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FlowerHub: An Online Flower Shop

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Abstract: *The study aimed to design and develop an online flower shop using object-oriented analysis and the Laravel PHP Framework. It aims to enhance local flower shops in Surigao City by improving manual ordering processing with online shopping convenience. The app offers a user-friendly interface, empowering flower shop owners with efficient inventory management, marketing strategies, and expanded reach. The system usability score of 85 out of 100 reflects higher user satisfaction and usability.*

Keywords: online flower shop, laravel

I. INTRODUCTION

The floral industry is undergoing significant transformation in response to the digital revolution, with online flowershops becoming increasingly popular among customers seeking convenience and variety. This shift has presented traditional flower shops with the challenge of staying competitive in an ever-evolving business landscape. To meet the changing needs of both flowershop owners and customers, this study aims to develop an innovative platform tailored specifically for the flower shops in Surigao City. FlowerHub aspires to bridge the gap between manual processing of informationin Surigao City flower shops and the digital era, offering a comprehensive and user-friendly web-based information system that enhances the overall floral shopping experience. With a primary objective of designing and developing FlowerHub, this study will determine the system's requirements, design an intuitive user interface, and create a robust system architecture. Additionally, the research will evaluate the system's usability using the System Usability Scale (SUS), a widely recognized tool for gathering user feedback. Through this approach, FlowerHub seeks to empower traditional flower shops and deliver an optimal user experience for both flowershop owners and customers, redefining the way local floral businesses in Surigao City operate in the information age.

II. BACKGROUND OF THE STUDY

The floral industry boasts a rich history, with the practice of giving and receiving flowers dating back centuries. However, in recent times, the industry has undergone significant changes, largely attributed to the emergence of online flowershops. These virtual platforms have revolutionized the market, leveraging digital technologies to connect with a broader customer base and offer convenient access to a wide array of floral products [1]. The appeal of online shopping and the ease of browsing and purchasing flowers from the comfort of one's home have propelled online flowershops as the preferred choice for consumers seeking a seamless floral shopping experience.

While traditional flowershops hold historical significance and a personal touch, they face various challenges in today's fiercely competitive marketplace. Notably, a significant obstacle is their limited geographic reach. In contrast, online flowershops have the advantage of serving customers across regions and even globally [2]. Moreover, efficiently managing inventory is a complex task for traditional flowershops, considering the perishable nature of flowers. Additionally, reaching potential customers in the digital age and implementing effective marketing strategies pose daunting challenges for these brick-and-mortar businesses.

In the contemporary business landscape, information systems play a crucial role in facilitating operations, decision-making, and communication. For flower shops and other businesses, adopting technology-driven information systems has become essential to stay relevant and competitive in a rapidly evolving digital world [3][4]. These information systems enable efficient data management, streamline processes, and enhance customer interactions, ultimately leading to improved business performance and increased customer satisfaction.

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Given the evolving floral industry and the challenges faced by traditional flower shops, the development of FlowerHub becomes imperative.FlowerHub aims to address the limitations of traditional flower shops and harness the potential of the digital landscape to empower both flowershop owners and customers. By providing a user-friendly and feature-rich online flowershop information system, FlowerHubendeavors to offer an innovative platform where flowershop owners can expand their reach, manage inventories more efficiently, and implement effective marketing strategies to attract customers [5]. The study also seeks to provide customers with a seamless and enjoyable shopping experience, offering a diverse range of floral products at their fingertips. By integrating information technology, aims to enhance the floral shops in Surigao City by creating a platform that seamlessly blends the best of traditional flower shops with the convenience of online shopping.

III. METHODOLOGY

The research will employ a combination of the Rapid Application Development (RAD) methodology and Object-Oriented Design (OOD) to design and develop FlowerHub. Additionally, the implementation of FlowerHub will utilize the Laravel PHP framework. To assess the system's usability, the evaluation will be conducted using the System Usability Scale (SUS).

3.1 Rapid Application Development

To expedite the development process and ensure timely delivery, the research will adopt the Rapid Application Development (RAD) methodology. This approach emphasizes iterative development, fostering collaboration between stakeholders, and enabling quick prototyping[6][7][9]. With its focus on continuous feedback and improvements, RAD is well-suited for collaborative projects like FlowerHub.

3.2Object-Oriented Design

Object-Oriented Design (OOD) will be applied to model the system's structure and behaviour [9][10][11]. Use-case diagrams will be utilized to illustrate the interactions between system actors and the functionalities they require. This graphical representation will provide a clear overview of FlowerHub's features and their relationships, guiding the development process effectively. Furthermore, class diagrams will be created to depict the objects in the system, their attributes, and the associations between different classes. These class diagrams will facilitate a comprehensive understanding of FlowerHub's architecture, promoting efficient development and ease of maintenance.

3.3 Laravel PHP Framework

The development of FlowerHub will leverage the Laravel PHP framework as the core technology. Known for its elegance, simplicity, and comprehensive features, Laravel is a widely-used PHP framework. Its capabilities in building scalable and maintainable web applications [12][13] make it an ideal choice for FlowerHub's development. The adoption of Laravel will streamline the development process, enhance code quality, and provide access to an extensive ecosystem of packages and resources. Additionally, Laravel's support for object-oriented programming aligns seamlessly with the Object-Oriented Design approach employed in this study.

3.4 System Usability

Following the completion of FlowerHub's development, the study will evaluate the system's usability using the System Usability Scale (SUS). This well-established and validated questionnaire-based tool assesses the overall usability of a system from the perspective of end-users[14][15].

IV. RESULTS AND DISCUSSION

The design and implementation of the web-based PUV booking app for the Surigao City Integrated Land Transport Terminal successfully employed the prototyping approach to system development, allowing iterative development based on stakeholder feedback. Object-oriented analysis and design were used to model the app's functionality and data structures. The app was implemented using the Laravel framework, providing a robust and efficient foundation.

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Continuous collaboration with stakeholders ensured a user-centric and effective app that met the terminal's specific needs.

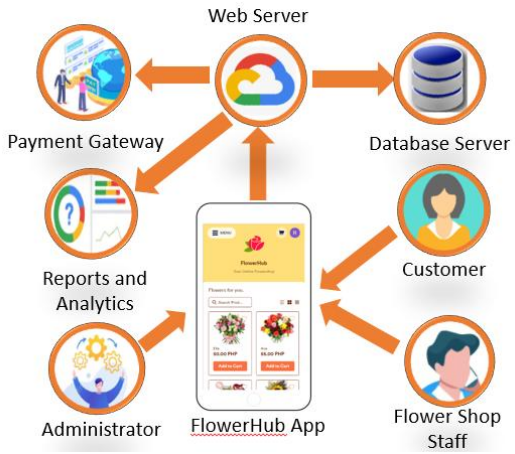

Fig. 1. System architecture

4.1 System Architecture

Fig. 1, shows the essential components of the FlowerHub app. At the center is the FlowerHub App, serving as the user interface, designed using the Laravel PHP framework and ensuring a responsive and consistent experience across devices. The Web Server handles user requests and responses, facilitating smooth communication between users and the backend services. Storing vital data for FlowerHub is the Database Server, housing information related to flower products, customers, orders, and inventory. Facilitating secure online transactions is the Payment Gateway, a critical component responsible for processing payments made by customers. The Reports and Analytics component gathers and analyzes data from the system, generating valuable insights through detailed reports and visualizations, enabling flower shop staff and administrators to make informed decisions and improve business performance.

The app caters to three main user types. Customers interact with the FlowerHubapp to browse and purchase floral products, view order status, and manage their accounts. Flower shop staff members utilize the app to manage inventory, and process orders. Meanwhile, administrators oversee the entire system, managing user accounts, reviewing payments, generating reports, and configuring system settings, ensuring the smooth operation and security of the FlowerHub platform.

4.2 System Design and Development

The application of object-oriented analysis and design (OOAD) played a crucial role in the design and modeling the system's structure and behavior. The use-case and class diagrams were developed todescribe the system's functionalities and interactions.

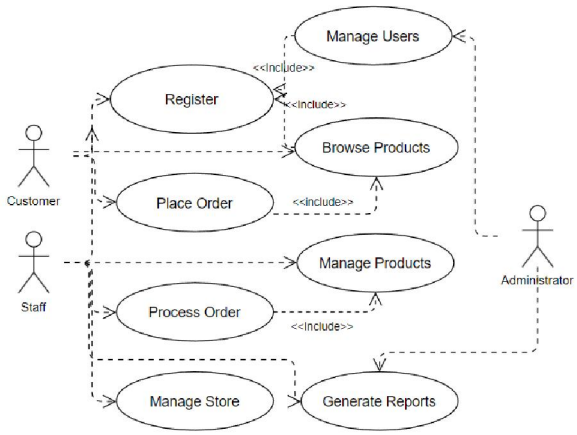

Fig. 2. Use-case diagram

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Fig. 2 presents the use-case diagram for the app. It gives an overview of the interactions between different actors (users) and the main functionalities they can perform within the system. The diagram highlights how users and the FlowerHub App engage in specific tasks to accomplish their goals. The actors involved in the system include Customer, Flower Shop Staff, and Administrator.

The Register use-case allows new customers to create accounts on the FlowerHub platform by providing their details during the registration process. Successful registration grants customers access to personalized features like order information and account management. The Manage Users use-case is exclusive to Administrators, empowering them to manage user accounts by adding new users, modifying existing profiles, or removing users from the system.

For actorsCustomer and Flower Shop Staff, the Browse Products use-case enables them to explore and view the diverse range of floral products offered by FlowerHub. Customers can initiate the Place Order use-case to select and purchase desired floral products, specifying the quantity before proceeding to checkout.

The Manage Products use-case is available toFlower Shop Staff, allowing them to handle the products within FlowerHub's inventory. They can add new products, update existing product details like price and description, and remove items that are no longer offered in their shops.Flower Shop Staff exclusively engage in the Process Order use-case, which involves managing incoming orders, updating order status, preparing items for delivery, and ensuring order fulfillment.Administrators hold control over the "Manage Store", enabling them to configure store settings, update store information such as location, and customize the store functionality.Lastly, the Staff and Administrator have the privilege of the Generate Reports use-case, empowering them to generate comprehensive reports and analytics. These reports provide valuable insights into various aspects of the FlowerHub business, including sales trends, customer behavior, and inventory status.

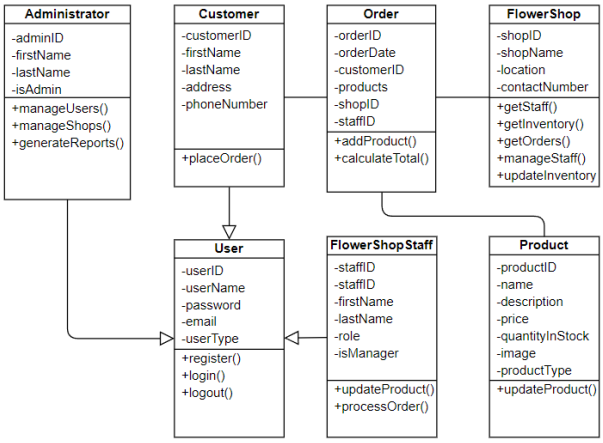

Fig. 3. Class diagram

The class diagram for the FlowerHub App (Fig. 3) illustrates the system's essential classes, their attributes, methods, and the relationship between them in a visual format. It provides a clear representation of the key entities and their interactions within the FlowerHub system. The diagram includes classes such as User, Customer, FlowerShopStaff, Administrator, FlowerShop, Product, and Order. The User class serves as a base class for users of the system, containing attributes like userId, username, password, email, and userType, representing unique identifiers, login credentials, and user roles. Derived from the User class, the Customer class adds specific attributes such as customerId, firstName, lastName, address, and phoneNumber to represent individual customers and their contact information.Similarly, the FlowerShopStaff class, also derived from User, includes attributes like staffID, firstName, lastName, role, and isManager, representing staff members of the flower shop and their roles, including whether they hold managerial positions.The Administrator class, another derived class from User, has attributes adminId, firstName, lastName and isAdmin, representing administrators managing the FlowerHub system.

The FlowerShop class represents individual flower shops within FlowerHub, with attributes like shopId, shopName, and location denoting unique identifiers, names, and physical locations of the shops.The Product class represents floral products available for purchase, with attributes such as productId, name, description, price, image, and quantityInStock signifying the unique identifiers, names, descriptions, prices, image, and available quantities of each product. The Order

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class indicates customer orders placed through the FlowerHub App. It includes attributes like orderId, orderDate, customer, and products, indicating unique identifiers, order dates, the customers who placed the orders, and the list of products included in each order.

Also, the class diagram visually depicts the relationships between these classes, showing inheritance relationships between User, Customer, FlowerShopStaff, and Administrator, as well as associations between FlowerShop, Order, Customer, and Product. It offers a comprehensive and easily understandable overview of the main entities and their attributes, providing insights into the data structure and interactions to aid the implementation of the system in Laravel.

4.3 The FlowerHub App - An Online Flower Shop Information System

The FlowerHub app was implemented using the PHP Laravel Framework. It provides a user-friendly platform for browsing and purchasing floral products, catering to both flower shop owners and customers. The details of the resulting web-based applicationare given below.

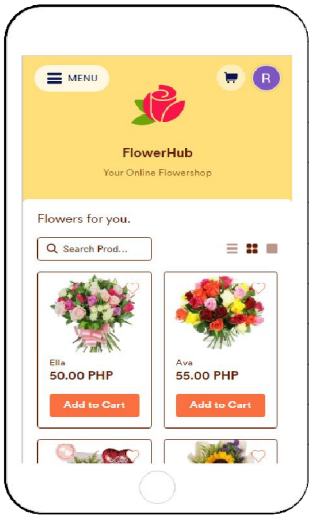

Fig. 4. Home page

The home page of FlowerHub app is shown in Fig. 4. It features the app's logo and name, providing a distinct identity. It displays a captivating image list showcasing available flowers from various shops, attracting users with a wide selection. Each flower image is accompanied by an "Add to Cart" button, enabling customers to easily add their desired items to the shopping cart. The home page also provides convenient access to the app menu, allowing users to explore other essential functionalities and options within app.

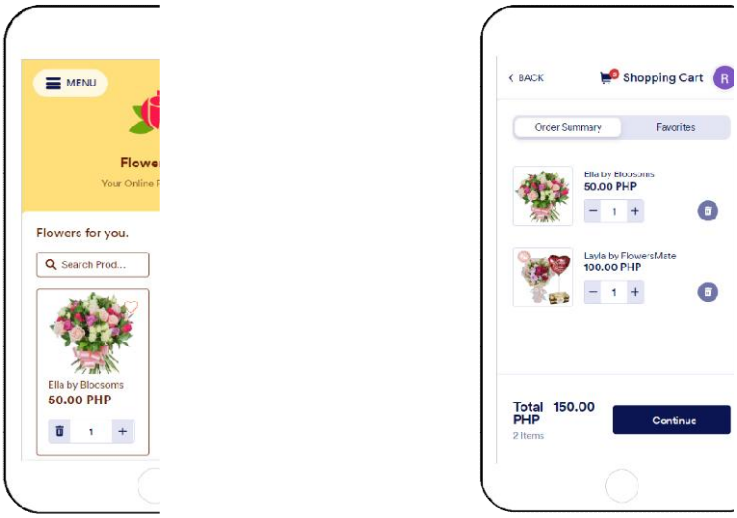

Fig. 6. Shopping cart pages

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The Shopping Cart page in FlowerHub (Fig. 6) is a dedicated section where customers can review, manage, and finalize their selected floral products before completing the purchase. After adding items to the cart from the product listings, users can navigate to the Shopping Cart page to view a list of their chosen flowers.On the page, each selected product is displayed with its corresponding details, including the flower's name, the flower shop name, description, price, and quantity selected. Customers can easily review their choices and make any necessary adjustments, such as modifying quantities or removing items they no longer wish to purchase. The page also calculates and presents the total order amount, giving customers a clear understanding of the overall cost before proceeding to payment. This helps users stay informed about their current expenses and make informed decisions.

Once customers are satisfied with their cart contents and any adjustments made, they can proceed to the checkout process by clicking the Continue button. The Shopping Cart page acts as an intermediary step, offering a final opportunity for customers to verify their selections before completing the order.

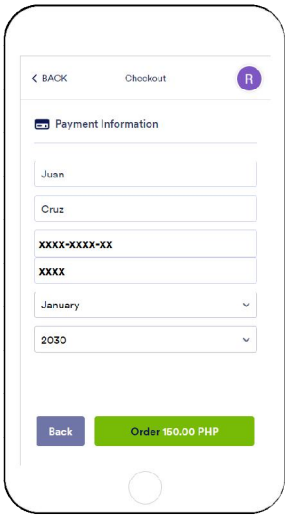

Fig. 7. Ticket and PUV boxes

In the app, the Checkout page, as shown in Fig. 7, serves as the last stage of the purchase process, where customers provide their contact details and choose their preferred payment method. To ensure security and safeguard sensitive data, FlowerHub employs secure payment gateways, guaranteeing the confidentiality of customers' financial information during transactions. Once all necessary information is provided and order details are confirmed, customers can proceed to finalize the purchase by clicking the Order button. A confirmation email is then sent to the customer, acknowledging the successful placement of the order.

4.4 App Evaluation

The evaluation of the FlowerHub app using the System Usability Scale (SUS) resulted in an overall SUS score of 85 out of 100. This score indicates a substantial level of user satisfaction and very good usability of the app. Participants, including flower shop owners (staff) and customers, provided valuable feedback, contributing to the positive assessment of the app's usability.The SUS questionnaire responses revealed that users found the app easy to use (SUS score: 4.5 out of 5), efficient (SUS score: 4.3 out of 5), and well-designed (SUS score: 4.4 out of 5). The majority of participants strongly agreed that they felt confident navigating the app (SUS score: 4.6 out of 5) and that the app was responsive to their interactions (SUS score: 4.5 out of 5).The app's clear presentation of floral products and the seamless checkout process also received positive feedback, with users expressing high satisfaction (SUS score: 4.4 out of 5) in these areas. While the evaluation yielded excellent scores, some participants provided suggestions for improvement, including the addition of more personalized features and ensuring consistent performance across different devices.

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V. CONCLUSION

In sum, the study successfully developed FlowerHub: An Online Flowershop, a web-based platform tailored for flower shop in Surigao City. Leveraging the PHP Laravel Framework, the app offers a seamless and user-friendly interface, improving the floral shopping experience for both flower shop owners and customers.

The evaluation using the System Usability Scale (SUS) demonstrated the app's high user satisfaction and very good usability, with an overall SUS score of 85 out of 100. Participants' feedback affirmed the app's effective design and functionality. The app bridges the gap between traditionally manual flowershops in Surigao City and the digital era, empowering flower shop owners with efficient inventory management, marketing strategies, and expanded reach. Customers enjoy a diverse selection of floral products and a seamless checkout process. The app's success lies in its user-centric design, secure payment gateways, and real-time analytics, enabling administrators to make data-driven decisions and optimize strategies.To further enhance the app's usability and user experience, future improvements will focus on personalized features and consistent performance across devices.

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