IJFEAT
INTERNATIONAL JOURNAL FOR ENGINEERING APPLICATIONS AND TECHNOLOGY

Title: Issue And Challenges In Designing of Prediction System Using Fuzzy Sets

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Abstract
Fuzzy logic is mainly associated with imprecision approximate reasoning and computing with words. Fuzzy Logic is multivalued logic that allows intermediate values to be defined, formulated and process by computer in order to apply more human like thinking. It is applied to the processes, which are too complex to be analysed by conventional techniques or where the available information is uncertain. Fuzzy logic is used to provide way of importance of precision and the application of fuzzy set theory to many control problems. Hence Fuzzy Logic plays important role in control system, precision system designing, and prediction system. This paper describes some major issue, challenges in designing fuzzy logic system during the development of fuzzy based prediction system.Author presents share experience gain during development of fuzzy logic system on system which predicts the fertility of soil .
Keywords— Fuzzy logic system, Complexity, Fuzziication,Defuzzification

I. INTRODUCTION

As model is difficult to construct as model never identical to reality but it is near about reality. There is need of making many complex control systems as traditional model is difficult to develop due to nonlinear and time variation nature of the variables. Hence the fuzzy Control is applied in traditional control systems with features of both systems which yield promising results. As fuzzy logic systems are dynamic system, fuzzy logic is bridge the gap between significance and precision. Fuzzy logic tosolve a problem in a specific domain has its own challenges. Process of designing fuzzy model is consist of several steps

1. Building model phase: To build a fuzzy model from the expert knowledge available for particular problem domain..
2. Integration phase: As per Software Engineering process,after the designing and Prototyping phase, model needs to be integrated into rule based fuzzy structure, of the system. With the help of the fuzzy logic based algorithm, inputs are applied and got output of the fuzzy logic solution. This integration phase contain series of problems, relating with target system. Fuzzy logic is fascinating area of research because it makes good balance of trading between significance and precision.

II. ISSUE

One of the main advantages of a fuzzy logic based approach that it allows the developers to focus on the decision logic of the algorithm. In this section the author describes some of the issues faced in fuzzy logic based projects [6] and a general overview of the issues with the use of fuzzy logic.

Handling Risk: fuzzy logic models are based upon fuzzy set theory and fuzzy logic, and useful for handle and analysed risks with insufficient knowledge or imprecise data. Using approximation and making inferences from complex knowledge and data, fuzzy logic models used for modeling risks [1].

Computation with imprecise Information: Most real-world problem contain probabilities are basically imprecise and these type of imprecise probabilities occur in imprecisely defined variables, functions, relations, events, etc. Fuzzy logic solve this reality make it precise to draw some conclusion .

Computational theory of perceptions: Humans are capable to perform a most of physical and mental tasks withoutany measurements and any computations. While performing such tasks people employ perceptions. The fuzzy-logic-system use perceptions to serves this purpose as fuzzy logic plays role between significance and precision.

Possibility Theory: Fuzzy logic is best combination of possibility theory and probability theory. Possibility theory handle formalization of perception of possibility, decision analysis and computation with imprecise whereasprobability theory only show chances to occur that process [2].

Uncertainty: Fuzzy logic theory admits the uncertainty of truth which incorporate information described in linguistic terms. Fuzzy logic models are more convenient for solve this type of problem with insufficient and imprecise data with the help of input and experience data both assess the uncertainty [1].

Decision taking capacity as prediction: In real world computing environment, the information is not complete, precise and certain, making very difficult to derive an actual decision. To deal with processing and modeling of such information, fuzzy techniques are applied to exercise the proper conclusion.

While facing real world problem, quality of data is not up to mark as data or information is precise, not having ability to arrive at actual decision. Design of fuzzy model solve this problem and provide correct prediction.

No of variable: The Fuzzy Logic Toolbox allow the number of input variable as many as requirement. If the number of inputs is too large, or the number of membership functions istoo big, then it may also be difficult to analyze the FIS using the other GUI tools. The granularity of the input variables specifies the maximum number of fuzzy rules that may compose the Rule Base (RB). So, it has a strong influence on aspects, like complexity of rule learning, interpretability or its accuracy of system.

Interpretability: To build fuzzy system with making correct balance of interpretability and accuracy, is difficult task. Interpretability depends on membership function, rule identification. Combination of these two makes more accurate and interpretation about goal [8].

Computational Complexity: Fuzzy logic consists of designing rule to solve problem. This consider as issues because thelack of appropriate tools and solutions. Other logic only requires the simple set of rules which modifies the behaviour of the algorithm and Fuzzy logicsolve this problem with appropriate support. Fuzzy logic based approach is allows the developers to focus on the decision logic of the algorithm.

Rule identification: If problem contain more amount of data, number of rule specification is more as more input vaiable[8]Hence, it is required to generate fuzzy rule sets with the help of ***Redundant rules, Wrong rules, Conflicting rules.*** Optimization of the membership function results in the improvement of interpretability and accuracy of the fuzzy systems. Also, the scaling functions are optimized to maintain and precise the context related issues in the fuzzy rule based systems [9].

III. CHALLENGES

In the following sections, the remaining and emerging challenges of developing model based decision support tools for integrated environmental management are discussed.Control of the environment for large computing systems is often a far greater challenge. In addition, the design of a precision environmental control system also faces nonlinearities, caused by such system. Uncertainties in system parameters are often present.

Risk management: Even with a solid theoretical foundation, the success of a system depends on many factors such as the quality of the experts' opinions, the system's own credibility and its linkage to

management decisions. [2].In some cases where problem is not clearly defined, a simulation project always contain a risk factor which neither the designer nor the user of the model can fully anticipate in the early stage of design project.

Conversion of Imprecision uncertainty into precise decision: To develop method that enable the uncertainties associated with human inputs, there is big challenge to develop uncertainty analysis methods that are able to convert imprecise information to precise **decision** [4]

Wise combination of truth and possibility: Precise prediction is essential in any application area. Fuzzy model design is based on combination of truth and possibility. if membership function are correctly specified.

Computational Efficiency: Development of approaches and strategies for increasingthe computational efficiency of integrated models, optimizationmethods and methods for estimating riskbasedperformance measures; [5]

Selection of Membership Functions: The membership function is a critically important input for the fuzzy logic system. It may be easy to come up with the inference rules; it is not so easy to devise the membership function because it requires translating the qualitative description into a quantitative measure.[1]

Quality and quantity of variable: Data Collection is done with quite accuracy for productivity. For soil fertility almost every parameter is included as it indirectly related with crop yield. Past study problem has concerned only one or two or three soil parameter which affect soil productivity.

Nonlinearities development: When results are presented as maps, the presentation combines spatial data which are generally accurate with analytic results which may be inaccurate, leading to an impression that analytic results are more accurate than the data would indicate. Challenges of the higher reliability raised design of precision and prediction for control system faces nonlinearities in the system.

Exact rule specification: While studying fuzzy application in soil science, It is observed thatwhen all possible combination of rule of soil parameter is taken into consideration then and then only possibility of accurate result. If one of combination is not taken into consideration affect the result. Finding out dependent variables and nondependent variables, sub groups are created and their dependability is tested. Large-scale-manufacturing systems tend to be very complex [7].

IV. PROBLEMS

Most of the tools available for developing fuzzy logic solutions have decent support for designing the algorithm. Some even provide great support for debugging and fine tuning those. The problem is that the development environment is rarely the same as the production environment, where the fuzzy logic solution will be applied. Also, deployment of the solution is not taken into consideration.

Most of the tools available for fuzzy logic development involve a set of available fuzzy logic functions (operators, defuzzification, etc.) but they do not provide a straightforward way to add additional functions. In some cases there is no possibility to add custom functions to the solution. This can be a serious problem when a used function is not supported by the fuzzy logic implementation.

V. CONCLUSION

Basically, fuzzy logic is a precise logic of imprecision and approximate reasoning. The real-world is pervaded with fuzziness. Fuzzy logic is needed to deal effectively with fuzzy reality. An important point that has to be made is that fuzzy logic is much more than a logical system. Prediction system development using fuzzy set is taken all aspects of real world problem into consideration so that all possible condition are under scenario.

VI. REFERENCE

[1] KailanShang,ZakirHossen,Applying Fuzzy Logic to Risk Assessment and Decision-Making,Sponsored by CAS/CIA/SOA Joint Risk Management Section November 2013©2013 Casualty Actuarial Society, Canadian Institute of Actuaries, Society of Actuaries

[2] Lotfi A. Zadeh, Is there a need for fuzzy logic? *,Department of EECS, University of California, Berkeley, CA 94720-1776, United States Received 8 February 2008; accepted 25 February 2008

[3] URL: http://cig.iet.unipi.it/cig/research02.html.

[4] Van der Sluijs, J.P., Craye, M., Funtowicz, S., Kloprogge, P., Ravetz, J.R., Risbey, J.S., 2005. Combining quantitative and qualitativemeasures of uncertainty in model based environmental assessment: the NUSAP system. Risk Analysis 25 (2),481–492.

[5]J.C. Ascough II a,_, H.R. Maierb, J.K. Ravalico b, M.W. Strudleyc,Future research challenges for incorporation of uncertaintyin environmental and ecological decisionmakinga USDAARS, Agricultural Systems Research Unit, 2150 Centre Avenue, Building D, Suite 200, Fort Collins, CO 80526 USA

[6] Norbert Sram, Marta Takacs, Minnesota code: A neuro-fuzzy-based decision tuning, INES, 2011, pp. 191 – 195.

[7]Feng Qi a,⋆ , A-Xing Zhu b,c, Mark Harrower c, James E. Burt c,Fuzzy soil mapping based on prototype category theorya Department of Political Science and Geography, University of Texas at San Antonio, 6900 NW Loop 1604, San Antonio, TX 78249, USA.

[8] U. Bodenhofer and P. Bauer, “A formal model of interpretability of linguistic variables”, in: J. Cassilas, O. Cordon, F. Herrera, L. Magdalena (Eds.), Trade off between accuracy and interpretability in fuzzy rule based modeling, Studies in Fuzziness and Soft Computing, Physica, Heidelberg, (2002).

[9]O. Cordon, F. Herrera, F. Hoffmann and L. Magdalena, “Genetic Fuzzy Systems: Evolutionary Tuning and Learning of Fuzzy Knowledge Bases, Applications in Fuzzy Systems – Applications and Theory”, World Scientific, vol. 19, (2001).

[9] O. Cordon, F. Herrera, “A proposal for improving the accuracy of the linguistic modeling”, IEEE Transactions on Fuzzy Systems, vol. 8, no. 3, (2000), pp. 335-344.

[10] A. Botta, B. Lazzerini and F. Marcelloni, “Context adaptation in Mamdani Fuzzy Systems through new operators tuned by a genetic algorithms”, FUZZ-IEEE, (2006), pp. 1641-1648.