

Barbershop Centralized Management System with Self-Service Queueing and Booking Features

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Abstract— Barbershop Centralized Management System is a software platform that helps barbershops improve their efficiency and customer experience by providing self-service queueing and booking features. Customers can use the system to view available appointments, book a time slot, and join the virtual queue from their own devices, eliminating the need to wait in person. The system also helps barbers manage their schedules and keep track of customer information. By centralizing all of these functions in a single platform, the Barbershop Centralized Management System simplifies the barbershop experience for both customers and employees. Additionally, the system development project will make use of client-server technology for the network element as well as user authentication and verification as a security element. Laravel will be used as the framework to support the back-end and the front-end while PHP will be used as the language to code in a code editor called Visual Studio Code.

Keywords— *Efficiency; customer experience; self-service queueing; booking; appointments; virtual queue; schedules; customer information; centralization; simplification; client-server technology; user authentication; verification*

I. INTRODUCTION

In the fast-paced and evolving world of barbershops, efficient management systems play a crucial role in enhancing operational processes and elevating the customer experience. The Barbershop Centralized Management System with Self-Service Queueing and Booking Features is a software platform designed to empower barbershops with advanced functionalities for improved efficiency and customer satisfaction.

In recent years, the demand for barbershop services has surged, leading to an increased need for streamlined operations and reduced wait times. Traditional barbershop models often rely on manual processes for appointment scheduling and queue management, resulting in inefficiencies and inconveniences for both barbers and customers.

However, the advent of digital technologies has opened up new possibilities for transforming the barbershop experience.

The solution that is proposed is to develop a centralized management system with self-queueing and booking features. The booking method will be digitalised in a web application so customers do not need to directly deal with employees through the messaging application and as for walk-in problems which is only using pens and papers will be countered with the solution of a digitalised order taking through a tablet provided in the barbershop. Finally, the problem of the management of multi-branches which is not having the access to business analytics will be solved with having an organized database to extract the datasets from and producing a chart to analyse.

II. LITERATURE REVIEW

The adoption of centralized management systems has proven to be advantageous for businesses, leading to improved productivity, cost savings, and enhanced customer experiences. By consolidating and centralizing data and processes, organizations can achieve better data accuracy, real-time information access, and efficient resource utilization. Additionally, these systems often provide advanced analytics capabilities, enabling organizations to make data-driven decisions and gain valuable insights into their operations. Some examples of barbershop management system that is available globally are StyleSeat, Vagaro and Booker.

1) *StyleSeat*

StyleSeat is an online platform that connects beauty and wellness professionals with clients seeking their services. The website offers a range of features and tools to help professionals manage their businesses, showcase their work, and attract new clients.

One of the key strengths of the StyleSeat website is its user-friendly interface. The website is well-designed, visually appealing, and easy to navigate, making it convenient for both professionals and clients to use. The platform provides a centralized hub where professionals can efficiently handle various tasks, such as managing appointments, showcasing their portfolios, and managing client relationships.

In conclusion, the StyleSeat website provides a convenient and comprehensive platform for beauty and wellness professionals to manage their businesses and connect with clients. Its user-friendly interface, robust appointment scheduling capabilities, portfolio showcase features, integrated payment functionality, and marketing tools make it a valuable resource for professionals looking to grow their clientele. However, professionals should assess their specific needs and preferences to ensure that StyleSeat aligns with their unique business requirements and goals.

2) Vagaro

Vagaro is a comprehensive web-based platform designed for businesses in the beauty, wellness, and fitness industries. The website offers a range of features and tools to help professionals manage their appointments, bookings, client relationships, and business operations effectively.

One of the key strengths of the Vagaro website is its user-friendly interface. The website is well-designed, visually appealing, and easy to navigate, making it convenient for both business owners and clients to use. The platform provides a centralized hub where businesses can efficiently handle various tasks, such as scheduling appointments, managing staff, processing payments, and tracking inventory.

In conclusion, the Vagaro website provides a comprehensive solution for businesses in the beauty, wellness, and fitness industries. Its user-friendly interface, robust appointment scheduling capabilities, integrated POS system, CRM features, and mobile accessibility make it a convenient and efficient platform for managing various aspects of a business. However, it is recommended for businesses to explore the specific features and requirements of Vagaro to ensure it aligns with their unique needs and goals.

3) Booker

Booker is a web-based platform designed to help businesses in the beauty, wellness, and service industries manage their operations effectively. The website offers a range of features and tools to streamline appointment scheduling, customer management, and business operations.

One of the key strengths of the Booker website is its comprehensive set of features for appointment management. The platform allows businesses to create and manage schedules, set up availability for staff members, and enable online booking for customers. It provides automated notifications and reminders to reduce no-shows and keep both businesses and clients updated on appointments.

In conclusion, the Booker website provides a comprehensive solution for businesses in the beauty, wellness, and service industries to streamline their operations. Its robust appointment management features, customer management capabilities, integrated POS functionality, marketing tools, and business management features make it a valuable platform for managing various aspects of a business. However, it is important for businesses to assess their specific requirements and determine if the features and functionalities provided by Booker meet their unique needs and goals.

Table 1. Comparison of Similar Existing system and Proposed System

Functions/Features	My Proposed System	StyleSeat	Vagaro	Booker
Web-based for both staffs and clients	Yes	Yes	Yes	Yes
Mobile application for clients		Yes	Yes	Yes
Mobile application for staffs				Yes
Online booking and scheduling	Yes	Yes		
Customer management and records	Yes	Yes		
Marketing and promotions management		Yes		
Payment processing and reporting	Yes	Yes		
Staff scheduling and management		Yes		
Appointments reminders and confirmations	Yes	Yes		
Integration with social media		Yes		
Inventory management			Yes	
Point of sale (POS)	Yes		Yes	
Client feedback and reviews			Yes	
Gift card management				Yes
Reporting and analytics	Yes			Yes
Multi-location management	Yes			Yes
Customizable booking page		Yes		
Virtual consultations		Yes		
Automated appointment confirmations and follow-ups			Yes	
Automated client feedback and surveys			Yes	
Customer loyalty program			Yes	
Employee commission				Yes

tracking and reporting.				
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III. METHODOLOGY

A set of approaches to the project are known as a methodology. Every accessible methodology is distinct and has its own areas of expertise. Agile methodology has been selected as of this project, and agile is being applied throughout this project to ensure the success of the development. For my project, I choose to use the Waterfall methodology for my project due to its clear and well-defined process that provides clear guidelines for each phase of the project, allowing me to plan and execute my project in a systematic and organized manner. The Waterfall methodology consists of a series of sequential phases, including requirements gathering, design, implementation, testing, and maintenance. Each phase must be completed before moving on to the next, ensuring a linear and well-defined process for software development.



Figure 1. Waterfall Methodology phase [1]

1) Requirement phase

In the requirements phase of the Waterfall methodology, all potential project requirements, timeframes, and standards are noted and compiled [2]. The possible conditions are carefully examined and documented to provide a framework for the upcoming development process. Once all the criteria are gathered, the scope and goal of the project are determined. Additionally, a review of relevant systems and technologies is conducted in the literature to ensure that the requirements are feasible and have been tested.

2) Design phase

In the design phase of the Waterfall methodology, a list of technical design requirements is compiled, encompassing database structures, services, programming languages, system architecture, software specifications, and hardware requirements [2]. Initially, the system's features are created independently. Once the basic design is completed, it is transformed into a physical design that aligns with the software and hardware technologies' specific needs. During this phase, the appropriate programming language and database are selected.

3) Implementation Phase

In the implementation phase of the Waterfall methodology, the source code for the project is written according to the established guidelines [3]. The source code

incorporates the specified models, logics, and third-party integrations. It is organized into smaller units or components based on the system's features. These units are then integrated to form the complete system.

4) Verification or Testing Phase

In the verification or testing phase of the Waterfall methodology, the source code for the project is subjected to comprehensive testing to ensure its reliability and adherence to requirements [4]. The testing process involves validating the functionality of implemented features, detecting and rectifying any defects or errors, and assessing the overall performance of the software. The source code is divided into smaller units or components based on the system's features, and thorough testing is conducted on these units prior to integration into the system.

5) Deployment and Maintenance Phase

During the deployment and maintenance phase of the Waterfall methodology, the system is prepared for deployment in a live environment, and subsequent maintenance activities are carried out to ensure its functionality and performance [5]. This phase involves verifying that the system meets all specified requirements from the testing phase and addressing any critical issues that may have been identified. Thorough checks are conducted to ensure a smooth transition to the production environment.

After deployment, the maintenance phase involves ongoing support and enhancements to the system [5]. Corrective maintenance is performed to address any issues or errors encountered by stakeholders, while adaptive maintenance focuses on making necessary modifications to accommodate changing user needs. These maintenance activities aim to ensure the system's reliability and effectiveness over time.

The software required to develop this proposed system are shown below:

- VSCode
- MySQL
- Laravel
- Microsoft Visio
- Microsoft Project
- Figma

Table below shows the system requirement analysis for the developer to build this proposed system.

Table 2. Minimum System Requirements

Hardware Requirements	Description
Operating System	Windows 10 Pro
Processor	Intel(R) Core(TM) i5-7200U CPU @ 2.50GHz 2.71 GHz
RAM	12GB
Graphics Card	Nvidia Geforce 940MX

IV. SYSTEM DESIGN AND METHODOLOGY

The use case model for this system involves 5 different actors and their corresponding actions within the system. One of the actors is the walk-in customer who can place an order, check their position in the queue, and choose to leave the queue if needed. Another actor, the early book customer, has the ability to book appointments in advance, cancel appointments when necessary, and view their booking information. The admin role is responsible for managing the system and can add or edit barbershop branches. The manager can access sales reports, while both the manager and barber can view barber performance reports. The admin, manager, and barber roles share common actions such as registering, logging in, and logging out. Lastly, the barber has access to information about their current client and can take on new clients or call the current client again.

1) System Architecture

The system architecture diagram of the system development project which is done web-based, from the client side of interacting with the website which is the front end which then communicates with the back end eventually fetch, delete or add the data in the database depending on the use case and lastly integrating the back end with third party services to function some of the use case in need of integration of external services.

2) Interface Design

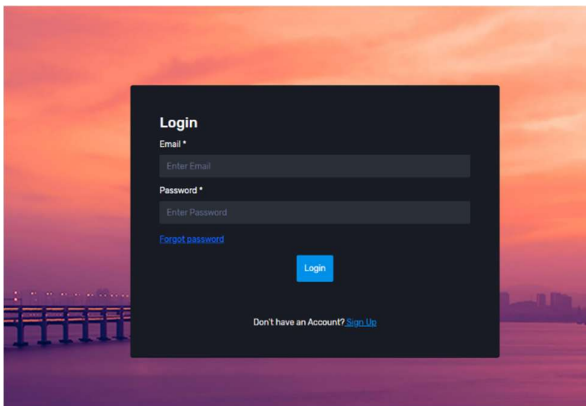


Fig 2. Login Page

Fig 2 shows the login page of this proposed system. Admin has to insert the username and password to be able login. The combination of the password and username must be correct and match the one in the database. The proposed system includes an additional security measure that enhances password security by implementing password hashing and salting techniques.

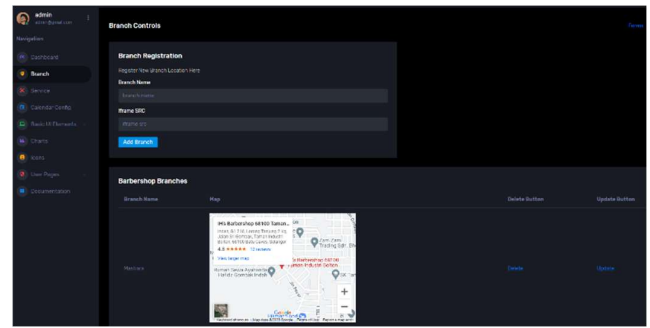


Fig 3. Branch Controls Page

Fig 3 represents a form that allows users to register a new barbershop branch. It includes fields for entering the branch name and an iframe source (a feature used to embed maps or other external content). When the form is submitted, it sends the data to the server for processing.

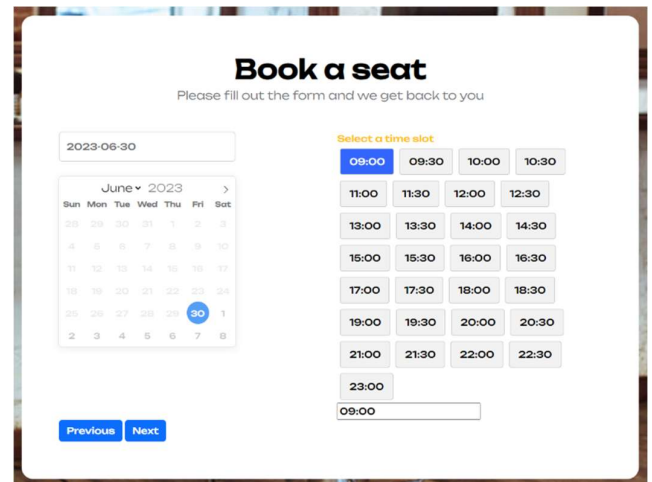


Fig 4. Book Appointment Page

Fig 4 shows a user-friendly booking form for the barbershop appointment. It consists of multiple steps where users can select their desired branch, service, user, date, and time, as well as provide their personal details. The form is designed to simplify the booking process by guiding users through each step and providing clear instructions. It allows for a smooth and efficient booking experience, ensuring that users can easily make their appointments online..

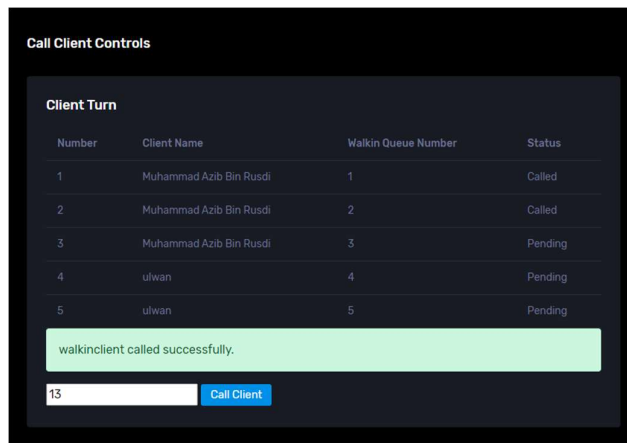


Fig 5. Call Client Page

Fig 5 represents a section in the barber's dashboard where they can see the current client to be served. The information is presented in a table format, showing the client's number, name, walk-in queue number, and status. The barber can easily identify which client to call next. Additionally, there is a form provided that allows the barber to call the client by clicking the "Call Client" button. If there are no walk-in clients at the moment, a message stating "no walk-in client" will be displayed. The view file aims to simplify the process of managing and serving clients for barbers, providing an organized and convenient interface..

V. SYSTEM IMPLEMENTATION TESTING AND RESULTS

The core functionality of the system is implemented using PHP, with HTML, CSS, and JavaScript utilized to create dynamic and interactive web pages. The data storage and retrieval are managed through a PHPMyAdmin database, ensuring secure and efficient handling of information. Finally, the system is hosted on 000webhost, allowing users to access the application from anywhere with an internet connection.

The proposed system underwent three different types of testing, namely white-box testing, black-box testing, and User Acceptance Testing (UAT). A total of 14 individuals participated in the testing process to evaluate the system's functionality and performance.

The User Acceptance Test responses for the Barbershop Centralized Management System with Self-Service Queueing and Booking Features revealed a mixed outcome. On the customer side, all participants were able to successfully book appointments and register walk-in orders, but none of them could cancel their bookings. Additionally, they had no issues viewing their appointment and order information. In the admin section, the single participant was able to add and edit barbershop branches, register and log in to their account, and successfully log out. However, the manager section had disappointing results, with none of the three participants being able to view sales or barbers' performance reports. On a positive note, all of them could register, log in, and log out of their accounts. The barber section showed better performance, as all participants successfully picked up clients using the

"call client" button and registered, logged in, and logged out without any difficulties. While there was limited variety in the responses, it is clear that improvements are needed in certain areas to enhance the system's functionality and address the identified issues.

VI. CONCLUSION

In summary, the Barbershop Centralized Management System caters to the needs of walk-in and early book customers, administrators, managers, and barbers. It offers features such as order registration, queue information, and appointment booking. Administrators can add and edit branches, while managers access sales and performance reports. All actors can register, log in, and log out. Overall, the system streamlines barbershop operations, enhances customer satisfaction, and improves management efficiency.

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