

Decision Support System for Selecting the Best Facial Wash for Acne-Prone Skin Using the ORESTE Method

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Abstract—Facial skin care has gained significant attention, particularly among adolescents and young adults, as facial appearance plays an important role in social interaction and self-confidence. Acne-prone skin is one of the most common dermatological problems, mainly caused by hormonal imbalance during puberty, environmental exposure, lifestyle factors, and genetic predisposition. Along with the rapid growth of the skincare industry, a wide variety of facial wash products are available on the market, offering different formulations, prices, and brand reputations. This condition often makes it difficult for consumers to determine the most suitable facial wash for their specific skin needs. Inappropriate product selection may lead to negative effects such as increased acne severity, skin irritation, dullness, and other long-term skin problems. To overcome this issue, this study applies a Decision Support System (DSS) using the Organization Ranking and Synthesis of Related Persons (ORESTE) method to support the selection of the best facial wash for acne-prone skin. The ORESTE method is an outranking-based multi-criteria decision-making approach that operates using ordinal data and emphasizes the priority of predefined criteria. The decision-making process is conducted through the Besson Rank procedure to generate a ranking of alternative products. The results of this study are expected to provide objective and reliable recommendations for consumers in selecting appropriate facial wash products. Furthermore, this research can serve as a reference for manufacturers in developing facial wash products that better meet the needs of acne-prone skin.

Keywords: Skin Care; Facial Wash; Acne; ORESTE; Decision Support System; Product Selection; Criteria; Decision Making

1. INTRODUCTION

Skin care, particularly facial skin care, has become increasingly important because the face is the primary aspect observed during social interactions. Facial appearance plays a crucial role in shaping first impressions and significantly influences an individual's self-confidence, especially among adolescents and young adults. Based on a survey conducted by Bioderma in Indonesia, approximately 80% of teenage girls are at risk of experiencing skin problems, such as acne. These skin issues are commonly caused by hormonal imbalances during puberty, genetic predisposition, and environmental factors, including pollution, climate conditions, and lifestyle habits. The high prevalence of facial skin problems has led to a growing awareness of the importance of proper skin care, particularly among teenagers and young adults. As a result, skincare products are no longer considered secondary needs but have become essential daily necessities. This trend has driven rapid growth in the beauty and skincare industry, resulting in a wide variety of products designed to address specific skin conditions. One of the most fundamental skincare products is facial wash, which serves as the initial step in maintaining facial hygiene and skin health. Selecting an appropriate facial wash is a critical factor in maintaining healthy skin, especially for individuals with acne-prone skin. However, many consumers, particularly women, often choose facial wash products that are not suitable for their skin type. The use of inappropriate products may lead to various adverse effects, such as worsening acne, dark spots, dull skin, blackheads, irritation, and in severe cases, an increased risk of long-term skin damage, including skin cancer. These conditions highlight the importance of making informed decisions when selecting skincare products. On the other hand, the abundance of facial wash brands and product variants available in the market creates additional challenges for consumers. The wide range of choices often leads to confusion, making it difficult to determine which product best meets individual skin needs. In addition to product benefits and price, brand reputation also plays a significant role in consumer decision-making, as well-known brands are generally perceived as more reliable and trustworthy. Several previous studies have explored the selection of the best facial wash using various decision-making methods. Research conducted by Fryanda Wulan Magda Rauan et al. (2024) demonstrated that the Simple Additive Weighting (SAW) method is effective in assigning scores to each attribute and producing a ranking of alternatives. This method simplifies the evaluation process by using predetermined preference weights for each criterion and applying matrix normalization based on benefit and cost attributes. Nevertheless, the SAW method has limitations, including its suitability primarily for local weighting and its restricted capability in handling complex crisp and fuzzy data. Another method, PROMETHEE II, was applied in a study by Danar Irawan et al. (2023). This method offers advantages in ranking alternatives through the use of preference functions and flexible weighting schemes. However, PROMETHEE II is considered less optimal for decision-making problems involving complex and hierarchical criteria structures. Under these circumstances, determining the most suitable facial wash for acne-prone skin remains a challenging task. Decision Support Systems (DSS) provide a systematic solution by facilitating the collection, processing, and analysis of relevant data to support more objective and effective decision-making processes.

In this study, the Organization Ranking and Synthesis of Related Persons (ORESTE) method is employed to support decision-making in selecting the best facial wash for acne-prone skin. The ORESTE method was first introduced

by Roubens in 1982 and is specifically designed to rank alternatives based on the relative importance of predefined criteria . This method has been widely applied across various domains, including the selection of web design companies (Adali & Tuisisik, 2017), the development of innovative collaborative vehicle designs (Wu & Liao, 2018), traffic congestion evaluation (Wang et al., 2020), and comparative studies with other multi-criteria decision-making methods such as COPRAS (Idaman & Gunung, 2024). As an outranking-based approach, the ORESTE method generates a comprehensive ranking of alternatives by considering the priority order of criteria, rather than relying solely on precise numerical values . According to Pastjin and Leysen, ORESTE ranks alternatives by emphasizing the importance hierarchy of predetermined criteria . The method operates using ordinal data, which represent preference rankings without requiring exact quantitative measurements . One of the key components of the ORESTE method is the Besson Rank process, which produces a position matrix to determine the ranking of each alternative based on the relevant criteria .

Based on the previous paragraph, this study is expected to provide recommendations for selecting the best facial wash for acne-prone skin to consumers, so that consumers can make more informed decisions based on the alternatives and predetermined criteria. Furthermore, the results of this study are expected to serve as a reference for manufacturers in developing facial wash products that are more suited to the needs of acne-prone skin. Therefore, this research makes a significant contribution to both consumers and the beauty industry.

2. RESEARCH METHODOLOGY

2.1 Dataset

This research was conducted in Pematangsiantar using the Organization Rangement and Synthese of Données Relationnelles (ORESTE) method. Data were collected through questionnaires randomly distributed to 92 consumers. The assessment criteria used are listed in Table 1.

Table 1. Criteria(C)

Criteria	Description
C1	Effectiveness
C2	Active Ingredient Content
C3	Price
C4	Availability
C5	User Reviews
C6	Side Effects

Based on Table 1, there are six assessment criteria used, namely Effectiveness (C1) of facial wash products, which has a very important influence because it is the main purpose of using a product. It is a measure of the extent to which a product provides benefits. Active Ingredient Content (C2) assesses whether the main ingredients of the product provide direct benefits, as this ensures the product is safe, meets user needs, and complies with health standards. Price (C3) is one of the factors consumers consider when purchasing a product. In determining the price, does it reflect the quality of the product and is it in line with the consumer's ability to pay? Availability (C4): Products that are easy to find, both online and offline, have a distinct advantage over products that are difficult to access. Products that are difficult to find will reduce consumers' intention to buy them. User Reviews (C5): These can provide a picture of the real experiences of other users, covering various aspects of effectiveness, comfort, or other issues. Reviews can also help consumers make decisions. Side Effects (C6): Products that are safe and free from side effects are more desirable, especially for health and cosmetic products. Side effects can affect consumer satisfaction and perception of product quality. The alternatives used in this study are listed in Table 2.

Table 2. Alternative(A)

Criteria	Description
A1	Garnier
A2	Wardah
A3	Biore
A4	Acnes
A5	Cetaphil
A6	Pond's
A7	Clean & Clear
A8	Kahf

Table 2 shows the alternatives used in this study, which are commonly used facial wash brands intended for acne-prone skin. The selection of alternatives was based on the level of consumer usage and the availability of the products on the market. Each alternative was assigned a code from A1 to A8 to facilitate the calculation and analysis process in the ORESTE method.

2.2 Research Stages

This research was conducted through a number of organized steps to ensure results that were in line with the objectives and issues that had been set. These steps covered the process from the beginning to the end of the research, as shown in Figure 1.

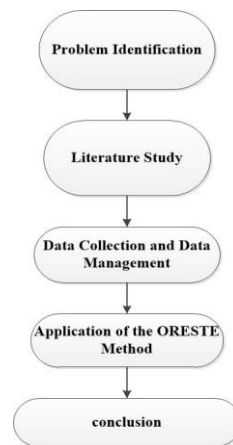


Figure 1. Research Framework

Based on Figure 1, the explanation of the stages of the research to be conducted is as follows:

- a. **Problem Identification:** The problem identification stage is an important part of the problem-solving process, with the main objective of recognizing the issues that need to be resolved. At this stage, an in-depth analysis of the existing situation or conditions is required, as well as identifying the factors that cause difficulties or obstacles(L. Zhang, 2025).
- b. **Literature Study:** Once the problem has been identified, the next step is to collect and evaluate published information, such as journals, articles, reports, and other references relevant to the problem being discussed by the researcher. This stage is important for gaining deeper insight into the research topic, assessing previously used research methods, selecting the appropriate methods to apply, and developing a supporting theoretical framework(Yang, 2025).
- c. **Data Collection and Data Management:** Data collection is the process of gathering information or facts in the field. Researchers collect information using questionnaires distributed to respondents[18], [19]. Once the data has been collected, researchers begin processing it by organizing it into an appropriate format and grouping the results according to their needs(Yang, 2025).
- d. **Application of the ORESTE Method:** After the suitability assessment data is obtained, the next step is to perform ranking calculations using the ORESTE method. The first stage in this calculation is to convert the alternative data for each criterion into Besson Rank, then calculate the Distance Score value, and the next stage is to calculate the Preference value(S. Wang, 2025).
- e. **Conclusions and Recommendations**

2.3 Decision Support System

A Decision Support System (DSS) is a computer-based system developed to support the decision-making process by providing relevant information, analysis, and assistance(Liu, 2025). DSS has the advantage of flexibility, so it can be tailored to the specific needs of an organization. These adjustments include criteria, analysis methods, and weightings, which can be adapted according to the level of complexity of the problem at hand(J. Zhang, 2025). A Decision Support System (DSS) is a tool that provides various alternative solutions based on a number of criteria for solving a problem, thereby supporting the decision-making process and meeting the needs of all parties involved. The main features of a DSS include:

- a. SPK is designed to support the decision-making process, both for structured and unstructured problems.
- b. SPK combines models and analysis methods with conventional data input techniques, and enables information integration to support data processing in the system.
- c. SPK uses an interactive model approach, allowing users to operate it easily.
- d. SPK is flexible, allowing it to adapt to changes in the environment and user needs.

2.4 ORESTE Method

In 1982, Roubens first introduced the ORESTE method. According to Prayudi et al. (2021), this method is one of the developments of various methods in decision support systems that fall under the category of Multi-Attribute Decision Making (MADM). Furthermore, Pohan et al. (2020) explain that the ORESTE method is designed to rank a number of alternatives based on predetermined criteria according to their level of importance(Manochitra, 2025). The uniqueness of this method lies in the use of Besson Rank, which is a method for setting priority scales for each criterion indicator. If there are identical criterion values in the ranking process, the approach used is to calculate the average. The following are the steps for solving using the ORESTE Method:

- a. Establish criteria that will be used as a basis for solving problems.

- b. Convert the alternatives into Besson Rank form, which is on an ordinal or ranking scale. If there are identical values, calculate the average value of the ranking.
- c. Calculate the Distance Score, which measures the “distance” for each pair of alternatives and criteria.
- d. This Distance Score indicates the ideal position achieved by the best alternative on the criteria considered most significant.
This score is calculated based on the average Besson Rank r_{c_j} for criterion c_j and Besson Rank $r_{c_j(a)}$ of alternative a on criterion c_j (Q. Wang, 2025).

$$D(a_j, c_j) = \left[\frac{1}{2} r_{c_j}^R + \frac{1}{2} r_{c_j(a)}^R \right]^{1/R} \tag{1}$$

Description:

- $D(a_j, a_j)$ = Distance-Score
- r_{c_j} = Besson – criteria ranking j
- $r_{c_j(a)}$ = Besson – alternative rank in criteria
- R = Coefficient (default = 3) Exponent value.

- e. Finding preference values

$$(V_i = \sum(Distance\ Score \times W_j)) \tag{2}$$

- f. Rank the alternatives based on the results of the ORESTE method calculation to determine the most optimal alternative. The lowest value is ranked 1, and so on.

3.RESULT AND DISCUSSION

3.1 Response Results

Table 3. Respondent Results

No	Respondent	Alternative	C1	C2	C3	C4	C5	C6
1	Respondent 1	Acnes	3	3	3	5	4	2
2	Respondent 2	Acnes	3	4	4	4	4	3
3	Respondent 3	Acnes	4	4	3	3	3	3
4	Respondent 4	Acnes	4	4	3	4	4	2
5	Respondent 5	Acnes	3	3	3	4	3	2
...
92	Respondent 92	Wardah	5	4	4	5	5	5

Table 3 shows the results of the questionnaire that was collected. The questionnaire was distributed to consumers through social media and contained six questions used as criteria, as well as five alternative choices.

Table 4. Questionnaire Rating Scale

Description	Value
Very Good	5
Good	4
Fairly Good	3
Not Good	2

Table 4 explains the rating scale used in the research questionnaire, namely Very Good (5), Good (4), Fairly Good (3), and Not Very Good (2). This scale is used to measure respondents' assessments of each facial wash alternative based on predetermined criteria and forms the basis for data processing in the ORESTE method to determine the ranking of alternatives.

3.2 Discussion

3.2.1 Defining Criteria and Weightings

At this stage, determine the criteria values obtained from the results of the questionnaire distributed to consumers. These will then be applied in the ORESTE Method.

Table 5. Alternative Values Based on Assessment Criteria

Alternative	C1	C2	C3	C4	C5	C6
Garnier	4	4	4	5	4	2
Wardah	4	4	4	5	4	4
Biore	3	3	3	5	4	5

Alternative	C1	C2	C3	C4	C5	C6
Acnes	4	4	4	4	4	2
Cetaphil	4	4	4	5	4	5
Pond's	4	4	3	5	4	2
Clean & Clear	4	4	4	4	4	2
Cave	5	4	5	5	5	5
WEIGHT	5	4	3	3	4	4

Table 5 shows the scores for each facial wash alternative based on six assessment criteria, namely effectiveness, active ingredient content, price, availability, user reviews, and side effects. The scores in this table were obtained from the processing of respondent questionnaires and were used as initial data in the application of the ORESTE method. The data is then converted into Besson Rank as the basis for calculating the distance score and determining the ranking of the best facial wash alternatives.

3.21 Application of the Oreste Method

In applying the ORESTE method, the first thing to do is to convert each alternative data into Besson-Rank.

Table 6. Effectiveness

Alternative	Alternative Value	Description	Value
A1	4	Ranking 2	4.5
A2	4	Ranking 2	4.5
A3	3	Ranking 8	8
A4	4	Ranking 2	4.5
A5	4	Ranking 2	4.5
A6	4	Ranking 2	4.5
A7	4	Ranking 2	4.5
A8	5	Ranking 1	1

From Table 6 A8 is ranked 1st with a score of 1. For ranks 2, 3, 4, 5, 6, and 7, since there are similar data, the average (mean) of the data will be calculated:

To find the rankings for 2, 3, 4, 5, 6, and 7.

Then: Mean Value $(2+3+4+5+6+7)/6 = 4.5$.

So the values for A1, A2, A3, A4, A5, A6, A7 are 4.5. Next, A3 gets a value of 8 because it is the last in the order of alternative values.

Table 7. Active Ingredient Content

Alternative	Alternative Value	Description	Value
A1	4	Ranking 1	4
A2	4	Ranking 1	4
A3	3	Ranking 8	8
A4	4	Ranking 1	4
A5	4	Ranking 1	4
A6	4	Ranking 1	4
A7	4	Ranking 1	4
A8	4	Ranking 1	1

From Table 7 There is similar data for alternatives A1, A2, A4, A5, A6, A7, and A8, so the average (mean) value of this data will be calculated:

To find the rankings 1, 2, 3, 4, 5, 6, 7.

Then: Mean $(1+2+3+4+5+6+7)/7 = 4$.

For alternative data, A3 received a score of 8 because it was the last in the sequence of alternative data scores.

Table 8. Prices

Alternative	Alternative Value	Description	Value
A1	4	Ranking 2	4
A2	4	Ranking 2	4
A3	3	Ranking 7	7.5
A4	4	Ranking 2	4
A5	4	Ranking 2	4
A6	3	Ranking 7	7.5
A7	4	Ranking 2	4
A8	5	Ranking 1	1

From Table 8 the ranking 1 is A8. For rankings 2, 3, 4, 5, and 6, since there are similar data, the average (mean) value of the data will be calculated:

To find the rankings for 2, 3, 4, 5, and 6.

Then: Mean $(2+3+4+5+6)/5 = 4$.

For ranks 7 and 8, there is also similar data, so the average value (mean) of that data will be calculated:

To find the rankings for 7 and 8.

Then: Mean $(7+8)/2 = 7.5$.

Table 9. Availability

Alternative	Alternative Value	Description	Value
A1	5	Ranking 1	3.5
A2	5	Ranking 1	3.5
A3	5	Ranking 1	3.5
A4	4	Ranking 7	7.5
A5	5	Ranking 1	3.5
A6	5	Ranking 1	3.5
A7	4	Ranking 7	7.5
A8	5	Ranking 1	3.5

From Table 9 There is similar data in alternative data A1, A2, A3, A5, A6, A8, so the average (mean) value of the data will be calculated:

To find the rankings 1, 2, 3, 4, 5, 6.

Then: Mean $(1+2+3+4+5+6)/5=3.5$.

For ranks 7 and 8, there is also similar data, so the average value (mean) of that data will be calculated:

To find the rankings for 7 and 8.

Then: Mean $(7+8)/2 = 7.5$.

Table 10. User Reviews

Alternative	Alternative Value	Description	Value
A1	4	Ranking 2	5
A2	4	Ranking 2	5
A3	4	Ranking 2	5
A4	4	Ranking 2	5
A5	4	Ranking 2	5
A6	4	Ranking 2	5
A7	4	Ranking 2	5
A8	5	Ranking 1	1

From Table 10 The ranking 1 is A8. For rankings 2, 3, 4, 5, 6, 7, and 8, since there are similar data, the average (mean) value of the data will be calculated:

To find the rankings for 2, 3, 4, 5, 6, 7, and 8.

Then: Mean $(2+3+4+5+6+7+8)/7 = 5$.

Table 11. Side Effects

Alternative	Alternative Value	Description	Value
A1	2	Ranking 5	6.5
A2	4	Ranking 4	4
A3	5	Ranking 1	2
A4	2	Ranking 5	6.5
A5	5	Ranking 1	2
A6	2	Ranking 5	6.5
A7	2	Ranking 5	6.5
A8	5	Ranking 1	2

From Table 11 There is similar data in alternative data A3, A5, A8, so the average (mean) value of the data will be calculated:

To find rankings 1, 2, 3.

Then: Mean $(1+2+3)/3 = 2$.

Next, A2 gets a value of 4. Then, for rankings 5, 6, 7, and 8, there is also similar data, so the average (mean) value of this data will be calculated:

To find the rankings 5, 6, 7, 8.

Then: Mean $(5+6+7+8)/4 = 6.5$.

The normalization results of the ORESTE method criteria are as follows:

Table 12. Normalization Results

Alternative	C1	C2	C3	C4	C5	C6
A1	4.5	4	4	3.5	5	6.5
A2	4.5	4	4	3.5	5	4
A3	8	8	7.5	3.5	5	2
A4	4.5	4	4	7.5	5	6.5
A5	4.5	4	4	3.5	5	2
A6	4.5	4	7.5	3.5	5	6.5
A7	4.5	4	4	7.5	5	6.5
A8	1	4	1	3.5	1	2

Table 12 presents the results of normalizing the values of each alternative against all criteria using the ORESTE method in the form of Besson Rank. The values in this table show the relative position of each alternative on each criterion, where a smaller value indicates a better ranking. This normalization process aims to equalize the assessment scale between criteria so that it can be used as a basis for calculating the Distance Score in the next stage.

3.2.2 Calculating the Distance Score

$$\text{DISTANCE SCORE: } D(a_i, c_j) = \left[\frac{1}{2} r_{c_j} R + \frac{1}{2} r_{c_j} (a) R \right]^{1/R} \tag{3}$$

CRITERIA 1

a. $D(a_1, c_1) = \left[\frac{1}{2} 4,5^3 + \frac{1}{2} \times 1^3 \right]^{0,333}$
 $D(a_1, c_1) = [11,390625 + 0,125]^{0,333}$
 $D(a_1, c_1) = [11,515625]^{0,333}$
 $D(a_1, c_1) = 2,258182134$

b. $D(a_2, c_1) = \left[\frac{1}{2} 4,5^3 + \frac{1}{2} \times 1^3 \right]^{0,333}$
 $D(a_2, c_1) = [11,390625 + 0,125]^{0,333}$
 $D(a_2, c_1) = [11,515625]^{0,333}$
 $D(a_2, c_1) = 2,258182134$

c. $D(a_3, c_1) = \left[\frac{1}{2} 8^3 + \frac{1}{2} \times 1^3 \right]^{0,333}$
 $D(a_3, c_1) = [64 + 0,125]^{0,333}$
 $D(a_3, c_1) = [64,125]^{0,333}$
 $D(a_3, c_1) = 4,00254696$

d. $D(a_4, c_1) = \left[\frac{1}{2} 4,5^3 + \frac{1}{2} \times 1^3 \right]^{0,333}$
 $D(a_4, c_1) = [11,390625 + 0,125]^{0,333}$
 $D(a_4, c_1) = [11,515625]^{0,333}$
 $D(a_4, c_1) = 2,258182134$

e. $D(a_5, c_1) = \left[\frac{1}{2} 4,5^3 + \frac{1}{2} \times 1^3 \right]^{0,333}$
 $D(a_5, c_1) = [11,390625 + 0,125]^{0,333}$
 $D(a_5, c_1) = [11,515625]^{0,333}$
 $D(a_5, c_1) = 2,258182134$

f. $D(a_6, c_1) = \left[\frac{1}{2} 4,5^3 + \frac{1}{2} \times 1^3 \right]^{0,333}$
 $D(a_6, c_1) = [11,390625 + 0,125]^{0,333}$
 $D(a_6, c_1) = [11,515625]^{0,333}$
 $D(a_6, c_1) = 2,258182134$

g. $D(a_7, c_1) = \left[\frac{1}{2} 4,5^3 + \frac{1}{2} \times 1^3 \right]^{0,333}$
 $D(a_7, c_1) = [11,390625 + 0,125]^{0,333}$
 $D(a_7, c_1) = [11,515625]^{0,333}$
 $D(a_7, c_1) = 2,258182134$

h. $D(a_8, c_1) = \left[\frac{1}{2} 1^3 + \frac{1}{2} \times 1^3 \right]^{0,333}$
 $D(a_8, c_1) = [0,125 + 0,125]^{0,333}$
 $D(a_8, c_1) = [0,25]^{0,333}$
 $D(a_8, c_1) = 0,629963436$

The results obtained from calculating the Distance Score for criterion 1 with alternatives A1, A2, A4, A5, A6, A7 =2,258182134 , A3 = 4.00254696, and A8 = 0.629963436. The same method was then applied to the other criteria and alternatives. The Distance Scores can be seen in Table 13.

Table 13. Alternative Values Based on Assessment Criteria

Alternative	C1	C2	C3	C4	C5	C6
A1	2.258182134	2.080068588	2.248952495	2.372784487	3.149766486	3.943489
A2	2.258182134	2.080068588	2.248952495	2.372784487	3.149766486	3.271028
A3	4.00254696	4.020669812	3.828300149	2.372784487	3.149766486	3.036555
A4	2.258182134	2.080068588	2.248952495	3.930721227	3.149766486	3.943489
A5	2.258182134	2.080068588	2.248952495	2.372784487	3.149766486	3.036555
A6	2.258182134	2.080068588	3.828300149	2.372784487	3.149766486	3.943489
A7	2.258182134	2.080068588	2.248952495	3.930721227	3.149766486	3.943489
A8	0.629963436	2.080068588	1.518288146	2.372784487	2.506625933	3.036555

Table 13 presents the results of calculating the Distance Score for each alternative against each criterion using the ORESTE method. The Distance Score value indicates the distance of an alternative from the ideal condition based on the ordinal ranking and criterion weights. The smaller the Distance Score value, the better the position of the alternative against that criterion. This value is then used as the basis for calculating the preference value (Vi) and determining the final ranking of alternatives.

3.2.4 Finding the Preference Value (Vi)

$$\text{PREFERENCE } (V_i = \sum(\text{Distance Score} \times W_j)) \tag{4}$$

Table 14 shows the distance score values for each alternative based on each criterion used as the basis for calculating the preference value (Vi). These values are then multiplied by the criterion weight to determine the contribution level of each criterion to the ranking of alternatives.

Table 14. Distance Score Calculation Based on Criteria Weight

Alternative	C1	C2	C3	C4	C5	C6
A1	2.258182134	2.080068588	2.248952495	2.372784487	3.149766486	3.943489
A2	2.258182134	2.080068588	2.248952495	2.372784487	3.149766486	3.271028
A3	4.00254696	4.020669812	3.828300149	2.372784487	3.149766486	3.036555
A4	2.258182134	2.080068588	2.248952495	3.930721227	3.149766486	3.943489
A5	2.258182134	2.080068588	2.248952495	2.372784487	3.149766486	3.036555
A6	2.258182134	2.080068588	3.828300149	2.372784487	3.149766486	3.943489
A7	2.258182134	2.080068588	2.248952495	3.930721227	3.149766486	3.943489
A8	0.629963436	2.080068588	1.518288146	2.372784487	2.506625933	3.036555
	X					
WEIGHT	5	4	3	3	4	4

Table 15 presents the results of the preference value (Vi) calculation obtained from the sum of all distance scores multiplied by the weight of each criterion. This preference value is used as the basis for determining the level of superiority of each alternative.

Table 15. Preference Results (Vi)

Alternative	C1	C2	C3	C4	C5	C6	Vi
A1	11.29091067	8.320274354	6.746857486	7.118353461	12.59906594	15.77395	61.84941681
A2	11.29091067	8.320274354	6.746857486	7.118353461	12.59906594	13.08411	59.15957209
A3	20.0127348	16.08267925	11.48490045	7.118353461	12.59906594	12.14622	79.44395487
A4	11.29091067	8.320274354	6.746857486	11.79216368	12.59906594	15.77395	66.52322704
A5	11.29091067	8.320274354	6.746857486	7.118353461	12.59906594	12.14622	58.22168289
A6	11.29091067	8.320274354	11.48490045	7.118353461	12.59906594	15.77395	66.58745977
A7	11.29091067	8.320274354	6.746857486	11.79216368	12.59906594	15.77395	66.52322704
A8	3.14981718	8.320274354	4.554864437	7.118353461	10.02650373	12.14622	45.31603414

3.2.5 Conducting Ranking

Table 16 shows the ranking results of facial wash alternatives based on preference values (Vi). The alternative with the lowest Vi value ranks first and is considered the best choice according to the criteria and ORESTE method used.

Table 16. Ranking

Alternative	Vi	Rank
A1	61.84941681	Ranking 4
A2	59.15957209	Rank 3
A3	79.44395487	Rank 8
A4	66.52322704	Rank 5
A5	58.22168289	Rank 2

Alternative	Vi	Rank
A6	66.58745977	Rank 7
A7	66.52322704	Rank 5
A8	45.31603414	Rank 1

From Table 16. To determine the ranking in the ORESTE method, the lowest value is sought to be ranked 1. The calculation performed using the ORESTE method shows that the data with the lowest index value obtained as an alternative is Kahf, with an index value of 45.31603414. Thus, it can be concluded that Kahf is the best choice for Facial Wash.

4. CONCLUSION

This study demonstrates the effectiveness of a Decision Support System (DSS) based on the Organization Ranking and Synthesis of Related Persons (ORESTE) method in supporting the selection of facial wash products for acne-prone skin. By utilizing ordinal data and prioritizing decision criteria, the ORESTE method is able to systematically rank available alternatives and provide objective recommendations. The application of the Besson Rank procedure allows for a structured evaluation process, reducing subjectivity and uncertainty in product selection. The findings indicate that the proposed approach can assist consumers in making more informed and rational decisions when choosing facial wash products that are appropriate for acne-prone skin. In addition, the results of this study highlight the potential of the ORESTE method as a reliable multi-criteria decision-making tool for skincare product selection problems involving multiple qualitative and quantitative considerations. Furthermore, this research provides valuable insights for skincare manufacturers by identifying key criteria that influence consumer preferences. These insights may support the development of facial wash products that better align with the needs of individuals with acne-prone skin. Future research may expand this study by incorporating additional criteria, alternative decision-making methods, or larger datasets to further enhance the accuracy and applicability of the proposed system.

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REFERENCES

- Guo, M. (2025). Risk and causation analysis of ship collision breakage into water based on Apriori-ISM-BN. *Harbin Gongcheng Daxue Xuebao Journal of Harbin Engineering University*, 46(9), 1693–1700. <https://doi.org/10.11990/jheu.202405036>
- Liu, M. (2025). Data-driven identification of pollution sources and water quality prediction using Apriori and LSTM models: A case study in the Hanjiang River basin. *Journal of Contaminant Hydrology*, 272. <https://doi.org/10.1016/j.jconhyd.2025.104570>
- Manochitra, V. (2025). Apriori-Enhanced Transformer with Federated Graph Neural Networks for Real-Time Dairy Process Optimization and Predictive Maintenance. *Ssrg International Journal of Electronics and Communication Engineering*, 12(7), 415–427. <https://doi.org/10.14445/23488549/IJECE-V12I7P133>
- Wang, Q. (2025). Association Mining-Based Video Recognition of College Students' Physical Fitness Training Using Improved Fuzzy Apriori Algorithms. *International Journal of Fuzzy Systems*. <https://doi.org/10.1007/s40815-025-02033-w>
- Wang, S. (2025). Analysis of the Characteristics of Ship Collision-Avoidance Behavior Based on Apriori and Complex Network. *Journal of Marine Science and Engineering*, 13(1). <https://doi.org/10.3390/jmse13010035>
- Yang, Y. (2025). Research on the Application of Improved Apriori Algorithm in Sport-Adaptive Online Teaching System Under Big Data Environment. *International Journal of High Speed Electronics and Systems*, 34(2). <https://doi.org/10.1142/S0129156424400172>
- Zhang, H. (2025). Genetic diversity and the prevalence of *Listeria monocytogenes* in food in Shanghai, China: Insights during 2020–2023 surveillance and the Apriori algorithm approach. *International Journal of Food Microbiology*, 441. <https://doi.org/10.1016/j.ijfoodmicro.2025.111323>
- Zhang, J. (2025). Data-driven development of entrepreneurial ecosystem based on the Apriori algorithm. *Journal of Computational Methods in Sciences and Engineering*, 25(4), 3224–3238. <https://doi.org/10.1177/14727978251319200>
- Zhang, L. (2025). Data mining and learning behaviour analysis of French online education data-driven teaching based on generative adversarial network improvement Apriori algorithm. *International Journal of Wireless and Mobile Computing*, 28(2), 205–215. <https://doi.org/10.1504/IJWMC.2025.144202>