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Implementation of AHP and Topsis Algorithm on Web-based Application Design to Determine Prospective Winners of Betta Fish Contest

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***Abstract*— The procurement of beauty competitions from ornamental betta fish has been held throughout Indonesia. The concept of judging and assessment carried out in the ornamental betta fish beauty competition still uses manual bookkeeping. The assessment with the national scale (SNI) is still a concern for the competition participants because of the lack of knowledge about the standard for judging ornamental betta fish contests. DSS (Decision Support System) can be an application development solution to determine the candidate for the winner of the ornamental betta fish contest. The criteria used include color value, neatness value, proportion value, mental value, and appearance value. The calculation method used in conducting this research is AHP and TOPSIS methods. The recommendations made will go through the AHP process for weighting based on the SNI assessment standard, while TOPSIS is used to receive alternatives from users. Then the ranking is based on the preference value generated by the TOPSIS method. This study has obtained the results of the application of the AHP and TOPSIS methods to make a recommendation system for contestants for winning ornamental betta fish correctly. Testing the level of user satisfaction obtains satisfaction results measured through the EUCS (End User Computing Satisfaction) dimension with the help of a Likert Scale calculation, so that it gets a satisfaction value of 87.89%.**

***Index Terms*— AHP; Betta Fish; DSS; Web Aplication; TOPSIS**.

I. INTRODUCTION

Betta fish are freshwater fish originating from various countries or regions in Southeast Asia that have unique shapes and characteristics and are more aggressive in defending their territory. Betta fish are generally divided into three groups, namely ornamental betta, complaint betta, and wild betta [1]. The procurement of beauty competitions from betta fish has been held throughout Indonesia. The scoring system of the betta fish beauty competition uses the SNI (Standar Nasional Indonesia) standard [2] and IBC (International Betta Congress) [3]. However, the judging that is carried out in every betta fish beauty competition is still done manually by each organizer, this makes the assessment time inefficient and tends to be slow to win the ornamental betta fish contest [4]. Then, for contestants who have just joined the contest, they tend to have concerns about the competition scoring system due to lack of knowledge about the standards for judging ornamental betta fish contests [5].

In designing an application to determine the best betta fish candidates, a decision support system is needed to get an accurate evaluation of the winners of the betta fish beauty competition. DSS (Decision Support System) is a system that is used as a problem solving tool to assist decision making that will be considered [6]. Then, we need a method that can convert weights and calculations to get ranking results. The Analytic Hierarchy Process (AHP) method is a decision making method that is objective and subjective and can be used to determine the weight of the criteria [7]. Meanwhile, the TOPSIS method is one of the best methods in making decisions with many alternative choices [8].

AHP and TOPSIS are methods that are widely used in decision making. Previous research concluded that the AHP and TOPSIS methods were able to provide an alternative with an ideal solution distance value. The combination of the two methods can produce a more objective ranking result, so that it has a better recommendation quality [9]. The second study concluded that based on the calculation of the AHP-TOPSIS method on student data in 2015 it had an accuracy of 81% better than the calculation of the PROMETHEE method on student data in 2015 which had an accuracy of 70% [10]. The latest research concludes that the system built can determine the best supplier based on the supplier who has the highest weight, in this study PT Global Fiberindo has the highest weight value of 0.472 [11].

II. METHODS

A. *Web Based Application*

Web-based applications are applications that can be accessed via an internet browser, the use of web-based applications has been widely used by people in this century. The advantage of web-based applications is that there is no need to get a license to develop it, this is

because the license is owned by the application service provider. Then, in the development of web-based applications, they tend to only require standard system specifications and do not really require high specifications. Web-based applications can also be accessed anywhere without the need to do the installation process into the user's device. The operating system is also not an obstacle in making web-based applications, because web based applications have no limits on the operating system owned by the user's device. Web-based applications can also be accessed through various electronic devices such as computers, smartphones, laptops, and tablets [13].

B. Betta Fish

Betta fish are freshwater fish originating from various countries or regions in Southeast Asia that have unique shapes and characteristics and are more aggressive in defending their territory. Betta fish are generally divided into three groups, namely ornamental betta, complaint betta, and wild betta. They has a unique shape and characteristics and tends to be aggressive in defending its territory. Among fans, hickeys are usually divided into three categories, namely ornamental hickeys, complaint hickeys, and wild hickeys. In Indonesia itself there are native races of betta fish, one of which is Betta channoides found in Pampang, East Kalimantan [1].

Betta fish consist of 73 species and are divided into 13 groups. Of the 73 species on earth, the betta fish species circulating in the market on average come from the splendens complex group, which consists of betta splendens, betta stiktos, betta mahachai, betta smaragdina and betta imbellis, as well as variants of crosses from these species. the. Betta fish fans divide the betta fish group 3 types, e.g ornamental, complaint, and wild [14].

In the ornamental betta fish contest there are 5 criteria to be assessed, namely color, tidiness, proportion, mentality, and appearance. Color categorization is based on looking at the colors on the betta fish's body parts [2]. Then, the categorization based on the neatness seen from the neatness of all parts of the betta fish body includes, body/head, anal fin, dorsal fin, pelvic fin, and tail fin. Neatness is assessed based on the detail aspects of ornamental betta fish, for example there is no bend in each fin bone, all scales are perfectly fused and nothing is loose, there are no fine hairs on the fish, and so on [2]. Categorization based on proportions seen from the balance between the body, tail, and fins of ornamental betta fish [2]. Categorization based on appearance is based on looking at various aspects, ranging from the size of the betta fish, the health condition of the betta fish, the style/behavior of the fish when testing, overall color, fish mentality, and overall tidiness [2].

Fig. 1 is an example of an ornamental betta fish that won the halfmoon class. This fish belonging to Alexander Chandra managed to get three titles, namely Best of Division, Best of Show, and best in the single tail category. The halfmoon fish has brooders who have won before. Genetic factors are also the cause of betta fish getting good genes from their parents [15].

Fig. 1. Betta Fish Contest Winner for Single Tail Halfmoon Category [15]

C. Decision Support System

The concept of a decision support system is characterized by computer-based interactive systems that help decision makers use data and models to solve unstructured problems. DSS combines data and models into one part and is designed to assist managers in the decision-making process of semi-structural problems. DSS provides support for the manager's judgment not to replace the manager's role. DSS works by combining models and analysis techniques by entering existing data to find the information contained therein. DSS is a computerized system that can collect and analyze data and synthesize it to produce comprehensive information reports. DSS can provide more informed decision making, timely problem solving, and improve the efficiency of problem handling or operations, planning and management [16].

D. Analytical Hierarchy Process

Analytic Hierarchy Process (AHP) was developed in 1980 by Thomas L. Saaty in his book entitled Analytic Hierarchy Process. Analytic Hierarchy Process (AHP) is a decision making process that explains the evaluation factors and weighting factors in multi-factor conditions by doing pairwise comparisons (Pairwise Comparison) [17].

The AHP calculation process begins with defining the problem, determining the solution, and compiling the hierarchy as shown in Fig. 2, in this study the calculation hierarchy only reached level 2 [17].

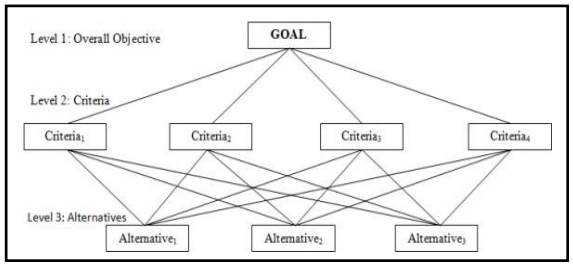

Fig. 2. Hierarchical Structure of AHP [18]

The second step is to determine the priority elements used by making comparisons in pairs, the comparison matrix uses numbers that represent the relative importance of one element to another [17].

TABLE I. PAIRWISE COMPARISON RATING SCALE [17]

Weight	Distribution
1	Both element are equally important
3	One element is slightly more important than the other
5	One element is clearly more important than the other element
7	One element is more important than the other element
9	One element is absolutely important than the other element
2,4,6,8	Values between two adjacent consideration
Opposite	If activity i gets one point compared to activity j then j has the opposite value compared to activity i

The third step is to determine the priority of the matrix by adding up the values in each column of the pairwise comparison matrix. Then, divide the column value by the total to get the result of matrix normalization. Then, add up the values of each row and then divide by the number of elements to get the average result [17].

The fourth step, multiply each value in the first column by the relative priority of the first element, multiply the value in the second column by the relative priority of the second element, and so on. Then, add up all the rows of the matrix. The number of rows is divided by the corresponding priority element. Add the quotient by the number of elements present and the result is called max [17].

The fifth step is to calculate the Consistency Index (CI). The CI calculation uses the max value minus the number of criteria, then divided by the number of criteria minus 1 as shown in (1) [17].

$$CI = \frac{maks-n}{n-1} \quad (1)$$

The fifth step is to calculate the Consistency Index (CI). The CI calculation uses the max value minus the number of criteria, then divided by the number of criteria minus 1 as shown in (1) [17].

$$CR = \frac{CI}{IR} \quad (2)$$

Index Random (IR) is a random index determined based on Table II. IR represents the value used in the calculation based on the number of criteria used in the study. The size of the matrix is the number of criteria used [17].

TABLE II. RANDOM CONSISTENCY INDEX LIST (IR) [17]

Matrix Size	Random Index Value
1,2	0.00
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49
11	1.51
12	1.48
13	1.56
14	1.57
15	1.59

The final step is to check the consistency of the hierarchy. If the CR value is less than or equal to 0.1, then the calculation results can be said to be consistent [17]. The AHP method provides a solution to a fairly broad and unstructured problem by creating a model [19].

E. TOPSIS

TOPSIS is a decision-making method with many standards, which can help solve various possibilities alternative problems and the best decision-making analysis process. In the analysis has a simple concept that is easy to understand. When performing calculations, this method is quite efficient in measuring the various alternative options available using a form of mathematical calculation that is simple and easy to calculate [8].

The first step is to make a normalization of the decision matrix. Then, weight the normalized matrix. Then, determine the positive and negative ideal solution matrices. Then, Determine the distance between the values of each alternative using a positive and negative ideal solution matrix. Then, determine the preference of the value of each alternative [8]. The calculation of the TOPSIS method for evaluating the performance of each alternative on each standard is normalized, as in (3) [8].

$$r_{ij} \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad (3)$$

$$y_{ij} = w_i r_{ij} \quad (4)$$

with i=1,2,…,m; and j=1,2,…,n.

$$A+ = (y1+, y2+, \dots, yn+) \quad (5)$$

$$A- = (y1-, y2-, \dots, yn-) \quad (6)$$

where $\boldsymbol{yj}$ + is the largest value if j is a profit attribute, while $\boldsymbol{yj}$ + is the smallest value if j is a cost

attribute. Then, $\boldsymbol{yj}$ − is the smallest value if j is a profit attribute, while $\boldsymbol{yj}$ − is the largest value if j is a cost attribute [8].

Formula for the distance between alternative Ai and positive ideal solution (7)

$$D_i^+ = \sqrt{\sum_{j=1}^{n}\left(y_i^+ - y_{ij}\right)^2}; \quad i = 1,2,..,m \qquad (7)$$

Formula for the distance between alternative Ai and negative ideal (8).

$$D_i^- = \sqrt{\sum_{j=1}^{n}\left(y_{ij} - y_i^-\right)^2}; \quad i = 1,2,..,m \qquad (8)$$

Formula for the preference value for each alternative (Vi) (9).

$$V_i = \frac{D_i^-}{D_i^- + D_i^+} \qquad (9)$$

A larger value of Vi indicates that the alternative of Ai is more used in the selection [8]. The TOPSIS method has an easy-to-understand concept, high computational efficiency, more efficient computational calculations and fast speed [20]. However, the drawback of the TOPSIS method is that there is no priority calculation that has become a standard, where the calculation is useful for increasing the effectiveness of the standard weighting calculation value. Therefore, for this reason, this method can be used in conjunction with, for example, the AHP method to produce maximum results or decisions [21].

F. Likert Scale

The Likert scale has two forms of questions, namely the form of questions that are used to measure the positive questions of the positive vector table and the form of negative questions that are used to measure the negative vector tables. The scores for the positive questions were 5, 4, 3, 2, and 1; scores for negative questions are 1, 2, 3, 4, and 5. to find the total score and the maximum total score, you can use the calculation formulas as in (10) and (11) [22].

$$TSmax = Respondent \times Highest\ Score \qquad (10)$$

$$Total\ Score = Respondent \times Score \qquad (11)$$

The total score is used to find the score index value to find out the conclusions of the study using a Likert scale, the formula for calculating as in (12).

$$Index = (Total\ Score : Score\ Max) \times 100\% \qquad (12)$$

TABLE III. RATING INTERVAL [22]

Interval	Description
0%-19,99%	Strongly Disagree
20%-39,99%	Disagree
40%-59,99%	Undecided
60%-79,99%	Agree
80%-100%	Strongly Agree

G. EUCS

End User Computational Satisfaction (EUCS) is a method to measure user satisfaction of application systems by comparing expectations and reality of information systems. The EUCS evaluation model was developed by Doll & Torkzadeh. Evaluation using this model can emphasize user satisfaction by evaluating the content, accuracy, format, timing and ease of use of the system [24]. The model uses five criteria that are used to measure user satisfaction.

H. IBM SPSS Statistics 26

IBM SPSS Statistics is a software capable of performing almost all types of data analysis used in the social sciences, natural sciences, or in the business world. SPSS and IBM have created a program that is user friendly and also powerful in performing statistical calculations. SPSS is capable of performing almost all types of statistical analysis ever used in the social sciences, business, and other sciences [26]. To use the IBM SPSS Statistics software requires experience in the field of statistics or being in such a learning process. Basic knowledge in statistics is important to understand so that the procedures used can produce the output that the user wants [26].

III. RESULTS AND DISCUSSION

A. AHP Process

The initial process in the AHP method is to determine the criteria used to perform calculations as in Table IV.

TABLE IV. TABLE CRITERIA

Code	Description
C1	Color
C2	Neatness
C3	Proportion
C4	Mental
C5	Appearance

The weights of these criteria are taken to create scores on the pairwise comparison rating scale. The comparison value between criteria using a pairwise comparison rating scale is made based on the difference between the weights of the criteria. The difference used is based on the difference between the criteria held by the SNI assessment weight of the Indonesian Betta Ornamental Society (MCHI) with the smallest difference of 0 points and the largest difference of 40 points. The comparison can be seen in Table V.

TABLE V. DETERMINATION OF VALUES BASED ON PAIRWISE COMPARISON RATING SCALE

Difference	Scale	Description
0	1	Equally important
5	2	Values between equally important and slightly more important
10	3	A little more important
15	4	Value between slightly more important and definitely more important
20	5	Obviously more important
25	6	The intermediate value is clearly more important and more important
30	7	More important
35	8	Value between more important and absolutely important
40	9	Absolute importance

The results of determining the interests obtained based on user input from the selected class and sub class will produce a scale value determined by the system. The scale values form a pairwise comparison matrix. The matrix is made based on comparisons between criteria as in Table VI.

TABLE VI. CRITERIA PAIRED COMPARISON MATRIX

	C1	C2	C3	C4	C5
C1	1	2	2	5	0,5
C2	0,5	1	1	4	0,33
C3	0,5	1	1		0,33
C4	0,2	0,25	0,25	1	0,167
C5	2	3	3	5,988	1
Total	4,2	7,25	7,25	19,98	2,327

Then the matrix normalization process is carried out by adding up each value in each column and dividing it by the value in each column. The calculation will produce a criterion normalization matrix which can be seen in Table VII.

TABLE VII. CRITERIA NORMALIZATION MATRIX

	C1	C2	C3	C4	C5
C1	0,238095	0,275862	0,275862	0,25015	0,214869
C2	0,119408	0,137931	0,137931	0,20012	0,141813
C3	0,119408	0,137931	0,137931	0,20012	0,141813
C4	0,047619	0,034483	0,034483	0,05003	0,071766
C5	0,47619	0,413793	0,413793	0,299581	0,429738

The results of the search for the value of the criterion weight (W) can be seen in Table VIII.

TABLE VIII. CRITERIA WEIGHT TABLE

Criteria	W
C1	0,2510
C2	0,1474
C3	0,1474
C4	0,0477
C5	0,4066

Then in Table IX is a table of the results of matrix multiplication between pairwise comparison matrices with the value of the criterion weight (W). The result of the multiplication produces the value of max. The value of max is used to find the t value which is the reference for the Consistency Index (CI) value search.

TABLE IX. LAMBDA MAX CALCULATION TABLE

Criteria	W	Lambda Max
C1	0,2510	1,2821
C2	0,1474	0,7451
C3	0,1474	0,7451
C4	0,0477	0,2395
C5	0,4066	2,0782

Then the next step is to get the value of t. The t value is obtained by dividing each column max by each column of criterion weight (W) and adding, then dividing by the number of criteria elements.

$$t = \frac{1}{5} \times \left(\left(\frac{1,2821}{0,2510}\right) + \left(\frac{0,7451}{0,1474}\right) + \left(\frac{0,7451}{0,1474}\right) + \left(\frac{0,2395}{0,0477}\right) + \left(\frac{2,0782}{0,4066}\right)\right) = 5,0709$$

Then the next step is to calculate the Consistency index (CI). The step to get the CI is to subtract the t value with the number of criteria elements, then divide by the number of criteria values minus 1. To get the Consistency Ratio (CR) value is to divide the result of the CI value by the Random Index (IR). The IR used for the number of criteria elements as many as 5 criteria is 1.12.

$$CI = \frac{5,0709-5}{5-1} = 0,017731 \quad (14)$$

$$CR = \frac{0,017731}{1,12} = 0,015832 \quad (15)$$

The CR value obtained is 0.015832, this value is below 0.1 which is a requirement so that the weight of the criteria can be used. Then the weight of the calculated criteria is considered valid. If the CR value is above 0.1, the calculation must be repeated so that the CR value can meet the requirements.

B. TOPSIS Process

TOPSIS calculation is carried out when the validation of the CR value has been fulfilled in the AHP calculation. The first stage is to make a decision matrix based on the input file from the user regarding the assessment of betta fish. The determined rating scale is set with a rating of 1-100, the value is obtained from the user via file uploads in the application. The decision matrix is shown in Table X.

TABLE X. DECISION MATRIX

Serial Number	Criteria				
	C1	C2	C3	C4	C5
A1	23	34	90	65	54
A2	32	33	87	86	53
A3	43	86	32	42	56
A4	12	57	32	42	67
A5	43	67	64	45	12
A6	23	86	53	42	32
A7	43	97	45	24	46
A8	53	56	32	43	45
A9	44	45	23	42	32
A10	80	34	98	53	74

Then the step taken is to find the value of the normalized decision matrix. The calculation is done by

squaring each value, then adding all of them and the result of the sum is rooted, then each data is divided by the result of the rooting. The calculation results can be seen in Table XI.

TABLE XI. NORMALIZED DECISION MATRIX

Serial Number	Criteria				
	C1	C2	C3	C4	C5
A1	0,1672	0,1689	0,4628	0,4036	0,3404
A2	0,2326	0,1639	0,4474	0,5340	0,3341
A3	0,3126	0,4273	0,1645	0,2607	0,3530
A4	0,0872	0,2832	0,1645	0,2607	0,4224
A5	0,3126	0,3329	0,3291	0,2794	0,0756
A6	0,1672	0,4273	0,2725	0,2607	0,2017
A7	0,3126	0,4819	0,2314	0,1490	0,2900
A8	0,3853	0,2782	0,1645	0,2670	0,2837
A9	0,3199	0,2236	0,1182	0,2607	0,2017
A10	0,5816	0,1689	0,5040	0,3290	0,4665

Then the next process is to calculate the weighted normalized decision matrix. The calculation process uses the criterion weight value (W) which has been multiplied by a normalized decision matrix. The results of the calculation of the weighted normalized decision matrix can be seen in Table XII.

TABLE XII. WEIGHTED NORMALIZED DECISION MATRIX

Serial Number	Criteria				
	C1	C2	C3	C4	C5
A1	0,0419	0,0248	0,0682	0,0192	0,1384
A2	0,0583	0,0241	0,0659	0,0254	0,1358
A3	0,0784	0,0629	0,0242	0,0124	0,1435
A4	0,0218	0,0417	0,0242	0,0124	0,1717
A5	0,0784	0,0490	0,0485	0,0133	0,0307
A6	0,0419	0,0629	0,0401	0,0124	0,0820
A7	0,0784	0,0710	0,0341	0,0071	0,1179
A8	0,0967	0,0410	0,0242	0,0127	0,1156
A9	0,0802	0,0329	0,0174	0,0124	0,0820
A10	0,1459	0,0248	0,0742	0,0156	0,1897

Next is to find a positive ideal solution and a negative ideal solution. The calculation in finding these two values is to find the minimum and maximum values in each column of the weighted normalized decision matrix. The matrix of positive and negative ideal solutions can be seen in Table XIII.

TABLE XIII. MATRIX OF POSITIVE IDEAL SOLUTION AND NEGATIVE IDEAL SOLUTION

	C1	C2	C3	C4	C5
y+	0,1459	0,2510	0,0742	0,0254	0,1897
y-	0,0218	0,1474	0,0174	0,0071	0,0307

The next calculation is to find the distance of the positive ideal solution and the distance of the negative ideal solution. The process is done by reducing the value of the ideal solution by the value of each criterion in the weighted normalized decision matrix. The calculation results are then squared and then added together. The result of the sum is rooted to get the value of the distance of the positive ideal solution and the distance of the negative ideal solution. The calculation results can be seen in Table XIV.

TABLE XIV. IDEAL SOLUTION DISTANCE TABLE

Serial Number	Ideal Solution Distance	
	C1	C2
A1	0,125098	0,121335
A2	0,113291	0,122755
A3	0,097078	0,132301
A4	0,138734	0,14235
A5	0,176391	0,069453
A6	0,154297	0,071297
A7	0,107985	0,115199
A8	0,10733	0,114521
A9	0,144078	0,078381
A10	0,047156	0,209672

Then the next step is to find the preference value. The calculation process is to add up the negative ideal solution distance (S-) with the positive ideal solution distance (S+). Then each S- is divided by the sum. The calculation results to get the preference value can be seen in Table XV.

TABLE XV. PREFERENCE VALUE MATRIX

Serial Number	Preference Value
A1	0,4923
A2	0,5200
A3	0,5767
A4	0,5064
A5	0,2825
A6	0,3160
A7	0,5161
A8	0,5162
A9	0,3523
A10	0,8163

Based on Table XV, the preference value of the highest ornamental betta fish contest is the participant with serial number A10. It can be concluded that the winner of the ornamental betta beauty contest is the fish with serial number A10 with a preference value of 0.8163. In Fig. 3 is a ranking display that has been sorted by preference value which is used as a percentage of the assessment. All preference values are made in the form of a percentage so as to produce a percentage rating. The value of the application is slightly different from the manual calculation due to the rounding performed on the application. It can be seen and concluded that the AHP and TOPSIS calculations in Fig. 3 are not much different from Table XV.

Appraisal Presentation
81.67%
57.73%
52.06%
51.63%
51.63%
50.74%
49.30%
35.22%
31.61%
28.18%

Fig. 3. System Ranking Calculation Results

C. System Evaluation Results

System evaluation is done by asking respondents who have participated in an ornamental betta fish competition to try the system. Then, respondents were asked to fill out a questionnaire consisting of 13 questions with 5 scales, namely strongly agree, agree, hesitate, disagree, and strongly disagree. The questions used are the End User Computing Satisfaction (EUCS) method. In the EUCS method, there are 5 dimensions of questions, namely, the dimensions of content (content), dimensions of display (format), dimensions of accuracy (accuracy), dimensions of timeliness (timelines), and dimensions of user ease (ease of use).

Based on the calculation of the five dimensions in the EUCS, the average percentage score can be calculated. The calculation can be seen as follows:

$$\boldsymbol{Final\ Percentage} = (88) + (88{,}89) + (84{,}89) + (87{,}67) + (90)5 = 87{,}89\%$$

The results of the final percentage calculation obtained 87.89%. It can be concluded that the respondents strongly agree with the satisfaction of the application to determine the winner of this betta fish contest.

D. Questionnaire Validity Test

The validity test of the questionnaire is a test to test the results of the questionnaire on user satisfaction in the EUCS method. Questionnaire validation is used to test the level of validity of the questionnaire that has been filled out by the respondent. This validity test was carried out using IBM SPSS Statistics 26. The calculation results for the questionnaire validity test can be seen in Table XVI.

TABLE XVI. VALIDITY TEST CALCULATION RESULT

Question	Score r_{table}	Score r_{count}	Description
1	0,374	0,832	Valid
2	0,374	0,856	Valid
3	0,374	0,835	Valid
4	0,374	0,838	Valid
5	0,374	0,833	Valid
6	0,374	0,880	Valid
7	0,374	0,799	Valid
8	0,374	0,854	Valid
9	0,374	0,860	Valid
10	0,374	0,906	Valid
11	0,374	0,891	Valid
12	0,374	0,860	Valid
13	0,374	0,883	Valid

Each value of r_count is compared to the value of r_table. Then, if the value of r_count > the value of r_table, then the data is considered valid. On the other hand, if the value of r_count < the value of r_table, then the data is considered invalid. Based on the results of the calculations in Table XVI, it can be concluded that each item in the questionnaire is considered valid.

E. Interface System Implementation

Figure 4 is part of Main Page and How to Use page where the user is given information regarding the first steps that must be taken to start running the application.

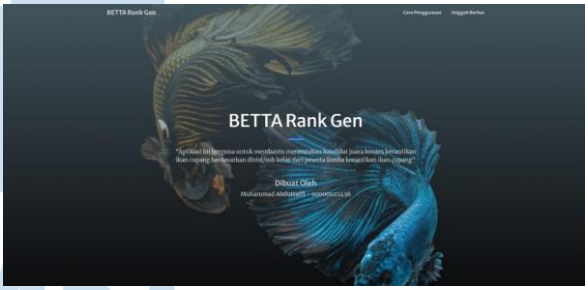

Fig. 4. Main Page

Figure 5 is the File Upload page for input betta fish class and their subclass. The betta fish class functions to provide information regarding which class is ranked, while the betta fish subclass functions to determine the weight of the betta fish species that are contested. The user must select both inputs to be able to proceed to the next stage.

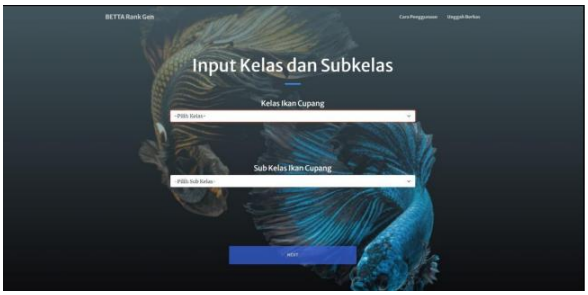

Fig. 5. Page File Upload

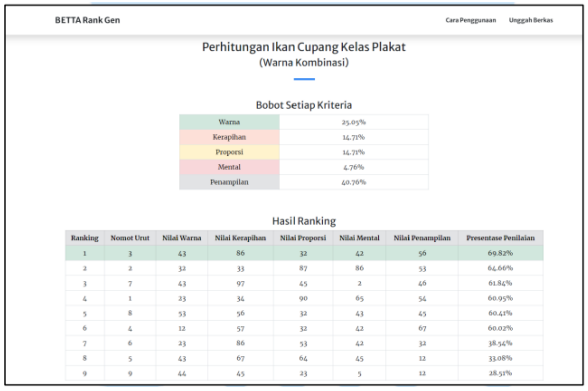

Fig. 6. Table of Calculation Results for Betta Fish Contest Champion Candidates

IV. CONCLUSIONS

The decision support system for determining the winner of the betta fish contest using the web-based AHP and TOPSIS methods has been successfully created. The system can provide recommendations for betta fish contest winners based on five criteria determined by the system, namely color value, neatness value, proportion value, mental value, and appearance value. The data provided by the user in the form of betta fish values from each criterion can be processed properly by the system. The survey has been conducted on 30 respondents. The method used in the survey is End User Computing Satisfaction (EUCS) to conclude user satisfaction with the application. The results of the calculations carried out reached 87.89% as the final percentage of testing the EUCS method. The calculation is assisted by the Likert scale method which produces a very good percentage. Test the validity of the questionnaire on 13 questions that have been filled out by respondents. Calculations were carried out using IBM SPSS Statistics 26. The calculation results stated that all 13 questions were valid.

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