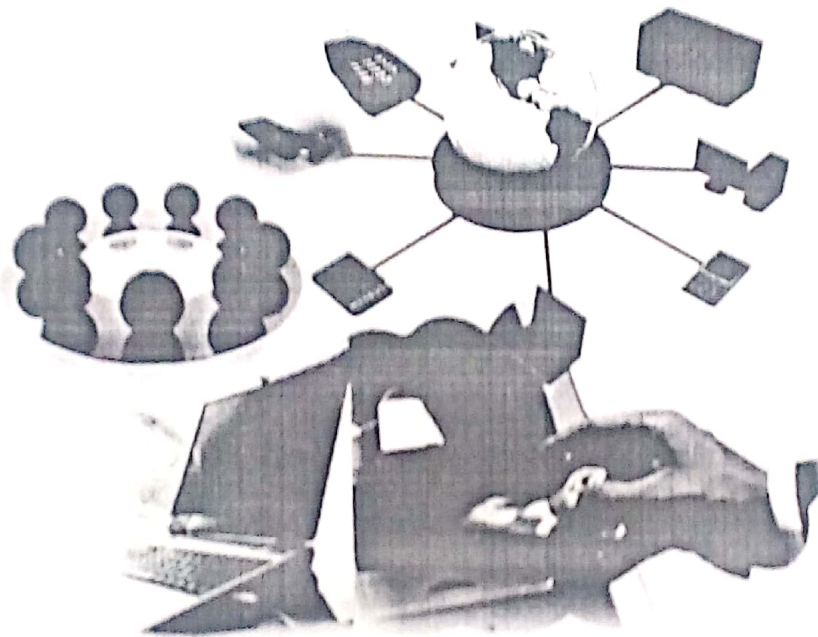# National Conference-2012
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Dr. Makarand Wazal

Dr. Mrs. Vijaya S. Nawale

Prof. Pramod Bora

Sinhgad Technical Education Society's

SINHGAD COLLEGE OF COMMERCE

Kondhwa (Bk.), Pune (M. S.), India

(Accredited by NAAC)

Decision Support System for Bank loan using fuzzy logic

Tushar Deshmukh, Vrunda V. Punde

Abstract

Decision support system has already showed the wide use and effectiveness for the different level managers. These managers are not only becomes more accurate and firm in taking decision. But most of the times it is been found that inputs for the decision making system are relative. I.e. for one manager monthly income of 40,000 is moderate but for another it is very positive point for sanctioning the amount. The difficulty increases when there are linguistic inputs like good profile, average profile etc. How to deal with such cases? The answer is fuzzy logic, which tries to deal with such linguistic variables. Here is an attempt to combine these two different domains i.e. decision support system and fuzzy logic, which helps the bank managers in taking decision in whether to pass the bank loan or not.

Key words :Decision support system, fuzzy logic, bank loans.

Introduction

Unlike the olden days the people mentality changes today. They don't feel uncomfortable in asking for loans for various reasons. So it's not a surprising picture where one can see, the desk of bank manager is crowded with piles of files pending for his sign with the same silly old question should the loan get sanctioned or not?

A decision support system (DSS) is a computer-based information system that supports business or organizational decision-making activities. DSSs serve the management, operations, and planning levels of an organization and help to make decisions, which may be rapidly changing and not easily specified in advance. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions.

Typical information that a decision support application might gather and present would be:

- Accessing all of your current information assets, including legacy and relational data sources, cubes, data warehouses, and data marts
- Comparative sales figures between one week and the next
- Projected revenue figures based on new product sales assumptions
- The consequences of different decision alternatives, given past experience in a context that is described

Three fundamental components of a DSS architecture are:

1. the database (or knowledge base),
2. the model (i.e., the decision context and user criteria), and
3. the user interface.

(The users themselves are also important components of the architecture.)

DSS systems are not entirely different from other systems and require a structured approach. Such a framework includes people, technology, and the development approach

DSS technology levels (of hardware and software) may include:

1. The actual application that will be used by the user. This is the part of the application that allows the decision maker to make decisions in a particular problem area. The user can act upon that particular problem.

2. Generator contains Hardware/software environment that allows people to easily develop specific DSS applications.

3. Tools include lower level hardware/software. DSS generators including special languages, function libraries and linking modules

An iterative developmental approach allows for the DSS to be changed and redesigned at various intervals. Once the system is designed, it will need to be tested and revised for the desired outcome.

The support given by DSS can be separated into three distinct, interrelated categories Personal Support, Group Support, and Organizational Support.

DSS components may be classified as:

1. Inputs: Factors, numbers, and characteristics to analyze

2. User Knowledge and Expertise: Inputs requiring manual analysis by the user

3. Outputs: Transformed data from which DSS "decisions" are generated

4. Decisions: Results generated by the DSS based on user criteria

Benefits by using DSS

1. Improves personal efficiency

2. Speed up the process of decision making

3. Increases organizational control

4. Encourages exploration and discovery on the part of the decision maker

5. Speeds up problem solving in an organization

6. Facilitates interpersonal communication

7. Promotes learning or training

8. Generates new evidence in support of a decision

9. Creates a competitive advantage over competition

10. Reveals new approaches to thinking about the problem space

11. Helps automate managerial processes

Fuzzy logic is a form of many-valued logic; it deals with reasoning that is approximate rather than fixed and exact. In contrast with traditional logic theory, where binary sets have two-valued logic: true or false, fuzzy logic variables may have a truth value that ranges in degree between 0 and 1. Fuzzy logic has been extended to handle the concept of partial truth, where the truth value may range between completely true and completely false. Furthermore, when linguistic variables are used, these degrees may be managed by specific functions.

While variables in mathematics usually take numerical values, in fuzzy logic applications, the non-numeric *linguistic variables* are often used to facilitate the expression of rules and facts. Human beings make decisions based on rules. Although, we may not be aware of it, all the decisions we make are all based on computer like if-then statements. If the weather is fine, then we may decide to go out. If the forecast says the weather will be bad today, but fine tomorrow, then we make a decision not to go

today, and postpone it till tomorrow. Rules associate ideas and relate one event to another. Fuzzy machines, which always tend to mimic the behavior of man, work the same way. However, the decision and the means of choosing that decision are replaced by fuzzy sets and the rules are replaced by fuzzy rules. Fuzzy rules also operate using a series of if-then statements.

Rules are usually expressed in the form:

IF *variable* IS *property* THEN *action*

For example, a simple temperature regulator that uses a fan might look like this:

IF temperature IS very cold THEN stop fan

IF temperature IS cold THEN turn down fan

IF temperature IS normal THEN maintain level

IF temperature IS hot THEN speed up fan

There is no "ELSE" – all of the rules are evaluated, because the temperature might be "cold" and "normal" at the same time to different degrees.

Proposed framework

In our approach, firstly the customer has to fill up the loan application, which will be a computerized process. The data and related information collected from the customer is saved in database. The information may be in linguistic manner. So here we have to apply the fuzzy logic to find out the rating crisp values that customer may earn.

The fuzzy logic is applied with the following steps:

1)**Fuzzification:** Using membership functions find out all the points on which it could be passed like monthly income, previous loans, credit cards, property, criminal record etc.

2)**Rule evaluation:** here one has to apply all the if then based rules to find out assets gained by customer. Ex: if past criminal record then the less probability etc.

3)**Defuzzification:** In this step we have to defuzzify the results we get in previous step. The defuzzification generates crisp or actual results. These results are generally some rating may be out of 10 or something.

After these steps the ratings are returned by fuzzy system and these are generally the points scored by a particular customer based on his assets. Now these results are feed to DSS as inputs, on the basis of which the DSS will calculate how safe it would be to pass such loan, or what is the probability of getting the amount back. These things of course vary according to banking policies.

After which the DSS suggest manager its view i.e. it helps the manger to take decision in loan passing, the amount of loan, the percentage of loan to be sanctioned etc.

Conclusion

As Man gets hungry in finding new ways of improving our way of life, new, smarter machines must be created. Fuzzy logic provides a simple and efficient way to meet these demands and the future of it is limitless.

Fuzzy systems not only could deal with linguistic variables but they can be changed to crisp values, which could decide the point scale of the user on which the amount or percentage of the loan to be sanctioned is suggested. And DSS are there just to help in making the decision process much easy, they can't insist managers to take the decision in that way.

References

1. MIS. waman jawdekar
2. Neural network and fuzzy logic : satish kumar
3. www. Wikipedia.com
4. www.seattlerobotics.org/encoder/mar98/fuz/flindex.html
5. fuzzy set and application : zedah

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Sinhgad Technical Education Society's

SINHGAD COLLEGE OF COMMERCE

S. No. 40/4A+4B/1, Near PMC Octroi Post,
Kondhwa - Saswad Road, Kondhwa (Bk.), Pune - 411 048 (M.S.), India

http://www.sinhgad.edu