

DECISION SUPPORT SYSTEM FOR HANDLING PUBLIC WELFARE ASSURANCE USING FUZZY TAHANI REASONING

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ABSTRACT

The study was conducted to design and analyze a decision support system at district development program sub pasaman barat. By using fuzzy logic reasoning method of fuzzy database with Tahani In obtaining the data I did it by observation, reading books and literature.

With the system can help the districts involved in district development program, especially the decision makers. of community self reliance institution with the results of this decision support system, relevant parties can make decisions easily, so this district development program can run in accordance with what is expected for both government and society.

INTRODUCTION

Tahani fuzzy is a fuzzy method that uses a standard database. on a standard basis, data is classified based on how it is viewed by the user. therefore the standard database displayed will come out like the data that has been stored[1].

This tahani fuzzy has often been used in processing certain data to produce information or a decision. Example Tahani fuzzy model for modeling decision support systems (DSS) for recommendations for purchasing cellphones, decision support systems for car purchases, and also fuzzy tahani are used to determine the best students, students, employees, employees of a particular institution etc.

Fuzzyfication is the first stage of fuzzy calculation, which is converting firm values to fuzzy values. The process is as follows: An analog quantity is entered as input (crisp input), then the input is entered in the scope of the membership function. The output of this process is a fuzzy value or what is commonly called fuzzy input[2].

The sub-district development program (PPK) is the embryo of the national independent community empowerment program for rural areas (PNPM Mandiri Rural). KDP is one of the Indonesian government's efforts to improve the welfare of rural communities, strengthen local institutions, and improve the performance of local governments, a form of this sub-district development program is providing assistance to the community, for example in terms of community needs such as building facilities and

infrastructure, providing loans to community for business capital and provide training to the community in the form of sewing training, computer training etc.

METHOD

Decision Support System (DSS) is one way that can be used for top management get recommendation promotion based on certain criteria, DSS with Fuzzy Tahani model method can help top management in making decision because this method is derived from artificial intelligence that do processing with factor certainty and uncertainty[3][4].

Decision is the activity of choosing a strategy or action in solving the problem[5]. The act of choosing a strategy or action that the manager believes will provide the best solution to something is called decision making. There are four phases in the decision making process[6]:

a. Search (intelligence)

This stage is the process of searching and detection of the scope of problematic and the introduction of problems.

b. Design (design)

This stage is the process of discovering, developing, and analyzing alternatives that can be done. This stage is a process to understand the problem, find solutions and test the feasibility of the solution.

c. Choice (choice)

Selected among possible action alternatives, in this phase can be combined with search or matching algorithms such as KMP, Boy-er-Moore, BFS and DFS. The election results are then implemented in the decision-making process.

d. Implementation (implementation)

This stage is actually part of the election stage, this stage is the implementation of the decision taken.

Fuzzy Tahani [7] is one of the branches of fuzzy logic, which is one of the fuzzy methods using standard databases. Tahani describes a fuzzy query processing method, based on the manipulation of a language known as SQL (Structured Query Language), so the fuzzy Tahani model is aptly used in precise and accurate data retrieval process.

RESULT AND DISCUSSION

In conducting system design, there are 4 input variables, namely: infrastructure, economy, health and education variables, while the output is a variable of life level. As can be seen in image 1.

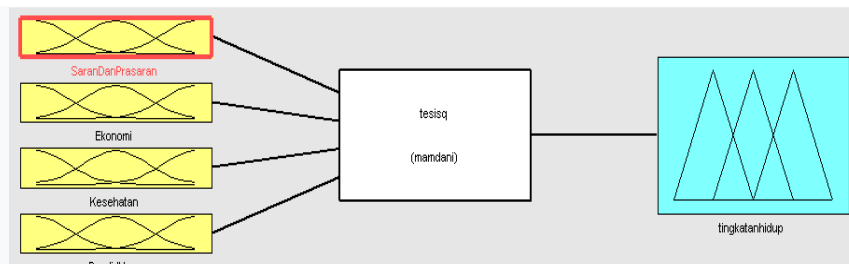


Image 1. Input variable and output variable

Analysis of the Variable System for Facilities and Infrastructure

For the variables of facilities and infrastructure are input variables, which are the values for facilities and infrastructure, namely facilities in terms of residence consisting of non-permanent, semipermanent, and non-permanent, classification can be seen in table 1 below.

Table 1. Fuzzy Set of Facilities and Infrastructure for Input

Fuzzy variable names	Model MF	Parameter	Range
Not Permanen	Trapmf	[0 0 2 4]	0 – 4
Semi Permanent	Trimf	[3 6 9]	3 – 9
Permanent	Trapmf	[7 10 12 12]	8 – 12

The use function of the facility and infrastructure variables can be formulated as follows:

$$\mu_{\text{Not permanent}}[x] = \begin{cases} 1; & x \leq 2 \\ (5-x)/(5-2); & 2 \leq x \leq 5 \\ 0; & x \geq 5 \end{cases}$$

$$\mu_{\text{Semi Permanent}}[x] = \begin{cases} 1; & x \leq 3 \text{ atau } x \geq 9 \\ (x-3)/(6-9); & 3 \leq x \leq 6 \\ (6-x)/(9-6); & 6 \leq x \leq 9 \\ 0; & \end{cases}$$

$$\mu_{\text{Permanent}}[x] = \begin{cases} 0; & x \leq 7 \\ (x-7)/(10-7); & 7 \leq x \leq 10 \\ 1; & x \geq 10 \end{cases}$$

if the facilities and infrastructure are 3, then the fuzzy membership value for each set is :

Fuzzy set is not permanent $\mu_{\text{Not permanent}}[3]=0,6$

$$\pi(3,2,5) = (5-3)/(5-2) = 0,6$$

semi permanent set $\mu_{\text{Semi Permanent}}[3]=0,3$

$$\pi(3,6,9) = (3-3)/(6-9) = 0,1$$

permanent set $\mu_{\text{Permanent}}[3]=0,0$

Value 3 is not included in the classification of permanent facilities and infrastructure, the result is = 0

Table 2. Database Model Holds Variable Facilities and Infrastructure

No Identity	Name	Facilities and infrastructure	Membership Degrees ([x])		
			Not permanent	Semi Permanent	Permanent
Xx	xxxxxxx	3	0,6	0,1	0

From the table of the variable farming model for facilities and infrastructure above, it can be concluded that the value of 20 is classified as a non permanent parameter.

Economic Variable System Analysis

For the economic variable is the input variable, which is the economic value, that is, in terms of income, which consists of income of Rp: 1,000,000 / month, Rp: 2,500,000, and Rp: 2,500,000; the classification can be seen in table 2 below

Table 3. Economic Fuzzy Sets for Inputs

Fuzzy variable names	Model MF	Parameter	Range
Low	Trapmf	[0 750rb 1jt]	0 – 1jt
Medium	Trimf	[750rb 1jt 1,5jt]	750rb – 1,5jt
High	Trapmf	[1jt 1,5jt 2,5jt]	1jt – 2,5jt

if the economy Rp:1.250.000, then the fuzzy membership value for each of the 2 sets is:

low Fuzzy set $\mu_{low}[1.250.000]=0,0$

value 1.250.000 not included in the classification of permanent facilities and infrastructure, the results obtained are = 0

Medium set $\mu_{medium}[1.250.000]=1$

$$\pi(20,15,30,45) = S(1.250.000-750.000)/(1.000.000-750.000) \\ = 1$$

High set $\mu_{high}[1.250.000]=0,5$

$$\pi(20,15,30) = S(20;30) \\ = (1.250.000-1.000.000)/(1.500.000-1.000.000) \\ = 0,5$$

Table 4. Database Model Holds Economic Variables

No Identity	Name	Economy	Membership Degrees ([x])		
			low	medium	high
xx	xxxxxx	1.250.000	0	0	0,5

From the economic variable farming model table above, it can be concluded that the value of 1,250,000 is classified as a non-permanent parameter.

Rules

Rules are obtained from existing data. The more data you get, the more rules you will get. The more rules you get, the better the analysis you get. From the four fuzzy inputs, we will determine the rules to be set. Following are 81 rules that will be determined based on the value of four inputs, namely: facilities and infrastructure, economy, health, education, and one output in the form of community life level. Of the 81 existing rules, the fuzzy rule base will be displayed only 5 rules, namely the 27th rule, the 50th rule, the 54th rule, the 70th rule, and the 79th rule, while the others can be seen. in the attachment. The rule process can be seen as follows:

Rules to - 79

[R. 79] *IF* Facilities and infrastructure = Permanent *AND* Economy = High *AND* Kesehatan = able *AND* Pendidikan = Low *THEN* Life Level = Rich. From the above rules the operator used is *AND*, so that :

$$\alpha_{79} = \mu_{\text{prediket R 79}} = (\mu_{\text{Facilities and infrastructure [20]}} \wedge \mu_{\text{High economy [1.250.000]}} \wedge \mu_{\text{Health Able [21]}} \wedge \mu_{\text{low education [25]}})) = 0,1$$

From the results of the search for the input values above, the output is obtained 0,1 then the value 0,1 this if we enter the economic level curve will refer to the rich parameter.

CONCLUSION

The design of a decision support system using the fuzzy method can help managerial parties in making decisions, here through assessment in terms of facilities and infrastructure, economy, health, and education. By using the fuzzy method in the form of certain parameters. So that the input value will be obtained according to the parameters in the fuzzy. Then the inputted data will be stored in a fuzzy database called the Tahani database. From the Tahani database, data searches will be carried out with the SQL command so that people who deserve this assistance will be found.

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