

Decision Support System For The Determination Of Web-Based Gayo Arabica Coffee Beans With Weighted Product (WP) Method

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Abstract

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The weakness of coffee entrepreneurs during this time is still the lack of knowledge about the sorting of the assessment the results sorting of coffee beans. So far the selection of coffee beans is still using the manual way but the coffee beans will be in the process will be sorted election to determine the quality. This condition causes producers inefficient and accurate in determining the quality of coffee beans because of insufficient technology to manage the quality determination of coffee beans that require manufacturers to analyze the quality of coffee beans using a system based on standardization assessment by the International coffee organization (ICO). To facilitate the manufacturer in this case, the authors build a decision support system of the determination of the sorting of coffee beans that can provide solutions that have been faced to produce quality coffee beans. To support this research, the data collection criteria from the International coffee organization (ICO) as data to conduct the quality assessment. The decision support system is formed using PHP, HTML, and MYSQL programming language as system database, weighted product as its design method. this decision support system is built by adding criteria to reduce the level of subjectivity, and the impact on the results of determining the quality of coffee beans is given to be more accurate and precise.

Keywords: Determination of quality of coffee beans, website, Weighted Product

1. Introduction

Coffee plants are currently one of the plantation crops that occupy important positions in the agricultural sector in general, and the plantation sector in particular and play a role as a source of foreign exchange for the country (Rahardjo, 2013). Of the many plants that produce in the Bener Meriah district, which is one of the areas that produce coffee in Aceh Province, the distribution base covers several sub-districts in Aceh in particular. Coffee plantations in Bener Meriah Regency are mostly a collection of small gardens owned by farmers.

Quality is a very important factor in the world of trade, the better the quality of the commodity to be traded, the higher the amount of demand. Quality coffee beans require accuracy in the selection process so that they fit the needs what consumers expect. Quality determination process coffee beans using the manual method, entrepreneurs/distributors carry out the sorting process by looking at the value of defects in the coffee beans and separating them to produce beans that are included in the good grade category.

Seeing the interest from coffee entrepreneurs, to make it easier to analyze the assessment, it is necessary to have an appropriate system in analyzing problems, accurate in solving and efficient in presenting data, so that it is very appropriate by these problems, namely "Decision Support System for

Determining the Sorting of Coffee Beans Based on Web With the "Weighted Product (WP)" method, this method uses a normalization process to find the best alternative from the many available alternatives by giving weight to each criterion for each alternative, then the sorting process is carried out based on the final value obtained.

So based on the background that the researchers described above, it can be concluded that the importance of a decision support system for determining coffee bean sorting is a more precise, good, and efficient determination instrument so that it can support the solution to a problem to evaluate an opportunity.

2. Method

a. Types of research

The type of research used by the author is

This type of qualitative research is using data that has been clarified in the Coffee Plantation environment with the aim of creating a decision support system for determining the sorting of coffee beans through the observed conditions, so that the data summarized is information that is related to each other and is reasonable in accordance with the actual situation. . This research method uses Weighted Product (WP).

b. Research Data

Data needed in implementation

This research is data related to determining the sorting of coffee beans such as the criteria for each quality of coffee beans obtained from journals and the results of interviews with coffee plantation farmers in Bener Meriah Regency, Reronga Village.

Context Diagram

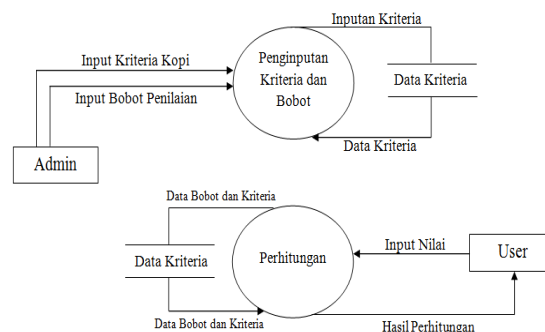
Context diagram is the highest level of data flow and contains only one process representing the system as a whole. The context diagram of this system is shown in Figure 1.



Figure 1. DSS Context Diagram for Determining Sorting Coffee Beans

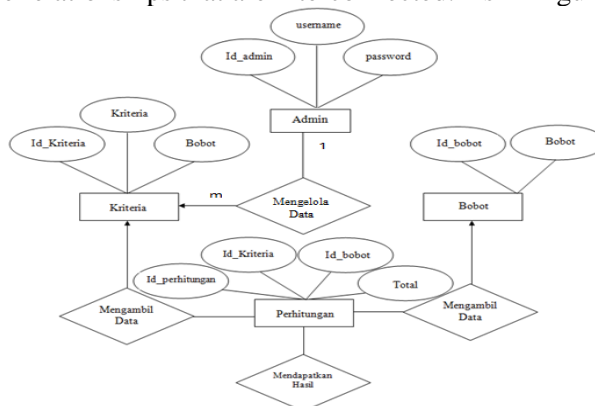
c. Data Flow Diagrams

Data Flow Diagram level 1 is a data flow diagram that is an elaboration or derivative of DFD level 0. DFD level 1 describes the flow of data and processes that will be integrated into the system. DFD level 1 describes in more detail the interaction between the system and the entities owned. As for DFD Level 1 can be seen in Figure 2 below.



d. Entity Relationship Diagram

Entity Relationship Diagram is one of the tools to analyze the design that describes the relationship between entities. In this study, the required entities are users, calculations, criteria and weights. Each entity has their respective relationships that are interconnected. As in Figure 3.



e. System Analysis with Weighted Product Method

Sorting coffee beans using the weighted product method criteria and weights are needed to perform calculations so that an alternative that produces the best quality will be obtained.

Criteria and Weights In the WP method that the researchers carried out there are several criteria needed for sorting coffee beans proposed in Table 1.

Table 1. Criteria

No	Criteria
1	Quality (E1)
2	Packing Typ (E2)
3	Fragrance (E3)

From each of these criteria, the initial weight will be determined before normalization is carried out, so the initial weight of each criterion can be seen in Table 2.

Table 2. Initial Weight of Each Criteria

Criteria	Weight
E1	5
E2	3
E3	4

From the criteria above, then a rating of the suitability of each alternative against each criterion is made in Table 3.

Tabel 3. Rating Of The Suitability Of Each Alternative Against Each Criterion

Score	Information
-------	-------------

-
- | | |
|---|-----------|
| 1 | Very less |
| 2 | Less |
| 3 | Enough |
| 4 | Good |
| 5 | Very good |
-

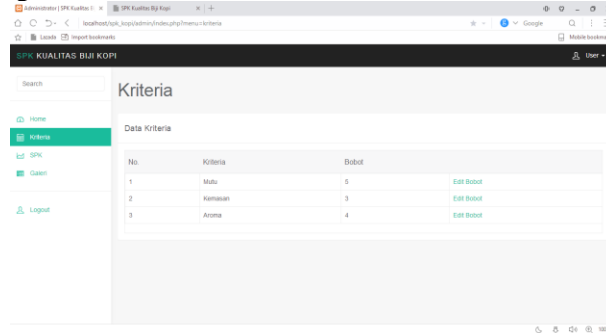
3. Results and Discussion

3.1 DSS Test Results on the System

SPK testing on the coffee bean sorting system is to ensure that the output of this application is accurate as expected. This test has several stages, including:

a. Observation of Coffee Bean Criteria Data

This stage is a process to view the data from the criteria and the weights of each criteria that are available in the MySQL database. This data will be the basis for calculating the DSS for determining the sorting of coffee beans. As in Figure 1.

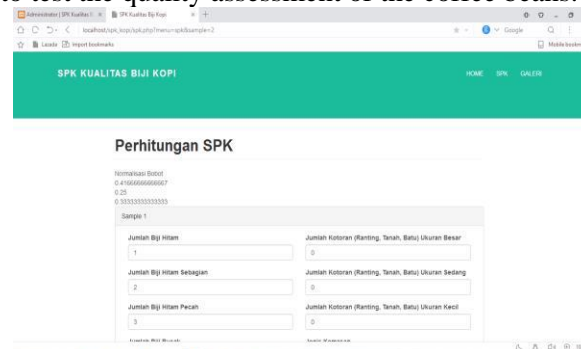


No	Kriteria	Bobot
1	Mutu	5
2	Kemasan	3
3	Asam	4

Figure 1. Observation of Coffee Bean Criteria Data

b. User Input on the System

At this stage the user will perform the test by inputting the value of the coffee bean sorting which is done by manual sorting to test the quality assessment of the coffee beans. As in Figure 2.

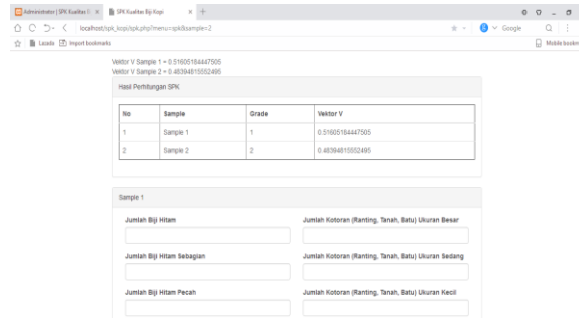


Sample 1	
Jumlah Biji Hitam	Jumlah Kotoran (Banting, Tanah, Batu) Ukuran Besar
1	0
Jumlah Biji Hitam Sedang	Jumlah Kotoran (Banting, Tanah, Batu) Ukuran Sedang
2	0
Jumlah Biji Hitam Pecah	Jumlah Kotoran (Banting, Tanah, Batu) Ukuran Kecil
3	0

Figure 2. Criteria Data

c. Output

At this stage, a direct test of the decision support system application will be carried out by displaying the output of the calculation results in the form of suggestions for the quality of coffee beans. As in Figure 3.



Vector V Sampel 1 = 0.51605164447505
Vector V Sampel 2 = 0.48394835552495

Hasil Perhitungan SPK:

No	Sampel	Grade	Vector V
1	Sampel 1	1	0.51605164447505
2	Sampel 2	2	0.48394835552495

Sampel 1

Jumlah Biji Hitam:
Jumlah Biji Hitam Sedang:
Jumlah Biji Hitam Pecah:

Jumlah Kotoran (Kandungan, Tanah, Batu) Ukuran Besar:
Jumlah Kotoran (Kandungan, Tanah, Batu) Ukuran Sedang:
Jumlah Kotoran (Kandungan, Tanah, Batu) Ukuran Kecil:

Figure 3. Output

3.2 User Main Menu

This menu is the main page menu for the user. In this menu, the user will be given the initial screen as shown in Figure 4.

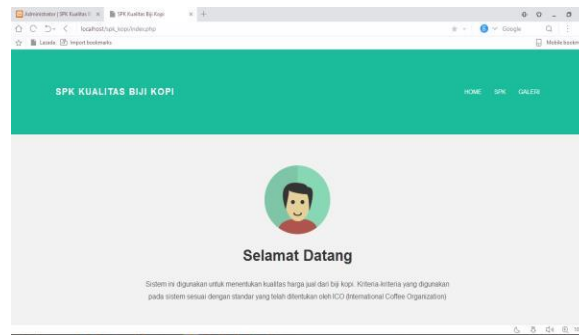


Figure 4. User Main Menu

3.3 User Input Menu

This menu is a menu for inputting seed sorting values coffee for users. In this menu, the user will input values according to the values in the coffee bean sorting results obtained. This value input will be processed according to the weight of each criterion so as to conclude the results that have been determined based on the criteria from the International Coffee Organization (ICO). As in Figure 5.

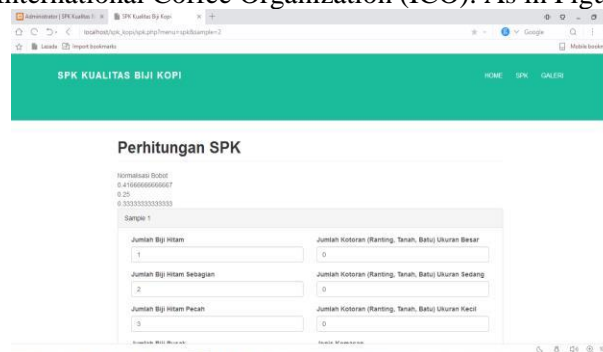


Figure 5. User Input

3.4 Output Results Menu

This menu will give results in the form of grade and vector V sequentially according to the calculation between the inputted values and the weights on each criterion. As in Figure 6.

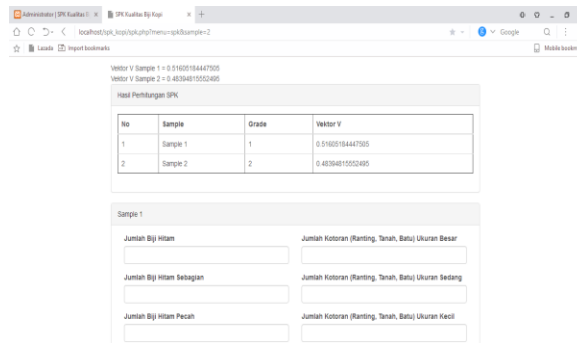


Figure 6. Output Results Menu

3.5 Gallery Menu

This menu only displays information about copies to the user. This view can in the form of displaying images and writing in accordance with the input. As in Figure 7.

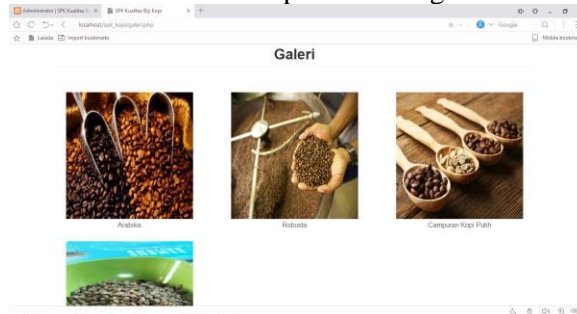


Figure 7. Gallery Menu

3.6 Admin Login Menu

This menu is an authentication for admin user rights on the system. The login menu serves to ensure that the admin can access the system and ensure whether the admin is registered in the database or not to be able to use this application. In this menu, the admin only needs to fill in the username and password to login. As in Figure 8.

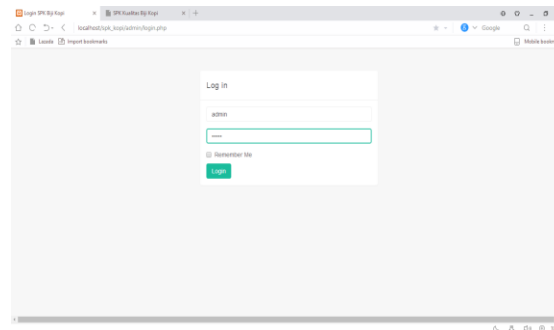


Figure 8. Admin Login Menu

3.7 Admin Weights and Criteria Edit Menu

This menu is the main menu on the admin after the admin has successfully authenticated the login. In this menu the admin can input and edit weights and criteria as desired. As in Figure 9.

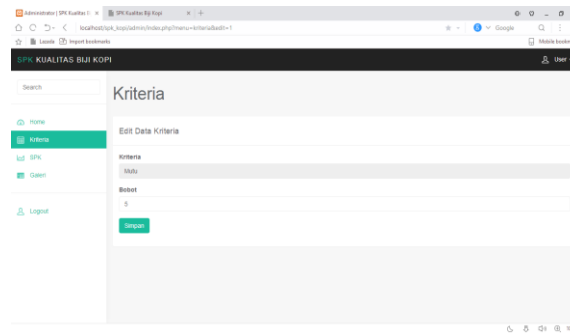


Figure 9. Menu Edit Weights and Criteria

4. Conclusions

- Testing the calculation of the weighted product method serves to determine whether the calculation carried out by the system is in accordance with the calculations on the weighted product method so as to produce accurate results. This testing process has several stages.
- Weight Normalization This stage is the weight normalization stage. Where each weight on the criteria will be divided by the total weight on all criteria for coffee beans or by as a test to produce the quality of coffee beans.
- Decision Support System (DSS) Determination of Sorting Coffee Beans using the Weighted Product method can produce decisions in the form of information on selected coffee beans based on using the formula $W_j \sum$ where W is grading standard from International Coffee Organizations (ICOs). normalized weights, and w is the original weight. Quality : $5/12 = 0.4$ Packaging Type : $3/12 = 0.25$ Aroma : $4/12 = 0.33$ 3. Calculation of User Input Value The next stage is the calculation process with user values. This process is a process of determining the value of Vector S and Vector V . Where the formula for Vector S is $S = (.w) . (.w)$ and Vector V .
- This decision support system was built by adding criteria so as to reduce the level of subjectivity, and the impact on the results of the selection of coffee beans being given to be more accurate and precise.

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