# A CONVINIENT AND SUSTAINABLE ONLINE BOOKING SYSTEM FOR A PORTABLE CAR CLEANING SERVICES

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# DICT/24805/0/24

# A software project report submitted in partial fulfillment for the requirement of the award of Diploma in Information and Communication Technology of Pan Africa Christian University

JANUARY 2024

# DECLARATION

This software project is my original work, except where otherwise stated and has not been presented for a degree in any other University or any other award.

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(BRANDON MWANGI) 10/02/2024

(DICT/24805/0/23)

# CERTIFICATION

# The undersigned certify that he has read and hereby recommend for acceptance of PAC University, a software project entitled: “A CONVINIENT AND SUSTAINABLE ONLINE BOOKING SYSTEM FOR A PORTABLE CAR CLEANING SERVICES”

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# 1.1.Background information

For car owners looking for quick, easy, and effective ways to keep their vehicles clean, online car cleaning services have become a popular and creative option. With just a few taps on their smartphones or clicks on their computers, customers can now book and get car cleaning services thanks to the growth of digital platforms and mobile applications. Technology developments, shifting consumer preferences, and the increasing need for flexibility and convenience are all contributing to the move towards online car cleaning services.

Car owners had to physically drive to a certain site and wait in line for their turn to receive a wash in the past. Nevertheless, this method frequently proven to be cumbersome and time-consuming, particularly for people with hectic schedules. Online car cleaning services platforms have sprung up in response to these difficulties, streamlining the procedure and enabling users to book appointments at any convenient time and place, even at home or at work.

The development of mobile technology and connection has also contributed to the growth of online car cleaning services. Customers may now access a variety of services and amenities from the palm of their hands thanks to the increasing use of smartphones and the availability of high-speed internet connection. The emergence of on-demand services, such as online car cleaning services, which use digital platforms to link clients with service providers in real-time, has been made possible by this greater connection.

# 1.2.Problem statement

The shortcomings and inefficiencies of conventional vehicle wash techniques, which are unable to satisfy the changing demands and tastes of contemporary customers, provide the problem statement for online car cleaning services. Conventional car cleaning services facilities might be difficult for time-pressed people looking for environmentally friendly and convenient auto cleaning alternatives because of their large time commitments, location restrictions, and environmental issues. Furthermore, typical car cleaning services experiences' inconsistent service quality and lack of guarantee erode patron loyalty and pleasure. It is critical to innovate the car cleaning services business by utilizing digital platforms to provide dependable, easily accessible, and environmentally friendly car cleaning solutions, as technological improvements continue to shift consumer expectations and fuel the desire for on-demand services. As a result, the issue statements on closing the gap between antiquated methods of car cleaning services and modern customer expectations, which calls for the creation of strong online car cleaning services platforms that put convenience, sustainability, and quality of service first.

## 1.2.1 Description of current system

Utilizing digital platforms and mobile applications to expedite the scheduling, delivery, and receipt of vehicle washing services is the core of the modern online car cleaning services service system. Customers usually use websites or mobile apps specifically designed for this purpose to access online car cleaning services platforms. From there, they may peruse available services, choose their favourite packages, and make appointments at a time that works for them. Customers can choose the preferred location for the car cleaning services, such as their house, place of employment, or another approved area, once a booking is confirmed. After being notified of the appointment, service providers—who are frequently independent contractors or associated detailing companies—send a cleaning crew to the specified site with the required equipment and supplies.

When the cleaning crew arrives, they wash and detail the customer's car in accordance with the chosen service package and any extra customisation choices made when making the reservation. Customers may be able to select eco-friendly cleaning chemicals, add-on services like interior detailing or waxing, and indicate any unique needs or areas of focus, depending on the platform and service provider. Through the online platform, clients may follow the progress of their appointment in real-time while the cleaning staff completes each step of the service. They will receive notifications and updates along the way.

Customers are informed and given a summary of the services rendered once the car cleaning services is finished. Usually, the internet platform is used to process payments for the service. Credit/debit cards, digital wallets, and other safe payment ways are among the accessible payment methods. Customers are also encouraged to review and comment on their experience, which helps the online car cleaning services platform's continuous quality control and improvement efforts. The overall goal of the current online car cleaning services service system is to provide consumers with a quick, easy, and customized vehicle cleaning experience while utilizing digital technologies to maximize customer happiness and service delivery.

## 1.2.2 How the Current System Works

Booking Process: Customers visit the company's website or use a dedicated app to book a car cleaning service. They select their desired service package (e.g., exterior wash, interior detailing, full-service cleaning), choose a convenient date and time, and provide their vehicle details (e.g., make, model, license plate).

Confirmation: After booking, customers receive a confirmation email or notification confirming their appointment details, including the service selected, date, time, and any special instructions.

Preparation: On the scheduled date, the cleaning crew prepares for the service by gathering necessary equipment, cleaning supplies, and ensuring that they have the correct service details for each appointment.

Arrival and Setup: The cleaning team shows up at the client's place at the appointed time. They arrange their tools and materials, making sure they have all they need to carry out the desired services effectively.   
Cleaning Procedure: In accordance with the chosen service package, the team starts cleaning the customer's vehicle. This can entail giving the outside a wash, vacuuming and cleaning the inside, waxing, detailing the surfaces, and applying additional specific treatments upon request.

Quality Check: Following the cleaning, a quality check is carried out to make sure the vehicle satisfies both consumer and business standards. Spots that were overlooked or that needed touch-ups are quickly taken care of.   
Customer satisfaction: The client is welcome to view the cleaned vehicle and offer comments regarding the quality of the service. To guarantee total satisfaction, the cleaning crew attends to any issues or extra requests.

Payment and Feedback: Using the online platform, payment is made when the consumer is satisfied with the completed service. Additionally, clients could be asked for comments regarding their interactions, which aids in the company's service improvement.   
Maintenance and Follow-Up: To assist clients in keeping their cars clean and well-maintained on a regular basis, some online car cleaning services include follow-up reminders for upcoming appointments or maintenance services.   
Customer Support: Customers can contact the company's customer support team via phone, email, or live chat in order to get help and resolution with any problems or questions.

## 1.2.3 Weaknesses of the current system

Even if the existing online car cleaning services service system is efficient and convenient, there are a few flaws that could jeopardize both the overall client experience and operational effectiveness. The possibility of variations in service quality and attention to detail is a serious shortcoming. It can be difficult to establish uniform standards across all service sites because many online car cleaning services platforms are decentralized and service providers may be independent contractors or linked enterprises. This may lead to differences in how thoroughly the cleaning is done, which could mean that some parts of the car are missed or not sufficiently cleaned.

The dependence on technology and communication, which occasionally causes interruptions or mistakes in service delivery, is another flaw. Appointment scheduling, service progress tracking, and payment processing may be hampered by technical difficulties, server outages, or problems with the online platform. Furthermore, some customers may find it difficult to utilize the digital platforms because they are less tech-savvy or do not have access to many internet-enabled devices. As a result, some demographic groups may not be able to use online car cleaning services.

One suggested remedy for the flaws in the current online car cleaning services service system is to put in place mechanisms that improve client happiness, service quality, and dependability. Initially, the implementation of uniform operating processes and performance indicators might aid in guaranteeing uniformity and responsibility among service providers. This entails carrying out routine examinations, offering guidance and assistance, and putting in place quality control procedures to uphold exacting levels of hygiene and expertise at every service location.

Furthermore, enhancing infrastructure and investing in new technologies might help to increase the dependability and effectiveness of the online car cleaning services platform. To protect consumer data and reduce service delivery interruptions, this may entail installing strong cybersecurity measures, improving mobile app functioning, and updating server capacities. Additionally, providing a variety of channels for communication and customer service can enhance accessibility and cater to the requirements of various client segments, including those with low levels of technological proficiency.

Furthermore, establishing openness and responsibility via customer review and feedback platforms can enable users to express their grievances and hold service providers responsible for their actions. Online car cleaning services platforms can exhibit their dedication to ongoing enhancement and consumer-focused service provision by proactively seeking feedback, immediately resolving customer complaints, and taking necessary remedial measures.

# 1.3 Research Aim and Objectives

## 1.3.1 General objectives

This study looks into the dynamics, prospects, and problems in the online car cleaning services market with the goal of offering thorough insights that can guide policy development, company innovation, and strategic decision-making. This study aims to address multiple important issues.

## 1.3.2 Specific objectives

* 1. First, to examine the variables influencing the uptake of online car cleaning services and comprehend the inclinations, actions, and reasons behind consumer selection of digital car cleaning services platforms over conventional techniques.
  2. Second, to determine the difficulties and impediments—such as technology limitations, governmental restrictions, and market rivalry—that are impeding the broad adoption of online car cleaning services.
  3. Thirdly, to evaluate how online car cleaning services affect the competitive environment, market dynamics, and ramifications for conventional car cleaning services companies within the automotive care sector.
  4. Fourth, to investigate how technology will influence online car cleaning services platforms going forward, considering new developments, chances for disruption, and growing patterns.
  5. Lastly, assess how online vehicle wash services affect sustainability, considering their resource efficiency, environmental impact, and role in promoting sustainable urban transportation. By achieving these goals, the research hopes to offer insightful information on the online car cleaning services market, empowering participants to make wise choices, spur innovation, and support long-term expansion in the car care business.

# 1.4. Research questions

* 1. What are the main reasons why customers choose online car cleaning services over conventional vehicle washes located in brick and mortar stores?  
     In comparison to traditional vehicle wash options, how do customers see the quality, convenience, and dependability of online car cleaning services?  
     What are the primary obstacles or worries stopping customers from using online car cleaning services, and what steps can be taken to remove them?  
       
     What effects do online car cleaning services have on the automotive care industry's competitive environment, taking into account both established mobile detailing services and car cleaning services businesses?  
     What part does technology play in improving the scalability, efficacy, and efficiency of online car cleaning services platforms, and which new technologies are influencing the direction of the sector going forward?
  2. What are the most important elements for online car cleaning services platforms to succeed in terms of attracting, keeping, and satisfying customers?

# 1.5 Problem justification

Given the changing customer preferences and the dynamic nature of the vehicle care market, the study on online car cleaning services is extremely important. Through an analysis of customer behaviors, motivations, and perceptions about online car cleaning services platforms, this research can offer significant insights to stakeholders, businesses, and governments. In order to successfully adapt their products, improve client happiness, and stay competitive in a market landscape that is changing quickly, service providers must comprehend the elements that are driving the use of online car cleaning services over traditional methods. Additionally, discussions about ethical business practices, sustainability initiatives, and the overall effect of the automotive care industry on environmental sustainability and urban mobility can benefit from insights into the regulatory, environmental, and social implications of online car cleaning services.

# CHAPTER TWO

**LITERATURE REVIEW**

# 2.1 INTRODUCTION

This is to get a form of wanted labour that one needs because lately we find that due to the high cost of living ,we find that it is way better to order for the carwash rather than a persona driving his or her way to the nearest carwash hence saving the cost of fuel that could have been used in other places, and also be able to create employment for the youth.

# 2.2 CASE STUDIES REVIEW OF SIMILAR SYSTEMS

A number of interesting examples surface when similar systems for online car cleaning services are examined in case studies. One case study centre’s on a firm that created a cutting-edge mobile application platform for booking appointments for car cleaning es. Customers' booking experiences were made easier by this technology, which also made it possible for the car cleaning service provider to allocate resources more effectively. The firm had notable development in spite of early difficulties establishing traction by utilizing social media marketing and providing special discounts to draw in new customers. An established car cleaning chain’s installation of an online booking system is the subject of another case study. The chain met the increasing demand for simple and time-saving services by adding online booking features to their current website.  
As a result, there was a rise in customer retention and satisfaction and an improvement in operational efficiency due to better scheduling and resource allocation. All things considered, these case studies demonstrate how online car cleaning systems may improve customer satisfaction, maximize resource use, and encourage growth of businesses in the ruthless car cleaning sector.

# 2.3 Research Gap: Challenges concerning the available carwash services.

Several important areas that require attention are found when the study gap about problems related to existing vehicle wash services is further explored. A noteworthy factor is the scarcity of research examining the financial sustainability and feasibility of independent, small-scale car cleaning businesses in contrast to huge chain stores. Developing measures to promote smaller players' survival and expansion requires an understanding of the economic obstacles they confront, such as growing operational costs and competition from larger entities. Furthermore, not much research has been done on the social effects of car cleaning services, including problems with fair salaries, worker rights, and working conditions.

Examining these social factors might reveal possible inequalities and unfair practices in the car cleaning industry, which in turn can guide advocacy campaigns and legislative changes meant to enhance working conditions. Furthermore, not enough research has been done on how laws and policies from the government have shaped the car cleaning sector, especially when it comes to zoning laws, licensing requirements, and environmental standards. More effective governance frameworks that strike a balance between customer safety, environmental protection, and industry sustainability can be informed by an understanding of the regulatory environment and its consequences for car cleaning operators. Scholars and politicians may help the car cleaning industry develop into one that is more socially conscious, sustainable, and egalitarian by filling in these research gaps.

# 2.4. The proposed system: The online carwash.

When recommending an online vehicle wash system, a number of important factors come into play. Initially, in order to make the booking and scheduling of car cleaning appointments as easy as possible, it is imperative to establish a user-friendly and intuitive mobile application or web platform. To accommodate a wide range of consumer preferences, the system should have features like configurable service bundles, numerous payment choices, and real-time availability updates.

Incorporating automatic alerts and reminders can also boost client involvement and communication during the reservation process. Second, by integrating data-driven insights and advanced analytics into the system, car cleaning operators will be able to better understand consumer behaviour, allocate resources optimally, and spot areas where their services can be improved. The system can increase operational efficiency and cost-effectiveness by anticipating demand variations, optimizing workforce levels, and minimizing idle time by utilizing technologies like machine learning and predictive analytics.

Furthermore, putting in place a strong feedback system that asks for ratings and reviews from customers can offer insightful data on customer happiness and service quality, enabling ongoing improvement and improvement of the car cleaning experience. In order to guarantee compliance and reduce legal risks, it is crucial to assure compatibility and integration with current industry standards and laws. This means implementing features like safe payment processing, data privacy safeguards, and compliance with environmental laws controlling chemical and water disposal. By taking these factors into account throughout the planning and development of the suggested online car cleaning system, stakeholders may build a platform that is customer-focused, scalable, and sustainable and that benefits both service providers and customers.

# 2.5.Chapter summary:

A thorough review of the literature on online car cleaning services is given in Chapter Two. Itstarts by describing the need for these services, which is fueled by the high cost of living, the need for cost-cutting measures, and the possibility of providing jobs for young people. Case studies on user experience and financial stability show that targeted marketing campaigns and improved user interfaces are examples of effective tactics. Comparative research reveals similar advantages of online car cleaning services, such as financial savings, business expansion, employment generation, and user-friendly experiences. The study also lists the difficulties that conventional vehicle wash services face, such as a lack of clients, rivalry, seasonal fluctuations, and personnel expenses.

The chapter also covers the suggested system for an online vehicle wash business, emphasizing aspects like appointment scheduling, secure online transactions, real-time tracking, feedback systems, and customer support in addition to user registration and service customization. The suggested online car cleaning program seeks to provide automobile owners with a quick and effective option while also giving jobless kids meaningful work possibilities by filling research gaps and overcoming identified challenges. By utilizing already-existing car cleaning facilities, the initiative can be creative in order to satisfy the distinct work ethic demanded of the unemployed, eventually promoting social and economic prosperity.

# CHAPTER THREE

**METHODOLOGY**

# 3.1 Introduction

Convenience is essential in the fast-paced world of today. The car cleaning industry is not an exception to the growing demand for online services. Customers can save time and worry by scheduling their car cleaning services online from the comfort of their own homes with the use of an online carwash system. Following a defined technique is necessary to create an online carwash system that is both user-friendly and efficient.

# 3.2. Software model process adopted

To guarantee effectiveness and quality,  creating an online carwash system needs to follow a methodical process. Iterative progress, stakeholder involvement, and adaptation to changing needs are made possible by adopting Agile development as the software process paradigm. The process starts with gathering all of the requirements and using market research and user interviews to define the main features and scope of the system. Next, after choosing appropriate technologies and frameworks, the lone developer creates the system architecture, which includes the database schema and user interface diagrams. Best practices are followed when coding the system during implementation, and dependability is regularly checked and fixed through debugging and testing.

During the deployment phase, the system is made ready for production by setting up the hosting infrastructure and doing last-minute checks. After that, there is ongoing maintenance and support. The lone developer keeps an eye on the system's performance, fixes problems, and applies upgrades as required. A single person can design the online carwash system with efficiency and effectiveness thanks to this systematic approach and Agile principles, which guarantees a high-quality final product.

# 3.2.1 Strength

Flexibility is where Agile technique makes it possible to adjust to priorities and requirements that change. Early Delivery is where Agile iterations enable measurable advancement by facilitating the early delivery of functional components. Transparency is where Consistent engagement of stakeholders promotes openness and congruence with project objectives.  
Waterfall methodology's structured planning guarantees well-defined requirements and design prior to the start of development. Risk Mitigation is where Comprehensive testing and ongoing integration lower the possibility of significant flaws or system malfunctions.  
Incremental Improvement is where Agile iterations allow for ongoing enhancement in response to changing requirements and user feedback. Flexibility is where The hybrid model can adapt to different project sizes and levels of complexity. Resource Optimization: Agile prioritizes tasks well, which facilitates effective resource allocation and increases output. Quality Assurance where the Extensive testing at every turn guarantees that the system satisfies user requirements and quality standards.

# 3.2.2weakness

Here is some of the weakness of the model chosen: Scope creep is where If agile iterations are not properly managed, scope creep may occur, lengthening project durations and raising expenses. Integration Difficulties: There may be dependencies and integration difficulties when coordinating the Agile and Waterfall phases. Resource-intensive: Adding more staff, time, and equipment may be needed to implement both approaches. Documentation Overhead: The focus placed by Waterfall on documentation, especially in teams that are Agile-oriented, may result in overhead. Expectations from Stakeholders where it might be difficult to reconcile the flexibility of Agile with the regimented methodology of Waterfall.

# 3.3 requirement gathering tools

The process of creating an online carwash system follows a methodical approach that begins with the extensive collection of requirements through the use of multiple technologies. In order to comprehend the requirements and expectations of patrons, car cleaning operators, and administrators, stakeholder interviews are first carried out. This aids in determining the essential functions and characteristics that the system must have. Furthermore, questionnaires and surveys can be used to validate preliminary results and get input from a larger audience. Observational studies can also be helpful because they enable engineers to see how carwash operations are currently run and pinpoint any issues that need to be fixed with the system. Additionally, focus groups and workshops enable cooperative talks between stakeholders, promoting a common knowledge of requirements and encouraging creativity in idea generation. Lastly, early in the development process, stakeholders can offer feedback thanks to the visualization of user interfaces and system workflows made possible by prototype tools like wireframing software. Developers can make sure that the online carwash system successfully and efficiently satisfies user expectations by using these requirements collecting techniques.

# 3.4 System requirement

The process of creating an online vehicle wash system starts with a detailed comprehension of the system specifications. These specifications cover a wide range of topics, such as user requirements, corporate goals, and technological limitations. First and foremost, the online payment process, service selection, and appointment booking for car cleaning es should all be easy for users to navigate via the system. To provide security and customisation, it must also have features like user registration and authentication. The system should also have administrative features for scheduling appointments, monitoring payments, and producing reports. Technically speaking, the system needs to interact with current payment gateways for safe transactions and be scalable to meet rising customer demand. Optimizing accessibility for users also means making sure that the system works with various devices and browsers.

In order to create a reliable and user-friendly online carwash system, a thorough grasp of these system requirements forms the basis for the development process and directs the phases of design, implementation, and testing.

## 3.4.1 Hardware requirements

The process of creating an online vehicle wash system involves multiple steps, and the hardware needs that are necessary for its effective operation are carefully taken into account. First off, hosting the system's backend components—such as the database and application server—requires a strong server infrastructure. The system can effectively manage concurrent user requests thanks to this server configuration, which guarantees peak performance and dependability. In addition, networking hardware like switches, routers, and firewalls is needed to provide safe connections between client devices and servers, protect private user information, and stop illegal access. Additionally, in order to access the frontend interface of the online carwash system, which allows users to book appointments, make payments, and communicate with the system without difficulty, clients such as PCs, iPads, and smartphones are required.

## 3.4.2 Software requirements

Gathering thorough software and system requirements is the first step in the process of creating an online carwash system, ensuring that every detail of the project is taken care of. A few software applications are necessary to make this process easier. First off, system requirements are best organized and documented using a requirements management tool like Google Sheets or Microsoft Excel. With the aid of these tools, a developer may effectively engage with stakeholders, track changes, and compile an organized list of features and functionalities. A diagramming program such as Microsoft Visio or Lucidchart is also essential for illustrating the system architecture and user interface design. With the assistance of these tools, a developer can produce intricate diagrams that clearly depict the user interface architecture and show the links between system components. Moreover, controlling changes to the system's source code requires version control tools like Git or Subversion. The developer can work with other members of the team, keep track of revisions, and guarantee the integrity of the codebase with the help of these tools. Lastly, the developer may better organize work, set deadlines, and monitor progress throughout the development process by using project management software such as Trello or Asana. These systems offer a consolidated project management platform that makes coordination and communication easier. All things considered, the online carwash system development process cannot be completed without the effective collection, management, and documentation of system and software requirements through the use of these software tools.

**CHAPTER FOUR**

**SYSTEM ANALYSIS AND DESIGN**

**4.1 Introduction**

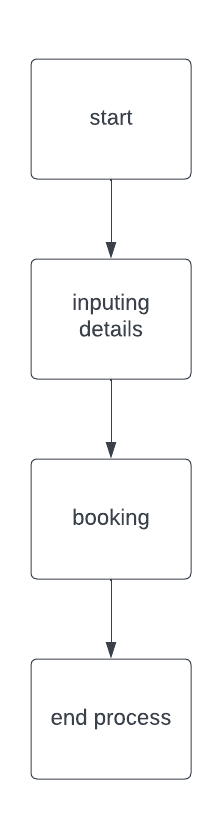
A car washing service's successful development and implementation depend heavily on the system analysis and design phase. An extensive rundown of the procedures used in the analysis and design of this system will be given in this chapter.

**4.2 Requirement analysis**

Requirement analysis is the first stage in the system design and analysis process. This procedure entails gathering and recording the system's functional and non-functional needs. The particular features and functionalities that a system must have, such the capacity to arrange a car cleaning and obtain the precise time and date of the cleaning, are known as functional requirements.

**4.3 Architectural design**

A system of interconnected components facilitates the booking, management, and delivery of cleaning services in an online car wash. The User Interface (UI), which is available to both workers and customers, is in the forefront. While staff workers manage appointments, see customer information, update service statuses, and communicate with customers, clients utilize the UI to book appointments, pick services, submit vehicle details, and make payments.



**4.4 System Analysis**

To better comprehend a system, its inputs, outputs, and interactions with other entities must be thoroughly understood. This is achieved through system analysis.

**4.4.1 Context diagram**

An overview of the car washing system's inputs and outputs is shown in the context diagram. The system receives all of the information it needs as inputs, and the output is the time and the made reservation.

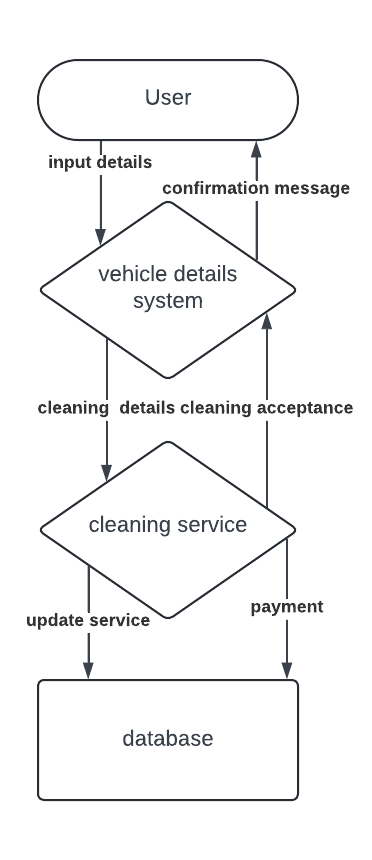


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