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DECISION SUPPORT SYSTEM IN CHOOSING THE BEST HONDA MOTORCYLE DEALER IN RIAU BY USING WEIGHTED PRODUCT METHOD(WP)

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Abstract

A decision support system is used to find out the best dealer A decision support system is used to find out the best dealer in Riau with the WP (Weighted Product) method and a system is made to run it. In this system, the user will assign a weight value to each criterion and alternative.The data will be collected using interview and observation techniques. The analysis technique that will be used is to collect data, analyze data and draw conclusions from the results of research that has been carried out related to this research.The result of this research is a web-based system where the user can see the ranking based on the criteria and alternative values that the user inputs.

BACKGROUND

The decision in choosing the best Honda motorcycle dealer is not an easy one, in fact there are many things must be considered in choosing the best dealer. The method that will be used for selecting the best dealer is to use the Weighted Product (WP) method because WP is a form of decision-making method that is suitable for use because it can determine the weight value for each attribute and is easier to understand and simpler. There are 4 criteria such as Sales, Service, Customer Satisfaction and Service which is provided and 60 Alternatives in terms of the alternative.

Decision Support System

A decision support system or Decision Support System (DSS) is a system that is used for the process of making a decision that can help the task of the decision maker. (Sibyan;2020).

The existence of DSS in a company or organization is not to replace the tasks of decision makers, but is a tool that helps them in making decisions. By using data that is processed into information to make decisions on semi-structured problems.

In the implementation of DSS, the results of the decisions of the system are not the benchmark, decision making remains with the decision maker. The system only produces output that calculates the data as considered by a decision maker. So that the work of decision makers in considering decisions can be facilitated (Taqwa and Mukhlasin; 2020).

Weight Product (WP)

The Weighted Product (WP) method is a method of Multiple Attribute Decision Making (MADM). MADM is a method used to find the optimal alternative from a number of alternatives with certain criteria. The essence of MADM is to determine the weight value for each attribute, then proceed with a ranking process that will select the alternatives that have been given (Marpaung; 2018).

Processing data using the Weighted Product method. The first step is to determine the alternative that becomes the decision choice, so that the purpose of the decision support system in determining the best dealer can be achieved properly. Then determine the criteria and assign a value weight to each set of criteria which will later be calculated which then produces a final value for the value of the profit weight on each criterion. Next, calculate the value of the S vector obtained from each so that it produces a preference value as the final value to find the highest value that is the result of the alternative choices.

RESEARCH METHODS

Data collection technique

The technique used in data collection is the interview method by conducting face-to-face questions and answers in order to obtain the necessary data. Collecting data and information by reading reference books, journals and internet sites that can be used as a reference for discussions related to this research.

Data analysis technique

The analysis technique that will be used is to collect data, analyze data and draw conclusions from the results of research that has been carried out related to this research.

Data analysis starts from looking for criteria values, looking for alternative values, calculating criteria weights, determining the value of the S vector, determining preference values and compiling rankings.

Following are the steps to perform data analysis:

1. Data that has been collected from secondary data in the form of criteria data and alternative data.
2. Classify data and group into tables
3. Processing the data using the help of the program to analyze the data that has been obtained.

RESEARCH RESULT

1. Trial and System Discussion

1.1. Use Case Diagram

In Figure 1 the Use Case Diagram explains that the user actor logs in first, then after that the user can input the criteria and alternative values. If it has been inputted then the user can calculate the results. So that the user can find out the results of the ranking that has been calculated.

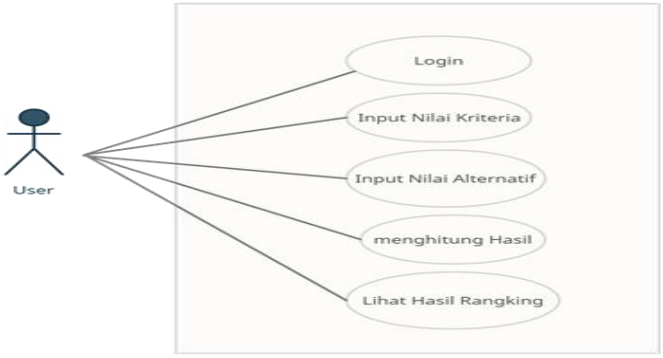


Figure 1. Use Case Diagram

1.2. Activity Diagram

Figure 2 describes the activity of the system, namely the first user must login, if the login is not valid, it will be returned to the login page. If the login is valid then the user will be taken to the main menu page where the user can select the data input menu to input data after that the user can see the results of calculations by doing activities to calculate the results.

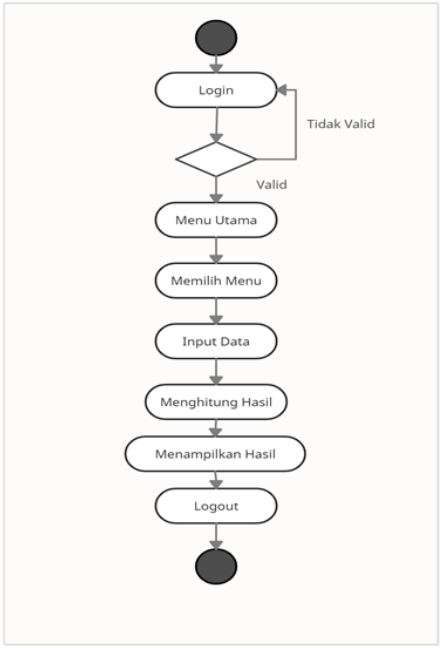


Figure 2. Activity Diagram

1.3. *Class* Diagram

Figure 3 explains that there are several classes. The attributes of each class that are used to identify its type and content of the system that has been designed.

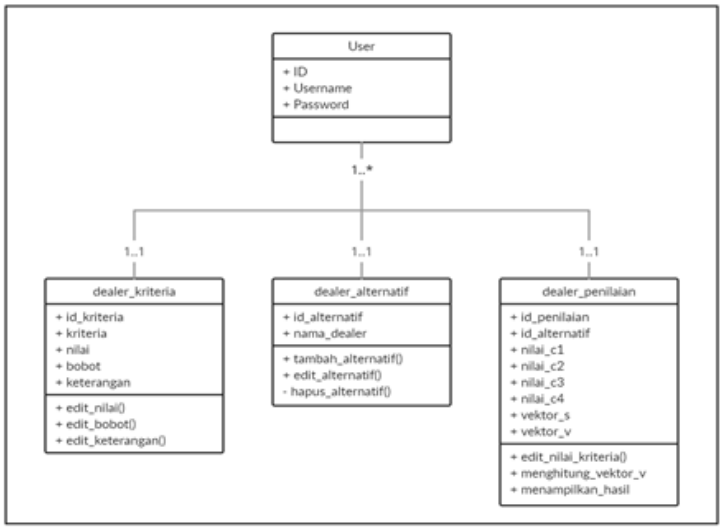


Figure 3. Class Diagram

Application of the Weighted Product Method in the System

The steps for calculating the weighted product in this system are as follows:

1. The first step is to determine the criteria used as a reference in decision making is Ci.

Table 1. Deterime the criteria

Kode Kriteria	Kriteria
C1	PENJUALAN
C2	PELAYANAN
C3	KEPUASAN PELANGGAN
C4	SERVIS YANG DISEDIAKAN

2. Determine the suitability rating, namely the suitability rating of each alternative on each criterion.

Table 2. Criteria Score and Weight

Kode Kriteria	Nilai	Bobot	Cost/Benefit
C1	90	5	Benefit
C2	85	5	Benefit
C3	75	4	Benefit
C4	70	4	Benefit

Table 3. The classification of the Score

NILAI	BOBOT	KETERANGAN
80 - 100	5	SANGAT BAIK
60 - 79	4	BAIK
40 - 59	3	CUKUP
20 - 39	2	BURUK
0 - 19	1	BURUK SEKALI

3. Normalize the weight of each criterion by comparing the value of the weight of the criteria with the total weight of the criteria at 60 Honda motorcycle dealers.

Table 4. Sample Weights for Assessment

Kode Alternatif	ALTERNATIF	KRITERIA			
		C1	C2	C3	C4
A1	PT. CDN - SO Arengka	88	90	89	85
A2	PT. CDN - SO Sudirman	91	83	88	92
A3	PT. CDN - SO Tambusai	77	70	82	85
A4	PT. CDN - SO Soekarno - Hatta	88	90	87	88
A5	PT. HOHO - Riau	88	90	88	91
A6	PT. Mitra Pinasthika Mustika	86	80	79	87
A7	PT. KPM - Pekanbaru	75	78	82	88
A8	PT. CDN - SO Kampar	69	72	85	82
A9	PT. Astra Motor - HSO	90	95	88	91
A10	PT. HOHO - Marpoyan	88	90	91	85

4. Calculating the value of the vector S
   To perform the calculation of each criterion to get the value of the vector S, that is by multiplying each criterion by the weight of the criteria.

Perhitungan C1 :

A1 = 88 / 0,278 = 24,4444
A2 = 91 / 0,278 = 25,2778
A3 = 77 / 0,278 = 21,3889

Perhitungan C2 :

A1 = 90 / 0,278 = 25,0000
A2 = 83 / 0,278 = 23,0556
A3 = 70 / 0,278 = 19,4444

Perhitungan C3 :

A1 = 89 / 0,222 = 19,7778
A2 = 88 / 0,222 = 19,5556
A3 = 82 / 0,222 = 18,2222

Perhitungan C4 :

A1 = 85 / 0,222 = 18,8889
A2 = 92 / 0,222 = 20,4444
A3 = 85 / 0,222 = 18,8889

5. Determine the value of the Vector V

Table 5. The sample in Determining the value of the Vector V

Kode Alternatif	Nilai Vektor S	Nilai Vektor V
A1	88,1111	0,0178
A2	88,3333	0,0179
A3	77,9444	0,0158
A4	88,3333	0,0179
A5	89,2222	0,0181
A6	83,0000	0,0168
A7	80,2778	0,0162
A8	76,2778	0,0154
A9	91,1667	0,0185
A10	88,5556	0,0179

6. Ranking results obtained from Vi

Table 6. Sample in Ranking Result

ID Alternatif	ALTERNATIF	Nilai	Ranking
A17	PT. CDN - SO Flamboyan	0,0186	1
A13	PT. CDN - SO Suram	0,0185	2
A9	PT. Astra Motor - HSO	0,0185	3
A57	PT. CDN - SO Tembilahan	0,0183	4
A44	PT. CDN - SO Bagan Batu	0,0182	5
A36	PT. Global Jaya Perkasa II	0,0181	6
A19	PT. CDN - SO Ujung Batu	0,0181	7
A52	PT. CDN - SO Air Molek	0,0181	8
A10	PT. HOHO - Marpoyan	0,0181	9
A2	PT. CDN - SO Sudirman	0,0179	10

Implementation

1. Form Login

The login form is the initial page before entering the system. In this form the user must fill in the username and password in order to enter the system.

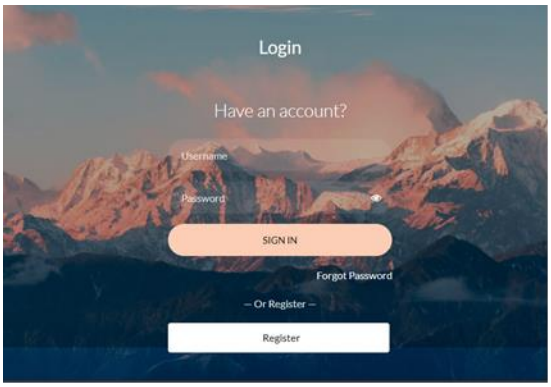


Figure 4. Form Login Display

2. Menu Criteria
   The criteria menu is a page that contains criteria data. In this menu the user can change the value and weight of the criteria data.

No	ID kriteria	Kriteria	Nilai	Bobot	Cost / Benefit	Action
1	C1	Penjualan	90	5	benefit	Edit
2	C2	Pelayanan	85	5	benefit	Edit
3	C3	Kepuasan Pelanggan	75	4	benefit	Edit
4	C4	Servis yang Disediakan	70	4	benefit	Edit

Figure 5. Menu Criteria Display

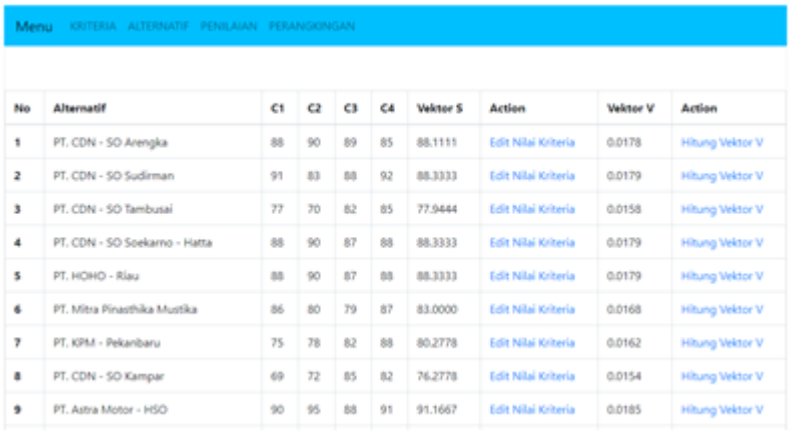
3. Menu Alternatif
   Alternative menu is a page that contains alternative data. In this menu the user can add, delete and change alternative data.

+ Tambah Alternatif

No	ID Alternatif	Nama Dealer	Action
1	A1	PT. CDN - SO Arengka	Hapus|Edit
2	A2	PT. CDN - SO Sudirman	Hapus|Edit
3	A24	PT. HOHO – Pangkalan Kerinci	Hapus|Edit
4	A23	UD Amsar Motor	Hapus|Edit
5	A22	UD Putra Sakti Jaya	Hapus|Edit
6	A21	CV. Karisma Jaya	Hapus|Edit
7	A20	UD Prima Motor	Hapus|Edit
8	A19	PT. CDN - SO Ujung Batu	Hapus|Edit
9	A18	PT. CDN - SO Selat Panjang	Hapus|Edit

Figure 6. Menu Alternative Display

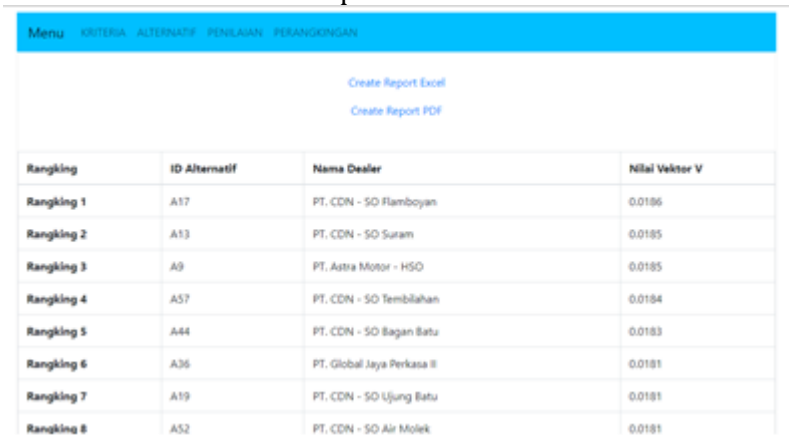
4. Assessment Menu
   The assessment menu is a page that contains the criteria values of each alternative and in this menu the user can change the value of each criterion and calculate the V vector to get the results.



No	Alternatif	C1	C2	C3	C4	Vektor S	Action	Vektor V	Action
1	PT. CDN - SO Arengka	88	90	89	85	88.1111	Edit Nilai Kriteria	0.0178	Hitung Vektor V
2	PT. CDN - SO Sudirman	91	83	88	92	88.3333	Edit Nilai Kriteria	0.0179	Hitung Vektor V
3	PT. CDN - SO Tambusai	77	70	82	85	77.9444	Edit Nilai Kriteria	0.0158	Hitung Vektor V
4	PT. CDN - SO Soekarno - Hatta	88	90	87	88	88.3333	Edit Nilai Kriteria	0.0179	Hitung Vektor V
5	PT. HOHO - Riau	88	90	87	88	88.3333	Edit Nilai Kriteria	0.0179	Hitung Vektor V
6	PT. Mitra Pinasthika Mustika	86	80	79	87	83.0000	Edit Nilai Kriteria	0.0168	Hitung Vektor V
7	PT. KPM - Pekanbaru	75	78	82	88	80.2778	Edit Nilai Kriteria	0.0162	Hitung Vektor V
8	PT. CDN - SO Kampar	69	72	85	82	76.2778	Edit Nilai Kriteria	0.0154	Hitung Vektor V
9	PT. Astra Motor - HSO	90	95	88	91	91.1667	Edit Nilai Kriteria	0.0185	Hitung Vektor V

Figure 7. Assessment Menu Display

5. Ranking Menu
   Ranking menu is a page that displays the ranking results of each alternative and on this page the user can export the results in excel and pdf form.



Rangking	ID Alternatif	Nama Dealer	Nilai Vektor V
Rangking 1	A17	PT. CDN - SO Flamboyan	0.0186
Rangking 2	A13	PT. CDN - SO Suram	0.0185
Rangking 3	A9	PT. Astra Motor - HSO	0.0185
Rangking 4	A57	PT. CDN - SO Tembilahan	0.0184
Rangking 5	A44	PT. CDN - SO Bagan Batu	0.0183
Rangking 6	A36	PT. Global Jaya Perkasa II	0.0181
Rangking 7	A19	PT. CDN - SO Ujung Batu	0.0181
Rangking 8	A52	PT. CDN - SO Air Molek	0.0181

Figure 8. Ranking Menu Display

CLOSING

Conclusion

Based on the research and discussion conducted, it can be concluded several things as follows:

1. A decision support system program has been made that can be used to manage and display the results that have been inputted.
2. The system that has been created can minimize errors in the old or manual system such as in ranking.
3. Simplify and expedite the process of value recapitulation in the decision support system.

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