

Implementation of the MOORA Method in a Web-Based Decision Support System for Selecting Cat Food for Cats with Digestive Disorders

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Abstract

Selecting appropriate food for cats with digestive disorders is a challenge for many pet owners due to the variety of products available with different nutritional contents, prices, and brands. Inappropriate food selection may affect the recovery process and overall health of cats. This study aims to develop a web-based Decision Support System (DSS) that assists users in selecting the most suitable cat food by implementing the Multi-Objective Optimization on the Basis of Ratio Analysis (MOORA) method. The system evaluates several criteria, including price, moisture content, protein content, fat content, and crude fiber content, to rank available alternatives objectively. The system was developed using the Personal Extreme Programming (PXP) approach and implemented as a web application to improve accessibility and usability. The results show that the MOORA method successfully provides objective recommendations based on the specified criteria and simplifies the decision-making process for users. System testing using Black Box Testing, White Box Testing, and User Acceptance Testing indicates that all system functions operate correctly and meet user requirements. Therefore, the proposed system can effectively support pet owners in selecting appropriate cat food while improving service quality at pet stores.

Keywords: *Cat Food, Decision Support System, Digestive Disorder, MOORA, Web-Based System*

1. Introduction

Cats are among the most popular companion animals, resulting in an increasing demand for appropriate nutrition to maintain their health, particularly for cats suffering from digestive disorders. However, the wide variety of cat food products available, each with different nutritional compositions, prices, and brands, often makes it difficult for cat owners to determine the most suitable product. At Toko Chempaka Limo, food recommendations are still provided manually based on staff experience and product packaging information, making the decision-making process relatively subjective. Previous studies have demonstrated that the Multi-Objective Optimization on the Basis of Ratio Analysis (MOORA) method is effective for solving multi-criteria decision-making problems, such as employee selection, scholarship recipient selection, and general cat food recommendations. Nevertheless, limited research has specifically applied the MOORA method to recommend cat food for cats with digestive disorders through a web-based Decision Support System (DSS) by considering nutritional criteria, including price, moisture, protein, fat, and crude fiber. Therefore, this study aims to develop a web-based DSS using the MOORA method to objectively evaluate available alternatives and provide appropriate cat food recommendations for cats with digestive disorders, thereby assisting pet owners in making more accurate decisions while improving service quality at Toko Chempaka Limo.

2. Theoretical Basis

2.1. Definition of Implementation

Implementation is the process of putting a formulated plan, strategy, concept, or policy into actual practice to achieve established goals. It represents a crucial stage in the planning process, as the success of a program depends not only on the quality of the plan itself but also on how effectively that plan is executed. Thus, implementation can be defined as the process of transforming ideas or concepts into concrete actions that contribute to achieving desired objectives. (Harmita Dwi, 2023)

2.2. Definition of a Decision Support System

A Decision Support System (DSS) is a system designed to assist the decision-making process in solving problems, particularly those that are semi-structured in nature. In practice, a DSS employs specific methods to ensure that the selection process is conducted systematically and is accountable.(Aji Kartiko et al., 2021)

2.3. Definition of Cats and Cat Food

Cats are popular pets due to their docile nature and ease of interaction with humans. Caring for them requires special attention, particularly regarding nutrition tailored to their specific needs and health conditions. Cat food comes in a wide variety of types based on age, brand, flavor, size, and price. Generally, cat food is categorized into two types: wet food and dry food.(Kumarahadi et al., 2025)

2.4. Definition of Website

A website is a form of information technology application used as a medium to disseminate information to the general public. Through a website, information can be accessed anytime and anywhere, provided there is an internet connection.

The use of websites also offers advantages in terms of cost-efficiency and broader reach, making them widely utilized across various sectors, including for supporting business activities and information services.(Soedewi et al., 2022)

2.5. Definition of Moora

MOORA (Multi-Objective Optimization on the basis of Ratio Analysis) is a method used in decision support systems to solve multi-criteria problems. This method was developed to assist the decision-making process involving multiple interrelated attributes. (Kusmanto et al., 2022)

3. Research Methods

This study employed a quantitative approach to develop a web-based Decision Support System (DSS) for selecting cat food for cats with digestive disorders at Toko Chempaka Limo. Data were collected through interviews, observations, literature studies, and questionnaires to obtain the information required for system development and evaluation.

The system was developed using the Personal Extreme Programming (XP) method, which consists of planning, design, coding, testing, and software release. To determine the best alternative, the Multi-Objective Optimization on the Basis of Ratio Analysis (MOORA) method was applied using five evaluation criteria: price, moisture content, protein content, fat content, and crude fiber content. The calculation process includes decision matrix construction, normalization, weighting, optimization, and ranking of alternatives.

The developed system was evaluated using Black Box Testing, White Box Testing, and User Acceptance Testing (UAT) to verify system functionality, program logic, and user acceptance. The testing results were used to ensure that the system operated correctly and fulfilled user requirements.

4. Proposed Use Case Diagram

A use case diagram is created to illustrate how users interact with the system. This diagram depicts the actors involved in the system, as well as the actions or procedures performed within it. The system's use case design supports the decision-making process for selecting cat food for digestive disorders using the MOORA method.

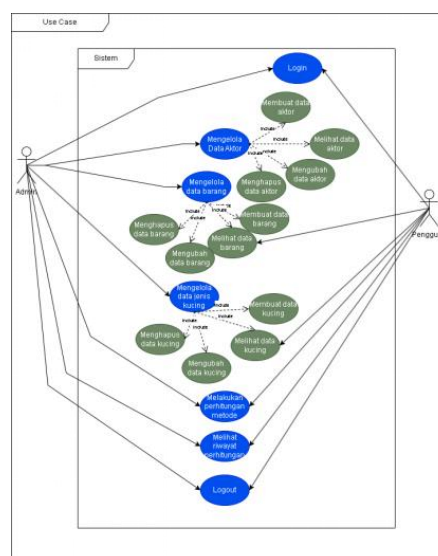


Fig. 1: Use Case

This use case diagram illustrates the interactions between the Admin and the User with the cat food recommendation system, which utilizes the MOORA method. The Admin has access rights to log in, manage data regarding actors, products, and cat breeds, perform MOORA method calculations, view calculation history, and log out. Meanwhile, Users can log in, view product and cat breed data, perform MOORA method calculations, view calculation history, and log out. The diagram depicts the allocation of access rights based on each user's role within the system.

5. Implementation and Testing

5.1. Interface Implementation

The program implementation phase details the translation of the interface design into a web-based application. This section presents each system page, along with the functions of the various menus used by both administrators and users.

a. Login

The login page is the initial interface that allows registered users to access the Chempaka Shop system. Users are required to enter their username and password for authentication before accessing the main dashboard. In addition, a registration button is provided for new users to create an account, ensuring secure and authorized access to the system.

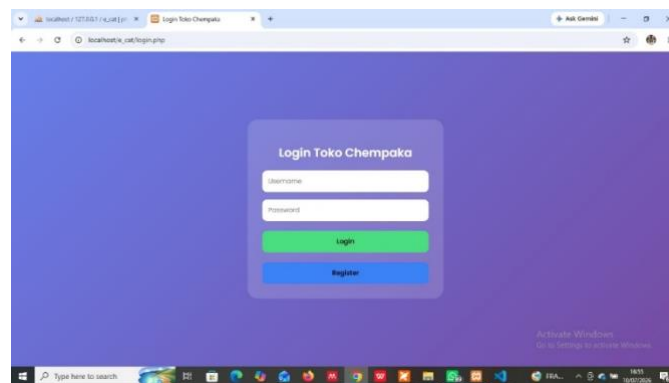


Fig. 2: Login Implementation

b. Register

The registration page enables new users to create an account before accessing the Chempaka Shop system. Users are required to enter a username, password, and password confirmation to complete the registration process. Once the registration is successful, users can return to the login page and access the system using their newly created account.

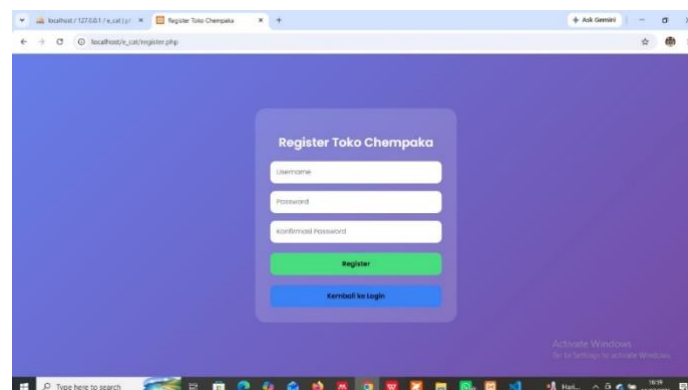


Fig. 3: Register Implementation

c. Dashboard Admin

The dashboard serves as the main interface of the Chempaka Shop system after user authentication. It provides an overview of important information, including the total number of users, products, MOORA calculations, and the latest calculation date. In addition, the dashboard displays the top three recommended cat food products based on the highest MOORA preference values, enabling administrators to monitor the system and access key information efficiently.

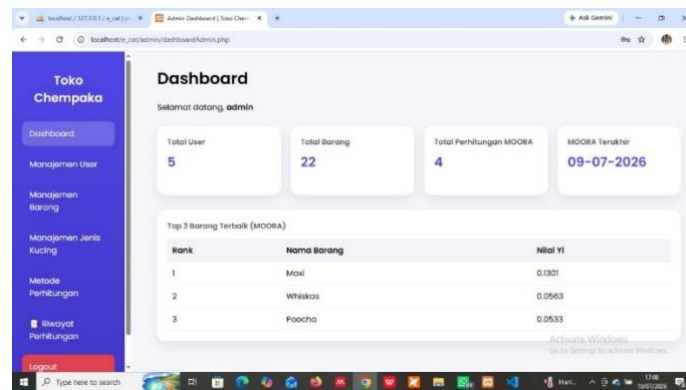


Fig. 3: Implementation of the Admin Dashboard

d. Admin User Management

The User Management page allows administrators to manage user accounts within the Chempaka Shop system. Administrators can add new users by entering a username, password, and user role, while the user list displayed below provides information for monitoring and managing registered accounts. This feature ensures efficient user administration and controlled system access.

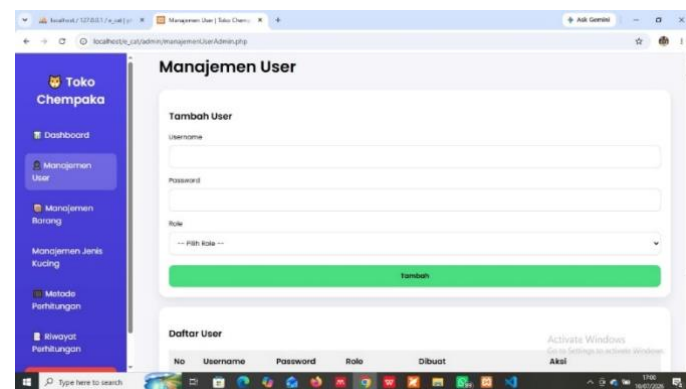


Fig. 4: Implementation of Admin User Management

e. Admin Inventory Management

The Product Management page enables administrators to manage cat food product data used in the decision-making process. Administrators can add product information, including product name, price, moisture content, protein content, fat content, and crude fiber content. This data serves as the input for the MOORA method to evaluate and rank product alternatives, ensuring accurate and objective recommendation results.

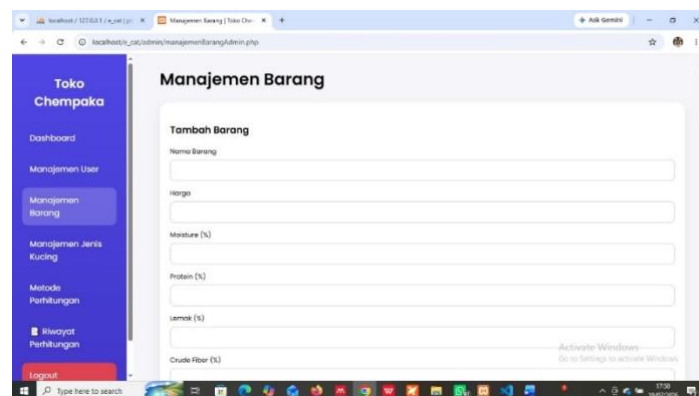


Fig. 5: Implementation of Administrative Inventory Management

f. Cat Type Management (Admin)

The Cat Type Management page allows administrators to manage information about different types of cats used in the recommendation process. Administrators can enter data such as cat type, age, category, life stage, weight, and characteristics. This information helps users identify the nutritional needs of their cats and supports the system in providing more appropriate cat food recommendations.

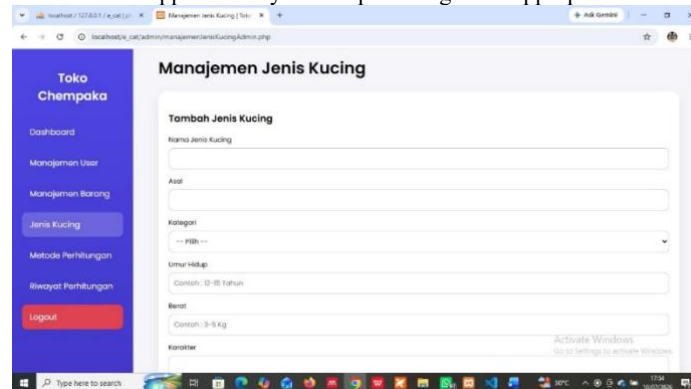


Fig. 6: Implementation of Cat Type Management (Admin)

g. MOORA Calculation Method

The MOORA Calculation page enables administrators to select cat food alternatives and assign weights to each evaluation criterion, including price, moisture content, protein content, fat content, and crude fiber content. After the calculation process is executed, the system automatically applies the MOORA method to rank all alternatives based on their preference values (Y_i). The ranking results provide objective recommendations, with the alternative having the highest Y_i value identified as the most suitable cat food for cats with digestive disorders.

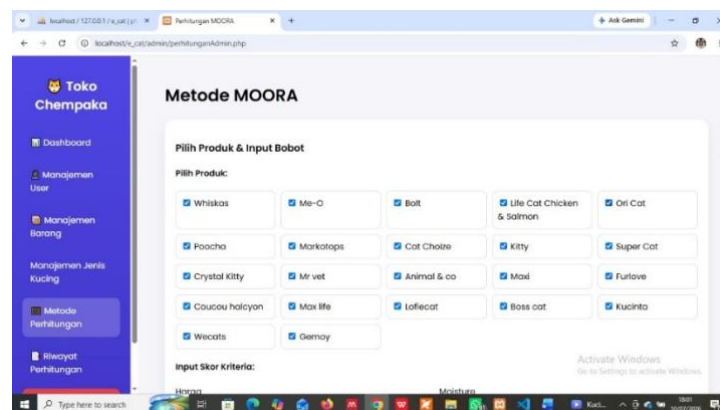


Fig. 7: Implementation of MOORA

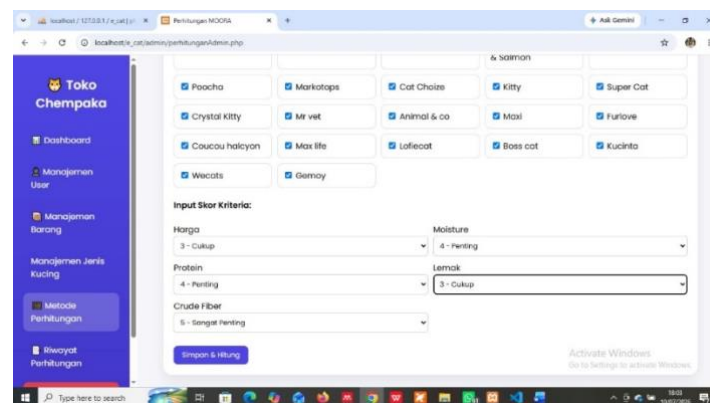
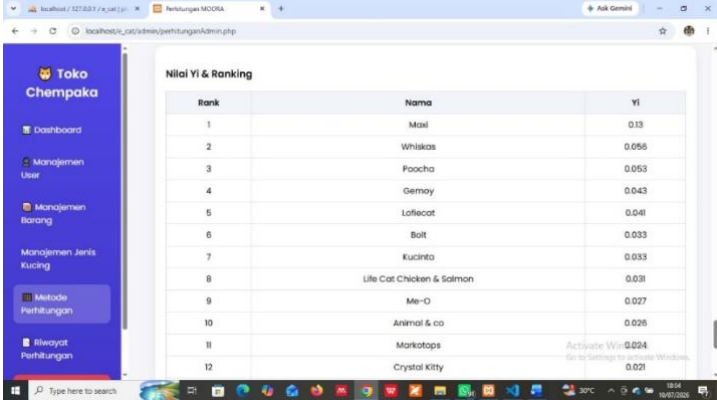


Fig. 8: MOORA Score Input

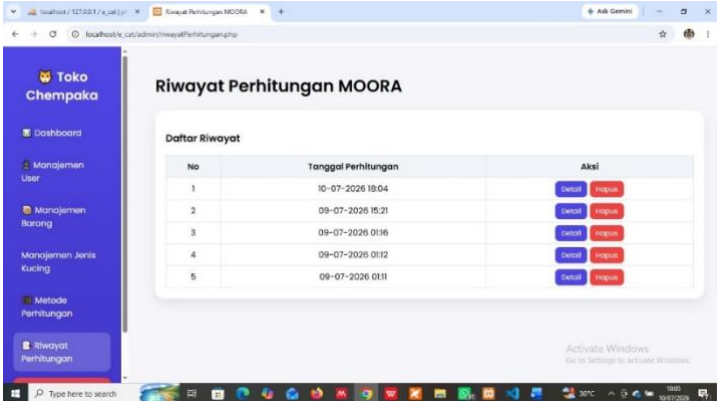


Rank	Nama	Yi
1	Maki	0.13
2	Whiskas	0.056
3	Poocha	0.053
4	Gemay	0.043
5	Loficat	0.041
6	Bolt	0.033
7	Kuchito	0.033
8	Life Cat Chicken & Salmon	0.031
9	Me-O	0.027
10	Animal & co	0.026
11	Markotaps	0.024
12	Crystal Kitty	0.021

Fig. 9: Input MOORA Results

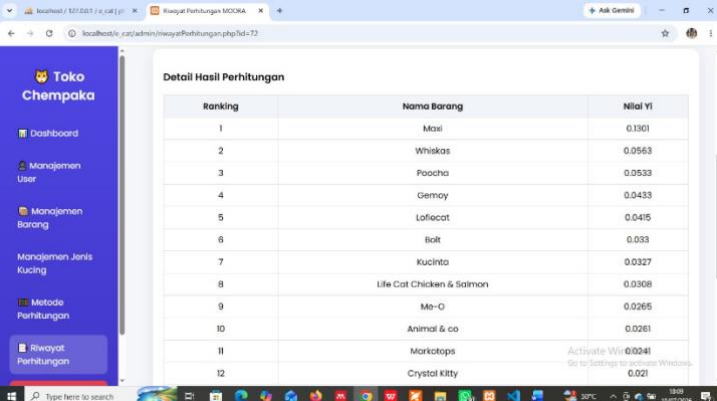
h. Calculation History

The MOORA Calculation History page stores all previous calculation results performed by the system. Administrators can view the calculation date, access detailed ranking results, or delete unnecessary records. This feature provides an organized history of decision-making processes, allowing users to review and manage previous MOORA calculation results efficiently.



No	Tanggal Perhitungan	Aksi
1	10-07-2026 18:04	Detail Hapus
2	09-07-2026 15:21	Detail Hapus
3	09-07-2026 01:16	Detail Hapus
4	09-07-2026 01:12	Detail Hapus
5	09-07-2026 01:11	Detail Hapus

Fig. 9: History Implementation



Ranking	Nama Barang	Nilai Yi
1	Maki	0.1301
2	Whiskas	0.0563
3	Poocha	0.0533
4	Gemay	0.0433
5	Loficat	0.0415
6	Bolt	0.033
7	Kuchito	0.0327
8	Life Cat Chicken & Salmon	0.0308
9	Me-O	0.0265
10	Animal & co	0.0261
11	Markotaps	0.0241
12	Crystal Kitty	0.021

Fig. 10: History Details

i. User Dashboard

The User Dashboard provides an overview of available cat food products and their nutritional information. Users can browse product details, including price, stock, moisture content, protein content, fat content, and crude fiber content, to better understand each alternative before performing the recommendation process. This interface enables users to access product information easily and supports informed decision-making.

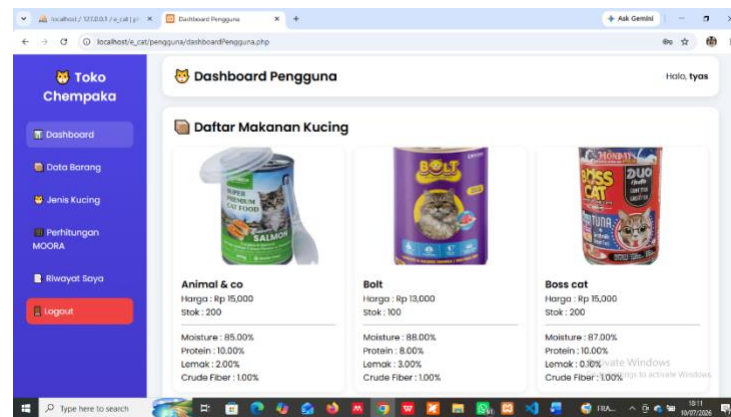


Fig. 11: Implementation of the User Dashboard

j. Data Barang Pengguna

The Cat Food Data page displays a list of available cat food products along with their nutritional information, including price, moisture content, protein content, fat content, and crude fiber content. This information allows users to compare product characteristics and serves as the primary data source for the MOORA calculation process, supporting accurate and objective decision-making.

Nama Barang	Harga	Moisture	Protein	Lemak	Crude Fiber
Animal & co	Rp 15,000	85.00%	10.00%	2.00%	1.00%
Bolt	Rp 13,000	88.00%	8.00%	3.00%	1.00%
Boss cat	Rp 15,000	87.00%	10.00%	0.10%	1.00%
Cat Chloae	Rp 15,000	85.00%	6.00%	2.00%	1.00%
Coucou halcyon	Rp 26,000	90.00%	10.00%	0.10%	1.00%
Crystal Kitty	Rp 15,000	85.00%	10.00%	1.50%	1.00%
Furlave	Rp 17,000	87.00%	9.50%	1.00%	1.90%
Gemay	Rp 16,000	80.00%	15.00%	2.00%	1.00%
Kitty	Rp 15,000	83.00%	8.50%	1.50%	1.00%
Kucinta	Rp 20,000	83.00%	14.00%	2.00%	1.00%

Fig. 12: Implementation of User Item Data

k. User Cat Type Data

The Cat Types page provides information about various cat breeds commonly kept in Indonesia. Each breed is presented with an image and detailed information, including origin, life expectancy, average weight, characteristics, and description. This feature helps users understand the characteristics of different cat breeds and supports them in selecting appropriate cat food based on their cats' specific needs.

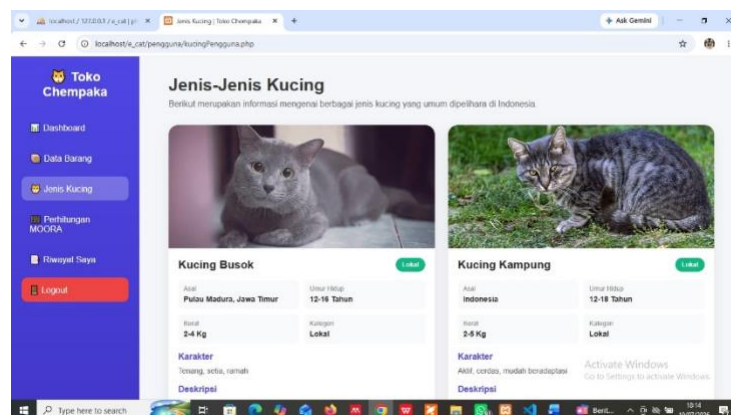


Fig. 13: Implementation of User Cat Types

5.2. Result Software Testing

Software testing was conducted using Black Box Testing, White Box Testing, and User Acceptance Testing (UAT) to evaluate the functionality, program logic, and usability of the developed web-based Decision Support System. The Black Box Testing results showed that all system features, including login, product management, MOORA calculation, and recommendation generation, functioned according to the specified requirements, while White Box Testing confirmed that the program logic and execution paths operated correctly without errors. Furthermore, the User Acceptance Testing (UAT), which involved 45 respondents, obtained a score of 85.66%, indicating that the system was categorized as very feasible and well accepted by users. These results demonstrate that the proposed system is capable of providing objective recommendations for selecting cat food for cats with digestive disorders and is suitable for practical implementation.

6. Conclusion

This study successfully developed a web-based Decision Support System for selecting cat food for cats with digestive disorders using the Multi-Objective Optimization on the Basis of Ratio Analysis (MOORA) method. The system objectively evaluates available alternatives based on five criteria, namely price, moisture content, protein content, fat content, and crude fiber content, to generate appropriate recommendations. Furthermore, the software testing results indicate that the developed system functions properly and achieves a User Acceptance Testing (UAT) score of 85.66%, demonstrating that it is feasible and effective for assisting users in selecting suitable cat food.

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