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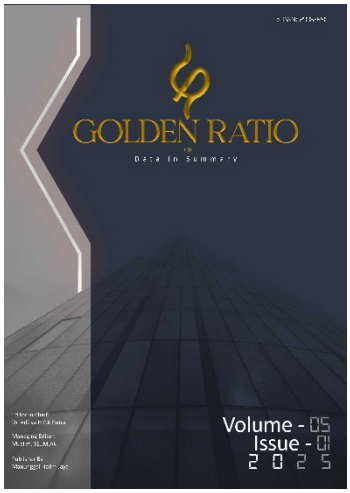

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DATA IN SUMMARY | COMPUTER SCIENCE

Integration of Customer Data Management in a Web-Based Fishing Profile Application

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Abstract: The advancement of communication media and technology has driven various business sectors to transform digitally, including fishing businesses in South Tangerang City. However, many fishing businesses still lack adequate information systems to manage company profiles and customer data in an integrated manner. This research aims to analyze, design, and implement a fishing profile website equipped with customer data management features using the Waterfall software development methodology. The waterfall methodology was chosen for its systematic and structured approach, which involves five main stages: requirements analysis, system design, implementation, testing, and maintenance. The process begins with requirements analysis and collecting necessary customer data to proceed to the data integration stage, followed by system design and implementation by developing a user-friendly web-based fishing profile application. System testing uses black box testing to ensure all features function properly. The research results show that the developed fishing profile website provides professional information and manages customer data, including customer registration, visit history, and service preferences for available fishing products. This system can enhance operational efficiency and strengthen fishing businesses' customer relationships. In conclusion, integrating customer data into a fishing business profile website can serve as an effective solution to support digital transformation in this sector.

Keywords: Information System, Profile Website, Customer Data, Waterfall Method, Fishing Business.

1. INTRODUCTION

In the ever-evolving digital era, data management has become a critical aspect of organizations and a fundamental need across various sectors, including recreational industries like fishing. Based on fisheries, fishing businesses provide facilities for fishing activities as a hobby or an economic venture (Kordi, 2010). One challenge fishing business owners face is the scattered and poorly integrated customer data management. Customer data, including identity information, fishing preferences, transaction history, and customer feedback, is often stored in disparate systems, such as manual formats, spreadsheets, or separate applications. This situation leads to inefficient data management, duplication, and difficulty deriving valuable insights for better decision-making.

Data represents symbolic depictions of numbers, facts, or descriptions gathered through observation or measurement and used for analysis (Turban & Volonino, 2010). Data integration combines data from various sources to provide a unified view, essential for effective decision-making in data warehousing (Kimball & Ross, 2013). Proper data management begins with thorough data analysis in the initial stages. This research aims to analyze, design, and implement a web-based fishing profile application integrated with customer data to improve operational efficiency and customer satisfaction. The study employs the Waterfall methodology, including requirements analysis and definition, system and software design, implementation and unit testing, integration and system testing, and operation and maintenance (Sommerville, 2011).

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Data management is closely tied to databases, which are collections of organized data enabling efficient retrieval and manipulation of information (Korth et al., 2019). The database design in this research utilizes an Entity Relationship Diagram (ERD), which illustrates relationships between entities within a system. ERD represents entities, attributes, and relationships, serving as a guide for database design (Kristanto, 2019). For analyzing actors and systems, this research uses a use case diagram. A use case describes interactions between users (actors) and the system to achieve specific goals, outlining functions or services the system provides to its users (Nugroho, 2010).

For data input validation, this research employs black-box testing. Black-box testing focuses on the functional requirements of the software, allowing testers to derive input conditions that fully exercise all program functionalities (Pressman, 2014). Data should always be maintained and monitored. System administrators must perform regular monitoring and data backups, preceded by training for core system users (Susila et al., 2021). Data backup stores a copy of existing data on different media to enable recovery after damage, hardware failure, or virus attacks. Backup aims to protect data and ensure the continuity of information system operations (Stallings, 2011). The research results are expected to enhance customer data management, improve user experience, provide better decision-making solutions, increase operational efficiency, improve data analysis capabilities, and support business growth.

2. RESEARCH DESIGN AND METHOD

The initial stage was the requirement analysis and definition of data. The researcher carried out observations and interviews to gather the necessary data for the study. After collecting the data, an analysis was performed on the data, and the customer needs to be integrated into the fishing profile application as the object of study. Key data included user needs, system requirements, and hardware and software specifications. The analyzed data were then converted into a logical data model for the database. The database design employed an Entity Relationship Diagram (ERD), interaction designs between the user and the system, and a user interface that integrates customer data into the web application. This design was then translated into a physical data model, including the required database and program code for the application's user interface. Interaction design between actors and the system was visualized using a use case diagram, while programming code was written in PHP using a text editor. The transformation of the logical database design into its physical form was executed using MySQL. Input data validation testing was performed using the black box testing method, with pre-designed input validation scenarios for the application. Functional testing of data integration within the application ensured that data input was valid and met the application's requirements. The final stage involved monitoring and maintenance, ensuring the customer data integration functioned as intended and aligned with the research objectives. This stage also marked the beginning of the system's lifecycle, addressing evaluations in data input or user interface usability based on the implemented feedback.

3. RESULT AND DISCUSSION

3.1. Requirement Analysis

The study identified essential customer data requirements and functionalities for the fishing profile application. Customers can register their information, log into their accounts, view the fishing profile, explore available products, book fishing spots, and access their booking data, history, and status. On the administrative side, the system allows administrators to manage customer and booking data effectively. To support these functionalities, the system necessitates minimum hardware and software specifications. These include an Intel Core i3 processor, 2 GB of RAM, 250 GB of hard drive space, a Generic PnP Monitor, and the Windows 10 64-bit operating system. The development

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tools used are Visual Studio Code for text editing, PHP and HTML for programming, and web browsers such as Opera and Chrome for application testing and deployment.

3.2. System and Software Design

The requirements analysis culminated in creating a use case diagram, which illustrates user interactions and the system, focusing on customer and admin activities. Admins manage the application and customer data while customers actively engage with the system through registration and booking activities.

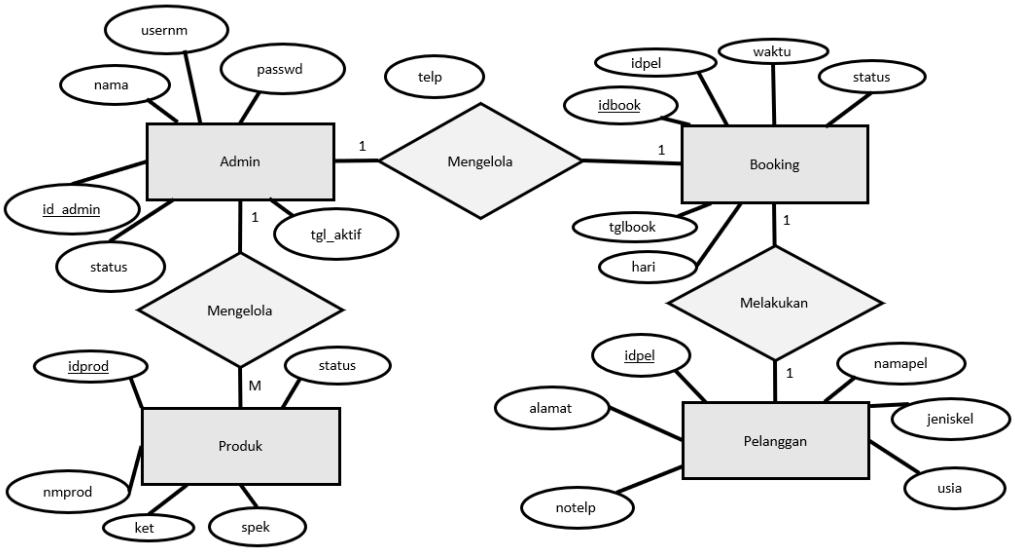

Figure 1. Entity Relationship Diagram

In addition, the study developed an Entity Relationship Diagram (ERD) to visualize data integration. This diagram establishes relationships between entities, including admin, customer, booking, and products. The admin manages the application and booking data, while customer data is captured through registration and booking processes. The system design ensures that each customer can make only one booking per activity, maintaining a logical and efficient structure for data management. This comprehensive analysis and design process ensures that the system is functional, user-friendly, and well-integrated to meet the needs of both customers and administrators.

3.3. Implementation and Unit Testing

Table 1. Admin Table Specifications

No.	Field Name	Data Type	Length	Information
1.	id_admin	int	3	*Primary Key, Auto Increment*
2.	nama	varchar	30	
3.	passwd	varchar	15	
4.	username	varchar	15	
5.	tgl_aktif	date	10	
6.	status	char	5	

Table 2. Customer Table Specification

No.	Field Name	Data Type	Length	Information
1.	impel	int	3	*Primary Key, Auto Increment*
2.	name	varchar	30	
3.	address	varchar	80	
4.	phone number	varchar	15	

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No.	Field Name	Data Type	Length	Information
5.	type of	char	10	
6.	age	int	2	

Table 3. Product Table Specifications

No.	Field Name	Data Type	Length	Information
1.	prod	int	3	*Primary Key, Auto Increment*
2.	improved	varchar	35	
3.	note	varchar	50	
4.	specs	varchar	100	
5.	status	char	5	

Table 4. Booking Table Specifications

No.	Field Name	Data Type	Length	Information
1.	ebook	int	5	*Primary Key, Auto Increment*
2.	impel	int	3	
3.	datebook	date	10	
4.	day	varchar	10	
5.	time	time	10	
6.	status	char	5	

Table 4 is a detailed logical description of the data specifications taken from the relationships between data described in Figure 2, where 4 data entities have relationships and are used for customer data management.

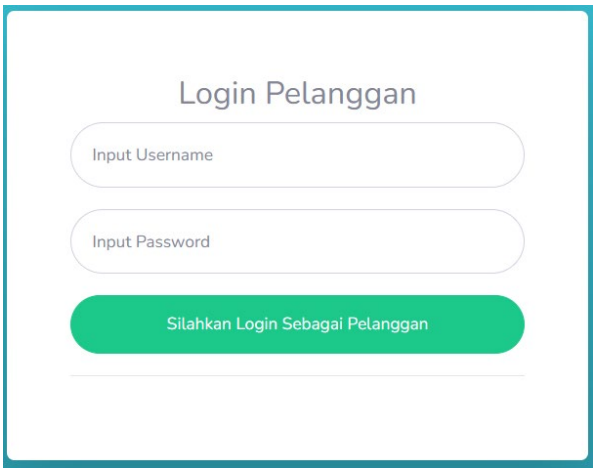

Figure 2. Customer Login

Figure 2 is an implementation of the user interface for data input in customer data integration in the application.

Table 5. Testing Customer Login Data

Test Scenario	Test Case	Expected results	Test results	Conclusion
Customer username and password are filled with valid data	username and password with valid data	The application receives customer data	As expected	Valid
Customer username and password are filled with valid data	username and password with invalid data	Application denies access to customer data	As expected	Valid

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Test Scenario	Test Case	Expected results	Test results	Conclusion
The username is valid, but the customer's password is filled with invalid data	valid username and password with invalid data	Application denies access to customer data	As expected	Valid
Invalid username, but customer password is filled with valid data	invalid username and password with valid data	Application denies access to customer data	As expected	Valid

Table 6. Customer Data Testing

Test Scenario	Test Case	Expected results	Test results	Conclusion
The input form is filled out entirely according to the specified character type and length.	Customer data is entered entirely according to the type and length of characters specified.	The application receives customer data	As expected	Valid
The input form is filled in entirely, with one of the inputs not being of the specified character type and length.	Customer data is entered wholly, and one of the inputs does not match the specified character type and length.	Application rejects customer data	As expected	Valid
The input form is incompletely filled.	Customer data is incompletely filled in	Application rejects customer data	As expected	Valid

Tables 5 and 6 above show the results of data validation input testing; if the data is inputted according to the provisions, the application will accept and receive the following response. This also happens in Table 6, where if the customer's name input is filled with numeric characters, it will be considered invalid, and the application will reject access to customer data.

4. CONCLUSION

This research collected data and analyzed requirements directly from the research object, where customer data was conceptualized into a logical design in the form of a database diagram. Four entities were identified as necessary for customer data integration: admin, customer, booking, and product. The validity of data inputs was verified using black-box testing scenarios on the designed user interface. Several points can be highlighted as conclusions, including more effective customer data management documentation, enhanced user experience, benefits for the research object in analyzing customer data, and the utilization of database-backed web technology. Overall, this research provides a strong foundation for leveraging technology to improve management and engagement in fishing activities while demonstrating the feasibility and benefits of integrating customer data management into a web-based application in the fishing industry.

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