Designing a Recommendation System at Yense Restaurants

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ABSTRACT

Keywords:	The culinary industry in Indonesia is experiencing rapid growth, driven by the increasing use of online food delivery platforms, which have transformed consumer behavior. This study aims to design a web-based recommendation system for Rumah Makan Yense, a restaurant in Jakarta, to enhance customer satisfaction and operational efficiency. The research utilizes the Association Rule Mining method with the FP-Growth algorithm to analyze customer transaction data and identify purchasing patterns. The system provides personalized menu recommendations to customers, addressing the challenge of information overload in menu selection. The findings demonstrate that the recommendation system effectively improves customer satisfaction by delivering relevant menu suggestions, while also increasing sales and service efficiency. The study concludes that implementing such a system enables Rumah Makan Yense to remain competitive in the dynamic culinary industry, showcasing the potential of technology in supporting business operations.
Recommendation System; web; SDLC; Assocation Rule Mining	

Introduction

The culinary industry in Indonesia continues to grow rapidly, driven by digitalization and the increasing use of online food ordering platforms such as GoFood, GrabFood, and ShopeeFood. Digitalization has become the main factor that drives Indonesia's economic progress in the current digital era (Gultom et al., 2024).

This digitalization not only makes it easier for customers to choose and order food but also significantly changes people's consumption patterns. In an increasingly competitive ecosystem, service personalization is becoming a critical element to provide a relevant customer experience and increase their loyalty.

Rumah Makan Yense, a restaurant located in Jakarta, serves a variety of signature dishes such as Hainan rice and grilled chicken. To reach more customers, Yense Restaurant has taken advantage of an online ordering platform. However, the presence of many menu options often makes customers feel confused, which can ultimately affect their purchase decision. Therefore, a system is needed that can help customers choose menus that suit their preferences, while encouraging restaurant operational efficiency. The phenomenon of excess information faced by most people in Indonesia opens up opportunities as well as a challenge to prove the role and existence of information experts

in the midst of the accelerating flow of information (Hariyati & Heriyanto, 2021; Prawitasari, 2022).

The recommendation system is one of the technological solutions that can be used to deal with the problem *of information overload*. The system works by analyzing customer historical data, such as ordering patterns, to provide relevant menu suggestions. With proper implementation, a recommendation system can not only improve the customer experience but also contribute to increased restaurant satisfaction, loyalty, and revenue (Pratondo, 2023; Rane et al., 2023).

Approaches such as Association Rule Mining are one of the potential methods in building a recommendation system. Algorithms such as A priori and FP-Growth are used to find association patterns among various items in sales data. This pattern can help restaurants understand the relationship between items, for example, menu combinations that are often ordered together. This information is useful not only for recommendation systems but also for promotion strategies, stock planning, and inventory management, which can ultimately improve restaurant operational efficiency (Swink et al., 2022; Zuhri & Utami, 2023).

This study aims to design a recommendation system that utilizes the Association Rule Mining approach to improve service efficiency, customer experience, and sales at Yense Restaurant. With this solution, it is hoped that Yense Restaurant can remain competitive in the midst of increasingly fierce competition in the culinary industry.

Table 1. Journal References

Reference	Discussion Results	Difference
Dino Akbar Pratondo [5]	The content-based *filtering-based recommendation system* with TF-IDF, SVD, and Cosine Similarity algorithms managed to achieve 85.22% accuracy in providing relevant campaign recommendations on the fundraising platform.	The research focused on food menu recommendations based on customer transaction data for Yense Restaurant, while the journal utilized campaign text metadata, not related to transaction data or specific dishes.
Savina Choirina Zuhri (2023)	The AHP method-based menu recommendation system helps customers choose menus based on criteria such as taste, price, and quality, with a consistent hierarchical approach through the calculation of *the Consistency Ratio*.	This research prioritizes order history data to compile recommendations based on customer preferences, while this journal uses explicit criterion weights (AHP) to provide recommendations, focusing on manual analysis of individual criteria.
Dhananjaya et al. (2022)	Research on personalized recommendation systems for e-learning using *content-based filtering* and machine learning approaches, shows the challenges of improving the accuracy and relevance of recommendations on big data.	This journal focuses on recommendations in digital content-based education and machine learning, while this research applies a recommendation system for cuisine with a more data-

	based approach to restaurant user transaction data.

Research methods

The association method works with the Association Rule Mining. Association rules are one of the techniques in descriptive data mining that serves to identify patterns of relationships between various items in data (Saputra et al., 2023). This method has a relationship between items (menus) formulated in the form of rules such as the following example rule: If a customer orders Hainan Rice, then they are likely to also order sweet iced tea. Each of these rules has several important evaluation parameters:

1. Support

   The support of an association rule is the percentage of combinations of items in the *database* or the percentage of transactions that contain certain combinations of items to the overall transaction (Maulidah & Bachtiar, 2021). *Support* is used to identify relationships between words (Fauzy et al., 2023).

2. *Confidence*

   Measure how often item B is purchased when item A is purchased.

3. *Elevator*

   Measure how much the relationship between two items compares if the two items are chosen at random.

In the application of this association method, there is an FP-Growth algorithm that has a very close relationship with the association method because this algorithm is a technique used in the application of association rule mining. FP-Growth with the concept of building a tree (FPTree) in looking for frequent itemsets (Ardianto & Fitrianah, 2019). This algorithm builds an FP-tree (Frequent Pattern Tree) structure to store data and look for patterns of frequently appearing items without having to go through the entire dataset repeatedly.
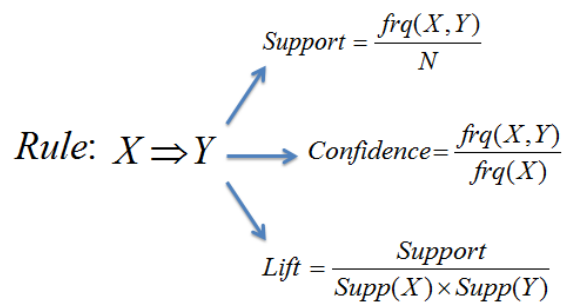
$$Rule: X \Rightarrow Y$$

$$Support = \frac{frq(X,Y)}{N}$$

$$Confidence = \frac{frq(X,Y)}{frq(X)}$$

$$Lift = \frac{Support}{Supp(X) \times Supp(Y)}$$

Figure 2. Association method formula

Source: (Nissa, 2020)

Results and discussion

After conducting the analysis, the next step is to create a web-based recommendation system application. In this application, there are menus at Yense restaurants and there are recommendations given to customers when they want to choose a menu.

In designing this application, several stages are needed.

1. Needs Analysis

    Determining the main purpose of the web, for example providing recommendations on the food menu and showing the entire menu at the restaurant so that buyers can be helped in determining the food menu to order.

2. Design
    - UI/UX Design Make a sketch or wireframe about how the web looks and layout starting from logos, menu lists, food recommendations and others.
    - System Architecture Design Create flowcharts to easily understand the interactions that can occur in the application.

3. Development
    - Frontend Development
    Create a basic framework using HTML, then add styles or layouts using CSS and add interactivity like JavaScript or React/Vue.js.
    - Backend Development
    Implement recommendation logic using Python and then build an API to connect the frontend and backend.
    - Responsiveness and Testing
    Ensure the design is responsive and compliant with CSS or frameworks and then test compatibility across various browsers.

3. Testing

    Conducting tests both in terms of functionality and usability. Ensure that the feature is working for the intended purpose and that the layout is easy to use.

After visiting the stages above, the design of the recommendation system can begin. The design of the recommendation system application to be made can be seen in Figure 3.
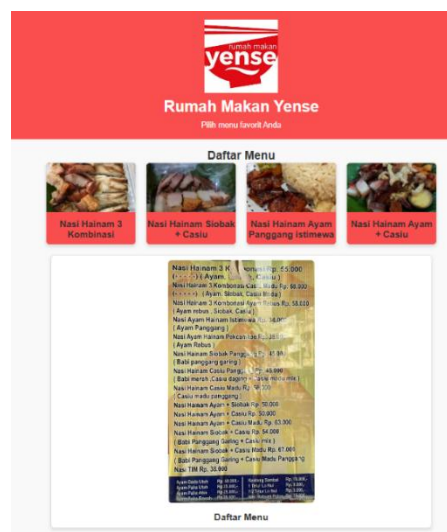

Figure 3. Web application view

Conclusion

The design of a web-based recommendation system application for Yense Restaurant is a strategic solution in answering the challenge of information overload in the competitive culinary industry. Using the SDLC Waterfall method, each stage, from needs analysis to maintenance, is carried out systematically to ensure the system can run according to its goals. This recommendation system leverages Association Rule Mining-based algorithms, such as FP-Growth, to analyze buying patterns and generate relevant menu recommendations. In addition to improving service efficiency, the system is also designed to support a more personalized customer experience and increase customer loyalty. With an intuitively designed interface through a UI/UX approach, as well as responsive frontend and backend integration, the app offers ease of use while supporting data-driven decision-making. Rigorous functional and usability testing ensures the system is able to meet user needs, while regular maintenance allows for further development based on the latest data and trends. With the implementation of this system, Rumah Makan Yense is expected to increase its competitiveness in the midst of the rapid growth of the digital-based culinary industry.

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