The Skincare Selection Application That Best Suits The Method *Analytical Hierarchy Process* (AHP)

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Abstract

The number of beauty and care products is widespread outside, the more skin problems people experience . Various problems of this disease are also caused by allergies due to the use of various beauty products and taking care of the skin from products on the market . Therefore, we need a system that can help choose good skincare according to skin type using the Analytical Hierarchy Process (AHP) method. The application that will be made for the selection of facial foam, moisturizer, and mask with criteria, namely oily skin, normal skin, dry skin, sensitive skin and combination skin, this application is expected to solve the problem of choosing skincare more effectively and precisely. The application of this application uses a waterfall system development, built using the PHP programming language, and bootstrap as a tool interface design to make it look attractive k.

1.   Introduction

Based on data from the Ministry of Health of the Republic of Indonesia that in 2012 common skin problems in all places reached 8.45% and then increased to 8% in the following year [1] . One of the skin diseases is dermatitis. DKA or Allergic Contact Dermatitis caused by beauty products account for 1-4% of all problems reported to beauty clinics. Various problems of this disease are also caused by allergies due to the use of various beauty products and taking care of their skin from products on the market. Skin care products and moisturizers are a major cause of cosmetic contact dermatitis [2].

Many systems have been created that can help treat skin problems. One of them is in the journal Application of the AHP Method in Choosing the Right Cosmetics for High School Students made by Fajar Agustini (2018), "this application uses the criteria of Price, Product Quality, Cosmetic Ingredients". And in the journal Decision Support System for Choosing Skincare That Is Suitable for Facial Skin Types Using Fuzzy Logic created by Vadlya Maarif, et al (2019), "This application is only a selection of facial foam, the criteria used are skin types, this application does not provide a solution for skin problems. ".

So from the above problems and previous research, researchers created a system that can help choose good skincare according to skin type with the output of Wardah recommended products, implement a Decision Support System from the AHP or Analytical Hierarchy Process approach, where AHP is a way of making decisions by comparing pairs of selected classification, and using the AHP method because this method can solve complex and multi-criteria problems. The application that will be made for the selection of facial foam, moisturizer, and mask with complex criteria, namely oily skin, normal skin, dry skin,

sensitive skin and combination skin. This application is expected to solve the problem of choosing skincare more effectively and precisely. So the researcher raised the title of the study "Selection of the most appropriate skincare using the method Analytical Hierarchy Process (AHP)".

According to Potter & Perry, the skin is found on the basic surface of the human body. The skin functions as a layer and protector of the organs underneath due to reduced or lost water, chemical or mechanical damage and overcomes bacteria that enter caused by a disease [3] . According to Darwati, explaining that so that beauty can be radiated evenly and well, the face needs to be treated properly, which is an attitude of effort to take care of the skin so as to maintain and maintain the beauty and charm that is emitted from the skin of the face [4]. According to Wirakusumah, also explained that facial care should be applied at an early age in adolescence in order to produce a role in showing firm and youthful looking skin for the future [4].

2.   Method

AHP or Analytical Hierarchy Process is a model that supports the decisions made and designed by Thomas L. Saty. The model is able to describe a complete multifactor or multicriteria problem as a hierarchy. The existence of a hierarchy makes a problem able to be summarized into various groups and then managed as a form of hierarchy so that the problem looks systematic and has a structure [5].

In Yulyantari's opinion, in his book L. Saaty. The Analytical Hierarchy Process has the basic principles of AHP, namely [6]:

1. Hierarchy creation, i.e. This creation can be learned by solving problems as a driving force, as well as arranging other parts with hierarchies.
2. Conditional and surrogate scoring, which is carried out with the analogy of a partner in several problems from a scale of 1 to 9 as the best scale to display the rating.
3. The main determination, which is carried out by analogy assessment through all alternative conditions that can be determined in the assessment in order to obtain priorities and weights.
4. Logical determination, namely the degree of interrelationship between objects on the basis of specified conditions

3.   Results and Discussion

Based on the procedures or stages to get results using the Analytical Hierarchy Process (AHP) method are:

Previously, researchers made the following terms for mask skincare products:

Table 1 Term Names of Masks

Term	Product name
R1	*Lightening Face Mask*
R2	*Perfect Bright Peel Off Mask*
R3	*Wardah Nature Daily Sheet Mask Aloe Vera*
R4	*Wardah Nature Daily Sheet Mask Green Tea*
R5	*Wardah Nature Daily Sheet Mask Rice*
R6	*Wardah Nature Daily Sheet Mask Rose*

a.   Create a Hierarchy.

In the AHP (Analytical Hierarchy Process) method, the criteria are arranged in a hierarchical form. Where Level 0 is the goal, namely the selection of the most suitable skincare, Level 1 is the criteria in choosing skincare, while Level 2 is an alternative skincare product that should be chosen. Like the image below below.
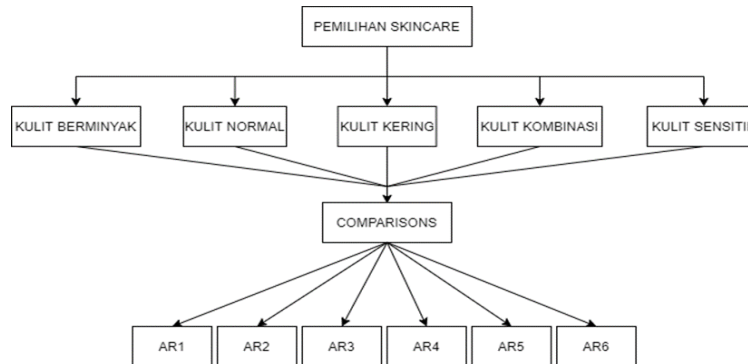

Figure 1. Mask Hierarchy Structure

b.   pairwise comparison matrix

To get the weight of the assessment of each variable, a paired comparison rating scale table is made. after that the value of each element of each column is summed. After obtaining the value of the matrix comparison and the sum of each element value, then normalization of the matrix is carried out by dividing each element value from the column by the total column in question. each element value, then divide by the number of elements. Like the table below:

Table 2. Criteria Priority Weight

Criteria	Weight	Priority
Oily skin	0.131	III
Normal Skin	0.037	V
Dry skin	0.056	IV
Combination Skin	0.324	II
Sensitive Skin	0.451	I

From the table above, it can be concluded that the criteria for the first priority skin type are Sensitive Skin as the most focused skin type.

c.   Looking for alternative weight values against criteria with pairwise comparison matrix

In this thesis, the researcher conducted research using 3 types of products, namely facial foam, moisturizer, and mask. To get the weight of the assessment of each variable, a paired comparison rating scale table is made, for the calculation the steps are the same as finding the priority weights on the criteria. Here is one result of the calculation:

Table 3 Priority Weight

Alternative	Weight	Priority
R1	0.046	V
R2	0.028	VI
R3	0.418	I
R4	0.259	II
R5	0.161	III

R6	0.087	IV

From the table above, it can be concluded that the criteria for sensitive skin for masks are the first to last priority, namely: R3 (Wardah Nature Daily Sheet Mask Aloe Vera).

d.   Choose the best skincare

After getting the priority weight of each criterion, and alternatives. Then find the weight of each alternative as a whole for the Mask by multiplying each level above it, which is as follows:

Table 4. Overall Weight of Mask Alternative

No.	Alternative	Weight
1.	R3	0.3264
2.	R4	0.3051
3.	R5	0.1126
4.	R6	0.1008
5.	R2	0.0837
6.	R1	0.0714

e.   Measuring Consistency
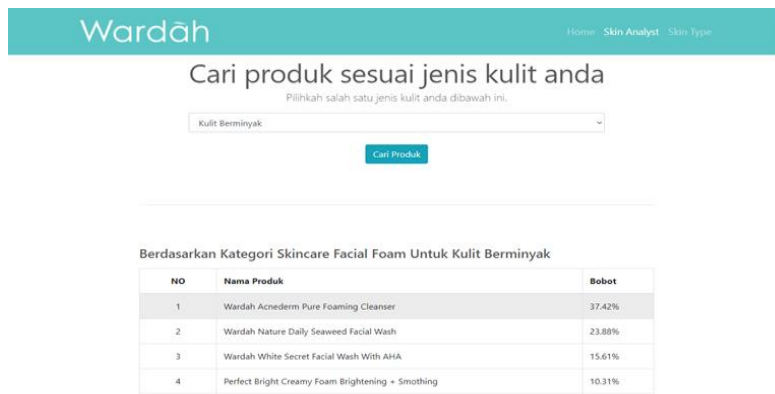
This consistency measurement is to see whether or not Wardah experts are consistent in filling out the questionnaire. If CR<0.1 or CR=0.1 then the pairwise comparison value in the given criteria matrix is consistent, if CR>0.1 then it is inconsistent. So filling out the questionnaire must be repeated. The following is the result of the consistency calculation:

Table 5. Consistency Ratio (CR) Wardah Expert Assessment

Pair Comparison	CR	Information
Between Criteria	0.04	Consistent
Between Alternative *Facial Foam* Against Oily Skin Criteria	0.05	Consistent
Between Alternative *Moisturizers* Against Oily Skin Criteria	0.10	Consistent
Between Alternative Masks Against Oily Skin Criteria	0.06	Consistent
Between Alternative *Facial Foam* Against Dry Skin Criteria	0.09	Consistent
Between Alternative *Moisturizers* Against Dry Skin Criteria	0.10	Consistent
Between Alternative Masks Against Dry Skin Criteria	0.05	Consistent
Between Alternative *Facial Foam* Against Normal Skin Criteria	0.10	Consistent
Between Alternative *Moisturizers* Against Normal Skin Criteria	0.10	Consistent
Between Alternative Masks Against Normal Skin Criteria	0.03	Consistent
Between Alternative *Facial Foam* Against Combination Skin Criteria	0.10	Consistent
Between Alternative *Moisturizers* Against Combination Skin Criteria	0.09	Consistent
Between Alternative Masks Against Combination Skin Criteria	0.03	Consistent
Between Alternative *Facial Foam* Against Sensitive Skin Criteria	0.08	Consistent
Between Alternative *Moisturizers* Against Sensitive Skin Criteria	0.10	Consistent
Between Alternative Masks Against Sensitive Skin Criteria	0.05	Consistent

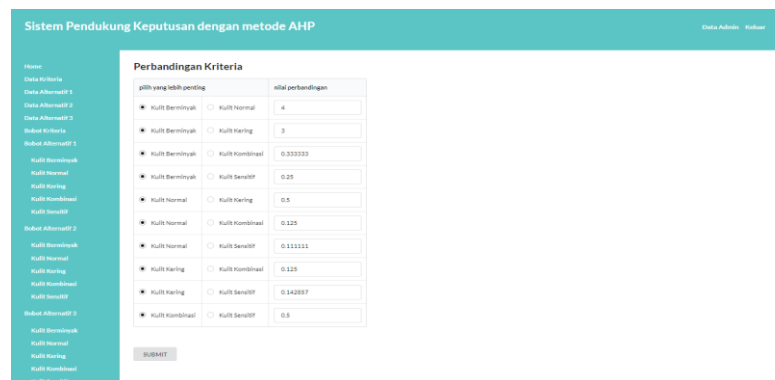**3.1   Implementation**

a.   Skincare Selection Page

Figure 2. Skincar Selection Page
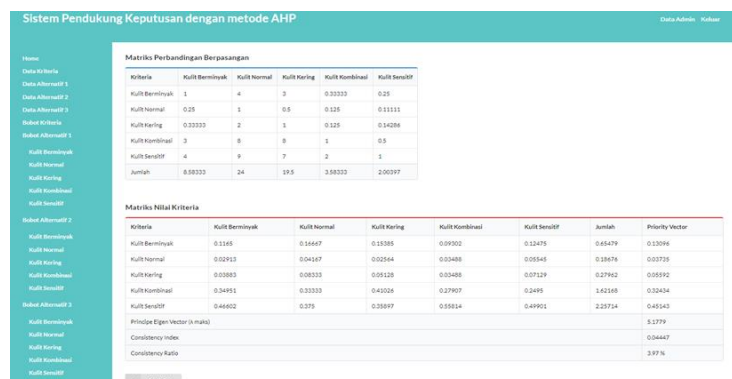
b.   Criteria Weighting Input Form

Figure 3. Criteria Weighting Page

c.   Comparison Matrix Page

Figure 4. Comparison Matrix Page

4.   Conclusion

After conducting a literature study, analysis and design, the following results were obtained. For oily skin types, for facial foam, namely: Wardah Acnederm Pure Foaming Cleanser, for moisturizer: Perfect

Bright Moisturizer SPF 28 and for masks, namely: Perfect Bright Peel Off Mask. For normal skin types, for facial foam, namely: Lightening Gentle Wash, for moisturizer, namely: Perfect Bright Moisturizer Normal Skin, and for masks, namely: Wardah Nature Daily Sheet Mask Aloe Vera. For dry skin types, for facial foam, namely: Renew You Anti Aging Facial Wash, for moisturizer, namely: Wardah Nature Daily Aloe Hydramild Multifuntion Gel and for masks, namely: Wardah Nature Daily Sheet Mask Aloe Vera. For combination skin types, for facial foam, namely: Wardah Nature Daily Seaweed Facial Wash, for moisturizer, namely: Lightening Day Cream and for masks, namely: Wardah Nature Daily Sheet Mask Green Tea. For sensitive skin types, for facial foam, namely: Wardah Nature Daily Seaweed Facial Wash, for moisturizer, namely: Wardah Nature Daily Aloe Hydramild Multifuntion Gel and for masks, namely: Wardah Nature Daily Sheet Mask Aloe Vera.

Based on the results of the analysis above, suggestions for the development of this application in the future are as follows. This application is made still web-based, it is hoped that in the future the development of this application can use mobile-based programming. The application only determines skin type, it is hoped that in the future the development of this application can determine skin problems as well.

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