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Cafe Recommendation Decision Support System Using the Simple Multi-Attribute Rating Technique (SMART) Method

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Abstract

The growth of cafe businesses in Cikarang, Bekasi Regency, with various facilities, has confused the Cikarang community, especially the Jababeka area, about finding a suitable cafe, so it takes a long time to make decisions. Significant technological developments have yet to accompany the rapid development of cafes in the Jababeka area. This makes consumers feel confused and need information to decide whether to visit the cafe that suits their wishes. Utilizing information technology and implementing the Simple Multi-Attribute Rating Technique (SMART) method with several cafe criteria in the form of places of worship, parking facilities, smoke-free areas or smoking areas, wifi facilities, indoor and outdoor spaces, interior design, meeting facilities, private and party rooms, gaming facilities, children's playgrounds and cafe data lists that the author gets from observations and questionnaires in the field. The system is designed using the SMART method, which is quantitative in decision-making, where each criterion is given a weight and then calculated for decision-making. This SMART method is based on the theory that each alternative consists of several criteria with values, and each criterion has a weight that describes how critical the criteria are to other criteria. The research results are in the form of a cafe name recommendation system output. The benefits of this research are that it provides decision-making information media for consumers to decide the right choice of cafe according to consumer desires.

Keywords: *Cafe Recommendation, Decision Support System; Simple Multi-Attribute Rating Technique; SMART.*

1. Introduction

Jababeka, a rapidly developing city in Indonesia, has witnessed significant growth in various sectors, including infrastructure, human resources, entertainment, and notably, the culinary industry. Among the culinary advancements, the proliferation of cafes stands out. The increasing number of students and cafe enthusiasts in Jababeka has driven this rapid growth, making cafes a

popular destination for social gatherings, relaxation, and enjoying a variety of beverages and meals.

Cafes in Jababeka cater to a diverse age group, from young adults to the elderly, offering a range of facilities and innovative features such as gaming areas, Instagrammable interior designs, and playgrounds. This trend has attracted numerous business entrepreneurs to open cafes, each striving to provide unique amenities and menus to meet the evolving preferences of the local population.

However, the abundance of cafes has led to a dilemma for Jababeka residents in choosing the right cafe that meets their criteria. Typically, people rely on recommendations from friends and social media, which often results in dissatisfaction due to inaccurate or incomplete information.

To address this issue, a decision support system (DSS) is proposed to assist residents in selecting cafes that align with their preferences. This system employs the Simple Multi-Attribute Rating Technique (SMART) to rank cafes based on various criteria, providing more accurate information and saving time for consumers in their search for the ideal cafe.

This paper aims to design a decision support system titled "Decision Support System for Cafe Recommendations Using the Simple Multi-Attribute Rating Technique (SMART) in Tampan District, Jababeka City."

2. Method

The methodology of this research encompasses several key stages to develop the Decision Support System for cafe recommendations in Jababeka, Cikarang.

Data Collection involved comprehensive steps including the development and distribution of questionnaires aimed at identifying and determining the criteria required by the community. The questionnaires were distributed both online and offline, and the responses were collected as raw data, which were later analyzed to prioritize the community's preferences for cafes. Additionally, Cafe Observation was conducted by visiting various cafes in Kecamatan Tampan to gather information on the facilities available. The final observations were compiled and used in the system development.

Data Analysis was performed by sorting and refining the raw data collected during the data collection process. The analysis yielded essential consumer criteria for cafes, such as worship facilities, parking spaces, smoke-free areas, Wi-Fi availability, indoor and outdoor room options,

attractive interior design (Instagrammable), meeting rooms, gaming facilities, and playgrounds for children. The analysis of the questionnaire data involved calculating the weight of each criterion using the SMART (Simple Multi-Attribute Rating Technique) method.

System Design involved creating models, databases, interfaces, and functionalities as part of the Decision Support System. UML (Unified Modeling Language) was utilized for system design, including use case, class, activity, and sequence diagrams.

System Testing included thorough testing of the developed system, employing black box, white box, and manual calculation methods to ensure accuracy and reliability.

System Implementation focused on executing the design using PHP for programming and MySQL for database management, with CodeIgniter as the framework.

Finally, Report Writing involved summarizing and documenting the entire research process and outcomes into a thesis titled "Decision Support System for Cafe Recommendations Using Multi Attribute-Rating Technique (SMART)."

3. Result and Discussion

Results and discussion can be made as a whole that contains research findings and explanations.

3.1. Data Collection and Analysis

In this study, the author collected data on the number of cafes and the criteria preferred by the general public regarding cafes in Jababeka, Cikarang through interviews and direct field observations. To gather criteria, the author developed a questionnaire and distributed it randomly to the general public. The resulting criteria from the questionnaire are presented in Table 1.

The criteria presented in Table 1 are the result of a randomly distributed questionnaire to the general public, aimed at determining the most favored criteria for visiting cafes in Jababeka, Cikarang. The questionnaire was designed to include a range of potential criteria that the public might choose from, ensuring that the data collected could serve as a reliable basis for understanding why the general public visits cafes. From the data gathered through the questionnaire, it was found that worship facilities were the most frequently selected criterion, while children's play areas were the least favored. The weight values were determined by the researcher following the SMART method, with an interval of 1-100. The total weight value of 579

was derived from the sum of all weight values, which will be used in the SMART method for normalization.

Table 1. Example shows research data in Table

No.	Criterion Name	Weight Value
1	Worship Facilities	98
2	Parking Facilities	95
3	Smoke-Free Area / Smoking Area	85
4	Wi-Fi Facilities	76
5	Indoor and Outdoor Room Options	64
6	Attractive Interior Design (Instagrammable)	57
7	Meeting Room / Private Room / Party Room	48
8	Gaming Facilities	35
9	Children's Playground	21

Although, good figures and tables are interesting and easy to understand, but the most important thing is that the results / data presented in the figure or table are honest. If an image can only be understood with the support of research data which may require half or a full page of paper, then the data should be included as an appendix. Do not hide important data that raises reader questions or leads to mistrust of the reader.

The results section is written following the chronological order as presented in the method section. The important thing in presenting results is that the author must not include references in this section. This section is the "findings" of the author himself. However, if the results of the study are presented in a figure or table that directly compares with the findings of another person, the part of the figure or table must include the findings of that other person, without the need to discuss it in this section.

3.2. System and Data Analysis

The cafe recommendation system is essentially a decision support system designed to assist the general public in quickly and easily finding cafes that meet their desired criteria. Initially, individuals relied on asking others or searching through social media to find the cafes they wanted. However, given the vast area of Kecamatan Tampan, people often found it overwhelming to locate suitable cafes.

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Thus, the decision support system represents an advancement from manual methods to a computational system, utilizing the SMART method to enhance the speed and efficiency of finding cafes that match consumer needs.

This decision support system is developed using PHP as the programming language and employs Object-Oriented Programming principles. The system operates on a web-based platform, where users fill out forms with their cafe criteria. The system then processes this information and provides recommendations for cafes that meet the specified criteria. Additionally, the system includes functionalities for cafe owners, who are the cafe proprietors, and administrators, who manage the website.

3.3. System Design

In the Unified Modeling Language (UML) design of the cafe recommendation decision support system, several diagrams are used, including Use Case Diagrams, and Class Diagrams.

1. Use Case Diagram

The Use Case Diagram illustrates the interactions between one or more actors and the system being developed. For the cafe recommendation decision support system, there are three actors: Admin, Cafe Owner, and User. In User is the end-user of the system, who interacts with the system to find cafe recommendations. Admin is a user with privileges to modify and update the system's data comprehensively. Cafe Owner is a user who can modify and update data related to their own cafes only.

The Use Case Diagram for the cafe recommendation decision support system is shown in Figure 1.

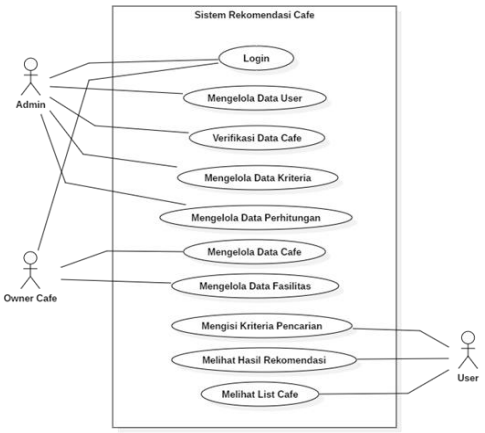

Figure 1. Use Case Diagram

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2. Class Diagram

The Class Diagram is used to depict the interactions among all the functions present within the system designed for the cafe recommendation decision support system using the SMART method. This diagram outlines the structure of the system by showing the classes, their attributes, methods, and the relationships between them. The Class Diagram for the cafe recommendation decision support system is illustrated in Figure 2.

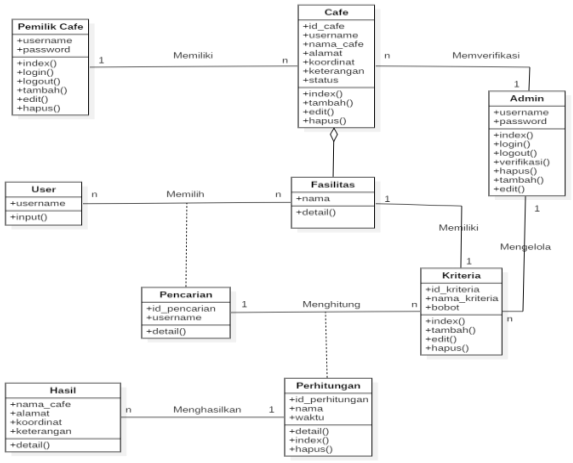

Figure 2. Class Diagram

3.4. Program Interface

The Program Interface refers to the visual elements and layout of the software application as it interacts with users.

1. Dashboard (Home Page)

The Use Case Diagram illustrates The Home Page is the initial screen that appears when users, admins, and cafe owners access the cafe recommendation decision support system website. This page serves as the entry point to the system, providing access to various functionalities based on the user's role.

The design of the Home Page is intended to be welcoming and easy to navigate, offering clear options for different user types. Key features include navigation links to main functionalities, user-specific dashboards, and system announcements. The layout and design of the Home Page can be seen in Figure 3.

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Figure 3. Home Page

2. Cafe List

The Cafe List Display is a page that presents a comprehensive list of all cafes available for users to view. This page allows users to browse through various cafes, providing essential details to help them make their choices.

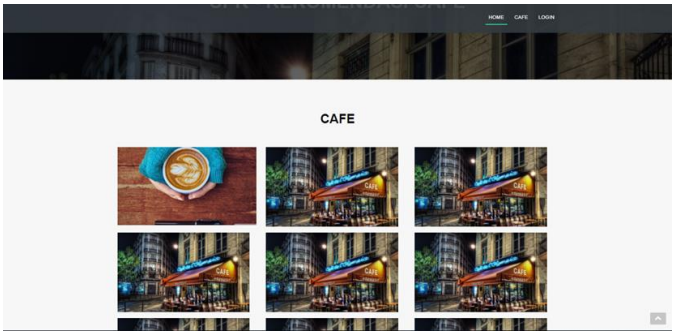

Figure 4. Café List

3. Recomendation List

This page displays the results of the system's calculations, providing recommendations for cafes based on the criteria entered by the user. It helps users find the most suitable cafes according to their preferences.

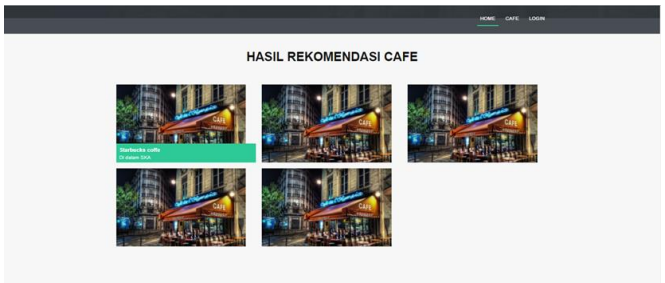

Figure 5. Recommendation List

3.5. Testing

Testing of the system is carried out through manual testing and system testing methods. Manual testing involves performing calculations manually using the SMART method, while system testing is conducted using both black box and white box techniques.

4. Conclusion

Based on the development of the cafe recommendation decision support system using the Simple Multi-Attribute Rating Technique (SMART), several key conclusions have been drawn. The development process involved multiple stages, including literature review, data collection, questionnaire creation, cafe observation, questionnaire distribution, data analysis, needs assessment, system design, testing, implementation, and report writing. The design phase included essential diagrams such as the Use Case Diagram, which details the interactions between the Admin, Cafe Owner, and User, along with their respective use cases. The Class Diagram outlines the key components, including Cafe Owner, Cafe, Admin, Facility, User, Search, Criteria, Calculation, and Result. Additionally, Activity and Sequence Diagrams illustrate the system's operational flow based on the Use Case and Class Diagrams.

5. Acknowledgement

To enhance the cafe recommendation decision support system using the SMART method, several improvements can be made based on the current system's limitations. First, integrating a route display feature would greatly benefit users by providing directions and distance information from their location to the recommended cafes, thereby increasing overall convenience. Adding new criteria related to trending facilities in the cafe industry would keep the system relevant and engaging for users, ensuring it reflects the latest trends. Expanding the database to include a larger number of cafes would diversify the recommendations, making the SMART method more effective and offering users a broader selection of options. Developing an Android application would allow users to access cafe recommendations from anywhere, enhancing accessibility and user experience. Additionally, exploring alternative decision-making methods such as ELECTRE, SAW, or Fuzzy logic could lead to more accurate recommendations. Finally, upgrading the system’s hardware to improve processing speed would enhance overall system performance and efficiency.

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