

Design And Development Of A Web-Based Encyclopedia Of Jambi Traditional Culinary: A Case Study Of The Department Of Culture And Tourism Of Jambi Province

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ABSTRACT

Jambi traditional culinary is part of the region's cultural heritage that has historical value, distinctive flavors, and local identity. However, information about Jambi traditional culinary is still scattered across various media and has not been presented in a structured digital system, making it difficult for the public to obtain complete and accessible information. This study aims to design and develop a web-based Encyclopedia of Jambi Traditional Culinary as a medium for information, promotion, and cultural preservation. The system was developed using the Waterfall model, consisting of requirements analysis, system design, implementation, and testing. The application was developed using PHP with the CodeIgniter 4 framework and MySQL database. The search feature applies the Fuzzy Matching method using the `similar_text()` and `levenshtein()` functions to provide relevant results for inaccurate keywords. Black Box Testing and Fuzzy Matching testing were conducted to evaluate system functionality and search capability. The results show that all main system functions operated according to the specified requirements, with an average similarity score of 86.50% and a processing time of less than 10 milliseconds. The system successfully presents information on Jambi traditional culinary, including names, descriptions, ingredients, cooking procedures, categories, and images. Therefore, the system can facilitate public access to culinary information while supporting the digitalization and preservation of regional cultural heritage.

Keyword : Encyclopedia, Jambi Traditional Culinary, Web, CodeIgniter 4, Fuzzy Matching.

INTRODUCTION

The development of information technology is currently progressing rapidly, particularly in the field of information and communication technology. This development has become an important necessity for humans in carrying out their daily activities [1]. The advancement of information technology has also created significant opportunities to preserve local culture through digital media. One form of culture that possesses historical, social, and economic value is traditional culinary.

Traditional culinary is an important part of the identity and culture of a region. Each traditional food not only has a distinctive taste but also contains historical values, symbolic meanings, and social practices that have been passed down from generation to generation. However, in the digital era, the existence of traditional culinary is increasingly marginalized due to limited documentation and low awareness among younger generations of local culinary heritage.

Globalization and modern culinary trends have contributed to declining interest among younger generations in Indonesian traditional food. Generation Z tends to be more familiar with foreign culinary products, such as Korean food, than with Indonesian traditional culinary, causing several traditional foods to be at risk of disappearing [2]. This condition encourages governments and communities to undertake preservation efforts through culinary festivals, exhibitions, and documentation of rare traditional recipes through initiatives such as the Pusaka Rasa Nusantara

project [3]. These efforts are intended to ensure that local culinary heritage remains preserved and can be recognized by future generations.

According to Ramadhan et al. [4], an encyclopedia is a collection of writings containing explanations of various types of information or specific fields of knowledge that are broad, comprehensive, and systematically organized according to alphabetical order or categories. An encyclopedia can also be equipped with illustrations, images, and other media elements that can help users understand the information. Therefore, an encyclopedia can be used as an appropriate medium for presenting information about traditional culinary in a complete and structured manner.

Previous studies have also demonstrated the use of web-based systems for presenting culinary information. Manullang and Suebu developed a website-based information system for Papuan traditional culinary using the Waterfall method. The system successfully provided culinary information through a web-based platform and included search and transaction features. Sari and Asmawati developed a website-based information medium for Mandar culinary tourism that presented culinary information, locations, operating hours, and food types to facilitate tourists. Mukhlis developed an information medium for the Wonorejo Culinary Tourism Center in Surabaya using the Model-View-Controller (MVC) approach and CodeIgniter. Febriani et al. developed a Lampung culinary information system using Extreme Programming, which included ordering, location searching, and food recommendation features. Meanwhile, Rozi et al. developed a web-based Indonesian culinary recipe platform called “RasaNusantara” using the Waterfall method, which provided recipe uploading, ingredient searching, and responsive interface features.

Based on these previous studies, it can be concluded that web-based systems have been widely used to provide information related to regional culinary, culinary tourism, food ordering, location information, recommendations, and recipe sharing. However, the systems discussed in these studies have different focuses from the present research. This study focuses specifically on developing a web-based encyclopedia that presents Jambi traditional culinary as a source of information, reference, promotion, and preservation of regional culture.

Jambi traditional culinary faces several challenges that may threaten its preservation. One example is tempoyak, a traditional fermented durian product from Jambi, which could potentially be produced on a large scale by other countries such as Thailand if it is not developed and positioned as a valuable regional product [5]. In addition, burasa, which is commonly served during Eid al-Adha celebrations in the coastal areas of Jambi, is becoming increasingly difficult to find, indicating a decline in the preservation of this traditional culinary practice [6]. Although culinary festivals have promoted legendary dishes such as gulai terjun and gulai tepek ikan, the low involvement of younger generations without a planned preservation strategy may result in the loss of traditional culinary as part of the region's intangible cultural heritage.

Furthermore, many younger generations are more familiar with instant food and global culinary trends than with traditional food from their own regions. This condition affects their knowledge and awareness of Jambi traditional culinary. Therefore, efforts are needed to document and publish information about Jambi traditional culinary so that it can be preserved and better known by younger generations, the community, and tourists, and so that it is not eroded by the digital era.

The development of a web-based information system faces several challenges, including requirements analysis, technology selection, interface design, platform compatibility, and system security. According to Al-Rousan et al., the analysis stage may be constrained by scope creep caused by unclear user requirements, which can make system planning unfocused. Technology selection also requires careful consideration so that it is appropriate to system requirements, team capabilities, and system scale. In addition, the interface must be responsive and accessible on various devices. Security is also an important consideration because coding errors may create critical vulnerabilities. These issues can be minimized through the application of secure coding practices and guidelines such as the OWASP Top 10.

To overcome the limitations of conventional information searching, the system developed in this study is equipped with a search feature using the Fuzzy Matching method. The search feature utilizes the `similar_text()` function to calculate the similarity level between words and the `levenshtein()` function to provide the closest keyword recommendations when typing errors occur. This feature is intended to help users find relevant culinary information even when the keywords entered are inaccurate.

The proposed system is a web-based Encyclopedia of Jambi Traditional Culinary that presents information including culinary names, descriptions, main ingredients, cooking procedures, brief historical information, categories, and supporting images. The system has two user roles, namely administrators and visitors. Administrators are responsible for managing culinary data, while visitors can access and search for information about Jambi traditional culinary. The system focuses on presenting culinary information and providing a search feature and does not include culinary transactions or product ordering.

The system is developed using HTML, PHP, CSS, the CodeIgniter 4 framework, XAMPP, and MySQL. The Waterfall method is used as the system development method because it provides structured and systematic stages consisting of requirements analysis, system design, implementation, and testing. UML is used in the system design through Use Case Diagram, Class Diagram, and Activity Diagram. The implementation of these technologies is intended to produce a structured and accessible digital information system for Jambi traditional culinary.

System testing is conducted using the Black Box Testing method to evaluate the functionality of the developed system. In addition, Fuzzy Matching testing is performed to measure the ability of the search feature to find relevant data when users enter inaccurate keywords. The testing process is intended to ensure that the functions of the developed system operate according to the specified requirements.

The developed encyclopedia is expected to provide benefits for the community by facilitating access to complete and easily accessible information about Jambi traditional culinary. The system can also serve as a reference for people who are interested in preparing traditional Jambi dishes at home. For academics, the research is expected to become a reference for future studies related to information technology and local cultural preservation. For the researcher, this study provides an opportunity to apply knowledge obtained during university study into a useful web-based information system.

Based on the problems described above, this study aims to design and develop a Web-Based Encyclopedia of Jambi Traditional Culinary as an effort to preserve the cultural heritage of Jambi Province. The system is expected to provide complete and structured culinary information, facilitate public access to information about Jambi traditional culinary, and support the digitalization, promotion, and preservation of regional culture. Therefore, the research is entitled “Design and Development of a Web-Based Encyclopedia of Jambi Traditional Culinary (Case Study: Department of Culture and Tourism of Jambi Province)”.

METHODOLOGY

2.1 Research Method

This study employed a descriptive qualitative approach to identify problems and analyze the requirements for developing a Web-Based Encyclopedia of Jambi Traditional Culinary. Data were collected through observation, interviews, and literature review to obtain information regarding culinary documentation, information dissemination, and user requirements. The collected data were analyzed and used as the basis for system design and development. The system development process applied the Waterfall model, which provides structured and sequential development stages.

2.2 Research Stages

The research stages were organized systematically to support the development of the Web-Based Encyclopedia of Jambi Traditional Culinary, as illustrated in Figure 1.

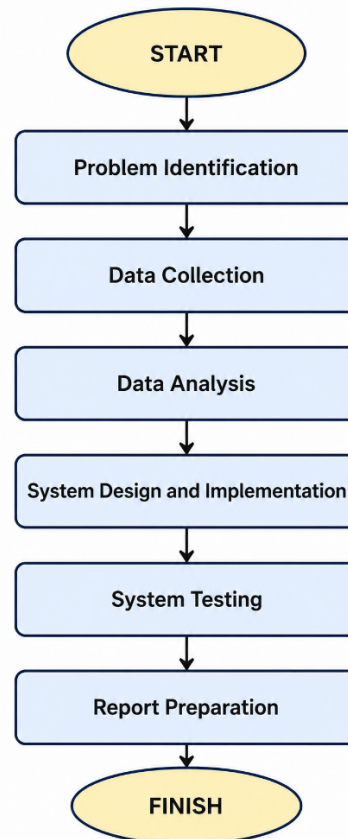


Figure 1. Research Stages

The research began with problem identification to determine the limitations of Jambi traditional culinary documentation and information dissemination. Data were then collected through observation, interviews, and literature review. The collected data were analyzed to determine functional and non-functional system requirements. The system was subsequently designed using UML and ERD, implemented using PHP and CodeIgniter 4, and tested using Black Box Testing and Fuzzy Matching testing. The research stages are explained as follows:

1. Problem Identification

This stage identifies problems related to the availability, documentation, and dissemination of Jambi traditional culinary information.

2. Data Collection

Data were collected through observation, interviews, and literature review to obtain culinary information and system requirements.

3. Data Analysis

The collected data were analyzed to determine functional and non-functional requirements, including information presentation, search features, accessibility, and system usability.

4. System Design

The system was designed using UML and ERD and implemented using PHP, CodeIgniter 4, and MySQL.

5. System Testing

The developed system was tested using Black Box Testing and Fuzzy Matching testing to evaluate system functionality and search performance.

6. Report Preparation

The final stage involved preparing the research report based on the results of the research, system development, and testing.

2.3 Data Collection

Data were collected using three techniques. Observation was conducted at the Department of Tourism and Culture of Jambi Province to examine existing Jambi traditional culinary documentation, promotional media, and culinary-related activities. Interviews were conducted with relevant staff, culinary business owners, and local cultural figures to obtain information about authentic culinary names, descriptions, ingredients, cooking procedures, cultural values, and system requirements. A literature review was conducted using relevant books, journals, official documents, previous studies, and technical references related to web-based information systems, Waterfall development, CodeIgniter 4, Black Box Testing, and search algorithms.

2.4 System Design and Development

The system was designed using Unified Modeling Language (UML), including Use Case Diagram, Activity Diagram, and Class Diagram, while Entity Relationship Diagram (ERD) was used for database design. The system development process applied the Waterfall model, consisting of requirements analysis, system design, implementation, and testing.

The system was developed using PHP with the CodeIgniter 4 framework and MySQL database. The application uses the Model-View-Controller (MVC) architecture. The search feature applies Fuzzy Matching using the Levenshtein Distance algorithm to assist users in finding culinary information when spelling errors occur.

2.5 System Testing

System testing was conducted using Black Box Testing and Fuzzy Matching testing. Black Box Testing was used to evaluate the functionality of the system, including culinary data input, data storage, information searching, and displaying information. Testing was performed manually and supported by Selenium IDE for browser-based testing.

Fuzzy Matching testing was conducted to evaluate the search feature using accurate, partial, and misspelled keywords. The Levenshtein Distance algorithm was used to handle spelling errors, while the `microtime()` function was used to measure search processing time. The testing results were used to evaluate whether the system functions and search features operated according to the specified requirements.

RESULTS AND DISCUSSION

3.1 Overview of the Institution

The Department of Culture and Tourism of Jambi Province is a regional government institution responsible for managing cultural and tourism affairs in Jambi Province. The institution plays an important role in promoting tourism and preserving local cultural heritage, including traditional culinary. The development of a Web-Based Encyclopedia of Jambi Traditional Culinary is intended to support the documentation, dissemination, and preservation of Jambi traditional culinary information.

3.2 Requirements Planning

a. Existing System

The existing process of documenting and disseminating Jambi traditional culinary information is not yet integrated into a specific digital encyclopedia system. Culinary information is available through various media, including brochures, banners, social media, websites, photographs, videos, catalogs, and other documents. This condition makes culinary information scattered

across different sources and less structured, making it difficult for the public to obtain complete information efficiently.

b. Proposed System

The proposed system is a Web-Based Encyclopedia of Jambi Traditional Culinary that provides structured information about traditional culinary. The system involves two main actors, namely administrators and visitors. Administrators can manage culinary and category data, while visitors can view culinary information, browse categories, and search for culinary data using keywords. The system also applies Fuzzy Matching to assist users in finding relevant information when spelling errors occur.

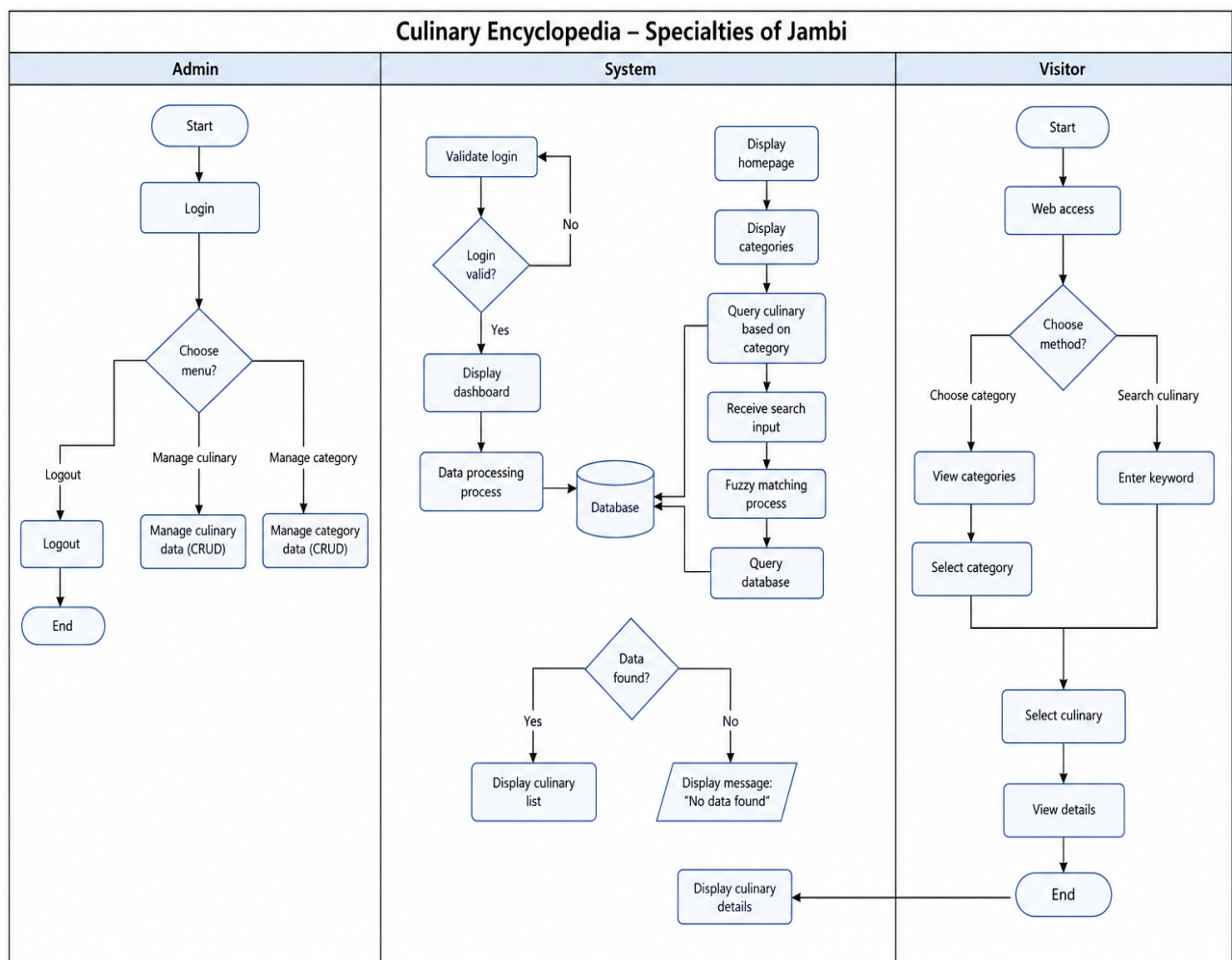


Figure 2. Proposed Web-Based Encyclopedia System

3.3 System Modeling

a. Use Case Diagram

The Use Case Diagram illustrates the interaction between the Administrator, Visitor, and the Web-Based Encyclopedia of Jambi Traditional Culinary. The Administrator can log in to the system, manage culinary data, manage culinary categories, and log out. Meanwhile, the Visitor can access culinary information, view culinary categories, and search for culinary data. The main interactions between the actors and the system are presented in Figure 3.

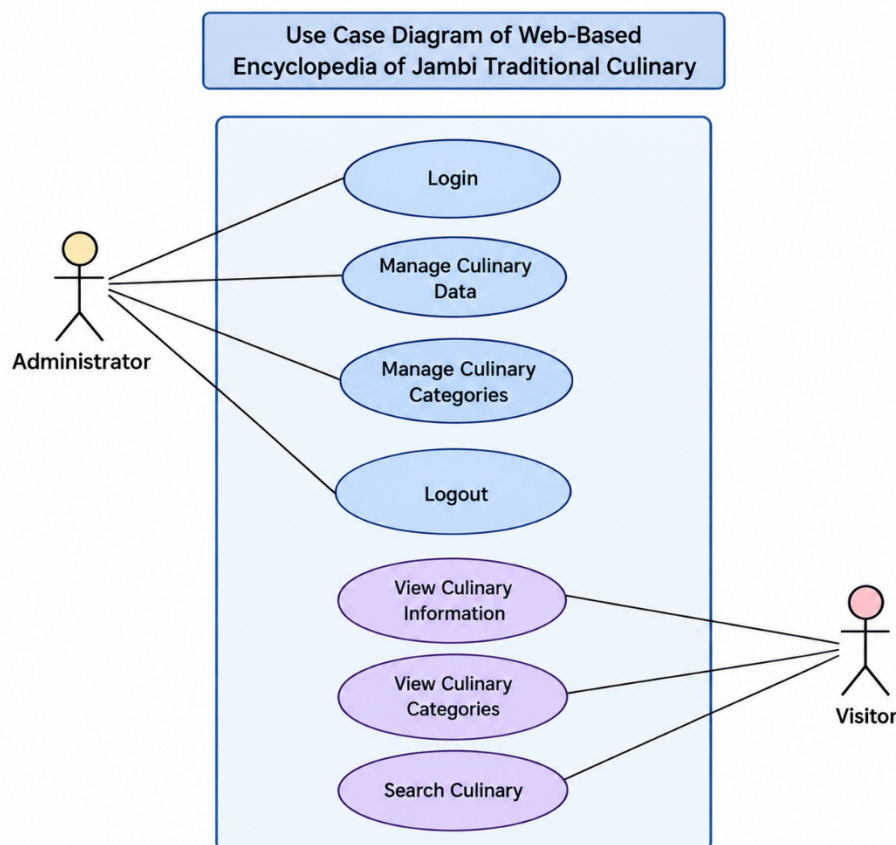


Figure 3. Use Case Diagram

b. Activity Diagram

The Activity Diagram describes the workflow of the system, including the process of accessing culinary information by visitors and managing culinary and category data by administrators.

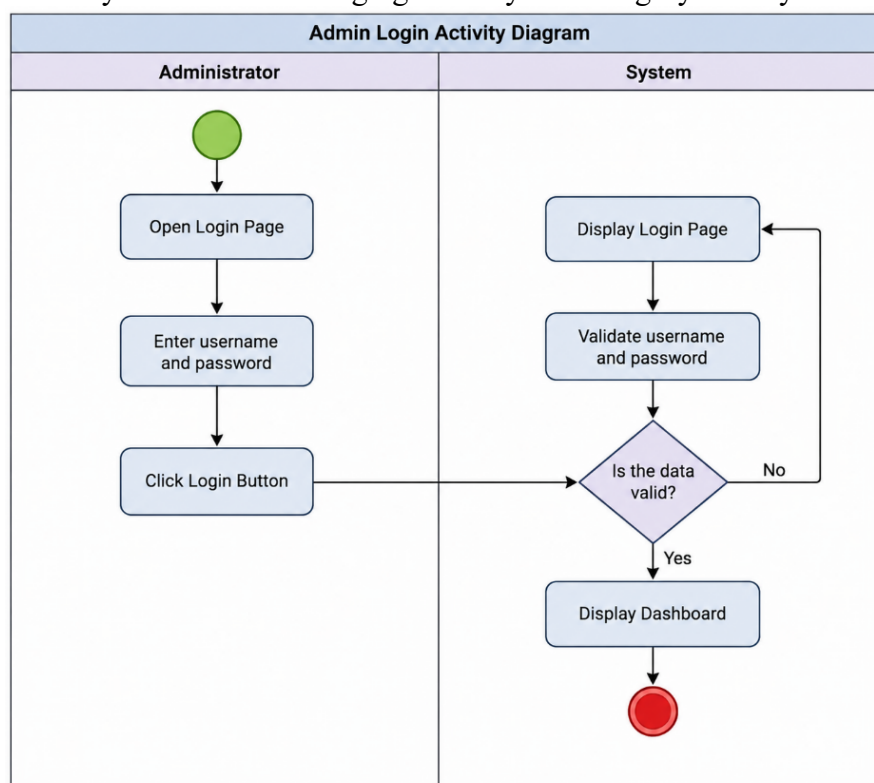


Figure 4. Activity Diagram

c. Class Diagram

The Class Diagram illustrates the structure of the system and the relationships between the main classes used in managing culinary information, categories, and user authentication.

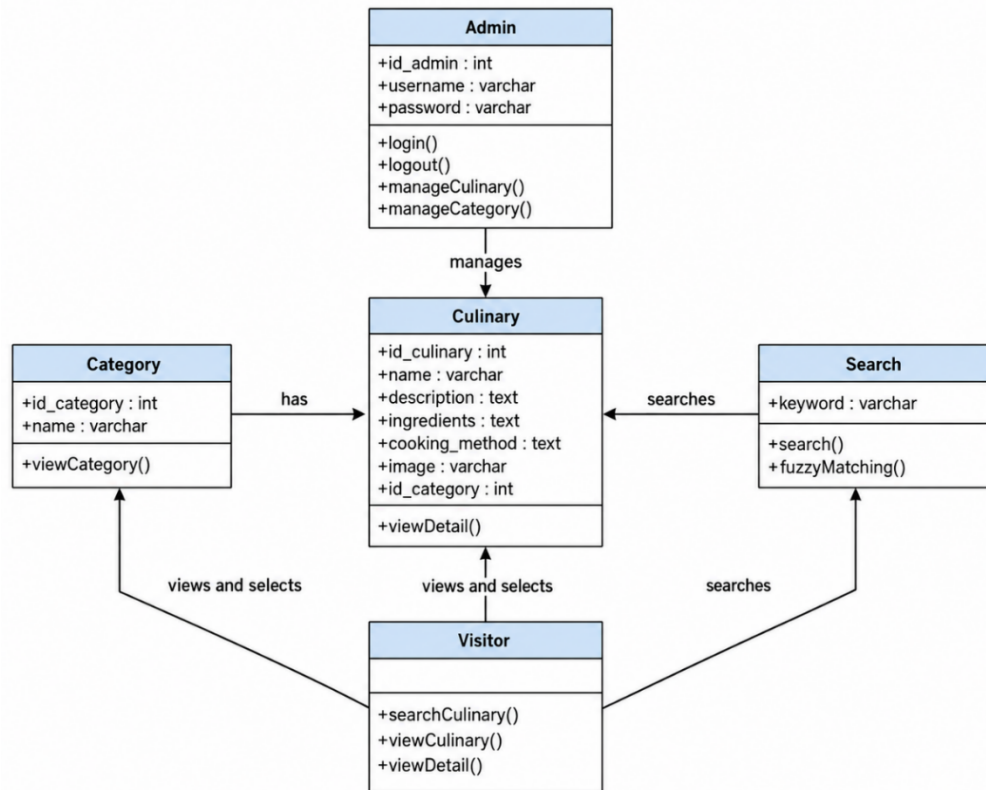


Figure 5. Class Diagram

d. Class Diagram

The Entity Relationship Diagram (ERD) illustrates the database structure and relationships between entities used in the Web-Based Encyclopedia of Jambi Traditional Culinary. The ERD of the proposed system is presented in Figure 6.

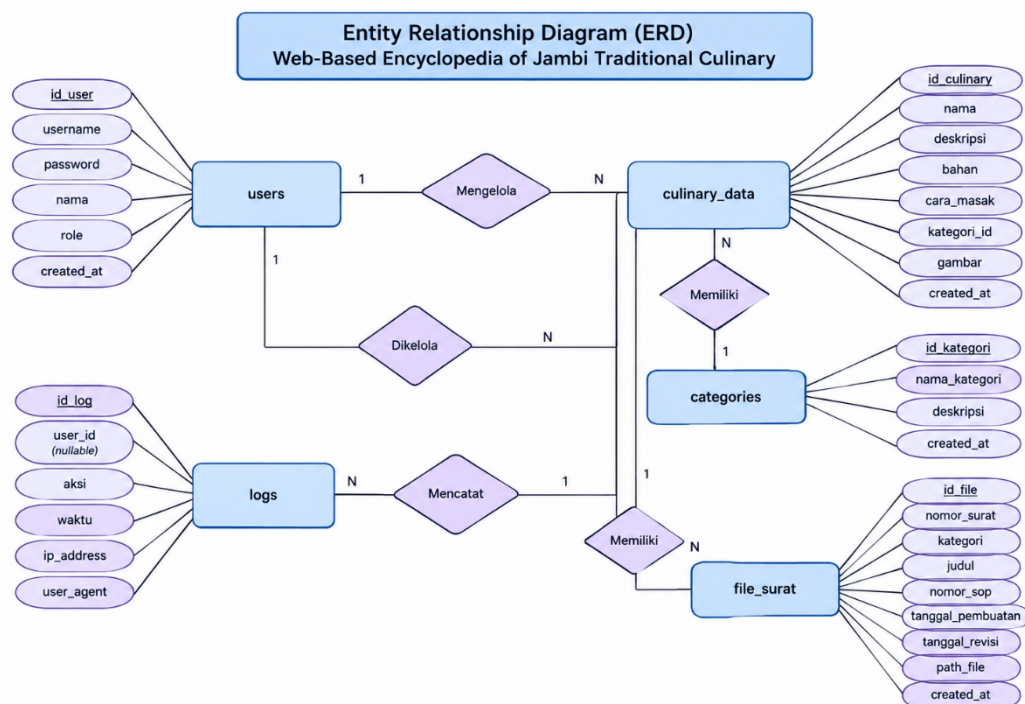


Figure 6. Entity Relationship Diagram

3.4 Implementation

The implementation stage presents the main interfaces and features of the developed Web-based Jambi Culinary Encyclopedia. The system consists of two types of users, namely administrators and visitors. Administrators are responsible for managing culinary and category data, while visitors can access culinary information, browse categories, view details, and search for culinary data.

a. Administrator Login Page

The Administrator Login Page provides an authentication form consisting of username and password. This feature is used to restrict access to the administrative functions of the system.

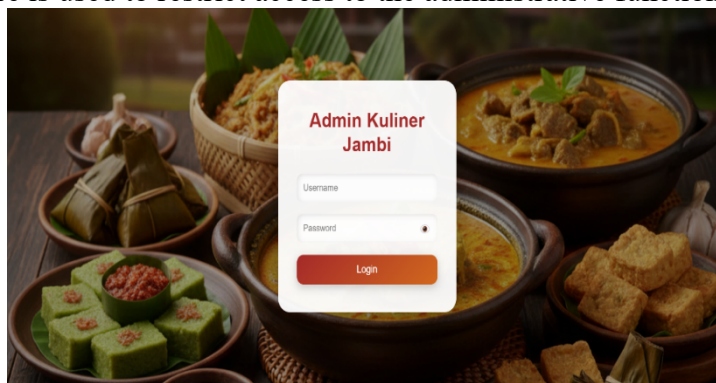


Figure 7. Administrator Login Page

b. Administrator Dashboard

The Administrator Dashboard serves as the main control interface after successful authentication. It provides navigation to culinary data and category management features.



Figure 8. Administrator Dashboard

c. Culinary Category Management Page

The Culinary Category Management Page allows administrators to manage culinary categories through add, edit, and delete functions. The category data are used to organize culinary information systematically.

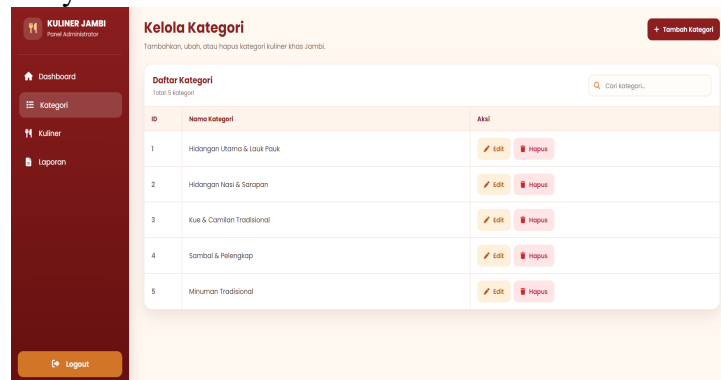


Figure 9. Culinary Category Management Page

d. Culinary Data Management Page

The Culinary Data Management Page allows administrators to manage culinary information, including adding, editing, and deleting data. The stored information consists of culinary names, categories, descriptions, ingredients, preparation methods, and images.



Figure 10. Culinary Data Management Page

e. Visitor Home Page

The Visitor Home Page is the initial interface accessed by visitors. It provides navigation menus, culinary search functionality, and culinary recommendations.

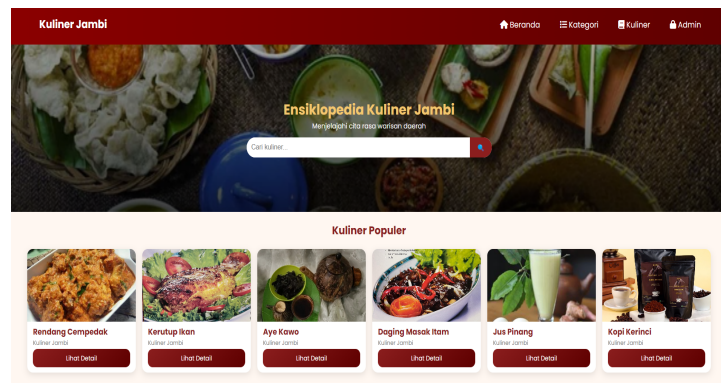


Figure 11. Visitor Home Page

f. Culinary Category and List Page

The Culinary Category and List Page displays available culinary categories and culinary data. Visitors can select a category to view culinary information based on the selected classification.

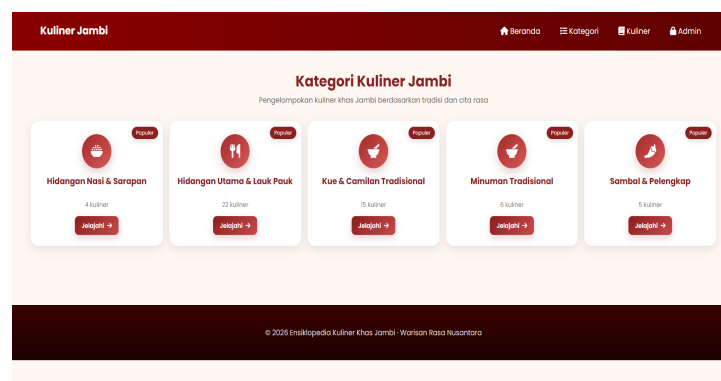


Figure 12. Culinary Category and List Page

g. Culinary Detail Page

The Culinary Detail Page displays complete information about a selected culinary item, including its description, ingredients, preparation method, and image.

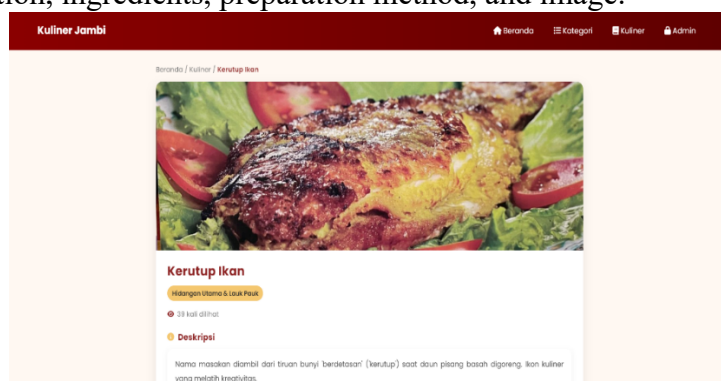


Figure 13. Culinary Detail Page

h. Fuzzy Matching Search Feature

The search feature combines exact matching and fuzzy matching. If an exact match is found, the system displays the corresponding culinary data with a similarity value of 100%. If no exact

match is found, the system compares the keyword with culinary data using the `similar_text()` function and applies `levenshtein()` to provide the nearest keyword suggestion.

The fuzzy search process compares keywords with several fields, including culinary names, ingredients, descriptions, preparation methods, and categories. The system applies a minimum similarity threshold of 40% to maintain the relevance of the search results.

3.5 System Testing

System testing was conducted to evaluate the functionality of the Jambi Culinary Encyclopedia and the performance of its search feature. The testing consisted of Black Box Testing and Fuzzy Matching Testing using 52 culinary recipe data stored in the system database.

a. Black Box Testing

Black Box Testing was conducted to evaluate system functionality without examining the internal program code. The testing involved the administrator, visitor, and an IT lecturer as tester. The administrator testing covered authentication, dashboard access, category management, culinary data management, and logout functions, while visitor testing covered the home page, categories, culinary lists, details, and search functionality.

A total of 22 test scenarios were performed, consisting of 15 scenarios for the administrator and 7 scenarios for visitors. All test scenarios produced valid results, indicating that the implemented functions operated according to the expected requirements.

b. Fuzzy Matching Testing

Pengujian Fuzzy Matching dilakukan untuk menguji kemampuan fitur pencarian dalam menemukan data berdasarkan tingkat kemiripan kata kunci. Pengujian menggunakan 52 data resep kuliner khas Jambi pada lingkungan localhost dengan XAMPP dan MySQL. Perhitungan kemiripan menggunakan fungsi `similar_text()`, sedangkan `levenshtein()` digunakan untuk mengukur jarak perbedaan karakter. Waktu proses diukur menggunakan `microtime(true)` dalam satuan milidetik (ms).

Pengujian dilakukan pada empat kondisi, yaitu Exact Match, Fuzzy Match atau input typo, input tidak sesuai, dan ambang batas kemiripan.

Tabel 4.22. Pengujian Fuzzy Matching

ID	Input	Target Kuliner	Levenshtein Distance	Similarity (%)	Waktu (ms)	Hasil
FM-03	rendng	Rendang Cempedak	10	55	7.79	Ditampilkan
FM-04	nasi gemk	Nasi Gemuk	1	95	8.39	Ditampilkan
FM-05	gulai trjun	Gulai Terjun	1	96	9.37	Ditampilkan
FM-06	burgooo	Burgo	2	91	8.03	Ditampilkan
FM-07	mie celr	Mie Celor	1	94	8.29	Ditampilkan
FM-09	gangan plapa	Gangan Palapa	1	96	8.61	Ditampilkan
FM-11	tempoyak ikn	Gulai Tempoyak Ikan	7	69	10.16	Ditampilkan
FM-13	dendeng batko	Dendeng Batoko	1	96	9.08	Ditampilkan

Hasil pengujian menunjukkan bahwa Fuzzy Matching mampu menemukan data kuliner meskipun terdapat kesalahan penulisan. Pada Exact Match diperoleh rata-rata similarity 100% dengan waktu proses 7,74 ms, sedangkan input typo menghasilkan rata-rata similarity 86,50%

dengan waktu proses 8,71 ms. Input tidak sesuai menghasilkan similarity 0% dengan waktu proses 7,90 ms. Pengujian ambang batas menghasilkan rata-rata similarity 46,67% dengan waktu proses 7,41 ms. Secara keseluruhan, fitur pencarian mampu memberikan hasil yang relevan dengan waktu proses rata-rata di bawah 10 ms pada lingkungan pengujian.

CONCLUSION

This study successfully developed a web-based Jambi Traditional Culinary Encyclopedia as a digital information medium for preserving and promoting local culinary culture. The system was developed using PHP, CodeIgniter 4, and MySQL with the Model View Controller (MVC) architecture, providing structured culinary information and administrative data management features. The Fuzzy Matching-based search feature also enabled users to find relevant culinary information despite keyword typing errors. Based on Black Box Testing, all tested system functions operated as expected, while the search testing demonstrated relevant results with fast response times. Therefore, the developed system can facilitate access to information on Jambi traditional culinary and support the digital preservation and promotion of local culinary culture.

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