DEPARTMENT OF INFORMATION TECHNOLOGY AND COMMUNICATION

DIPLOMA IN INFORMATION TECHNOLOGY
(DIGITAL TECHNOLOGY)

SMARTWASH: NEXT-GEN CAR WASH BOOKING

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SESSION : PENDEK 2024 || II: 2023/2024

DECLARATION

We hereby declare that the technical report entitled "SmartWash: Next-Gen Car Wash Booking" is based on original work under supervision and guidance of Puan Zamhariah Binti Md Zain except for citations and quotations which have been duly acknowledged. We also declare that it has not been previously and concurrently submitted for any other diploma or award at Polytechnic or other institutions.

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APPROVAL FOR SUBMISSION

Project Title   :   SMARTWASH: NEXT-GEN CAR WASH BOOKING

Session   :   PENDEK 2024 || II:2023/2024

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ABSTRACT

The goal of the Car Wash Management System is to improve customer satisfaction and efficiently manage car wash appointments. The objective of the Car Wash Management System is to provide a website that makes scheduling car wash services easier.

The automobile wash system will be created as a webpage and app, with capabilities like user registration, appointment setting and scheduling, monitoring of past car washes, and connectivity with current car wash databases

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1.0 PROJECT PLAN

1.1 PROBLEM STATEMENT

1. **Reliance on Manual Processes:**

    The traditional car wash booking system depends heavily on phone calls and walk-ins. This method is inherently inefficient and prone to errors, leading to scheduling difficulties for customers, double bookings, and missed appointments. These issues contribute to customer frustration and dissatisfaction.

2. **Limited Customer Communication:**

    Traditional system often lack mechanisms for effective communication with customers. This results in missed notifications about appointment confirmations, changes, or special offers, negatively impacting customer satisfaction and loyalty.

3. **Difficulty in Handling Feedback:**

    Collecting and managing customer feedback manually is inefficient. An integrated system can streamline feedback collection, allowing for timely responses and continuous improvement.

1.2 OBJECTIVE

1. To streamline booking, create a web-based system that eliminates manual processes, reduce errors and prevents double bookings.

2. To integrate automated communication tools to ensure timely notifications for confirmation, changes, and special offers, enhancing customer engagement, satisfaction, and loyalty.

3. To implement a feedback feature to streamline gathering customer insights, enabling timely responses and continuous service improvement.

1.3 SCOPE

User Scope:

Customers will be able to register and create accounts on the platform, view available car wash services with detailed descriptions and pricing, and schedule appointments based on their preferred time slots. They will also have the capability to make secure payments for the services they book and receive confirmation along with reminders before their scheduled appointments.

Employees will have separate accounts with access to the backend off the system, allowing them to view and manage appointment schedules efficiently. They will be able to add, modify, or cancel bookings as needed and mark appointments as completed, updating the booking status in real-time.

System Scope:

The SmartWash platform will enable secure user management, allowing both customers and employees to register, log in, and manage their accounts efficiently. This includes features for password management, profile customization, and account recovery, ensuring a seamless and secure user experience. The system will also facilitate booking management, allowing users to easily schedule car wash appointments by viewing available time slots and selecting desired services.

To keep users informed, the platform will provide automated notifications for booking confirmations, reminders, and updates. Additionally, employee management tools will be included to support the efficient administration of employee accounts, roles, and permissions. This will enable the scheduling of employees, assignment of tasks, and tracking of performance, thereby optimizing overall workforce management.

1.4 PROJECT SIGNIFICANCE

The SmartWash project revolutionizes the car wash industry by automating booking processes, freeing employees from administrative tasks to focus on quality service. Its user-friendly platform simplifies scheduling and payments, enhancing customer satisfaction and loyalty through seamless and convenient experiences.

A centralized database ensures data accuracy and easy access, aiding better decision-making and improved customer service. SmartWash also optimizes workforce management with tools for managing employee roles and tracking performance. Built with modern web technologies, it is scalable and adaptable to industry changes.

1.5 COST PLANNING

Expense Category	Details	Estimated Cost
Infrastructure	Domain registration	RM200

2.0 LITERATURE REVIEW

Introduction:

There is various car wash application launch in the market nowadays. Car wash application that has been reviewed is using appointment scheduling method to schedule customers' appointment. However, every application has their own strengths or weaknesses.

BR CAR WASH

BR car wash is a car cleaning application which include many different functional applications developed by BR Softech expertise. This application had used appointment scheduling method and allows customers to make appointment. BR car wash is offered in Android and iPhone platforms.

Strength:

1. GPS location tracking for finding nearby car wash centers.
2. Real-time scheduling, allowing 24/7 appointment bookings.
3. Cost savings from optimized manpower utilization.

Weakness:

1. Lacks a driver tracking feature for customers to prepare for arrival.

Fresh Car Wash

Fresh Car Wash offers an online booking system for car wash services, making it convenient for customers and helping businesses manage their schedules efficiently.

Strengths:

1. User-friendly interface for booking and payments.
2. Automated reminders and notifications to customers.

Weaknesses:

1. Limited customization options for service packages.

JRNI (Anastasia Masters, 2019)

JRNI provides insights into appointment scheduling benefits.

Strengths:

1. Enhances appointment attendance rates.

2. Reduces no-shows through automated reminders.

Weaknesses:

1. Initial setup costs and complexity.

3.0 METHODOLOGY

The Agile methodology, a dynamic approach within the SDLC, is employed to develop the mobile application for this project. This iterative and incremental method allows for regular user feedback and continual refinement of requirements. It addresses errors and issues in short cycles, progressing through development and delivering a functional product in each sprint. This approach minimizes the risk of poorly defined user requirements.
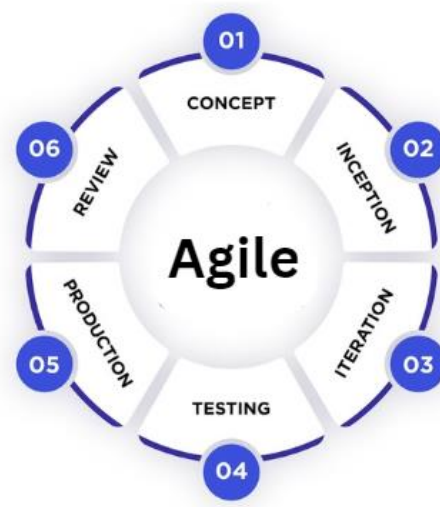
1. **Concept phase**

   Define the project scope, goals, and requirements. During this phase, requirements are gathered from stakeholders, including car wash shop owners and customers. Features are prioritized, and a product backlog is created. Sprints are planned, milestones are set, and roles and responsibilities within the team are assigned. The duration of the project is set at 6 weeks.

2. **Inception Phase**

   Create a blueprint of the system. Activities include developing wireframes and mockups of the user interface, designing the system architecture and database schema, and creating user stories and acceptance criteria for each feature. Additionally, the user experience (UX) and user interface (UI) design are planned.

3. **Iteration Phase**

   To build the system incrementally. Tasks are broken down into manageable pieces and assigned to team members. Features are implemented in iterations, focusing on one feature or module at a time. Daily stand-up meetings are conducted to track progress and address any blockers. Code quality is ensured through peer reviews and pair programming.

4. **Testing Prototype**

   To ensure the system works as intended. Unit tests, integration tests, and functional tests are written and executed. User acceptance testing (UAT) is performed to validate the system against requirements. Bugs or issues discovered during testing are identified and fixed. Code is continuously integrated and deployed to maintain a stable build.

5. **Production Phase**

   To release the system to users. Deployment plans and scripts are prepared. The system is deployed to a staging environment for final testing. Final acceptance testing is conducted with stakeholders. Finally, the system is deployed to the production environment.

6. **Review Phase**

   To evaluate the project and identify improvements. Sprint review meetings are held to demonstrate completed work to stakeholders. Feedback is gathered from stakeholders and users. Sprint retrospectives are conducted to reflect on what went well and what could be improved. The product backlog is updated based on feedback, and the next iteration is planned.

4.0 REQUIREMENT SPECIFICATIONS

4.1 FUNCTIONAL REQUIREMENT

Users can register, log in, and manage their accounts to access a personalized dashboard where they can schedule car wash appointments by selecting available time slots, view detailed descriptions and pricing of services, and securely process payments.

The system also sends automated notifications for appointment confirmations, reminders, and updates, ensuring users are well-informed. On the backend, employees have access to tools that allow them to efficiently manage schedules, modify or cancel bookings, and update the status of appointments in real-time, streamlining operations and enhancing service quality.

4.2 NON-FUNCTIONAL REQUIREMENT

Requirement	Product
Usability	Handle increasing numbers of users and appointments without performance degradation.
Reliability	Provide accurate and consistent service with minimal downtime.
Performance	Process user request and transaction promptly, ensuring fast response times.
Security	Ensure data privacy and protection against unauthorized access and cyber threats.

4.3 HARDWARE AND SOFTWARE REQUIREMENT

HARDWARE REQUIREMENT	
Processor	Intel i5/i7 or AMD equivalent.
RAM	Minimum 8GB, 16GB recommended for smoother performance.
Storage	SSD with at least 256GB for faster access and storage of project files.
Display	Full HD resolution (1920x1080) for better clarity and workspace.

SOFTWARE REQUIREMENT	
Operating System	
Development	Windows, macOS
Development Tools	
IDE/Code Editors	Sublime Text
Programming Languages	
Frontend	HTML, CSS, JavaScript
Backend	PHP
Database	SQL (MySQL)
Web Server	Apache
Other Tools	
Documentation	Microsoft Office or Google Docs for creating project documentation.

4.4 SYSTEM CONFIGURATION

1. **Web Server Configuration**

   The web server will be set up with the necessary modules to run the application, with a secure configuration to prevent unauthorized access

2. **Database Configuration**

   The database will have proper indexing and normalization for optimized performance, along with backup and recovery mechanisms to prevent data loss.

4.5 SECURITY REQUIREMENT

Security measures include secure user authentication (e.g., two-factor authentication), role-based access control, encryption of sensitive data at rest and in transit, regular security audits and penetration testing, and regular backups of the database and critical configuration files.
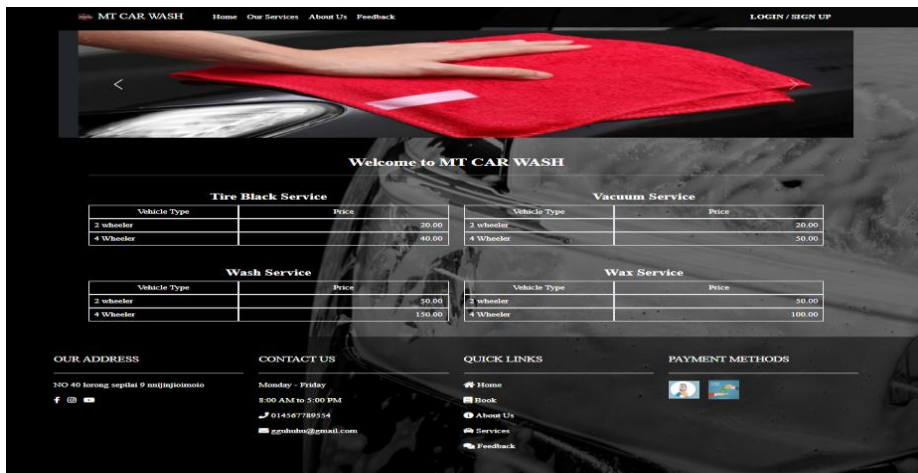
5.0 FINAL DESIGN

5.1 LOGICAL DESIGN
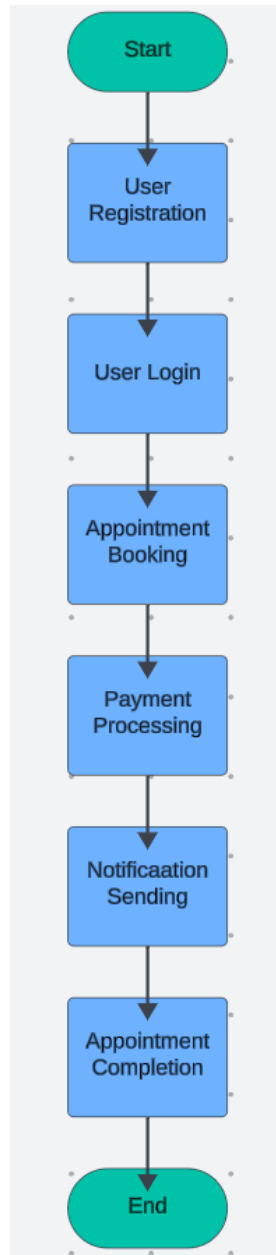
The customer interacts with the SmartWash system. SmartWash is connected to the Payment Processor, Appointment Scheduler, and Employee Management systems. This indicates that the SmartWash system likely handles the booking of appointments, the scheduling of employees, and the processing of payments.
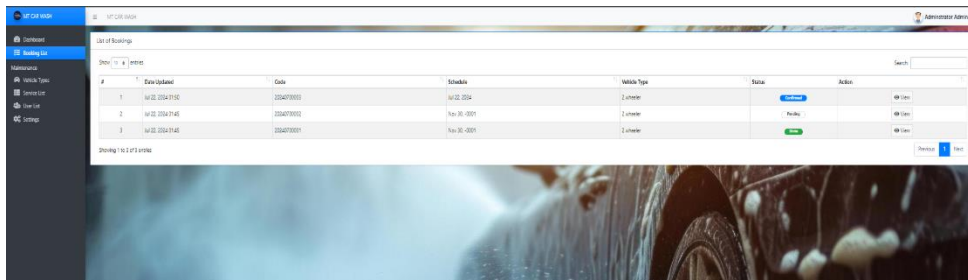
5.2 PHYSICAL DESIGN

Displays the MT CAR WASH website, featuring sections for different car wash services (Tire Black, Vacuum, Wash, Wax) with their respective prices, contact information, address, and quick links for navigation.
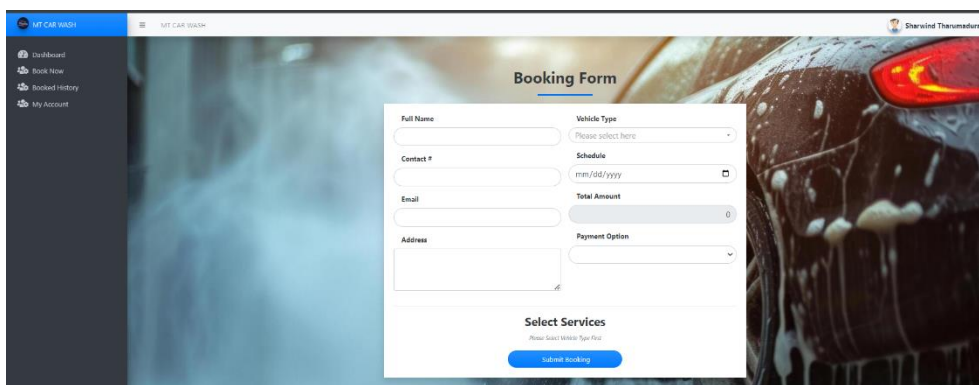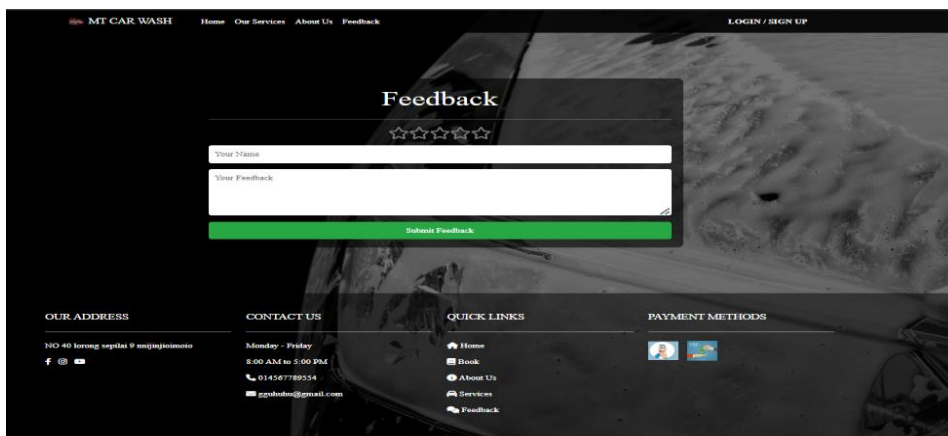

The feedback section of the MT CAR WASH website, where users can rate the service, enter their name and feedback, and submit it using the "Submit Feedback" button.

The admin interface of the MT CAR WASH booking system, displaying a list of bookings with details such as date updated, code, schedule, vehicle type, status, and an action button to view each booking.

Car wash website's booking form. It allows customers to schedule an appointment by entering their contact information, preferred date, and selecting the desired car wash service.

6.0 TEST DESCRIPTION AND RESULTS

6.1 UNIT TESTING PLAN

INTEGRATION TESTING PLAN (ITP)					
No	Test Case Name	Test Procedure	Pre-condition	Expected Result	Tester	Result (Pass/Failure)
1.	User Registration	Verify user registration functionality	User navigates to the registration page	User is registered successfully and redirected to the login page.	Adam	Pass
2.	User Login	Verify user login functionality	User is registered	User is redirected to the homepage.	Dhia Uzma	Pass
3.	Appointment Booking	Verify appointment booking functionality	User is logged in	Appointment is booked and confirmation is displayed.	Muhesh	Pass
4.	Appointment Modification	Verify modifying an existing appointment	User has a booked appointment	Appointment details are updated.	Puan Zamhariah	Pass
5.	Payment Processing	Verify payment processing functionality	User has booked an appointment	Payment is processed and receipt is generated.	Sharwind	Pass

6.2 INTEGRATION TESTING PLAN

No	Test Case Name	Test Procedure	Pre-condition	Expected Result	Tester	Result (Pass/Failure)
			INTEGRATION TESTING PLAN (ITP)			
1.	User Registration	Enter valid data in the registration form and submit	Registration page is accessible	User receives a confirmation email and is registered	Muhesh	Pass
2.	User Login	Enter valid credentials and click login	User is registered	User is redirected to the homepage after login	Sharwind	Pass
3.	Appointment Scheduling	Select an available time slot and book an appointment	User is logged in	Appointment is successfully booked and confirmation sent	Puan Zamhariah	Pass
4.	Modify Appointment	Change the details of an existing appointment	User has booked appointment	Appointment details are updated and confirmation sent	Adam	Pass
5.	Payment Processing	Complete the payment process using valid payment details	User has booked an appointment	Payment is processed, and receipt is sent to the user	Dhia Uzma	Pass

7.0 MAJOR FINDINGS AND CONCLUSIONS

7.1 THE ADVANTAGES OF THE PROJECT

1. **Automated Booking Process**

   The system automates the car wash booking process, reducing the need for manual handling of appointments, which minimizes scheduling errors and prevents double bookings, thereby enhancing operational efficiency.

2. **Improved Customer Satisfaction**

   By providing a user-friendly platform for scheduling and payments, the system enhances customer satisfaction through seamless and convenient experiences.

3. **Real-time Updates and Notifications**

   Automated notifications for booking confirmations, reminders, and updates ensure customers are well-informed, improving engagement and satisfaction.

7.2 THE DISADVANTAGES OF THE PROJECT

1. **Initial Setup Cost**

   The initial cost for setting up the infrastructure, including domain registration and server setup, can be high.

2. **Maintenance and Updates**

   Regular maintenance and updates are necessary to keep the system secure and functional, which could incur ongoing costs.

3. **Technical Issues**

   Potential technical issues or system downtimes could disrupt the booking process and negatively impact customer satisfaction.

8.0 RECOMMENDATIONS AND CONCLUSIONS

SmartWash should enhance its user interface, develop mobile apps for Android and iOS, and implement strong marketing strategies. Form partnerships with car wash providers, establish efficient customer support, and ensure robust data security. Design the system for scalability, integrate multiple secure payment options, and encourage user feedback for continuous improvement.

In conclusion, the SmartWash: Next-Gen Car Wash Booking system is a viable and promising solution that addresses a growing market need for convenient car wash services. With its user-friendly interface, scalable architecture, and potential for significant market penetration, SmartWash is poised to become a leading platform in the car wash industry. By adhering to the recommended strategies and continually improving the platform based on user feedback, SmartWash can deliver substantial value to both customers and service providers, ensuring long-term success and profitability.

9.0 REFERENCES

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APPENDIXES

A- PROJECT GANTT CHART

Project Task	Project Week					
	1	2	3	4	5	6
Planning Phase						
Decide project title	■					
Research project background	■					
Analysis Phase						
Literature review on existing previous work	■					
Determine problem statement	■					
Determine project scope and project objective	■					
Design Phase						
Identify methodology used in this project		■				
Identify technologies and tools needed in this project		■				
Design system framework		■				
Design system using diagrams		■				
Implementation Phase						
Create Prototype		■	■	■		
Enhance prototype incrementally			■	■		
Test the system				■	■	
Deploy the system					■	
Documentation						■

B- CODING/CONFIGURATIONS

https://drive.google.com/drive/folders/1mPac2pdm8hAWLhZ4jHSWzW-o4uQddKY2?usp=sharing