Development of Order Tracking and Mutation Check Modules in Rachmat Purnama Farm's Chrysanthemum Tea E-Commerce

Medhanita Dewi Renanti¹, Anita Ristianingrum², Ai Imas Faidoh Fatimah³, and Leni Lidya⁴

¹Software Engineering Technology, College of Vocational Studies IPB University, Bogor, Indonesia
²Agribusiness Management, College of Vocational Studies IPB University, Bogor, Indonesia
³Food Quality Assurance Supervisor, College of Vocational Studies IPB University, Bogor, Indonesia
⁴Agribusiness Management, College of Vocational Studies IPB University, Bogor, Indonesia

Abstract. This research is focused on the design and implementation of an enhanced e-commerce system for Rachmat Purnama Farm's Chrysanthemum Tea. It aims to improve the e-commerce system by introducing order tracking and automatic mutation check features. The research utilized the Extreme Programming (XP) approach for software development, along with observations, interviews with key stakeholders, and literature study. Through iterative design changes and thorough testing, the order tracking and automatic payment confirmation features were successfully integrated into the system. The research findings indicate a significant increase in online consumers, improved sales performance, and an expanded market reach. This research has demonstrated the benefits of incorporating innovative features into e-commerce systems to meet consumer demands and accelerate business growth.

1 Introduction

Chrysanthemum tea, with its distinctive flavor, has gained popularity as a beverage in numerous countries, owing to its delightful aroma, unique taste, and various health benefits [1]. In Asia, chrysanthemum tea is prepared from the Chrysanthemum morifolium Ramat flowers [2]. Chrysanthemum (Chrysanthemum morifolium and Coreopsis tinctoria) has long been cultivated for both its use in tea and culinary. Both the tea made from chrysanthemum flowers and dishes incorporating fresh chrysanthemum leaves are regarded as beneficial for human health [3].

The significance of information and communication technology is rapidly growing in various aspects of our lives, not only limited to production or other industries, but also profoundly impacting sales systems [4]. In the current landscape, knowledge and information have emerged as the main keys in achieving productivity, competitiveness, wealth, and convenience [5].

In today's business world, companies frequently encounter the need to continuously introduce new products or services that cater to previously unaddressed demands to sustain high profitability [6]. Consequently, the presence of an efficient information system becomes imperative to accommodate this process. The modern Internet trading system...
stands as a complex and integrated system of organization and production, comprising dynamic components that constantly evolve and interact with each other [7].

The information system is expected to support product sales, specifically in the realm of E-commerce. E-commerce typically refers to the process where buyers and sellers engage in trading activities, completing exchanges of goods and money. This trade takes place over the Internet, serving as the underlying network, and is primarily based on a client-side approach [8]. This research was conducted at Rachmat Purnama Farm, in Kingkung Village, Sukaresmi District, Cianjur Regency, West Java Province. Rachmat Purnama Farm was established in 2015 and is under the management of Yudi Pramadi. It spans an area of 4.5 hectares and operates as a social entrepreneurship venture, following the concept of Integrated Farming. The Rachmat Purnama Farm Foundation specializes in selling a variety of products, including chrysanthemum tea, mushroom seasoning, crispy mushrooms, and more. Within the foundation, Yudi Pramadi has several employees in the services of making processed chrysanthemum tea and other products.

Researchers have successfully developed an e-commerce system for selling chrysanthemum tea at the Rachmat Purnama Farm Foundation [9]. The system comprises several key features, including a website-based sales platform, effective marketing strategies for promoting products offered by the foundation, comprehensive recording of all types of sales transactions, and efficient product management on the sales website.

As a result of implementing this system, it can be inferred that the marketing and sales of products at the Rachmat Purnama Farm Foundation have been thriving. The business process has seen a significant boost in marketing efforts, leading to increased awareness in public about the products offered by the Rachmat Purnama Farm Foundation.

Despite the success of the e-commerce system, certain weaknesses have been identified that require attention. These include the absence of automatic payment confirmation detection and order delivery tracking features. To address these shortcomings and further enhance the system’s functionality, system updates are essential to ensure its optimal performance.

To develop and improve the existing sales information system for Rachmat Purnama Farm's chrysanthemum tea e-commerce, several features need to be added, such as adding tracking package receipts, implementing automatic payment confirmation, and redesigning the website to improve user experience. The goal of developing this sales information system is to complement the features and usability of the previously built website. This will enable users to have a seamless and comfortable browsing experience while also allowing them to track their orders and receive instant payment confirmations.

2 Materials and Methods

Research methods are the guidelines, techniques, and procedures employed in a study to collect, process, and analyze data, generating findings and concluding results to fulfill research objectives [10]. In this sense, the research method serves as a systematic approach for gathering essential information within the ongoing study. In this case, the research methods employed include:

2.1 Data Collection Procedures

In this study, the necessary data were collected in stages that were tailored to meet the specific needs and linked to the research objectives. The type of information required depended on the problem under investigation and the desired research outcomes. To acquire
relevant data, the data collection processes involved field observations, interviews, and literature study. By employing these methods simultaneously, the aim was to obtain comprehensive and in-depth insights into the research topic raised.

2.1.1 Observation

During the observation stage, the researchers conducted an on-site visit to the Rachmat Purnama Farm Foundation to gain a comprehensive understanding of its operations and gather data related to the management and sales processes. The objective of this observation was to design and develop a website-based information system that aligns with the foundation’s requirements. By directly observing the foundation’s practices, the researchers were able to obtain relevant and accurate information regarding ongoing practices at the foundation, enabling them to formulate effective and efficient solutions in the development of information systems.

2.1.2 Interviews

In the context of this research, interviews were conducted with the key stakeholders, namely the management of the Rachmat Purnama Farm Foundation, as resource persons in the interview. The primary objective of these interviews was to gather essential information that would serve as the basis for designing an information system. Through this interview process, the researchers hoped to gain a deeper understanding of the foundation’s needs and perspectives, thus enabling them to develop a relevant and effective information system. The data collected from these interviews is expected to be a valuable contribution in the development and enhancement of the information system to be created.

2.1.3 Literature Study

The literature study undertaken involves referencing journals, articles from trusted websites, and relevant books that pertain to the system design being developed.

2.2 System Development Method

The system development method employed in developing this system is the Extreme Programming (XP) method. Extreme Programming (XP) is a lightweight software development process designed for small teams facing vague or rapidly changing requirements [11]. The basis of all software development activities with the XP method is code writing and testing. The XP method is specifically designed for small teams, ranging from two to ten individuals, handling tasks that are frequent or less familiar. However, projects that time-consuming or difficult to obtain timely feedback, especially from a technological perspective, may not be suitable for this method. XP is a flexible agile methodology that places great emphasis on the interconnection between the proposal and implementation stages [12].

2.2.1 Refactoring

Refactoring is a critical process of changing a software system in a manner that does not impact the external behavior of the code but enhances its internal structure [13]. These refactors serve as crucial design activities aimed at improving the existing code, making the
software more comprehensible, facilitating the identification of bugs, and accelerating the programming process. Programmers should engage in refactoring when introducing new functions, addressing bugs, or conducting code reviews [14].

2.2.2 New Design

During the system development phase, a new design is created by incorporating new functions according to the user stories identified by the customer. These new designs are usually implemented by a pair of programmers collaborating on a single machine, sharing one keyboard and one mouse. Working as a pair, these programmers are adept at addressing design defects or preventing them from appearing in the first place [15].

2.2.3 Error Fix

Error fixing is the process of resolving errors that are revealed during the development phase. Programmers are responsible for writing unit tests, while customers contribute by creating functional tests to verify product’s performance [16].

These three activities dominate the developer’s effort in the XP process. Therefore, it is important to comprehend the interrelationship between these activities from both engineering and management perspectives.

3 Results and Discussions

3.1 Refactoring

When incorporating new features into the existing system, there will be a modification in the software requirements analysis. The updated system designs are as follows:

3.1.1 Use Case Diagram

A use case is a methodology employed in system analysis to identify, describe, and organize system requirements. Use case diagrams are utilized in UML (Unified Modeling Language), which is a standard notation for modeling objects and systems in the real world. The use of the e-commerce case diagram for chrysanthemum is illustrated in Figure 1.

3.1.2 Class Diagram

Class diagrams are utilized to describe the static structure of an application, with classes being the primary components, along with the relationships between them. A class represents a concept and may have associated attributes and operations [17]. The class diagram for chrysanthemum e-commerce is shown in Figure 2.
Fig. 1. Use Case Diagram of Rachmat Purnama Farm’s Chrysanthenum Tea

Fig. 2. Class Diagram of Rachmat Purnama Farm’s Chrysanthenum Tea
3.1.3 Activity Diagram

Activity diagrams identify the actions required to execute a use case and illustrates the connections between these activities. Furthermore, it allows the identification of objects involved in each activity and the definition of how the roles, status, and attribute values of these objects change throughout the process [18]. The activity diagram for order tracking is shown in Figure 3, while the activity diagram for automatic mutation checking is shown in Figure 4.

![Activity Diagram of Order Tracking](image)

**Fig. 3. Activity Diagram of Order Tracking**
3.2 New Design

At this stage, the implementation of the system interface is now conducted based on the previous design results. Figure 5 is the initial page of the system that users see when they open the website.

Fig. 4. Activity Diagram of Automatic Mutation Checking

Fig. 5. Homepage
Figure 6 displays the products added to the user’s cart.

**Fig. 6. Cart Page Display**

Figure 7 allows users to view checkout details for the products they have purchased.

**Fig. 7. Checkout Page Display**

Figure 8 displays the user’s shipping address.

**Fig. 8. Address Page Display**
Figure 9 displays the available courier options for sending packages to their address.

**Fig. 9.** Display of Courier Types

Figure 10 displays the various payment methods available for users to choose from.

**Fig. 10.** Display of Payment Methods

Figure 11 allows users to review and confirm their product orders and see order details.
Fig. 11. Order Confirmation

Figure 12 shows all the user’s order history.

Fig. 12. Order History

Figure 13 displays the details of user’s order history where payment has not been made.

Fig. 13. Order History Details

Figure 14 displays order details that have made payments and their status is processing.
**Fig. 14. Order Processed**

Figure 15 displays order details for shipped orders, including the receipt numbers, and tracking options.

**Fig. 15. Order Shipped**

Figure 16 allows users to check their order status using their email or order number. In Figure 16, there is a status if the email or order number entered is incorrect.

**Fig. 16. Order Tracking Page**
Figure 17 shows the interface where users can view or check order status through their email and order number. If the email and order number entered are correct, it will display order details according to the order number.

![Order Tracking Detail Page](image)

**Fig. 17. Order Tracking Detail Page**

The features on the admin side change when there is an order. Figure 18 shows detailed order data obtained by the Rachmat Purnama Farm Foundation (admin side).

![Display of Order Data Details](image)

**Fig. 18. Display of Order Data Details**

Figure 19 displays a column for entering a receipt number to display in the user's order details.
Fig. 19. Receipt Number Input Display

Figure 20 displays a list of customer data for users who have an account and make transactions on the Rachmat Purnama Farm’s chrysanthemum tea e-commerce.

Fig. 20. Display of Customer Data List

Figure 21 displays a list of sales report data that has been obtained by the Rachmat Purnama Farm Foundation.

Fig. 21. Display of Sales Report Data List
Figure 22 displays how to set an automatic transfer code when a user orders goods.

![Figure 22. Transfer Code Display](image)

Figure 23 displays settings for the shipping method when a user orders goods.

![Figure 23. Shipping Method Display](image)

Figure 24 displays settings for payment confirmation when a user orders goods.

![Figure 24. Payment Confirmation Display](image)
Figure 25 displays settings for tracking packages or ordering when a user orders goods.

![Figure 25. Order Tracking Display](image)

Figure 26 displays settings for the order status to be automatically canceled if there is no payment within two hours when a user orders goods.

![Figure 26. Display of Automatic Cancel Order](image)

Figure 27 displays the bank statements that are automatically recorded when a user orders goods.
Fig. 27. Bank Mutation Check

3.3 Error Fix

The findings of this study demonstrate that the implementation of Error Fix in XP has been successful in improving software quality by reducing the occurrence of errors and improving the efficiency of the testing process. This approach has proven beneficial for both development teams and customers, as they are able to work more effectively and focus on the end goal of producing a high-quality product. Moreover, the implementation of Error Fix has facilitated deeper understanding of the software being developed and encourages closer collaboration between the development team and customers.

The implementation of Error Fix in Extreme Programming has demonstrated a positive contribution in improving software quality and increasing the productivity of the development team. To further explore its potential benefits, it is recommended that future research includes broader and more extensive testing with larger samples and diverse types of software projects to observe the effect of implementing Error Fix in various software development scenarios.

4 Conclusion

Based on the stages of the Rachmat Purnama Farm’s chrysanthemum tea e-commerce development process, successful design changes were made, and new features for order tracking and automatic payment confirmations were added. These features have been thoroughly evaluated and seamlessly integrated into the system for processing orders. The addition of these functionalities has significantly improved the user experience, benefiting both consumers and Rachmat Purnama Farm. The introduction of the chrysanthemum tea e-commerce platform has resulted positive effects on the sales of chrysanthemum tea products. There has been a notable increase in the number of consumers purchasing chrysanthemum tea products online. In addition, the marketing reach for chrysanthemum tea has expanded to Jakarta and Kalimantan, indicating the successful expansion of the market of these products.

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