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Decision Support System for SEJOLI Basic Food Recipients (Sedekah Joglo Peduli) Using Fuzzy Logic and Simple Weighting Methods (Case Study of Joglo Village, Surakarta City)

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ABSTRACT

Alms Joglo Peduli is the distribution of basic necessities managed in Jaoglo Village to underprivileged Joglo residents, the elderly who are experiencing the ailments of aging in the Joglo Village area. The background to this thesis research is based on the results of initial observations and interviews that the author conducted with employees of Joglo Village, Surakarta City, where they experienced problems in determining recipients of Sejoli aid. Lovebirds' assistance is still done manually so it is not efficient when determining aid recipients so that the target recipients of aid are less precise. So an innovative design is needed that utilizes technological advances, one of which is the design of a Decision Support System for website-based selection of Sejoli aid recipients combined with fuzzy methods and Simple Additive Weighting which can handle different decisions by considering the subject matter and the validity of the selected criteria. And there is a weighted sum using the Simple Additive Weighting method to find the performance assessment results for each option in all the evaluated attributes. The results of the research conducted by the author show that there is a strong level of relationship between the Decision Support System using the Fuzzy calculation method and Simple Additive Weighting. From the results of the data calculation scores, the highest recipients of Sejoli basic food assistance showed value**2,659.** Based on the results of the analysis and conclusions in the discussion chapter, the author makes the following suggestions: It is necessary to add input data on citizen criteria which have been automatically converted into fuzzy numbers, adding variables to produce more specific recommendations for citizens who are entitled to receive assistance.

KEYWORDS
Social Assistance
Fuzzy
Simple Additive Weighting
Decision Support Systems

1. Introduction

Alms Joglo Peduli is the distribution of Joglo Peduli (Sejoli) basic necessities managed in Joglo Village to the poor, underprivileged, elderly who experience chronic illness in the Joglo Village area. The alms are in the form of basic necessities, milk and bread which aim to share feelings and empathy and help reduce the burden of life and increase nutritional intake. This activity is carried out every Friday morning regularly for underprivileged residents in the Joglo

Village area. This assistance cannot be separated from the role of the donors and Bhayangkara, who fosters security and public order, who are at the forefront of providing this assistance.

In the current conditions in Joglo Sub-District, the selection of recipients of the Lovebirds assistance still uses manual data collection with various criteria which are requirements that will be used as an assessment, starting from health condition, amount of savings, number of family dependents, amount of income, type of building floor. Meanwhile, the time given by the Joglo Village admin is to collect data on residents who have the criteria to receive assistance or Alms Joglo Peduli once a week for citizen data.And the selection team is only given one week to decide which residents are entitled to receive the proposed assistance, so the selection process becomes less efficient with the selection being carried out manually, so it requires precision and quite a long time. Taking into account the previous explanation, an innovation design is needed that takes advantage of technological advances. One of them is the design of a Decision Support System for the selection of Couples Assistance Recipients to assist Joglo Village in providing assistance to the community efficiently and on target.

Decision Support Systemsis a flexible, interactive and adaptable computer-based Information System developed to support solutions to unstructured management problems. Decision Support Systems use data, provide an easy user interface and can incorporate decision-making thinking(Setiyawan, 2023).The SPK was developed to help the Joglo Subdistrict Government to select data on residents who will receive basic food assistance.

One of the methods used in Decision Support Systems uses fuzzy logic because it has the advantage that criteria weights can be adjusted to suit the purpose of making it possible to describe uncertain decisions, consider uncertainty and reduce the scale of uncertainty that is clear or firm in nature. The Decision Support System uses the fuzzy method and Simple Additive Weighting, the author uses this method because the method is suitable for assessment with several criteria, alternatives, and alternative values to produce an assessment calculation value(Christian Ervina Wijaya, 2024).

The author can conclude that in this research the website-based SPK application developed is a system that obtains results from tests carried out by comparing the results of manual calculations and by using a system that displays the same results. The results of the decision show that this method is more effective in determining recipients of Lovebirds assistance in accordance with appropriate criteria(Al-Had, 2023).

The aim of creating this Website-based Decision Support System is to be able to manage basic food aid for the poor so that it is distributed to people who deserve it, does not take a long time to distribute, and makes it easy for Village officials to determine the most appropriate and non-subjective recipients of aid. This application was built using the PHP (Hypertext Preprocessor) programming language, which is a programming language that can be run on a web server and combined with HTML, CSS, and JavaScript to create dynamic web pages.

2. Method

2.1. Observation Method

This observation was carried out by sub-district researchers by visiting each house of prospective residents receiving assistance. This observation is directed at accurate monitoring activities, recording emerging phenomena such as health conditions, the amount of income earned by each family member, the number of dependents obtained. In terms of observation, you will get data about a problem, so that you can understand the information obtained previously.

2.2. Literature Review

A literature review was conducted to gain an in-depth understanding of the theory, conceptual framework, and related research findings. Relevant literature includes studies of fuzzy logic methods and simple additive weighting. In the context of decision making. These sources provide the

theoretical basis for the analysis in this research. Apart from that, there is literature on decision making for recipients of basic food aid.

2.3. Systems Development Life Cycle

The Systems Development Life Cycle is a systematic approach to designing, developing, implementing and maintaining information systems ensuring that system development is carried out in a structured and efficient manner, minimizing risk and ensuring alignment with user needs. The following is a framework for detailing the steps for developing a decision support system for love food recipients as depicted in Figure 1.

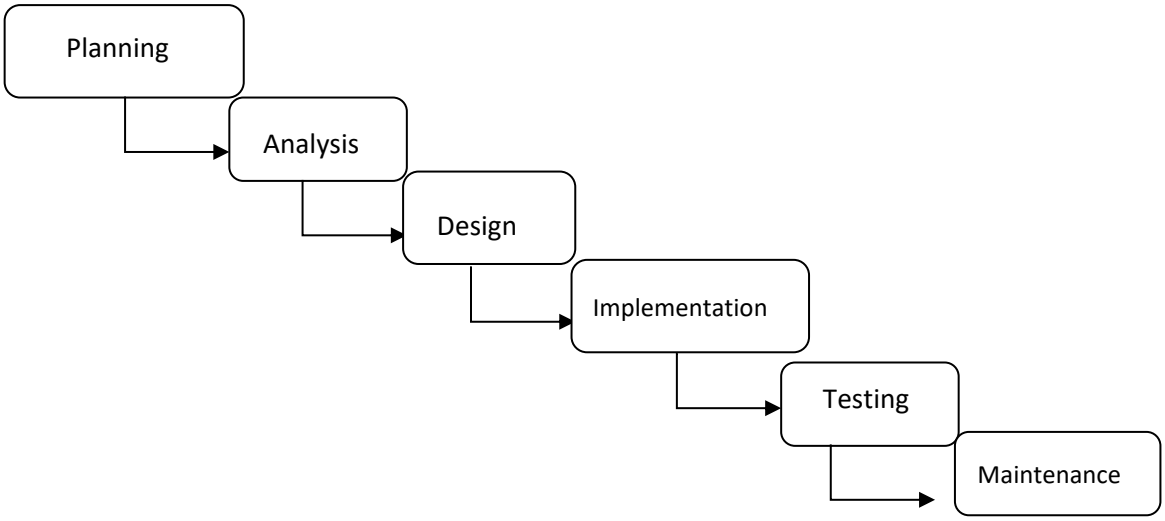

Figure 1. Systems Development Life Cycle

- **Planning Phase**
  - Determine the requirements/criteria for the decision support system for basic food aid recipients to select basic food recipients
  - Analyze obstacles that may arise during system development
- **Analysis Phase**
  - Determine relevant variables to determine eligibility for assistance
  - Developing a database structure to store and manage data on residents receiving basic food aid for lovebirds
- **Design Phase**
  - Design a user interface for data input and viewing of recipient results
  - Design how fuzzy logic and simple additive weighting methods will be integrated into the system.
- **Implementation Stage**
  - Translate designs into programming code using HTML, CSS and PHP as the main language
  - Programming the application of fuzzy and SAW methods into the system to determine the level of importance and ranking of aid recipients
- **Testing Phase**
  - Perform functional testing to ensure all system features work as required
  - Integration test between fuzzy and SAW methods to ensure consistency and accuracy of results.
- **Maintenance Phase**
  - Monitor system performance post-testing and respond to potential problems or necessary improvements

- Updating the system according to regulatory changes and updating identified bugs or issues

3. Results and Discussion

3.1. System Design

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3.1.1. Context Diagram

A context diagram is a diagram that shows the system as a process. The purpose of context diagrams is to provide a general view of a system as a process(Safitri, 2021). System design actions are made in a context diagram as depicted in Figure 2:

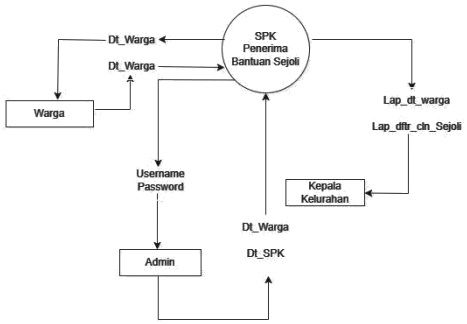

Figure 2. Use context diagrams

3.1.2. HIPO Diagram (Input Process Output Hierarchy)

HIPO (Input Process Output Hierarchy) is used as a tool for system development and program documentation techniques, the functions of the system are described by HIPO in three levels depicted in the form of separate diagrams, thus HIPO uses three types of diagrams for each level as depicted in figure 3:

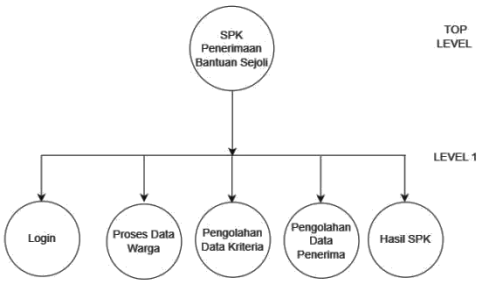

Figure 3. HIPO Diagram

3.1.3. Data Flow Diagram

Data Flow Diagram (DAD) is a diagram that uses notations to describe the flow of system data whose use is very helpful for understanding the system logically, structured and clear.DAD level 0 is an elaboration of the context diagram. System design actions are made in the data flow diagram as depicted in Figure 4:

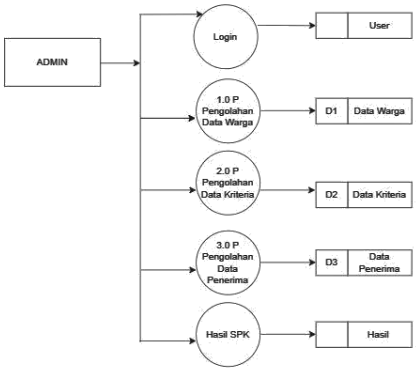

Figure 4. Data Flow Diagram

3.2. Application

3.2.1. Implementation of the Fuzzy Method

The calculation process using Fuzzy Logic begins with determining criteria where each criteria element has its own weight value in selecting recipients of Sejoli basic food assistance in Joglo Village, Surakarta City.

- **Data on Prospective Aid Recipients**

Table 1. Data on Prospective Food Recipients for Lovebirds

Alternative	Criteria				
	C1	*C2*	*C3*	*C4*	*C5*
Sartini	2	Healthy	150,000	Land	0
Parno	3	Mild pain	1,100,000	Ceramics	700,000
Haryanto	1	Special needs	0	Cement	0
Evita	1	Special needs	0	Cement	0
Maryatun	3	Severe pain	0	Ceramics	1,500,000
Tri aditomo	5	Mild pain	1,750,000	Ceramics	750,000
Maria Susanti	5	Mild pain	1,500,000	Ceramics	650,000
Ahmad Jayadi	3	Severe pain	250,000	Cement	100,000
Agus Purnomo	1	Severe pain	500,000	Ceramics	175,000
Siti Maryamah	3	Aging hurts	1,000,000	Ceramics	2,000,000
Rizal adeng	4	Aging hurts	1,500,000	Ceramics	1,000,000
Triyono Amrin Widodo	3	Special needs	0	Ceramics	0
Hesti Triwidarti	3	Mild pain	1,500,000	Granite	500,000
Retno is beautiful	2	Severe pain	250,000	Cement	0
Budi prayitno	4	Severe pain	750,000	Cement	250,000
Marnie	3	Mild pain	1,000,000	Cement	750,000
Ibn Ditiro	5	Healthy	2,100,000	Ceramics	1,500,000
Joko	4	Healthy	1,750,000	Ceramics	1,000,000
Rohinah	3	Mild pain	1,200,000	Cement	1,000,000
Pardi	3	Mild pain	1,100,000	Ceramics	2,000,000
Sri Fortune	2	Healthy	1,900,000	Granite	2,200,000
Sugeng Widodo	3	Healthy	1,000,000	Ceramics	750,000
Concerned	2	Healthy	750,000	Land	0
Wahyono	2	Mild pain	0	Land	0
Surtajo	2	Healthy	0	Cement	0
Suyani	3	Healthy	1,250,000	Ceramics	0

Alternative	Criteria				
	C1	*C2*	*C3*	*C4*	*C5*
Pariyem	2	Aging hurts	475,000	Cement	1,000,000
Suparni	2	Healthy	0	Ceramics	2,500,000
Mulyani	3	Healthy	1,900,000	Ceramics	500,000
Sudarsono	2	Aging hurts	1,000,000	ceramic	0

- **Criterion Data (Fuzzy variables)**

The criteria data contains the number of dependents, health condition, total income, type of building floor, amount of savings derived from income. Interview with the sub-district head, namely Mr. Margono, where the data is criteria obtained from the provisions of the sub-district, which are used to determine recipients of Sejoli assistance using calculations*fuzzy*.The SAW process requires criteria that will be taken into consideration in the ranking process. The criteria that can be taken into consideration can be dillSee table 2 below:

Table 2. Criteria for Determining Recipients of Assistance for Lovebirds

Code	Criterion Name	Status	Weight
C1	The number of dependents	*Benefits*	0.6
C2	Health condition	*Cost*	1
C3	Total Income	*Cost*	0.8
C4	Building Floor Types	*Cost*	0.2
C5	Amount of Savings Deposits	*Cost*	0.4

From the criteria above, one level of importance of criteria is created based on the weight values that have been determined in table 3

Table 3. Fuzzy Weight Value

No	Information	Mark
1	Very good	1
2	Good	0.8
3	Enough	0.6
4	Not enough	0.4
5	Very less	0.2

- **Fuzzy Set Data**

Fuzzy set data contains condition data or values of fuzzy variables, consisting of 3, namely fuzzy sets, interests and fuzzy sets compatibility. The fuzzy set of interests is the value/condition for assessing criteria in determining the recipient of Sejoli assistance for each alternative with the criteria presented by the variables.

a. The number of dependents
   This criterion is a benchmark for being classified as a community that is entitled to assistance from lovebirds

Table 4. The Number of Dependents

The number of dependents	Fuzzy numbers	Mark
1	Very good	1
2	Good	0.8
3	Enough	0.6
4	Not enough	0.4
> 5	Very less	0.2

b. Health condition

A state of health both physically, mentally, spiritually and socially which allows everyone to live a productive life socially and economically. To determine the criteria for health conditions, they are having a health condition which means having poor health or being seriously ill which can be categorized as healthy, mild illness including mild asthma attacks, aging illness, being categorized as elderly who are experiencing serious illness and serious illness which can be categorized as meningitis, stroke, heart attack, etc. lung infections, cancer. The following is a breakdown of health conditions:

Table 5. Health Condition

Health condition	Fuzzy numbers	Mark
Healthy	Very good	1
Mild pain	Good	0.8
Aging hurts	Enough	0.6
Severe pain	Not enough	0.4
Special needs	Very less	0.2

c. Total income

The resulting income or income is the amount of money received by the company or from the sale of products/services for each family member. The criteria for the amount of income obtained were the results of an interview with Mr. Margono with the criteria value being the average amount of income divided by 100,000 to determine the recipient of the Lovebirds' assistance.

d. Building Floor Types

The type of building floor for family members is a criterion in determining the recipient of assistance for lovebirds. Because if the floor type of the building is still dirt, this includes poor people. The following is the composition of building floor types for family members in Joglo sub-district.

Table 6. Building Floor Types

Building Floor Types	Fuzzy numbers	Mark
Marble	Very good	1
Granite	Good	0.8
Ceramics	Enough	0.6
Cement	Not enough	0.4
Land	Very less	0.2

e. Amount of Savings Deposits

Underprivileged residents can be seen from the assets they own, so residents who are classified as truly underprivileged if they do not have savings. The following is the distribution of the amount of savings deposits

Table 7. Amount of Savings Deposits

Amount of Savings Deposits	Fuzzy numbers	Mark
1,500,000-5,000,000	Very good	15
350,000-2,000,000	Good	3.5
175,000-500,000	Enough	1.17
80,000-250,000	Not enough	0.8
0-100,000	Very less	1

- **Data processing**

In data processing, we will explain the process stages that occur in searching for data using fuzzy logic. To get optimal results in determining the recipients of assistance for lovebirds using the

fuzzy method through certain stages. There are several stages, namely problem representation, evaluation of fuzzy sets and selection of optimal alternatives. The following are the completion steps for determining input values using the fuzzy method (Fikri, Helmiah & Putri 2022).

a) Suitability rating

In table 4.13 is the suitability rating data for each alternative against the criteria, data taken from Joglo Village residents who entered input into the application. This calculation process begins by creating a suitability rating for aid recipients and giving a value according to the weight using fuzzification.

Table 8. Suitability Rating of Each Alternative

No	Alternative	C1	C2	C3	C4	C5
1	Sartini	0.8	1	0.8	0.2	1
2	Parno	0.6	0.8	3.5	0.6	3.5
3	Haryanto	1	0.2	1	0.4	1
4	Evita	0.8	0.2	1	0.4	1
5	Maryatun	0.6	0.4	1	0.6	3.5
6	Tri aditomo	0.4	0.8	15	0.6	3.5
7	Maria Susanti	0.2	0.8	15	0.6	3.5
8	Ahmad Jayadi	0.6	0.4	0.8	0.4	1
9	Agus Purnomo	0.8	0.4	0.8	0.6	1.75
10	Siti Maryamah	0.6	0.6	3.5	0.6	3.5
11	Rizal adeng	0.4	1	15	0.6	3.5
12	Triyono Amrin Widodo	0.6	0.2	1	0.6	1
13	Hesti Triwidarti	0.6	0.8	`15	0.8	1.75
14	Retno is beautiful	0.8	0.4	0.8	0.4	1
15	Budi prayitno	0.4	1	3.5	0.4	0.8
16	Marnie	0.6	0.6	3.5	0.4	3.5
17	Ibn Ditiro	0.2	1	15	0.6	3.5
18	Joko	0.4	1	15	0.6	3.5
19	Rohinah	0.6	0.8	0.8	0.4	3.5
20	Pardi	0.6	0.8	3.5	0.6	15
21	Sri Fortune	0.8	1	15	0.8	15
22	Sugeng Widodo	0.6	1	3.5	0.6	3.5
23	Concerned	0.8	0.8	3.5	0.2	1
24	Wahyono	0.4	1	1	0.2	1
25	Surtajo	0.8	1	1	0.4	1
26	Suyani	0.2	1	3.5	0.6	1
27	Pariyem	1	1	1.75	0.4	3.5
28	Suparni	0.8	0.6	1	0.6	15
29	Mulyani	0.6	1	3.5	0.6	1.75
30	Sudarsono	0.4	1	3.5	0.6	1

b) Matrix values

The next step is to create a decision matrix x. This matrix is created from the suitability rating table (table 8) as follows:

$$\begin{vmatrix} 0.8 & 1 & 0.8 & 0.2 & 1 \\ 0.6 & 0.8 & 3.5 & 0.6 & 3.5 \\ 1 & 0.2 & 1 & 0.4 & 1 \\ 0.8 & 0.2 & 1 & 0.4 & 1 \\ 0.6 & 0.4 & 1 & 0.6 & 3.5 \\ 0.4 & 0.8 & 15 & 0.6 & 3.5 \\ 0.2 & 0.8 & 15 & 0.6 & 3.5 \\ 0.6 & 0.4 & 0.8 & 0.4 & 1 \\ 0.8 & 0.4 & 0.8 & 0.6 & 1.75 \end{vmatrix}$$

$$X=\begin{vmatrix}
0.6 & 0.6 & 3.5 & 0.6 & 3.5\\
0.4 & 1 & 15 & 0.6 & 3.5\\
0.6 & 0.2 & 1 & 0.6 & 1\\
0.6 & 0.8 & `15 & 0.8 & 1.75\\
0.8 & 0.4 & 0.8 & 0.4 & 1\\
0.4 & 0.1 & 3.5 & 0.4 & 0.8\\
0.6 & 0.6 & 3.5 & 0.4 & 3.5\\
0.2 & 1 & 15 & 0.6 & 3.5\\
0.4 & 1 & 15 & 0.6 & 3.5\\
0.6 & 0.8 & 0.8 & 0.4 & 3.5\\
0.6 & 0.8 & 3.5 & 0.6 & 15\\
0.8 & 1 & 15 & 0.8 & 15\\
0.6 & 1 & 3.5 & 0.6 & 3.5\\
0.8 & 0.8 & 3.5 & 0.2 & 1\\
0.4 & 1 & 1 & 0.2 & 1\\
0.8 & 1 & 1 & 0.4 & 1\\
0.2 & 1 & 3.5 & 0.6 & 1\\
1 & 1 & 1.75 & 0.4 & 3.5\\
0.8 & 0.6 & 1 & 0.6 & 15\\
0.6 & 1 & 3.5 & 0.6 & 1.75\\
0.4 & 1 & 3.5 & 0.6 & 1
\end{vmatrix}$$

- **Normalization Calculations**
  At this stage, normalization must be carried out, initially from matrix x to a matrix r, r is the symbol of the variable of a matrix, the value of a matrix r consists of a collection of normalized values symbolized in the variable r. The r value is obtained from formula (1). The process of normalizing matrix x to r is as follows:

a) From the normalization calculations C1-C5 will produce a normalized matrix r as follows:

$$R=\begin{vmatrix}
0.8 & 0.2 & 1 & 1 & 0.8\\
0.6 & 0.25 & 0.228 & 0.33 & 0.228\\
1 & 1 & 0.8 & 0.5 & 0.8\\
0.8 & 1 & 0.8 & 0.5 & 0.8\\
0.6 & 0.5 & 0.8 & 0.33 & 0.228\\
0.4 & 0.25 & 0.053 & 0.33 & 0.228\\
0.2 & 0.25 & 0.053 & 0.33 & 0.228\\
0.6 & 0.5 & 1 & 0.5 & 0.8\\
0.8 & 0.5 & 1 & 0.33 & 0.457\\
0.6 & 0.33 & 0.228 & 0.33 & 0.228\\
0.4 & 0.2 & 0.053 & 0.33 & 0.228\\
0.6 & 1 & 0.8 & 0.33 & 0.8\\
0.6 & 0.25 & 0.053 & 0.25 & 0.457\\
0.8 & 0.5 & 1 & 0.5 & 0.8\\
0.4 & 0.2 & 0.228 & 0.5 & 1\\
0.6 & 0.33 & 0.228 & 0.5 & 0.228\\
0.2 & 0.2 & 0.053 & 0.33 & 0.228\\
0.4 & 0.2 & 0.053 & 0.33 & 0.228\\
0.6 & 0.25 & 1 & 0.5 & 0.228\\
0.6 & 0.25 & 0.228 & 0.33 & 0.053\\
0.8 & 0.2 & 0.053 & 0.25 & 0.053\\
0.6 & 0.2 & 0.228 & 0.33 & 0.228\\
0.8 & 0.2 & 0.228 & 1 & 0.8\\
0.4 & 0.25 & 0.8 & 1 & 0.8\\
0.8 & 0.2 & 0.8 & 0.5 & 0.8
\end{vmatrix}$$

0.2	0.2	0.228	0.33	0.8
1	0.2	0.457	0.5	0.228
0.8	0.33	0.8	0.33	0.053
0.6	0.2	0.228	0.33	0.457
0.4	0.2	0.228	0.33	0.8

1) **Alternative Calculations**

Calculation of the best alternative with weight values for each citizen's data as a potential aid recipient on the R matrix using the final stage in receiving Sejoli aid is each ranking. Using formulas$\boldsymbol{vi} = \sum_{j=i}^{n} \boldsymbol{wj\ rij}$) ……. (**3**)

From the above calculations, the ranking results are obtained as in table 19 below:

Table 9. Results of Assessment of Candidates for Receiving Assistance

Alternative	C1	C2	C3	C4	C5	VI
Sartini	0.8	1	0.8	0.2	1	**1,999**
Parno	0.6	0.8	3.5	0.6	3.5	**0.950**
Haryanto	1	0.2	1	0.4	1	**2,659**
Evita	0.8	0.2	1	0.4	1	**2,539**
Maryatun	0.6	0.4	1	0.6	3.5	**1,658**
Tri aditomo	0.4	0.8	15	0.6	3.5	**0.690**
Maria Susanti	0.2	0.8	15	0.6	3.5	**0.570**
Ahmad Jayadi	0.6	0.4	0.8	0.4	1	**2,079**
Agus Purnomo	0.8	0.4	0.8	0.6	1.75	**2,029**
Siti Maryamah	0.6	0.6	3.5	0.6	3.5	**1,034**
Rizal adeng	0.4	1	15	0.6	3.5	**0.640**
Triyono Amrin Widodo	0.6	0.2	1	0.6	1	**2,386**
Hesti Triwidarti	0.6	0.8	`15	0.8	1.75	**0.885**
Retno is beautiful	0.8	0.4	0.8	0.4	1	**2,199**
Budi prayitno	0.4	0.1	3.5	0.4	0.8	**1,122**
Marnie	0.6	0.6	3.5	0.4	3.5	**1,067**
Ibn Ditiro	0.2	1	15	0.6	3.5	**0.520**
Joko	0.4	1	15	0.6	3.5	**0.640**
Rohinah	0.6	0.8	0.8	0.4	3.5	**1,601**
Pardi	0.6	0.8	3.5	0.6	15	**0.880**
Sri Fortune	0.8	1	15	0.8	15	**0.794**
Sugeng Widodo	0.6	1	3.5	0.6	3.5	**0.900**
Concerned	0.8	0.8	3.5	0.2	1	**1,432**
Wahyono	0.4	1	1	0.2	1	**1,600**
Surtajo	0.8	1	1	0.4	1	**1,740**
Suyani	0.2	1	3.5	0.6	1	**0.889**
Pariyem	1	1	1.75	0.4	3.5	**1,357**
Suparni	0.8	0.6	1	0.6	15	**1,541**
Mulyani	0.6	1	3.5	0.6	1.75	**0.992**
Sudarsono	0.4	1	3.5	0.6	1	**1,009**

3.2.2. Ranking Results

From the above calculations, the ranking results are obtained after sorting them from highest to lowest as in table 10 below which is the most feasible alternative for getting assistance from Joglo Village Lovebirds.

Table 10. Ranking Data Results

No	Alternative	C1	C2	C3	C4	C5	VI	Rank
1	Haryanto	1	0.2	1	0.4	1	**2,659**	**1**
2	Evita	0.8	0.2	1	0.4	1	**2,539**	**2**
3	Triyono Amrin Widodo	0.6	0.2	1	0.6	1	**2,386**	**3**
4	Retno is beautiful	0.8	0.4	0.8	0.4	1	**2,199**	**4**
5	Ahmad Jayadi	0.6	0.4	0.8	0.4	1	**2,079**	**5**
6	Agus Purnomo	0.8	0.4	0.8	0.6	1.75	**2,029**	**6**
7	Sartini	0.8	1	0.8	0.2	1	**1,999**	**7**
8	Surtajo	0.8	1	1	0.4	1	**1,740**	**8**
9	Maryatun	0.6	0.4	1	0.6	3.5	**1,658**	**9**
10	Rohinah	0.6	0.8	0.8	0.4	3.5	**1,601**	**10**
11	Wahyono	0.4	1	1	0.2	1	**1,600**	**11**
12	Suparni	0.8	0.6	1	0.6	15	**1,541**	**12**
13	Concerned	0.8	0.8	3.5	0.2	1	**1,432**	**13**
14	Pariyem	1	1	1.75	0.4	3.5	**1,357**	**14**
15	Budi prayitno	0.4	0.1	3.5	0.4	0.8	**1,122**	**15**
16	Marnie	0.6	0.6	3.5	0.4	3.5	**1,067**	**16**
17	Siti Maryamah	0.6	0.6	3.5	0.6	3.5	**1,034**	**17**
18	Sudarsono	0.4	1	3.5	0.6	1	**1,009**	**18**
19	Mulyani	0.6	1	3.5	0.6	1.75	**0.992**	**19**
20	Parno	0.6	0.8	3.5	0.6	3.5	**0.950**	**20**

3.3. Website Appearance

The appearance of this research website explains the integration and management of images from the website created. This is important to ensure an attractive and optimal visual appearance for users.

- **Login Page Display**

Design a page that displays the main page of the website by entering the username and password to log in to the website. Shown in the following picture:

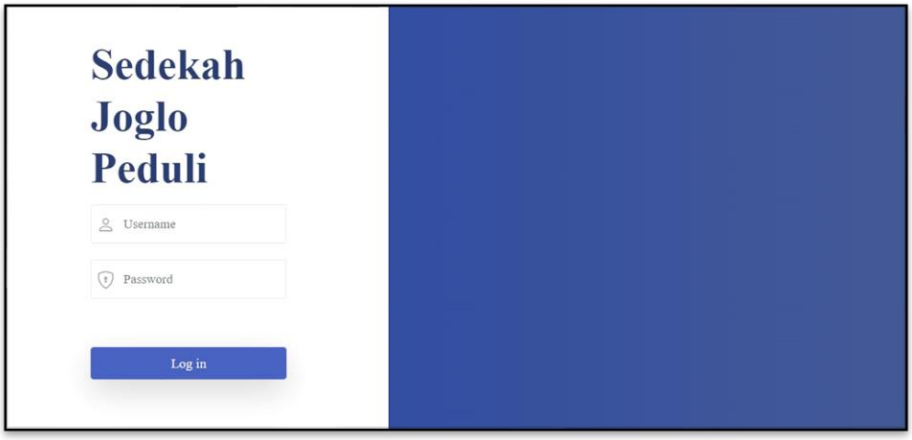

Figure 5. Login Page

- **Home Page View**

Page on the decision support system website displaying a dashboard. Shown in the following picture:

Figure 6. Home Page

- **Alternative Data Views**

The designed data page will display an alternative data table to which alternative data can be added. Shown in the following image:

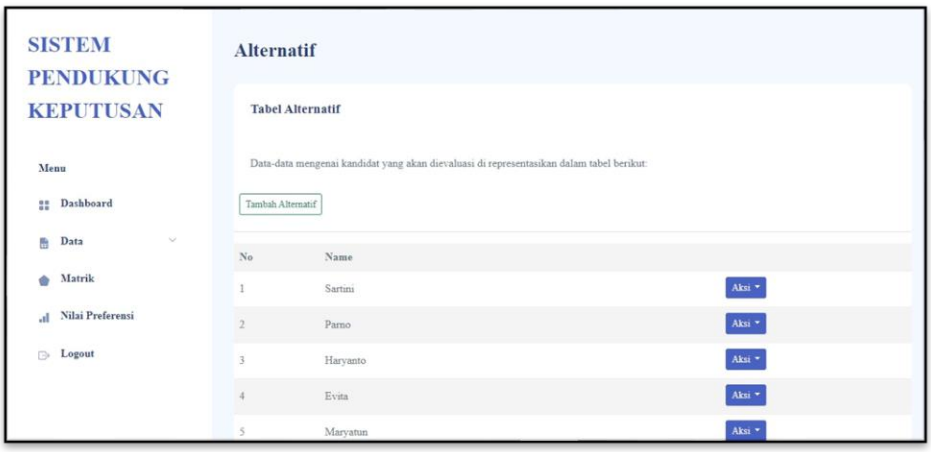

Figure 7. Alternative Pages

- **Alternative Value Table Page**

Data page designed to add and display alternative tables. Shown in the following picture:

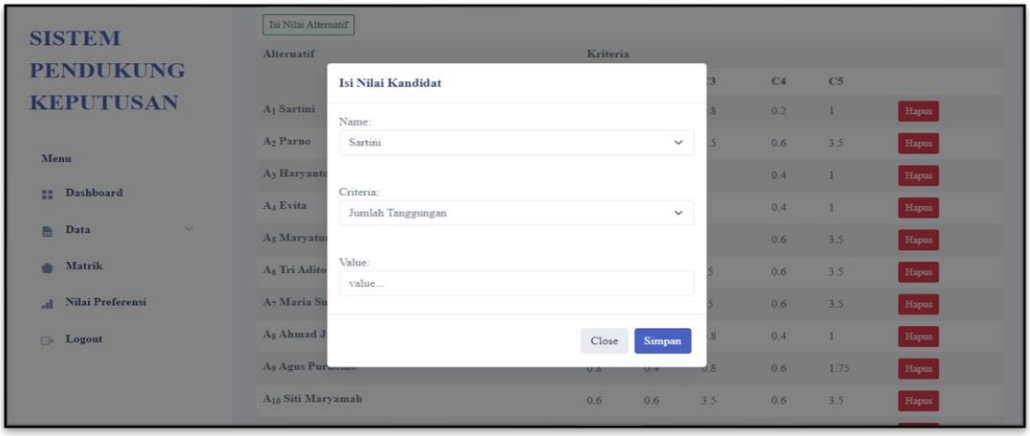

Figure 8. Alternative Value

- **Weights & Criteria Page**

A page designed to display the contents of weights & criteria. Shown in the following picture:

Figure 9. Weights & Criteria Page

- **Preference Values Page**

Page that displays the final decision results from the final score ranking. Shown in the following picture:

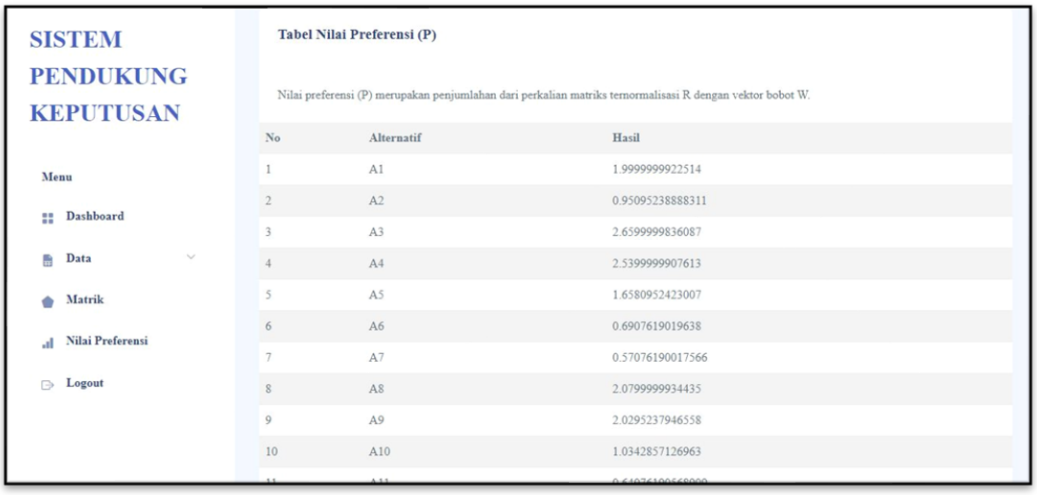

Figure 10. Preference Value

3.4. Functionality testing

With black box testing, it is hoped that there will be errors or deficiencies in the application.

a) Testing the Login Form

Table 11. Login Page Testing

No	Testing	Test cases	Expected results	Results
1	Empty all login data fields, then immediately click the 'Login' button	User code: empty Password: empty	The system will deny login access and will display the login page	Valid

2	Just fill in the username data and empty the password data, then click 'Login'	User code: admin Password: empty	The system will deny login access and will display the login page	Valid
3	Enter the correct login data, then click the 'Login' button	User code: admin Password: admin	The system receives login access and then goes directly to the dashboard page	Valid

b) Testing on Input Data

Table 12. Tests on Input Data

No	Testing	Test cases	Expected results	Results
1	Enter data on the names of potential aid recipients by entering them twice, then click 'submit'	Enter data with the same name	The system will display data with the same alternative name	Valid
2	Enter the names of potential aid recipients correctly, click 'submit'	Input alternative name	The system will display a list of alternative names in order	Valid

c) Testing on Alternative Values

Table 13. Tests on Alternative Values

No	Testing	Test cases	Expected results	Results
1	Input alternative value data with the same criteria and the same values, then click 'save'	Criteria: number of dependents Value : 1 With two inputs	The system will display error data on the website	Valid
2	Enter alternative value data and criteria correctly, click 'save'	Criteria: number of dependents Value : 1 One time input	The system will display a list of alternative values and criteria correctly	Valid

d) Testing on Value Results

Table 14. Tests on Value Results

No	Testing	Test cases	Expected results	Results
1	Fill in an alternative name Fill in the weight values and criteria	Alternative name: Sartini Weight: 3, number of dependents: 1 Health condition: 3 Total income: 3 floors of	The system will display alternative names and preference	Valid

	values	building < 8 meters: 0 Do not have max savings of 500,000 : 3	value results	
2	Empty alternative names, weight values and criteria	(blank)	The system will display an empty list of preference values	Valid

4. Conclusion

Based on the analysis, design and implementation of a fuzzy system for recommendations for determining recipients of assistance for lovebirds, several conclusions can be formulated, namely that this system is able to help users, namely residents who are entitled to receive basic food assistance, in making decisions to choose alternative residents. Residents who are categorized as underprivileged residents have the right to receive assistance from several available alternative options even though these alternatives have uncertain data. To ensure that there is no wrong target in distributing aid to lovebirds, the conclusions are limited to the index value.

Despite the significant findings of this research, there are several limitations that need to be considered, one of the main limitations is that in this system there are still no fuzzy numbers to input citizen criteria data into a unified system. So it is necessary to add citizen criteria data input which has been automatically converted into fuzzy numbers and this application would be better if there was an additional Excel calculation import feature in the Sejoli assistance decision support system.

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