

Decision Support System to Determine the Best Menu with Comparison of Methods the Simple Additive Weighting (SAW) and Weighted Product (WP)

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Abstract: Akul Cafe, is a business field in serving food and drinks to the community. Current technological developments are sophisticated. From some of the existing literature with the SAW method, it can determine the best menu according to the customer's wishes accurately. Decision Support System is a system that can help in making decisions that are made accurately and in accordance with the desired goals. Desktop-based Decision Support System with several criteria, namely Taste, Aroma, Appearance and Selling Price. By using a comparison of Simple Additive Weighting (SAW) method by finding the weight of the highest rating and Weighted Product (WP) by using multiplication raised with weights as a way to determine the best menu results that can be recommended. The results of this study produced a menu recommendation namely Chicken Mozzarella according to the accuracy. Calculation based on manual calculations and calculations on the decision support system for the best menu selection.

Keywords: Decision support system, SAW method, WP method, Menu recommendation

I. Introduction

1.1 Background

Kids college cafe is a business field in serving food for the community. The menu in the cafe that is most popular with customers is Steak and Fried Rice. The college kids cafe was founded by Ms. Rima Tamara Aldisa and her sister Aldi Nugroho. On November 22, 2017 up to the present in the South Jakarta. The large number of competition in the field of food presentation results in increased competition. Therefore, it is important for cafe owners to find ways to be able to keep customers in competition. One way that can be done by college kids cafe is to try to provide a diverse menu and the best service in order to be able to retain existing customers, attract new customers, create loyalty, good quality. Based on these problems can help to make use of a decision support system to help the process of selecting the best menu. The method chosen is using the SAW and WP methods. Both of these methods will produce the final value for determining the best type of food recommended at the Children's Cafe.

1.2.2 Problem Formulation

Based on the background above, the problem can be formulated, namely how the decision support system can help the cafe owner determine the best menus according to the customer's desires accurately that can be accepted by the user.

1.3 Objectives and Benefits of Research

1.3.1 Research Objectives

Can produce a recommendation system for customers at the Cafe Boy College in making consistent decisions to determine the best menus with two SAW and WP methods

1.3.2 Benefits of Research

The benefits of this research are:

1. It can be beneficial for owners of college kids Cafe to help provide maximum service to customers
2. Can monitor transactions accurate results
3. Can determine the menu that is often ordered by customers

II. CONCEPTUAL THINKING

2.1 Literature Review

2.1.1 Café

Understanding cafes according to Longman. Small restaurants that serve or sell snacks and drinks, cafes are usually used by people to relax (Dictionary of English Language and Culture) Cafe (Café) is a good place to use as a place to gather or just relax to unwind after a move. Cafes usually provide food and soft drinks as dishes and there is also live music as an addition to entertainment for visitors who come. What distinguishes Cafe from other eating places is a cafe that prioritizes entertainment and the convenience of visitors. Now there are lots of cafes that present live music. The entertainment can make cafe visitors not get bored quickly.

2.1.2 Over stock and Under stock

Control policy to determine the level of inventory that must be maintained. If the amount of inventory is too large or too much (over stock) resulting in the emergence of idle funds, it also raises the risk of damage to larger raw materials and high storage costs. However, if too little inventory or raw materials run out, the risk of inventory shortages (under stock) is because often the raw materials cannot be brought in suddenly which are needed, which will cause loss or disappointment with the customer menu. Ristono (2009: 7-8)

2.3 Concept Framework / Mindset

Problem Solving

The specific criteria as input or reference in determining the food and beverage menu are as follows:

1. Taste
2. Aroma
3. Appearance
4. Selling Prices

The decision support system method used to process the criteria data as input or reference above is to use the Simple Additive Weighting method and the Weighted Product comparison method so that it is expected to produce the best food and beverage menu recommendations.

2.4 Hypothesis

Allegedly by building a decision support system using Simple Additive Weighting (SAW) and Weighted Product (WP) can facilitate management in determining the best menus for maximum service to customers accurately and acceptable to users.

III. Research Method and Design

3.1 Research Methods

The Research Methodology used in the research of Decision Support System to Determine the Best Menu in the Cafe is to use quantitative methods. This quantitative research develops and uses mathematical models, theories and hypotheses. The existing criteria have been determined since the beginning of the study. This Research Decision Support System (SPK) was used to examine the process of solving the problem of distribution or determining the best menu at Kuliah Children's Cafe. The Decision Support System method used in this study is the method (Simple Additive Weighting) and Weighted Product (WP). The results of this study are expected to be used to determine what menus can be recommended to customers.

3.2 Testing for Accuracy

Accuracy testing is done by matching the results of the best decision-making decision support system. This accuracy test aims to find out how much the match between the data from the decision system and the data from expert decisions, the number of matches will determine the level of accuracy of the system. Accuracy testing is calculated from the exact number divided by the amount of data. (Nugraha, 2006).

$$\text{Accuracy (\%)} = \frac{\text{correct test data}}{\text{total test data}} \times 100\%$$

IV. Discussion of Research

Data analysis techniques are the initial stages based on the data that has been collected through the stages of interviews, observation and literature to get the system requirements to be used in solving the right problems. To obtain information about system requirements, interviews with staff in the Finance and Production fields were conducted. As well as direct observation at the cafe Kuliahan Children.

The criteria for determining the best menu that is used as the basis for analysis at the Cafe Kuliahan Children are carried out through interviews and questionnaires with customers, which are useful for café management. Children of the College include the Owner, Manager, Finance. Section, Production Section / Procurement of Goods and Servants assigned to consider giving recommendations on the best menus. From the results of the interview, several criteria were set in determining the best menu as follows:

No	Code	Criteria Conditions
1	KR-001	Rasa
2	KR-002	Aroma
3	KR-003	Appearance
4	KR-004	Selling Prices

1. Taste is a stimulus that can be tasted by the tongue. There are 5 types of flavors, namely sweet, sour, salty, bitter, savory.

2. Aroma is a food processing that will determine the result of the smell that is smelled.

3. Appearance is the end result of food, which includes: neatness of presentation, outer appearance of food, softness of food.

4. Selling Price is the price that will be charged to consumers or calculated from the production costs and expected profits.

4.1 Calculation Results using the SAW method

Ranking results using the SAW method

Rangking	Alternatif	Total
1	AL-0010	95.00
2	AL-0013	80.15
3	AL-0018	75.05
4	AL-0019	75.05
5	AL-0004	70.15
6	AL-0015	70.10
7	AL-0020	70.10
8	AL0014	65.10
9	AL-0003	60.20
10	AL-0016	60.15
11	AL-0017	55.20

The biggest ranking results using the SAW method are AL-0010, thus the alternative to the best menu is Chicken Mozzarella.

4.2 Calculation Results with WP method

Rangking	Alternatif	Total
1	AL-0003	0.077120
2	AL-0004	0.086810
3	AL-0010	0.131883
4	AL-0013	0.117882
5	AL-0014	0.080312
6	AL-0015	0.087096
7	AL-0016	0.075573
8	AL-0017	0.07113
9	AL-0018	0.09257
10	AL-0019	0.09257
11	AL-0020	0.08709

The biggest ranking result using the WP method is AL-0010, thus the alternative to the best food menu is Chicken Mozzarella.

4.4.1 Main menu



A. Figure IV-1 Draft Main Menu Screen

The above screen design displays the main menu screen of the best menu decision support system application.

4.4.2 Transaction



Figure IV-2 Transactions

This screen design is used to display and print sales and payments

4.4.3 Results of Assessment Method SAW

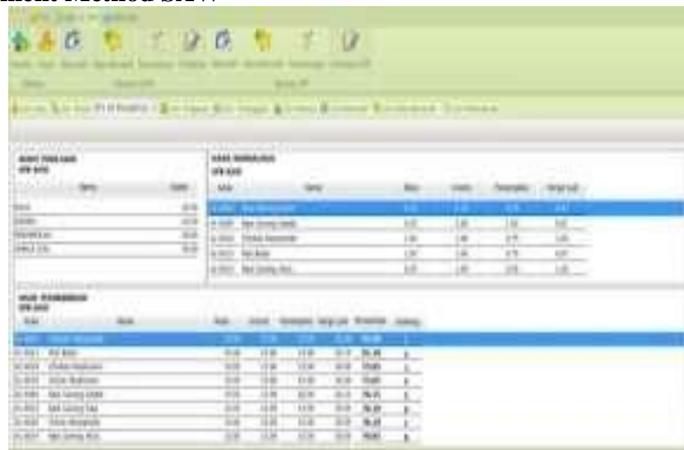


Figure IV-3 Results of Assessment Method SAW

This screen design is used to find out the results of ranking on the decision support system application to determine the best menu.

4.4.4 Results of Assessment Method WP

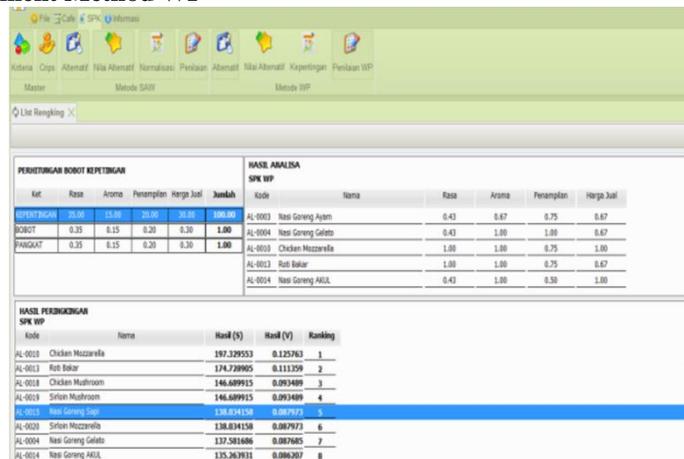


Figure IV-4 Results of Assessment Method WP

This screen design is used to find out the results of calculations using the WP method on the decision support system application to determine the best menu.'

4.5 Testing for Accuracy

$$\text{Accuracy (\%)} = \frac{\text{correct test data}}{\text{total test data}} \times 100\%$$

For accuracy testing, the results of ranking decision support systems using the SAW method were compared with the results obtained from the original data obtained from the Children's Cafe. The accuracy test results are as follows.

No	Menu	Σ correct test data	Σ total test data	Accuracy
1.	Chicken Fried rice	57	60.20	94%
2.	Gelato Fried rice	67	70.15	95%
3.	Abul Fried rice	64	65.10	98%
4.	Cow Fried rice	66	70.10	94%
5.	Bread Toast	78	80.15	97%
6.	Indomie Mushroom	54	60.15	89%
7.	Indomie Single	53	55.20	96%
8.	Chicken Mozzarella	95	95.00	100%
9.	Chicken Mushroom	71	75.05	93%
10.	Sirloin Mushroom	63	75.05	83%
11.	Sirloin Mozzarella	60	70.50	85%

This the final results of the above calculations with the initial data approach each other and the results of the ranking become back and forth which makes the accuracy incompatible. Because of the accuracy test results on the menu of 94% chicken fried rice, 95% gelato fried rice, 98% fried rice, 94% beef fried rice, 97% toast, Indomie mushroom 89%, Indomie single 96%, Chicken mozzarella 100% , Chicken mushroom 93%, Sirloin mushroom 83%, Sirloin mozzarella 85%. From the results of the test it can be concluded that the difference in value between menus affects the results. The fewer the difference in value between food menus, the smaller the accuracy of the results. In addition to these comparisons, the authors also compared the results of the calculation of the SAW and WP methods in this system with the results of calculations performed using Excel. The results of both are the same. So it can be concluded that the calculation of the SAW and WP methods in this system is correct.

V. Conclusions

This study succeeded in determining the best menu recommendations to perform calculations with ranking results that have been successfully built. Some conclusions can be described as follows:

1. This system aims to help make decisions consistently to determine the best menus with two methods: Simple Additive Weighting and Weighting Product.
2. Calculation on the system to do the best menu ranking using the SAW (Simple Additive Weighting) and WP (Weighting Product).
3. The results of this study resulted in a menu recommendation namely Chicken Mozzarella according to the level of accuracy based on manual calculations and calculations on the decision support system for the best menu selection.

5.2 Suggestions

Based on the research conducted, there are several suggestions that the decision support system is better to provide the best menu recommendations. These suggestions include:

1. Develop this system online so that decision makers can see the results of this system wherever they are
2. Can be tried using other methods to support more effective decisions

References

- [1]. Fishburn, P.C., A 1967. Problem-multi-selection-based methods, making a Blackwell Publishing attribute attribute,
- [2]. Fitriyani. 2012. Decision Support System for the Selection of Maternity Hospital in Pangkal Pinang Case Study. Thesis. Mikroskil. Field.
- [3]. Kusumadewi, Sri., Hartati, S., Harjoko, A., and Hardoyo, R. 2006. Fuzzy Multi-Attribute Decision Making (FUZZY MADM). Graha Ilmu, Yogyakarta Laudon, K, & J.P. Laudon. 2008: Decision Support Systems, 11th edition. New Jersey:Prentice Hall.
- [4]. Simple Additive Weighting Method and Features Based on Android '. Accessed at the Faculty of Computer Science, Universitas Brawijaya. <http://j-ptiik.ub.ac.id/index.php/jptiik/article/view/2538> Nugroho, Adi. 2006. "Testing accuracy. Yogyakarta: Andi Offset. Notoatmodjo, 2010.
- [5]. Pressman, Ph.D. Roger S. 2010. Waterfall Method. Issue 7. Publisher Andi.Yogyakarta. Pages 45–46
- [6]. Prihasyo and Rian, 2017, 'Design of Decision Support Support Systems Android-Based Eating Places Using the WP Method 'Accessed by Satya Christian University Discourse repository.uksw.edu/bitstream/123456789/13507/1/T1_672011182_Full%20text.pdf
- [7]. Roger S. Pressman, P. D. (2012). Software Engineering (ApproachPractitioner) Issue 7: Book 1. Yogyakarta
- [8]. Saleh Muhammad, 2014, 'Supporting Decision Determination System Consumers of Coffee Menu Using the SAW Method 'Accessed at Dian Nuswantoro University
- [9]. Santo, 2018, 'A Web Application for Restaurant Recommendations Using Weighted Product 'Accessed at Multimedia Nusantara University,
- [10]. S. Eniyati, 2011. "Designing a Decision Support Support System for Scholarship Acceptance by the SAW (Simple Additive Weighting) Method,"Din.Teknol. Inf.vol.16, no.Sri Eniyati, pp. 171–177