AGRI-SHOP E-COMMERCE SYSTEM

(A CASE STUDY OF NURA VEGE FOODS)

BY

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CERTIFICATION

This is to certify that the project report titled "Agri-shop e-commerce System" has been carried out by **ISHAQ HASSAN** with registration number **CST/18/SWE/00128** under my/our supervision. The work presented in this report is original and has not been submitted for any other degree or examination.

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DEDICATION

I dedicate this work to my parents; Hassan Aliyu and Rabi'a Ishaq, expressing my gratitude for their moral and financial support, guidance, and encouragement throughout this journey. Without you, this path could have been much more challenging. May Allah (SWT) bless and reward you with Jannatul Firdaus as your eternal dwelling place.

ACKNOWLEDGEMENT

I express my heartfelt thanks to the faculty members at the Faculty of Computing, Bayero University Kano, Kano State, for providing me with the support that significantly influenced my academic journey. I am especially grateful to my project supervisor, Malama Maryam Ibrahim Mukhtar, for her tireless support and guidance. May Allah grant her the highest place in paradise, Jannatul Firdaus.

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND OF THE STUDY

E-commerce, an integral sector of the economy, facilitates the buying and selling of goods through electronic platforms, notably the Internet. Developing an online shopping web application tailored for purchasing fruits, spices, and vegetables with payment options post-delivery is imperative. Websites serve as vital tools for numerous corporate entities, streamlining business operations and making online shopping increasingly accessible. The essence of a virtual store lies in its ability to provide customers with a curated catalog, enabling them to browse and select products conveniently. Completion of various steps is necessary for customers to place orders for desired items (Suryadevara, 2023).

The retail landscape in Nigeria is undergoing a profound transformation, largely propelled by the widespread adoption of the internet and smartphones. This evolution is reshaping consumer behavior, with a growing preference for online platforms for shopping needs. Key drivers of this shift include the convenience, extensive product variety, and competitive pricing offered by online retailers (Winny, 2023).

Zawaciki and Gasau, strategically located near companies and a dry port, enjoy proximity to both local and international populations. This advantageous positioning amid economic hubs and a diverse populace presents both challenges and opportunities for local businesses like Nura Vegfoods. Situated in Zawaciki, specifically at Diga close to Panshekara, Nura Vegefoods operates as a vendor of vegetables, fruits, and spices, poised to leverage its proximity to thriving economic zones and diverse consumer segments.

1.2 PROBLEM STATEMENT

Nura's vegetables store is currently solely relying on sales at the physical shop location. This limits their sales growth potential as only people close to the area will know its existence. As only people near the area patronize the shop, sometimes the vegetables get spoiled leading to loss sales.

Hence the need for an e-commerce system for Nura's store to increase their visibility and allow customers to order for good and get them delivered to their homes.

1.3 AIM AND OBJECTIVES

The project aim to develop an e-commerce system that enables Nura Vegefoods to efficiently market their products via an online platform and engage in receiving customer feedback. To achieve the project aim, the following objectives have been identified:

1. To Gather functional and non-functional of the system
2. To design the using the sytem with Visual Studio Code IDE, HTML, CSS, Javascript python and Django framework
3. To develop and implement a user-friendly online store that caters to the convenience preferences of customers and clients with varying levels of technical expertise.
4. To test and implement feedback features that allow customers to share their opinions or complaints on products.

By accomplishing these objectives, the project aims to provide Nura VegeFoods with a comprehensive platform that enhances its sales.

1.4 SIGNIFICANCE OF STUDY

The project holds significant importance in the branding and managing Nura VegeFoods. It was designed to cater to customers through enhanced engagement by implementing a web-based platform for sharing customer feedback and enables Nura VegeFoods to expand its market reach beyond its physical location by attracting customers within Zawaciki who may not have access to its nearby vegetable shop and improve brand awareness by establishing an online presence through the website. The platform serves as a digital storefront, allowing it to showcase its expertise in spices, vegetables, and culinary culture to a broader audience.

1.5 SCOPE

This study focuses on designing and developing a user-friendly and secure e-commerce system for Nura VegeFood, having the following key functionalities:

I. Consumer platform: Product browsing, search, shopping cart, secure checkout, user accounts, and cash on delivery payment.
II. Shop owner platform: manages shopkeepers and performs all shopkeeper's functionalities.

III.   Shopkeeper platform: registration, upload, and management of products, order management, and profile management.

1.6 DEFINITION OF TERMS

- Market share: Percentage of the total market sales captured by a specific company

- Management of sales: Processes and systems used to track, organize, and analyze sales data

- Sustainable business growth: Growth that can be maintained over the long term without negatively impacting the environment or society

- Web-based platform: A website or application accessible through a web browser

- Virtual storefront: An online store replacing a physical shop

- Perishable goods: Products that have a limited shelf life and require special handling

- Branding: Creating a distinct image and identity for a business

- Customer engagement: Building relationships and interactions with customers

- Digital storefront: A website or app used to display and sell products online

- E-commerce system: An online platform for buying and selling goods

- Consumer platform: Interface for customers to browse, search, and purchase products

- Shop owner platform: Interface for managing the entire online store

- Shopkeeper platform: Interface for managing product listings and orders

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter gives a review of existing projects related to the proposed system with their features, differences, and a comparative structure of how they relate.

2. 2 RELATED WORKS

The table 2.1 below gives the summary overview of the literatures reviewed.

Table 2.1 Summary Literature review

S/N	Title/Author/Year	Objectives	Methodology	Findings	Limitations
1	Design and Development of E-commerce: Web-application for Cooperative Store. Tenzin, S., Lhamo, T., & Dorji, T. (2022).	To design and develop an E-Commerce web application, cooperative Store Management System for the CST cooperative store in Bhutan.	The study begins with a literature review to understand existing technologies and trends in E-Commerce. Interviews, brainstorming sessions, and team meetings was conducted to collect complete data requirements for the system.	The proposed E-Commerce web application includes both front-end and back-end interfaces, with features such as order placement, home delivery, and record-keeping for sales, expenses, and stock.	the absence of an integrated payment system, and barcode reader functionalities.
2	A Web-Based Mobile System for Promoting	To develop a web-based mobile system	The methodology involved a	Findings revealed that most farmers rely on alternative	The Limitations include a

				means for	focus on
	Agribusiness in Northern Nigeria. Mungadi, I. M., Argungu, M. S., & Mahmud, N. I. (2022).	supporting agribusiness for farmers in Kebbi State.	survey, sampling techniques, and data collection through questionnaires.	information, but the web-based system has significant benefits.	Kebbi State and reliance on self-reported data
3	Investigating Factors Influencing Electronic Commerce Adoption in Developing Countries: The Case of Nigeria. Ali, U. T., Usman, B., Kachalla, A., & Ali, A. (2021).	To investigate the factors affecting the smooth running of e-commerce services in Nigeria.	Structured interview and Review document.	E-commerce struggles in Nigeria due to People don't know much about it or its benefits, security concerns, poor postal services, delivery systems, and internet infrastructure make things difficult, confused payment method.	
4	BIG BUY (E-Commerce website) by using Frontend Web Development.	To develop an E-commerce web application that will simplify the buying and selling process	The methodology of the study involves the use of HTML, CSS, and JavaScript to construct an E-	The findings indicate that customers can search for their favorite products, and they can purchase products	The limitations include the study's focus on frontend development, without the

	Sharma, A. K. (2021).	for phones and electronics.	commerce website structure, design, and interactive elements.	by adding it to their cart, which they can then increase or decrease by clicking on the "adding " or "deleting" buttons. They can check the total amount of the carted products.	backend development
5	E-Commerce web Application by using MERN Technology.

Naidu, N. D., Adarsh, P., Reddy, S., Raju, G., Kiran, U. S., Sharma, V., ... & Sharma, V. (2021). | To develop a fully functional E-commerce web application using MERN stack technology. | The methodology utilizes MERN stack technology, incorporating MongoDB for the database, Express.JS for server-side handling, React.JS for the user interface, and Node.JS for the server platform. | The findings indicate features such as a homepage displaying various T-shirts, sign-in/sign-up options, seamless integration of a secure payment gateway, administrative features, such as category creation, product addition/deletion, and an admin dashboard. | |
| 6 | E-COMMERCE IN NIGERIA: | To explore the benefits of e- | Six (6) different cities (Edo, | The findings indicate that E- | |

	BENEFITS AND CHALLENGES. Okolie, U. C., & Ojomo, A. H. (2020).	commerce and the challenges of e-commerce that inhibit its successful operation in Nigeria.	Delta, Lagos, Port Harcourt, Abuja, and Abia) are surveyed using questionnaires. Analyzed responses with SPSS, highlighting reliability through Cronbach's Alpha.	commerce adoption in Nigeria yields benefits like increased sales and improved customer loyalty, but faces challenges such as power outages, security concerns, and the need for skilled IT personnel.	
7	Adoption of e-commerce by the agri-food sector in China: the case of Minyu e-commerce company. Yang, X., Chen, X., Chen, X., Jiang, Y., & Jia, F. (2020).	To examine the evolution of Minyu's business model across different stages.	The case study used a qualitative approach, utilizing; Semi-structured interviews and documentary analysis.	The study found that Minyu evolved through three stages (birth, expansion, and leadership) by continuously innovating its business model. It transitioned from a one-sided customer platform (online shoppers) to a multi-sided platform integrating suppliers, e-commerce	

				companies, and upstream partners.	
8	E-commerce as a tool to promote the development of Cuban agro-industrial companies. Perdigón Llanes, R. (2020).	To implement e-commerce as a new business model for "Frutas Selectas" to improve commercial management and boost economic development.	The case study of "Frutas Selectas" used in-depth interviews, survey, participant observation, theoretical triangulation, and modeling.	The study reveals the implementation of four stages of development strategy which are diagnosis, planning, implementation, and lastly monitoring and feedback.	
9	E-commerce and entrepreneurship in SMEs: the case of myBot. Shemi, A. P., & Procter, C. (2018).	To explore how e-commerce entrepreneurship using Social Media Network (SMN) is conceptualized and applied in SMEs, and to highlight factors that influence this e-commerce innovation in myBot.	The methodology of the study involved qualitative research (i.e. interview, website content analysis, and document analysis of the firm's reports and observations.)	The finding reveals myBot's manager's innovative ability to use Facebook and e-mail to increase sales through its niche market. Factors that propelled e-commerce entrepreneurial activities using Facebook include trust, commitment, and innovativeness.	

| 10 | Promote Local Agricultural Products Using E-Community Supported System.

Salunke, A., Shinde, S., Tone, A., Satpute, A., & Deshmukh, J. (2018). | To develop a web application and mobile application for an e-Community Supported Agriculture (e-CSA) system called "FarmUS." | The methodology involves quantitative data collection and analysis using surveys conducted on farmers and customers. | The findings indicate that customers benefit from convenient access to organic products from local farms, reducing transportation time and costs. Farmers also can efficiently manage orders and production, and receive news and updates through the web and mobile app. | The paper doesn't delve into potential challenges faced by the system, such as internet connectivity issues, technological barriers for farmers, or marketing strategies. |
|---|---|---|---|---|---|

Literature Review Summary

Tenzin et al. (2022) study proposed the design and a developed E-Commerce web application, Cooperative Store Management System, for the CST cooperative store in Bhutan. The specific goals include reducing the workload of salespersons, minimizing manual errors through automation, providing convenience to customers by enabling online shopping, and enhancing overall service efficiency. The existing manual system for the cooperative store faces challenges such as time-consuming record-keeping, lack of timely information dissemination to customers, and operational inefficiencies. The proposed E-Commerce web application includes both front-end and back-end interfaces, with features such as order placement, home delivery, and record-keeping for sales, expenses, and stock.

Argungu et al. (2022) study aimed to develop a web-based mobile system supporting agribusiness for farmers in Kebbi State. The study used UML, surveyed farmers, and implemented a conceptual framework. Findings revealed that most farmers rely on alternative

means for information, but the web-based system has significant benefits. The methodology used involved a survey, sampling techniques, and data collection through questionnaires. Limitations include a focus on Kebbi State, reliance on self-reported data, potential technological constraints, and the dynamic nature of technology.

Umar Tijjani Ali et al. (2021) study investigates factors influencing e-commerce adoption in Nigeria, particularly focusing on Konga Nigeria. Data were collected through semi-structured interviews with six participants representing government, academia, and the banking sector. Additionally, document reviews of customer feedback from Konga Nigeria were conducted. The factors identified from the interviews included lack of awareness, security concerns, poor infrastructure, trust issues, and others. Further research was recommended to expand data collection, develop new models for studying e-commerce in developing countries, and address specific challenges in Nigeria and Africa.

Avnish Kumar Sharma (2021) study develops an E-commerce website that will simplify the buying and selling process for phones and electronics. The methodology of the study involves the use of front-end technologies to construct website components using HTML, implement responsive design using CSS, and incorporate animations using JavaScript. The Frontend has a user-friendly interface with product browsing, a shopping cart, a search bar, and a login/logout. Customers can easily search for their favourite products. They can purchase the product by adding it to their cart, which they can then increase or decrease by clicking on the "adding " and "deleting" buttons. They can check the total amount of the carted products.

Naidu et al. (2020) study proposed a develop E-commerce web application using MERN stack technology with distinct user and admin interfaces. The methodology utilizes MERN stack technology, incorporating MongoDB for the database, Express.JS for server-side handling, React.JS for the user interface, and Node.JS for the server platform. The system features include homepage displaying various T-shirts, sign-in/sign-up options, seamless integration of a secure payment gateway, administrative features, such as category creation, product addition/deletion, and an admin dashboard.

Okolie and Ojomo (2020) study explore the benefits of e-commerce and the challenges of e-commerce that inhibit its successful operation in Nigeria. The findings indicate that the major benefits of e-commerce adoption in Nigeria are increased sales, competitive advantage, customer loyalty, increased automation of processes, extended application of new technology,

better knowledge management, and enhanced well-being and education of customers. The key challenges identified in the Nigerian context include power outages and frequent power interruption, insecurity, technology cost, lack of trust in web retailers, software compatibility, and acquisition of IT skilled personnel.

Yang et al. (2020) study examines the evolution of Minyu E-commerce, a company dedicated to facilitating agricultural e-commerce in rural China. This case study employs a qualitative approach, utilizing Interviews with key personnel at Minyu, government officials, farmers, and other stakeholders to provide valuable insights into the company's operations, challenges, and successes. Review of company documents, and government reports. The study found that Minyu evolved through three stages (birth, expansion, and leadership) by continuously innovating its business model. It transitioned from a one-sided customer platform (online shoppers) to a multi-sided platform integrating suppliers, e-commerce companies, and upstream partners.

Perdigón Llanes (2020) study investigates the potential of e-commerce in boosting the development of agribusiness companies in Cuba, using the Trading Company "Frutas Selectas" of Pinar del Río as a case study. The case study of "Frutas Selectas" used in-depth interviews, surveys, participant observation, theoretical triangulation, and modeling. The Development of a four-stage e-commerce implementation strategy which includes Diagnosis (market analysis, product characteristics, customer identification), Planning (competition analysis, IT resource securement, software development, payment gateway setup, social media marketing), Implementation (execution of planned elements), and lastly Monitoring and Feedback (performance evaluation, website updates, customer feedback, corrective actions).

Shemi et al. study (2021) study explores how e-commerce entrepreneurship using Social Media Networks (SMN) is conceptualized and applied in SMEs, and highlights factors that influence this e-commerce innovation. The methodology of the study involves qualitative research i.e. face-to-face semi-structured and unstructured interviews with the manager as primary means of obtaining in-depth information. Further information was obtained through website content analysis and document analysis of the firm's reports and observations. The finding reveals myBot's manager's innovative ability to use Facebook and e-mail to increase sales through its niche market. Factors that propelled e-commerce entrepreneurial activities using Facebook include trust, commitment, and innovativeness.

Salunke et al. (2020) study developed a web application and mobile application for an e-Community Supported Agriculture (e-CSA) system called "FarmUS." The findings indicate that customers benefit from convenient access to organic products from local farms, reducing transportation time and costs while Farmers also can efficiently manage orders, and production, and receive news and updates through the web and mobile app. The survey conducted on farmers and customers suggests quantitative data collection and analysis. The paper doesn't delve into potential challenges faced by the system, such as internet connectivity issues, technological barriers for farmers, or marketing strategies.

2.3 SUMMARY

The literature review delved into several related to e-commerce systems literatures. It covered topics such as the features and functionalities of these systems, user perspectives and needs, technological solutions, and the integration of social media platforms.

Avnish Kumar Sharma (2021) study Developed an E-commerce site for phones and electronics, used HTML, CSS, and JavaScript and features such as user-friendly interface, product browsing, cart, search, and login/logout.

Naidu et al. (2020) study Proposed MERN stack E-commerce app. The key features are T-shirt display, sign-in, secure payments, admin tools.

CHAPTER THREE: METHODOLOGY

3.1 INTRODUCTION

This chapter provides a detailed insight into the methodologies employed for the development of the software solution. It aims to offer a comprehensive overview of the systematic approach to designing, developing, and implementing the software by outlining the methodologies and procedures followed.

3.2 PROJECT WORKFLOW

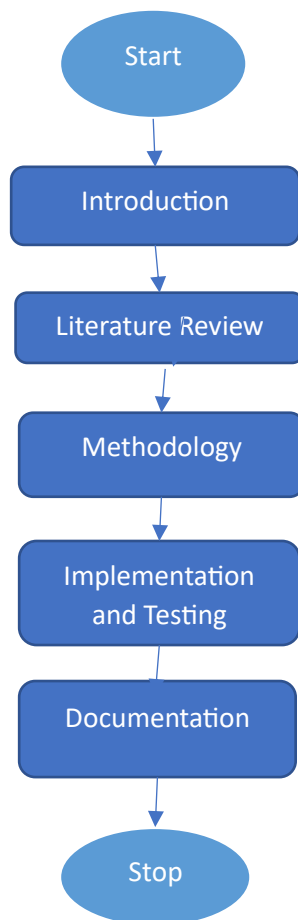Figure 3.1 shows the complete structure of the project workflow taken to complete the project.

Figure 3.1 Project Workflow

1. Introduction: This phase briefly describes the project, its goals, and the problem it aims to solve, and provides an overview of the project scope and expected outcomes.

2. Literature Review: The project begins with the literature review, where objectives, findings, methodology, and limitations are gathered from related works of scholars.

3. Methodology: This phase outlines the overall approach taken to investigate, design, and develop the system including phases, tasks, and tools used and lastly defines roles and responsibilities within the team.

4. Implementation: This phase begins with actual coding and development work happens here, the design and specifications into functional software. This stage may involve iterative development cycles and constant testing.

5. Testing: This phase assures the software functions as intended and meets quality standards. Includes various testing types (e.g., unit testing, integration testing, user acceptance testing). Bugs and defects identified are fixed and retested before moving forward.

6. Documentation: This phase records the knowledge gained throughout the project for future reference.

3.3 SOFTWARE DEVELOPMENT LIFE CYCLE (SDLC)

The Software Development Life Cycle (SDLC) is a structured framework outlining the tasks involved in the software development process. It encompasses defining, planning, development, maintenance, design, and deployment, providing a roadmap for efficiently organizing work. The SDLC aims to improve software quality and development processes by breaking down the process into logical stages. This allows software companies to build products with the desired functionality within defined time and budget constraints. In this project Iterative process model was used.

3.3.1 ITERATIVE PROCESS MODEL

Iterative Process Model: The iterative process begins with the direct implementation of a segment of the software requirements and incrementally improves the developing versions until the entire system is implemented, design changes are made and new functional features are added with each iteration. The basic idea behind this approach is to create a system through iterative, repeatedly repeated cycles. The Iterative and Incremental model is shown in the following in Figure 3.2.
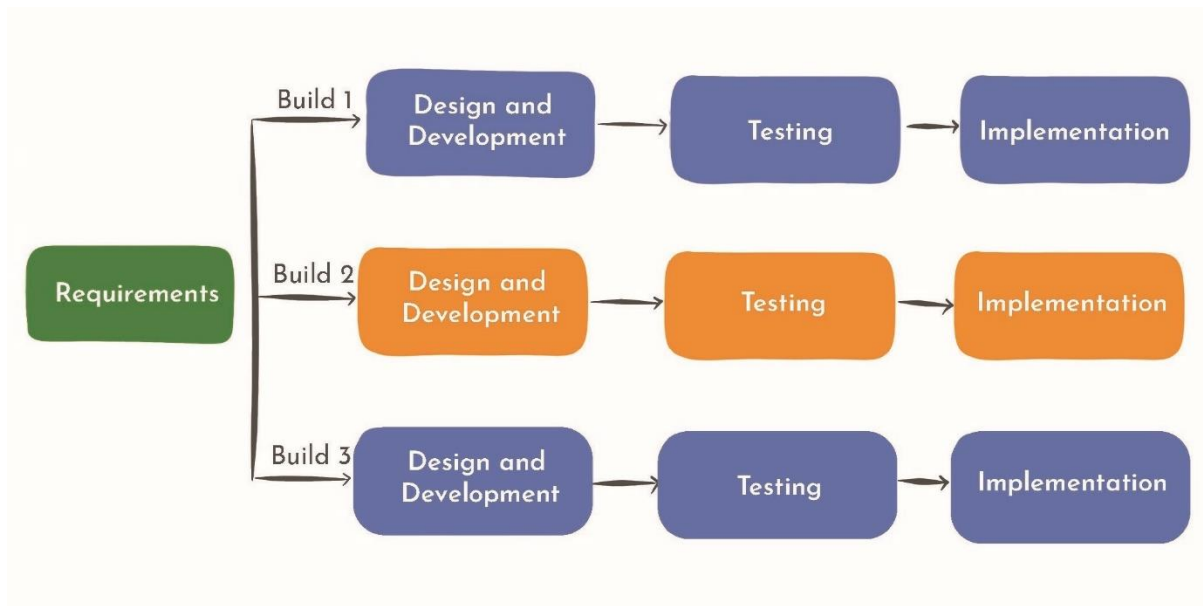
Figure 3.2 Iterative Process Model

3.3.2 Analysis of Existing System

There is no existing system

3.3.3 Description of Existing System

There is no existing system

3.3.4 Requirement Elicitation

This is the crucial phase in software development. It involves data gathering, analysis, and documentation of the needs and expectations of the stakeholders (i.e. the customer and clients). During this, I conducted an interview with the client and his staff during which we discussed intensively his customers, products and services, Logistics and operations, and teams. The question structure is shown below in Appendix A.

3.3.5 Requirement Definition

The requirement Definition is the process of gathering, validating, refining, and prioritizing stakeholder product needs to succeed.

3.3.5.1 Functional Requirements:

- User Registration and Authentication:

a. Allow customer to register an account with their email and password.
b. Authenticate customers during login to ensure secure access to the system.

- Product Browsing:

a. The system shall enable users to search for products.
b. Product details shall include descriptions, images, specifications, and reviews.

- Shopping Cart:

a. Users shall be able to add items to their shopping cart.
b. The system shall allow users to manage quantities of items in the cart.
c. Users shall be able to view the contents of their cart.

- Order Management:

a. Upon successful checkout, the system shall provide users with order confirmation.
b. Users shall have access to real-time tracking information for their orders.
c. The system shall facilitate return and exchange processes for orders.

- Content Management

a. The system shall include an admin panel for managing product information.
b. Admins shall be able to add and edit product details, promotions, news, etc.

3.3.5.2. Non-Functional Requirements:

- Performance: Fast loading times, responsive design, ability to handle high traffic volumes.

- Security: Secure user data storage, robust authentication, protection against vulnerabilities.

- Usability: Intuitive interface, user-friendly navigation, clear design language.

- Accessibility: Compliant with accessibility standards for users with disabilities.

- Scalability: Ability to adapt to future growth in users, products, and transactions.

3.4 Requirement Analysis

After outlining the requirements, a thorough examination of the needs, expectations, and constraints influencing the system's development was conducted to guarantee alignment with stakeholder needs. Subsequently, a foundational blueprint for the system's development was established. Throughout the requirements analysis phase, stakeholder functionalities are vital for the platform's success, encompassing users and administrators. The sequence disgram is shown in the following in Figure 3.3.
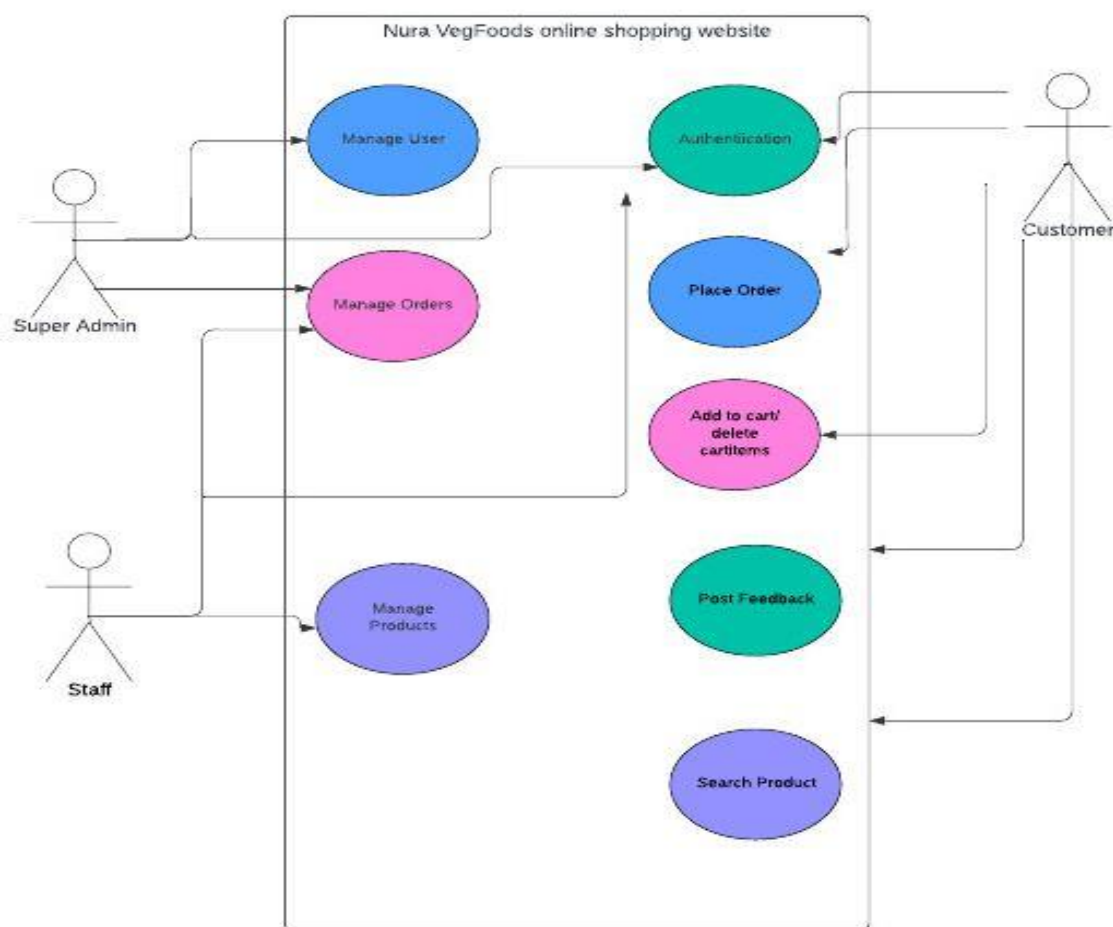

Figure 3.3 Use Case Diagram

3.3.1 System Design

The following section describes the proposed system, shows the flow of activities using an activity diagram, and the architecture using a class diagram.

3.3.2 Description of Proposed System

The envisioned system, named "Agri-Shop E-commerce System" is crafted to expand NuraVegfoods' customer base. Its objective is to offer a unified platform that elevates customer satisfaction, boosts market exposure, and streamlines transactions.

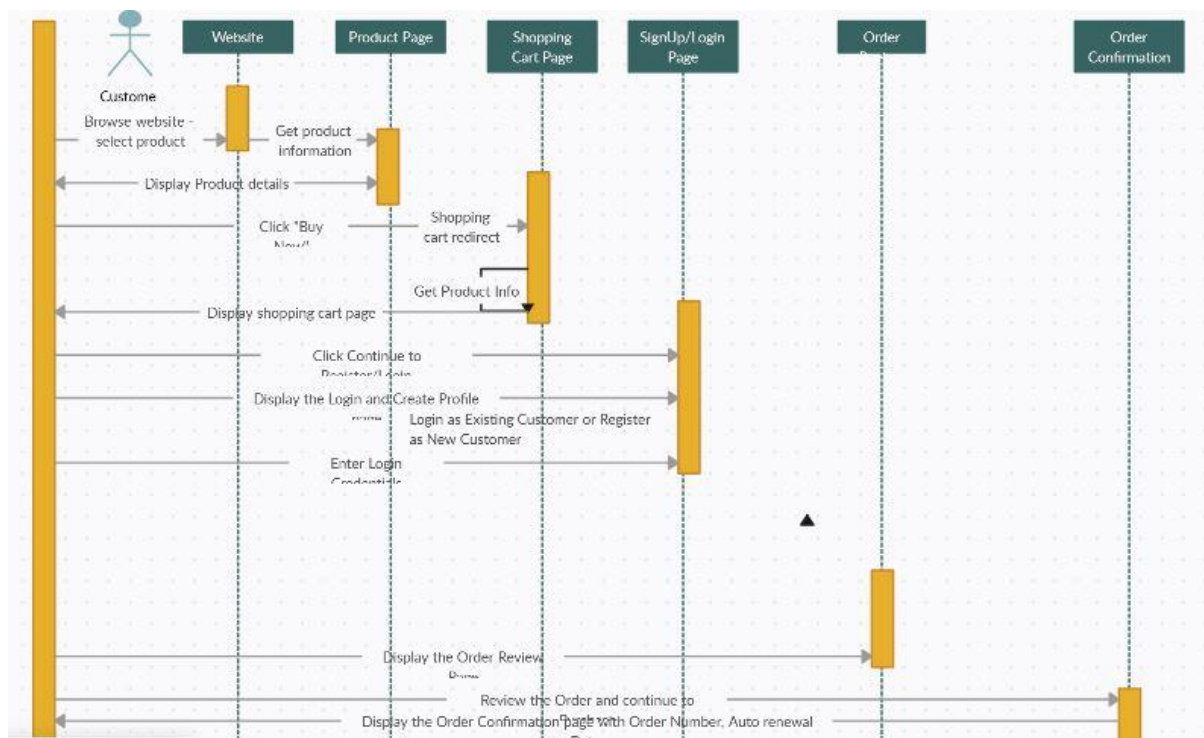Figure 3.4 depicts the sequence of interactions for using the proposed system.

Figure 3.4 Sequence Diagram

3.3.3 Architecture Design

An entity-relationship diagram (ER diagram) is a visual representation of data within a database system, illustrating the logical structure and relationships between entities.

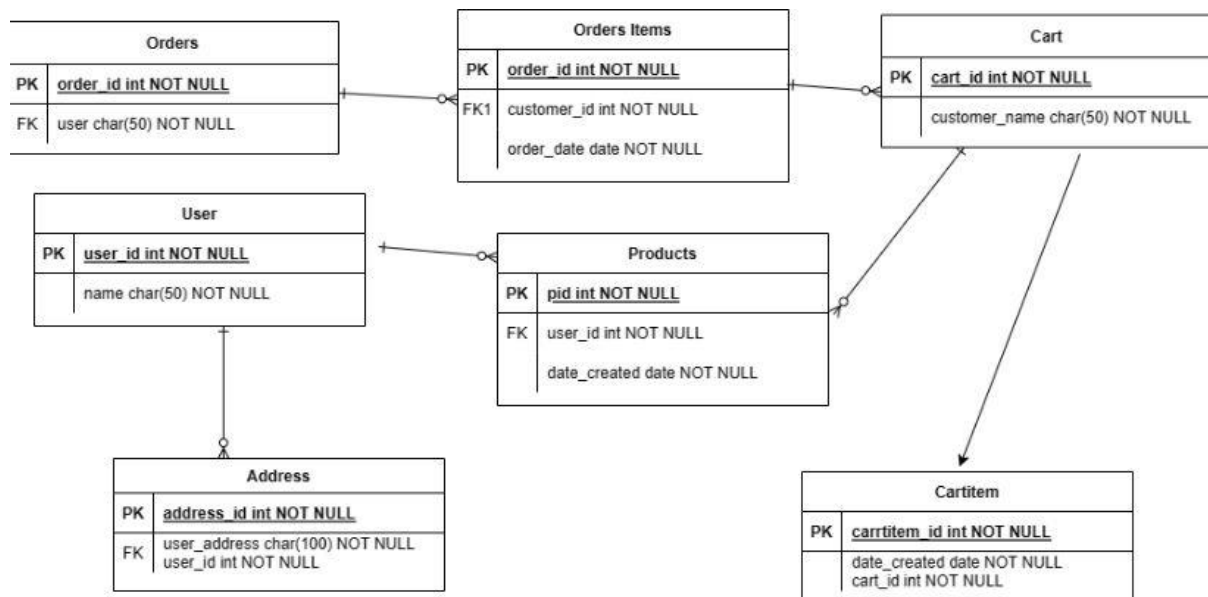Figure 3.5 depicts the entity relational for using the proposed system.

Figure 3.5 ER Diagram

3.3.4 Database Design

A class diagram, a structural diagram within software engineering, portrays the static arrangement and interconnections among classes within a system. It visually depicts classes, along with their attributes, methods, and relationships with other classes.

Refer to Figure 3.6 for an illustration of the class diagram detailing the system's architecture and database framework. Each class corresponds to a database table, with arrows indicating the relationships and associations between them.
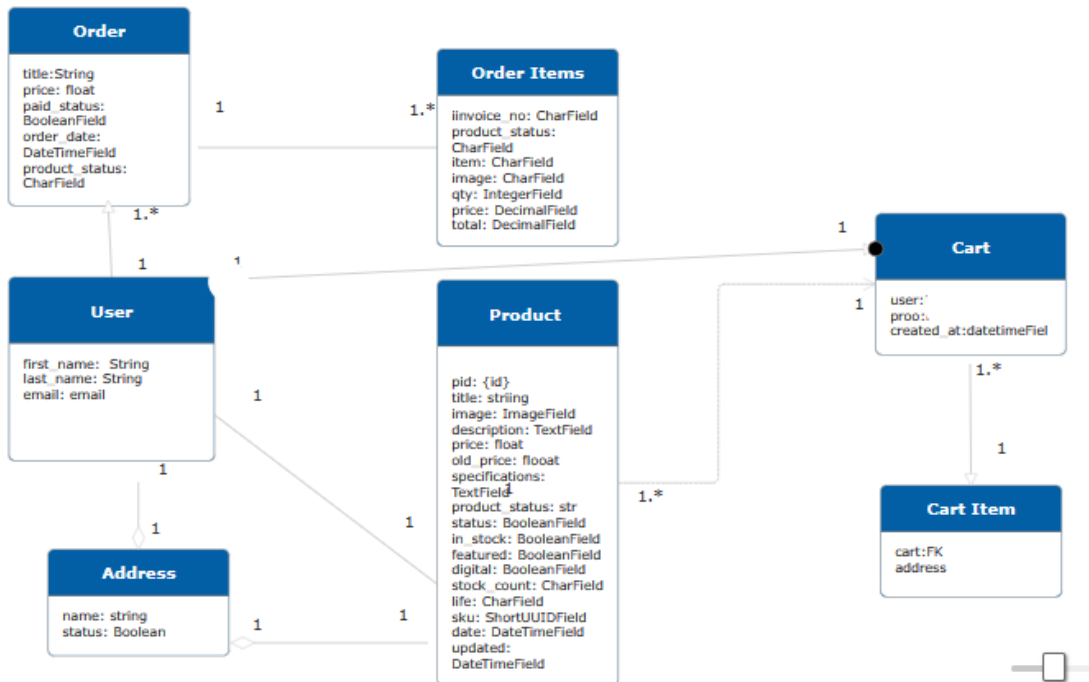
Figure 3.6 Class Diagram

3.4 SUMMARY

The methodology chapter outlines the systematic approach to software development, including project workflow, SDLC, iterative process model, requirement elicitation, system design, and database design. It emphasizes phased progression from project introduction to documentation, with thorough analysis of stakeholder needs and constraints. The proposed e-commerce system for NuraVegfoods aims to enhance customer satisfaction and streamline transactions. Architecture and database designs are depicted through activity and class diagrams, ensuring a structured framework for development.

CHAPTER FOUR: IMPLEMENTATION AND TESTING

4.1 INTRODUCTION

This chapter delves into the practical implementation of the system, outlining the processes involved in translating design specifications and functional requirements into a fully operational entity. Additionally, it emphasizes the importance of comprehensive testing procedures undertaken to guarantee the system's efficacy and reliability.

The principal objective of this chapter is to provide a comprehensive overview of the development methodology, utilized tools and technologies, and associated frameworks. It further underscores the critical role of rigorous testing in detecting and rectifying potential issues prior to system deployment.

Following the implementation phase, the testing stage is meticulously designed to ensure the system's adherence to defined requirements and functional operability as intended. A diverse range of testing methodologies, encompassing unit, integration, and system testing, are employed to meticulously verify the system's functionality, performance, security, and user experience. This rigorous testing phase plays an indispensable role in identifying and resolving any potential issues or anomalies that could negatively impact the system's usability or reliability.

4.2 IMPLEMENTATION

This section describes the process and tools used for implementing the proposed system and also the different screens of the implemented system.

4.2.1 IMPLEMENTATION TOOLS

In the development of the Agri e-commerce system, various tools and technologies were utilized to ensure an efficient and effective implementation process.

Table 4.1 on page 27 outlines the key tools and technologies employed during the implementation phase.

Table 4.1 Implementation tools table

Category	Software Used
Operating System	WINDOWS 11
Integrated Development Environments (IDEs)	VISUAL STUDIO CODE
Programming Language	HTML, CSS, JAVASCRIPT, PYTHON, SQL
Frameworks	DJANGO
Database	SQLITE3
Web browser	MICROSOFT EDGE, CHROME

Utilizing these tools and technologies, I successfully constructed an Agri-shop ecommerce that is dynamic, user-friendly, and scalable. Using HTML, CSS, and JavaScript allowed for the creation of an engaging and interactive user interface. The DJANGO MVT Python framework aided in organizing the application and ensuring its structural integrity. Visual Studio Code offered a productive development environment, while SQLite3 guaranteed dependable data storage and retrieval.

4.2.2 Algorithms of Major Functionality

The Agri-shop e-commerce system incorporates several functionalities. This section provides a brief introduction to the algorithms used in implementing these key functionalities. The algorithms outlined below serve as a foundation for the subsequent implementation of the system's features.

Figure 4.1 below shows the algorithm for adding a product to a cart

```python
def add_to_cart(request, product_id):

    product = Product.objects.get(id=product_id)

    cart_item, created = CartItem.objects.get_or_create(product=product,

                            user=request.user)

    cart_item.quantity += 1

    cart_item.save()

    return redirect('core:view_cart')
```

Figure 4.1 Add to Cart algorithm

Figure 4.2 below shows the algorithm for making an order

```python
def checkout_order(request):

    # get all the cart items

    cart_items = request.user.cart.cartitem_set.all()

    if cart_items.count():

        # first create an order

        order = models.CartOrder.objects.create(user=request.user)

        # replicate the cart items to order items and delete them from the cart

        for item in cart_items:

            models.CartOrderItems.objects.create(
```

```
            order=order, product=item, qty=item.quantity, price=item.product.price

        )

        item.delete()

    return redirect("core:index")
```

Figure 4.2 Order checkout algorithm

Figure 4.3below shows the algorithm for accepting customer feedback

```
def contact_view(request):

    if request.method == "POST":

        email = request.POST["email"]

        message = request.POST["message"]

        phone_no = request.POST["phone_no"]

        full_name = request.POST["full_name"]

        models.ContactUs.objects.create(

            full_name=full_name, email=email, phone_no=phone_no, message=message

        )


        return render(request, "core/contact.html", {"full_name": full_name})

    else:

        return render(request, "core/contact.html", {})
```

Figure 4.4 2 User Feedback Algorithm

Figure 4.5 below shows the algorithm for viewing cart

```python
def view_cart(request):

    delivery = float(55.00)

    discount = float(32.00)

    cart_items = request.user.cart.cartitem_set.all()

    sub_total = sum(item.product.price * item.quantity for item in cart_items)


    for item in cart_items:

        item.total = item.product.price * item.quantity


    total = float(sub_total) + delivery - discount

    context = {

        "total": total,

        "delivery": delivery,

        "discount": discount,

        "sub_total": sub_total,

        "cart_items": cart_items,

    }

    return render(request, "core/cart.html", context)
```

Figure 4.5 Cart View

Figure 4.6 below shows the algorithm for searching a product

```python
def search_view(request):

    query = request.GET.get("q")

    products = models.Product.objects.all()

    if query:

        products = products.filter(

            Q(title__icontains=query) | Q(description__icontains=query)

        )

    context = {"products": products, "query": query}

    return render(request, "core/search.html", context)
```

Figure 4.6 Product Search Algorithm

4.2.3 Description of system operation

4.2.3.1 Login Page

login interface of the application allows users to login to the system using their email and password as it is represented in the figure 4.7 below
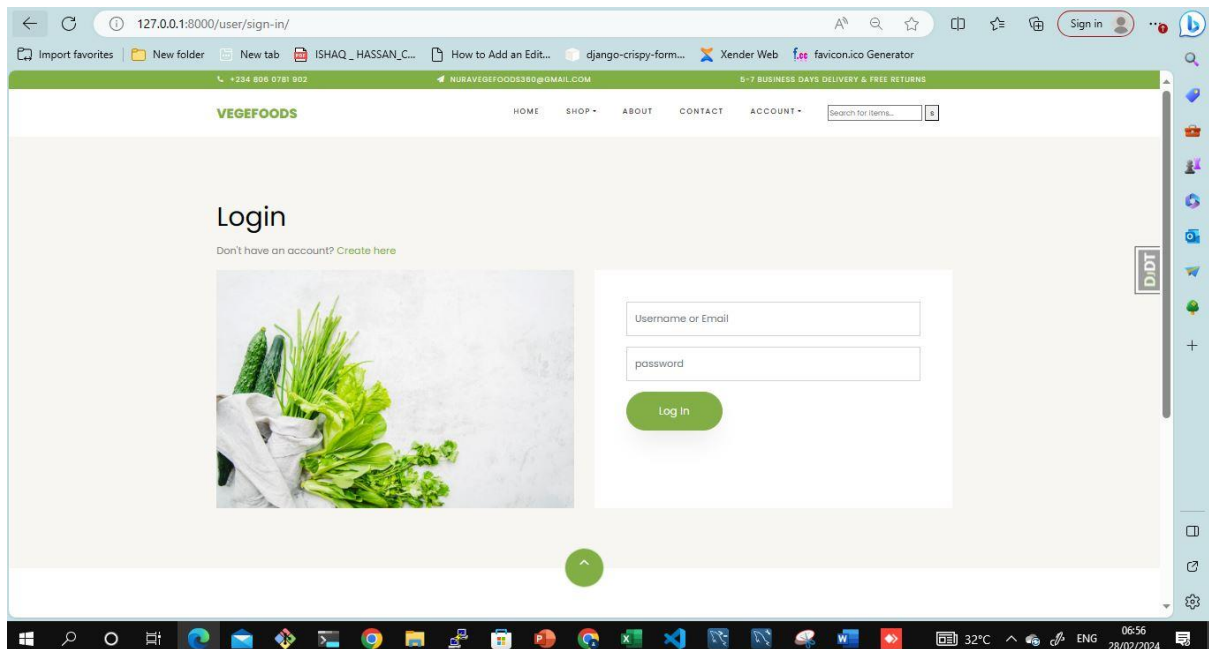
Figure 4.7 Login Page

4.2.3.2 Signup Page

Signup interface of the application allows new user to create new account into the system using their username, email and password as it is represented in the Figure 4.8 below
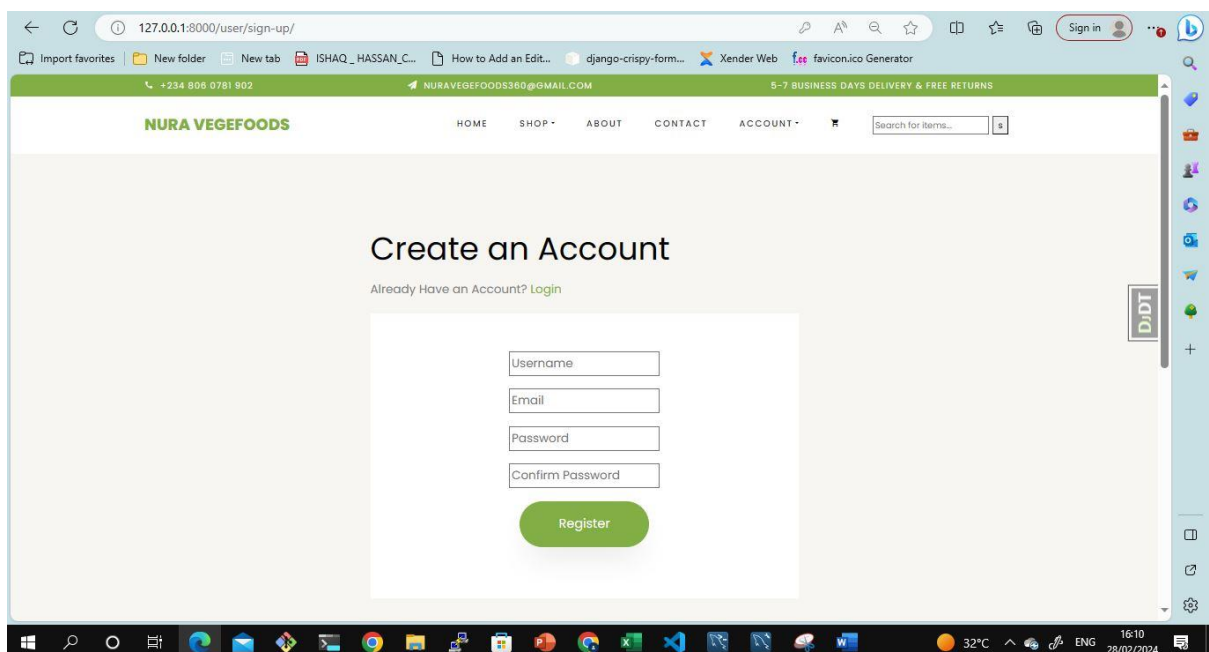
Figure 4.8 Signup page

This displays list of added products and could be remove by user. It is presented in figure 4.9 below:

Figure 4.9 Signup page

4.2.3.4 Edit Product Page

This is an activity that admin to edit an existing product into the system. It is presented in figure 4.10 below:

Figure 4.10

4.2.3.5 Add Product Activity

This is an activity that allows admin to add new product into the system. It is presented in figure 4.11 below

Figure 4.11

4.3 TESTING

4.3.1 Testing Strategy

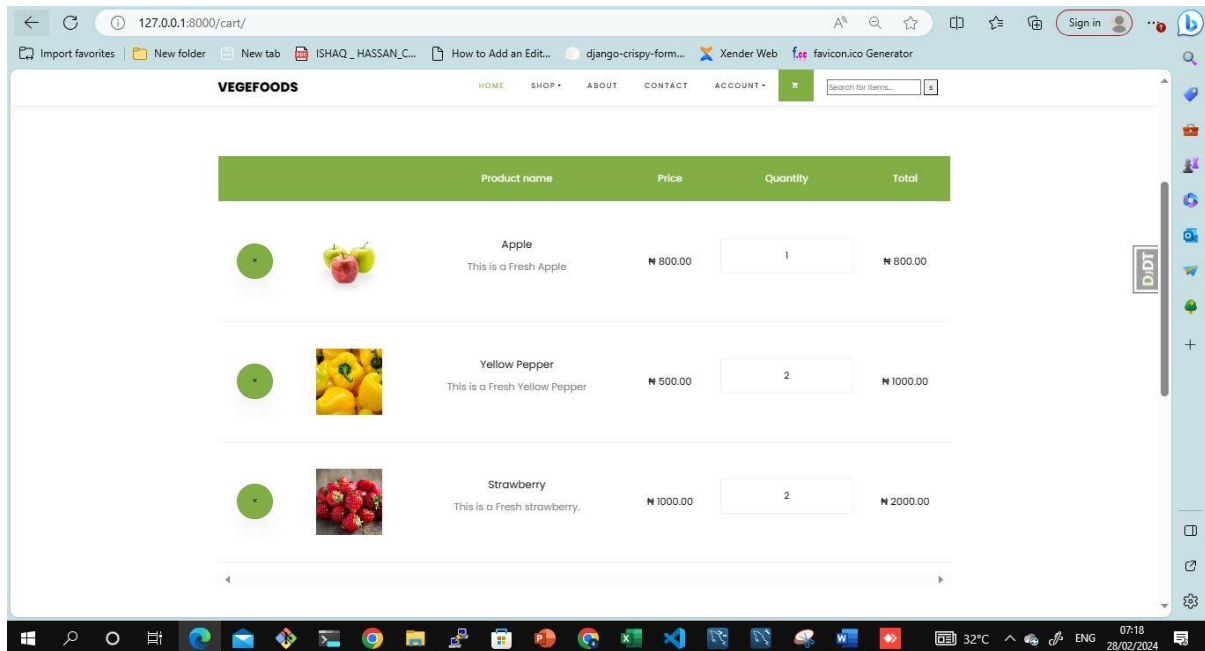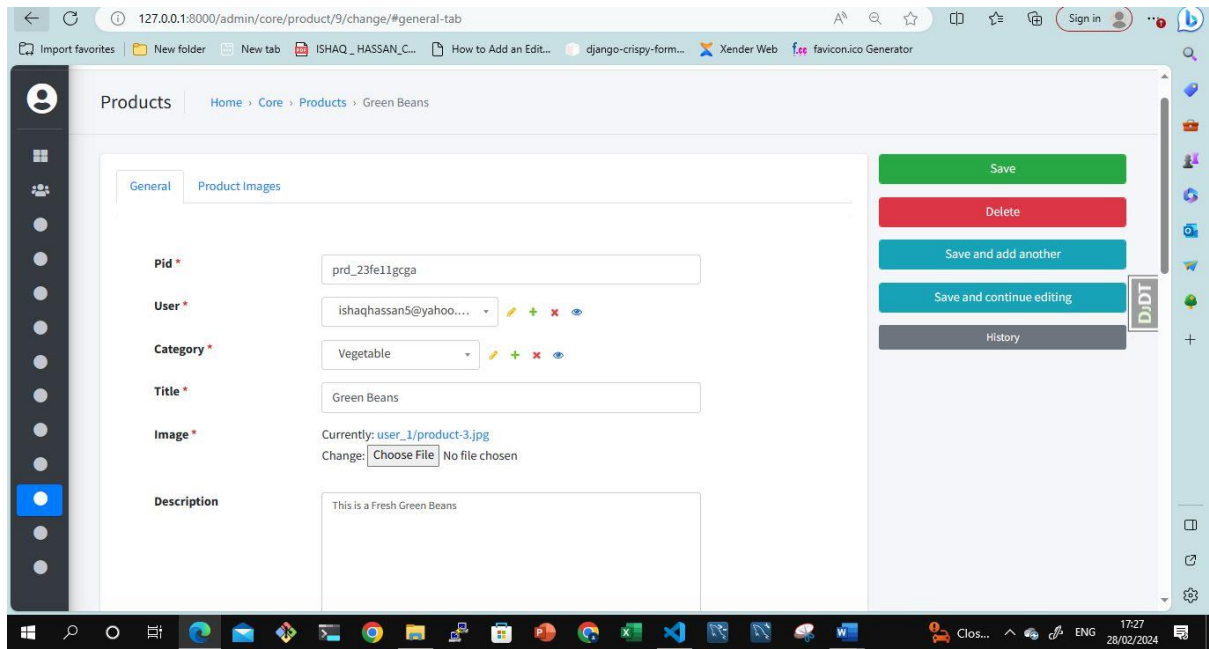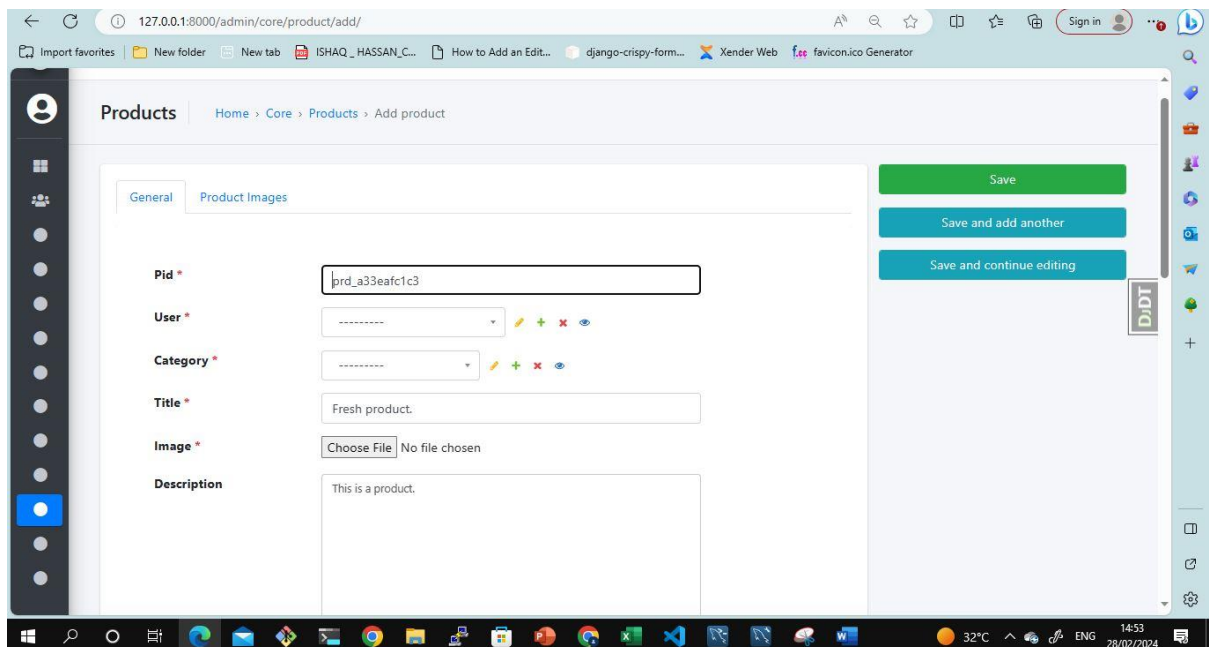Our testing approach revolves around Use Case testing, a method that hinges on extracting test cases from the system's utilization scenarios. This strategy guarantees a validation of the system's functionality, grounded in practical scenarios and user interactions.

The process of Use Case testing encompasses the following stages:

1. Identification of Use Cases: We identify and scrutinize the use cases delineated in the system requirements. These use cases encapsulate the actions and interactions users can undertake within the system, with each one representing a distinct functionality or feature necessitating testing.

2. Prioritization of Use Cases: Use cases are prioritized based on their significance and impact on the system. Those deemed critical or frequently utilized are accorded higher precedence, ensuring they undergo more rigorous testing. This hierarchical arrangement facilitates the efficient allocation of testing resources, guaranteeing a thorough examination of pivotal functionalities.

3. Analysis of Use Case Flow: Subsequently, we delve into the flow of events within each use case. This entails delineating conceivable pathways, user actions, system responses, and anticipated outcomes. Such scrutiny sheds light on the system's behaviour across diverse usage scenarios, thereby identifying potential test scenarios.

4. Generation of Test Cases: Test cases are derived from the identified use cases and their respective flows. Each test case is tailored to scrutinize a specific scenario or interaction, encompassing both positive and negative scenarios, boundary values, and alternative pathways. The meticulous selection of test data and inputs ensures comprehensive test coverage.

5. Execution of Test Cases: The generated test cases are then executed in adherence to predefined procedures. Emulating user interactions aligned with the use case flows, we input appropriate data and verify the system's responses. Validation entails confirming that the system behaves as expected, generates accurate outputs, and handles errors and exceptions adeptly.

6. Embracing the Use Case testing strategy enhances the Agri-shop e-commerce system to real-world user scenarios and interactions. This approach fosters assurance that the system operates as intended, encompasses critical functionalities, and aligns with user expectations. The

methodical and structured nature of Use Case testing facilitates efficient test case generation and comprehensive test coverage, bolstering the system's overall quality and reliability.

4.3.2 Unit testing

Unit testing constitutes a crucial facet of the testing regimen within the Agri-shop ecommerce system project. It entails scrutinizing discrete units of code—be it functions, methods, or classes—to validate their accuracy and operational efficacy. This segment delineates the approach and methodologies employed for unit testing within the project.

Table 4.2: login testing

Test Unit	Login		
Test Type	Unit Testing		
Test Objective	To test and validate the process of logging in to the system		
Test Case	Input		Expected Output
	email id	Password	
1.	Empty	Empty	Fields cannot be empty
2.	Valid	Empty	Field cannot be empty
3.	Empty	Valid	Field cannot be empty
4.	Invalid	Invalid	Invalid user id or password
5.	Valid	Valid	Login Successful
REMARK	The login activity was tested successfully and users have been able to login to the system with their registered credentials		

Table 4.3: customer searching testing

Test Unit	Customer Search	
Test Type	Unit Testing	
Test Objective	To test and validate the process of Searching available products in the system	
Test Case	Input	Expected Output
	Product	
1.	Empty	Blank Activity
2.	Invalid product	the product does not exist
3.	Valid	Return product
REMARK	Tested and products available are displayed to the User.	

Through meticulous unit testing, the Agri-shop e-commerce system project safeguards the quality and dependability of individual code units. This endeavour plays a pivotal role in fortifying the system's overall stability and operational prowess.

4.3.3 Integration testing

Table 4.4: Integration testing

SN	DESCRIPTION	STEPS	INPUT	EXPECTED OUTPUT	ACTUAL OUTPUT	RESULT
1	User registration integration	User fills out registration form	User details (Username,	User data is successfully stored in the	User data stored in the user database	Pass

		User submits form	Email, Password)	user database		
2	User forgets password integration	User clicks on forget passkeys Users enter their User email and Password User submits form	Email ID	Passkey Frame Pop-Up	Passkey reset success	Pass
3	User Login Integration	User enters login credentials Login button	Email and Password	Successful login, the user is redirected to the home page	The user successfully logged in	Pass
4	Product registration integration	Admin enters product details in the registration form Admin submit form	Product details, title, description, image, etc.)	Product details are stored in the product database	Product data stored in the product database	Pass

5	Update product integration	Admin selects product record to update Admins modify product details Admin save changes	Admin Updated product details	Product details updated in the database	Product details successfully updated	Pass
6	Search for patient integration	Customer enters product The user clicks on the search button	Search Criteria	Matching similar products displayed	Matching similar products displayed	Pass
7	Customer feedback integration	The user sends Feedback to the admin	user details and bed availability	Admin view and access customer feedback	Admin received, viewed, and access customer feedback	Pass
8	Delete product integration	Admin delete product details	Click the delete button	Products successfully deleted	Products successfully deleted	Pass

9	Delete cart products integration	User deletes product details	Click the delete button	Cart products successfully deleted	Cart products successfully deleted	Pass
. 10	Logout integration	User clicks on the logout button	None	User session terminated, redirected to login page	The user successfully logged out	pass

4.3.3 System testing

System testing is a pivotal phase within the testing process for the Agri-shop ecommerce system project. It involves a comprehensive evaluation of the entire system to validate its adherence to specified requirements and intended functionality. This section provides a detailed overview of the system testing procedures implemented within the project.

1. Test Environment Preparation: A dedicated test environment is set up to closely replicate the production environment. This includes deploying necessary software, configuring databases, and establishing essential infrastructure components. The goal is to create an environment conducive to testing the system under realistic conditions.

2. Functional Validation: Functional testing focuses on verifying each function of the system to ensure smooth operation. It assesses the system against predefined functional requirements, confirming the accurate implementation of all features and functionalities. This includes testing user registration, login processes, knowledge sharing and collaboration features, notifications, search capabilities, and other critical system functionalities.

3. Error Handling and Exception Testing: Various error conditions and exceptional scenarios are deliberately introduced to evaluate the system's error handling and exception management mechanisms. This involves intentionally injecting invalid inputs, boundary conditions, and various error scenarios to assess the system's ability to identify and gracefully handle errors. The objective is to provide appropriate error messages and fallback mechanisms.

4. Through thorough system testing, the Agri-shop e-commerce system project aims to ensure that the system meets the desired functionality, performance, and usability standards. This proactive approach helps identify and address potential issues or anomalies before system deployment, thereby delivering a high-quality and reliable solution for end-users.

5. Usability Testing : Usability testing plays a vital role in the testing process for the Agri-shop e-commerce system project. It focuses on evaluating the system's ease of use, efficiency, and overall user satisfaction. This section provides a detailed explanation of the usability testing methodology utilized within the project.

   The primary goals of usability testing include assessing the system's user-friendliness, identifying usability issues, and gathering feedback from real users. The aim is to ensure that the system is intuitive, easy to navigate, and delivers a positive user experience.

   A carefully controlled testing environment is created to conduct usability testing, aiming to accurately replicate the actual user environment, including hardware, software, and network configurations. This helps establish realistic testing conditions.

   Test scenarios are meticulously designed to mimic real-world user interactions with the system, covering various tasks, workflows, and user journeys. These scenarios aim to thoroughly evaluate different features, functions, and user interfaces, ensuring comprehensive coverage of the system's usability aspects.

   During usability testing sessions, participants are presented with test scenarios and asked to perform assigned tasks using the system. Their interactions are observed and recorded, with any encountered usability issues, difficulties, or confusion carefully documented. Participants are encouraged to share their thoughts, provide feedback, and offer insights throughout the testing process.

   Usability metrics are defined to assess the system's usability, including task completion time, error rates, user satisfaction ratings, ease of use evaluations, and learnability assessments. Both quantitative and qualitative data are collected to evaluate the system's usability against these metrics.

   Data gathered during usability testing is thoroughly analyzed to identify recurring usability issues, common pain points, and areas for improvement.

Through comprehensive usability testing, the Agri-shop system project aims to ensure that the system is user-friendly and delivers a positive user experience. This effort helps identify usability issues, gather user feedback, and inform design decisions to enhance system usability and enhance user satisfaction.

SUMMARY

This chapter outlines the practical steps taken to build and test the AgriShop system. It details the development tools used, including Python for programming, Django for framework support, and a combination of HTML, JavaScript, and CSS for user interfaces. Microsoft SQL (SQLite) was chosen for data storage. The iterative development methodology allowed for flexibility and collaboration throughout the process. To ensure quality and reliability, various testing phases were conducted which are unit testing, integration testing, system testing, and usability testing. The chapter emphasizes the importance of each testing phase in ensuring a successful system that delivers both functionality and a positive user experience.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter outlines the key challenges encountered during the design and development of this project. It then uses these insights to draw conclusions and recommend improvements for future iterations of the system.

5.2 SUMMARY

Chapter One explains the challenges faced by Nura Vegefoods due to reliance on a physical store. It introduces a project focused on developing an e-commerce platform to address these challenges, expand market reach, and gather feedback. The project's core objectives include designing user-friendly interfaces for customers, shop owners, and shopkeepers. Ultimately, the chapter outlines how these efforts aim to improve Nura Vegefoods' brand and engage their customer base.

Chapter Two delved into several related to e-commerce systems literatures. It covered topics such as the features and functionalities of these systems, user perspectives and needs, technological solutions, and the integration of social media platforms.

Avnish Kumar Sharma (2021) study Developed an E-commerce site for phones and electronics, used HTML, CSS, and JavaScript and features such as user-friendly interface, product browsing, cart, search, and login/logout.

Naidu et al. (2020) study Proposed MERN stack E-commerce app. The key features are T-shirt display, sign-in, secure payments, admin tools.

Chapter Three outlines the systematic approach to software development, including project workflow, SDLC, iterative process model, requirement elicitation, system design, and database design. It emphasizes phased progression from project introduction to documentation, with thorough analysis of stakeholder needs and constraints. The proposed e-commerce system for NuraVegfoods aims to enhance customer satisfaction and streamline transactions. Architecture and database designs are depicted through activity and class diagrams, ensuring a structured framework for development.

Chapter Four outlines the practical steps taken to build and test the AgriShop system. It details the development tools used, including Python for programming, Django for framework support, and a combination of HTML, JavaScript, and CSS for user interfaces. Microsoft SQL

(SQLite) was chosen for data storage. The iterative development methodology allowed for flexibility and collaboration throughout the process. To ensure quality and reliability, various testing phases were conducted which are unit testing, integration testing, system testing, and usability testing. The chapter emphasizes the importance of each testing phase in ensuring a successful system that delivers both functionality and a positive user experience.

5.3 CONCLUSION

The development of the software marks a significant milestone in addressing the challenges Nura VegeFoods in traditional sales and product data management. The software isn't just a technological solution; it's a testament to my commitment towards helping Nura Vege Foods mission of providing e-services. The impact of this System extends beyond innovation.

5.4 RECOMMENDATIONS

Based on the project completed, I recommend that:

1. Secure Payment Gateway: Implement multiple secure payment gateway options, catering to diverse customer preferences and ensuring a seamless checkout experience and staff payroll system.
2. Multilingual Support: Implement multilingual capabilities to cater to a broader customer base and expand market reach, considering the potential for international sales.
3. Data Analytics and Reporting: Integrate data analytics tools to track user behaviour, customer preferences, and sales trends.

APPENDIX

APPENDIX A: ELICITATION EVIDENCE

ADMINISTRATOR INTERVIEW GUIDE

My name is ISHAQ HASSAN I am a student of the software engineering department, faculty of computing at Bayero University Kano pursuing a bachelor's degree of science in Software Engineering. I am doing a research project to initiate, design, and develop an agricultural products e-commerce system for your business to bridge the gap between the traditional way of transaction and an online way of transaction. I would love to have your cooperation in the development of the system. If it will not inconvenience you in any way, I would very much be pleased for your assistance.

Name of the admin interviewee: NURA SALISU

Name of the staff interviewee: MAHDI NURA

Target Audience:

1. Who are your ideal customers? (consumers, specific demographics)

2. What are their preferred methods of communication and customer service?

Products and Services:

1. What types of agricultural products will you sell/source? (Fresh fruits, spices, and vegetables)
2. What unique selling proposition (USP) will differentiate your agri-shop from competitors? (Locally sourced, fair trade, organic, delivery options)

3. What are your plans for inventory management and quality control?

4. Do you have any plans for expanding your product offerings or services?

Logistics and Operations:

1. How will you handle product fulfillment and delivery? (Partner with existing logistics providers, own delivery network)

2. What payment methods will you accept? (Cash on delivery, online wallets, credit cards)

3. Do you have a plan for returns and exchanges?

4. How will you ensure data security and customer privacy?

    Team and Expertise:

1. Do you have an existing team with e-commerce experience?

2. What are your biggest concerns or challenges in launching an Agri-shop e-commerce platform?

3. What are your long-term goals and vision for this project?

4. The role of each staff?

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