handle a large amount of knowledge for giving solutions. It is necessary to store the knowledge unambiguously and efficiently so that the inference drawn is incredible, consistent and fast. However, it is a challenging task to represent large amount of knowledge unambiguously to get fast inference from it. A lot of research work has been done in this direction. [3].

II. RELATIONAL DATABASE

The Relational algebra is basically query languagein which a user requests the system to fetch out the information from the database. Query languages are basically a higher level language than a standard programming language. Query language can be classified into two categories i.e. procedural and non- procedural. Some of the procedural query languages are SQL, Oracle, etc.

III. FUZZY RELATIONAL DATABASE

We generally think that attributes of tables are precise in nature but this is not always true. There can be uncertainty in the attribute values in the tables for handling uncertainty in relational database models[4] various query languages such as SQLF etc. have been proposed but this thesis proposes handling uncertainty in attributes using the same SQL only but with the help of some extra tables. Further the mapping has been done between those tables and Fuzzy knowledge base rules for underlying Fuzzy relational database and fuzzy knowledge base.

IV. FUZZY QUERIES

To handle the fuzziness in both data and knowledge it is required to query them. IFRD(Intelligent

fuzzy Relational Database Architecture)processor processes the fuzzy query in following steps:1.It communicates with the catalog to find out whether the query involves rules or not.2.If the query involves rules ,it communicates with the knowledge base and applies fuzzy inference mechanism with the similarity based approach for selecting and firing the rules.3.

It processes the fuzzy conditions in the where clause of the query by applying similarity matching on the database.4.Derived rule definition can also be stored in the knowledgebase and these rules are processed like simple rules. The IFRD processor has been built using JSP.

V. GENETIC FUZZY RULE-BASED SYSTEMS

The most essential and effective GFS type is the rule based system, where a GA is allocated to learn or configure several components of FRBS. The essential point is to allocate an efficient way of learning process to automate the knowledge base (KB) generation. From the optimisation method the way of searching a proper knowledge base (KB) for problems, is equal to parameterise the fuzzy KB (rules and membership functions), and to search that parametric values which arebest as compared to optimisation criterion. The KB parametric valueinaugurate the optimisation space for the value, which converted into a suitable genetic representation.

The initial phase in designing a Genetic Fuzzy Rule Base System is to decide which component of the Knowledge Base are required to optimise by genetic algorithm. The knowledge base does not form a same similar structure rather compiling of several parts.

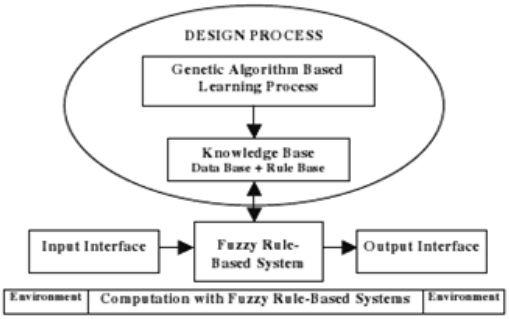

Fig3 Generic structure of fuzzy ruled based system

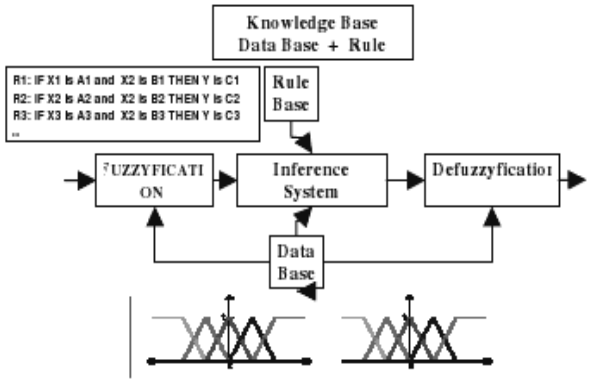

Fig4 Genetic fuzzy systems

It is very essential to determine the difference between tuning and learning problems. The final selection of participate to adapt depending upon the two condition parameters: granularity and efficiency of the search. A search space of smaller size results faster and simpler learning process. A larger size search space, consist of the entire KB and has a finer granularity and more likely to uphold optimal solutions, but it has become very inefficient and slow. The Rule Base consists of five linguistic rules: Rule 1: If A1 is small and A2 is short then B is not good, Rule2: If A1 is small and A2 is medium then B is not good, Rule 3: If A1 is medium and A2 is short then B is medium, Rule 4: if A1 is big and A2 is medium then B is medium.

VI. GENETIC TUNING

The parameterized scaling and membership functions are taken care under the GA as discussed in fitness function.that discuss in very quantitative manner about the design criteria. The scaling functions are present to the input & output variable of fuzzy rule base system[5]. It defines the universes of discourse. They are generally evaluated by the single scaling factor i.e. lower & upper bound.

Case1. Linear scaling: one/several contraction/dilatation parameters.

Case2. Non Linear scaling: For scaled universe of discourse better matches under adaptation of one to four parameters.

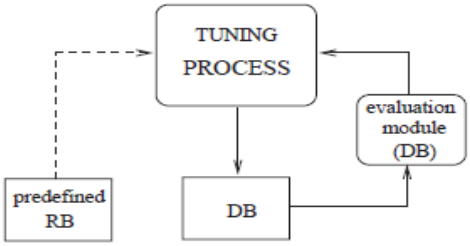

Fig5 Tuning the database

During the tuning membership function, one stand alone present complete database as its chromosomes encodes the parameterised member function(PMF). The space of parameters for each membership function is about one to four eaac parameter in binary coded. The participation of chromosomes into fuzzy partitions. This theory is globally accepted to optimise global semantic in the rule base. During the tuning of approximate model is a specific instantiation of knowledge base learning. Rules are defined by their membership function rather than linguistic term in the database.

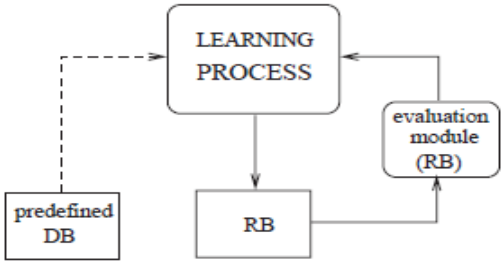

Fig6 Learning the database

VII. GENETIC LEARNING OF THE RB

Genetic learning makes a pre and well defined order set of FMF in database where rules are applied by philological tags. It is applied to explain FBRSs, as approximate approach gaining rule is equal to new modified membership function.

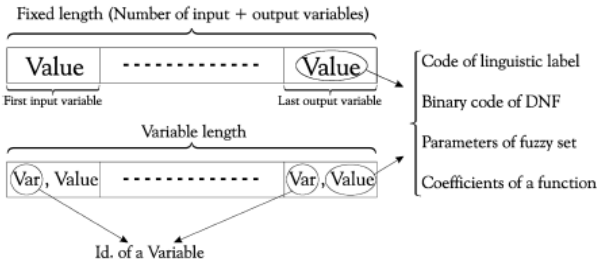

Fig7 Representing a rule with fixed or variable length codes

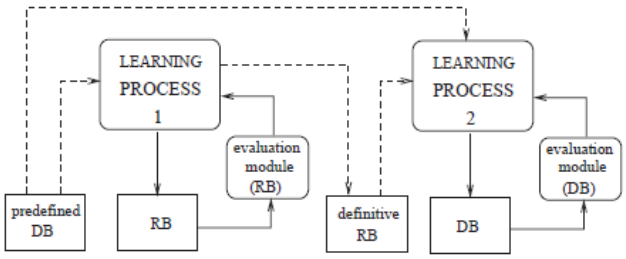

Fig8 Learning the database

The three learning approaches described as:

1. Michigan approach
2. Pittsburgh approach
3. Iterative rule learning approach

The Rule base is present by:

1. Relational matrix
2. A decision table
3. A list of rules

Relational matrix & decision table applied only in Pittsburgh approach. A main concern to coding individual rule is to utilise in DNFC (Disjunction Normal Form) present in exact length binary string.

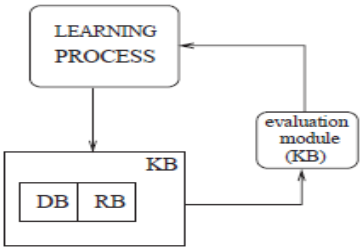

Fig9 Learning the knowledge base

VIII. GENETIC LEARNING OF THE KB

Genetic learning of knowledge base belongs to dissociate search space which includes several genetic representations i.e.

1. Flex length chromosomes
2. Multi- genomes

The computational cost of the search with increasing complexity of search space. A GFRBS are the method to optimise the flexible & complex rile space in which result remains feasible and efficient[6,8]. The proposals for learning KB include systems obtaining approx. Mamdani type FRBS.

IX. NEW INNOVATION IN GENETIC FUZZY RULE-BASED SYSTEMS

Several techniques & methodology can be applied in genetic technique to Fuzzy Rule Base Systems. Some are mentioned below:-

a) Creating FRBSs with genetic programming

Genetic programming is focused with the automation of program. Fuzzy GP, operateson a context free language. Now, it's quiet easy to differentiate among GP which uses a grammar for learning for learning linguistic rules to diverted to the use of domain specific knowledge. It explains the function & set of terminals.

b) Opting Genetic for FR sets:

When large no. of inputs are added, no. of rules in the RB develop exponentially . Other methods used for rule reduction are Neutral Networking(NN), clustering techniques, transformation, Priori genetic, database learning based to a knowledge based learning where GA gain database components i.e. scaling function, membership function and granularity parameters.

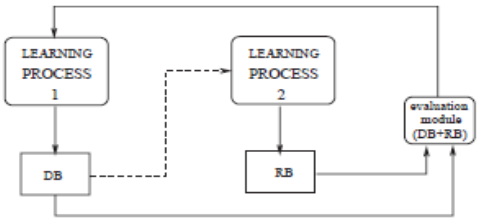

Fig10 Learning the database a priori.

c) Further genetic based machine learning approaches:

This context explains other approaches present in the literature. A hierarchical transformation process to design FRBSs. Genetic approaches are generally based upon the solving of the fuzzy clustering problems.
Example: **Hybrid fuzzy expert system in CND:** The

CND is Computer Network Design. It is the part of world wide area network designing system known as END (EXPERT NETWORK DESIGNER). It is categorised into four different phases.

1. Configuration Entry Phase: In this phase, HFES interact with user with the help of user interface to establish a basic description of the planners which provide no. of hierarchical question forwardedfrom the higher possible network level. WAN interconnecting between different location passing to no. of building, offices, school, in each site, to the no. of workstations & servers in LAN department Technology & Design Technique learning are used to improve the time efficiency of END's Network design problem.

2. Solutions Guidance Phase: From this method, HFES finalise the optimal topologies & cable system which is most suitable for the user's application & working area for every subnet &WAN moreover, provide confidence rank in every solution. In the end session, a graphical layout of optimal network carried out to user on graphical user interface. Unchosen solution are also available in order to evaluate & differentiate between them.

3. Model Simulation Phase: In case user choose from unchosen or no optimal solution. END will generate a side model for every non optimal solution under a network simulation package, it will run the simulations & report the expert system. [9]

4. Solutions Analysis Phase: Performance Analyser receives result from model simulation phase. In conjunction with GN solution from solution guidance phase to categories the several solutions with respect to each evaluated performance parameters.

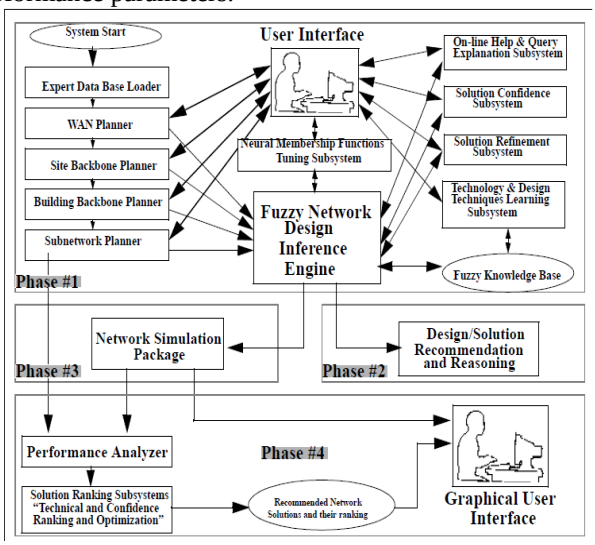

Fig11 The Internal Structure o the Hybrid Fuzzy System.

X. RESULT AND CONCLUSIONS

Phase 1	Phase 2	Phase 3	Phase 4
User interface ⇨	Design ⇨	Network ⇨	Graphical user interface
FUZZY NETWORK DESIGN INTERFACE ENGINE	DESIGN SOLUTION RECOMMENDATION AND REASONING	NETWORK SIMULATION	RECOMMENDED NETWORK SOLUTION AND THEIR RANKING

The phase 1 deals with user interface that includes the fuzzy networking and design interface engine it is the initial and main phase of the system in which all the information will be collected and gathered for further processing, Phase 2 include the design solution for the system and recommend with the proper reasoning, Third phase is network simulator, Fourth is the performance analysis it will analyse all the process including ranking and positioning of the system. These four phases become a hybrid system which make efficient and hassle free results.

XI. CONCLUSIONS

GFs is another name of hybridization of fuzzy logic and computation. It has been become and evolutionary research from the last decade, by which several papers, special issues have been published. It has been a tribute to this hybridization. Now, it has become in lime light and new researches are going on. Different integration have been made to formulate this technique to new innovative era. This hybridisation technique of fuzzy logic and computation will help to our new era by which new technologies can be established. This research will help our society, industry, organization, colleges scholars and etc. in upcoming time.

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