Style Guidelines for Final Year Project ReportsDroPilot: AI Assisted Dropshipping Automation

Final Year Project – Mid Report

Session 2021-2025

A 4th Year Student

A project submitted in partial fulfilment of the

COMSATS University Degree

of

BSc. (Hons.)BS in Computer Science / Software Engineering (CUI)



Department of Computer Science

COMSATS University Islamabad, Lahore Campus

17 December 2024

# Project Detail

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type (Nature of project) | | | [✔] **Development**  [ ] **Research** & **Development** | | |
| Area of specialization | | | Artificial Intelligence and Automation | | |
| **Project Group Members** | | | | | |
| Sr.# | Reg. # | Student Name | | Email ID | \*Signature |
| (i) | FA21-BSE-040 | Abdul Hanan | | fa21-bse-040@cuilahore.edu.pk |  |
| (ii) | FA21-BSE-044 | Yahya Irfan | | fa21-bse-044@cuilahore.edu.pk |  |
| (iii) | FA21-BSE-153 | Bushra Hasan | | fa21-bse-153@cuilahore.edu.pk |  |

\*The candidates confirm that the work submitted is their own and appropriate credit has been given where reference has been made to the work of others

# Plagiarism Free Certificate

This is to certify that, I am Abdul Hanan S/D/o Muhammad Sharif group leader of FYP under registration no CIIT/ FA21-BSE-040 /LHR at Computer Science Department, COMSATS University Islamabad, Lahore Campus. I declare that my FYP report is checked by my supervisor and the similarity index is 6% that is less than 20%, an acceptable limit by HEC. Report is attached herewith as Appendix A.

Date: 17-December-2024 Name of Group Leader: Abdul Hanan Signature: 

Name of Supervisor: Dr. Atif Saeed Co-Supervisor (if any): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Designation: Assistant Professor Designation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature:  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Table of Contents

[1 Project Introduction 13](#_Toc185296637)

[1.1 Introduction 13](#_Toc185296638)

[1.2 Objectives 15](#_Toc185296639)

[1.3 Problem statement 16](#_Toc185296640)

[1.4 Assumptions & constraints 16](#_Toc185296641)

[1.4.1 Assumptions 16](#_Toc185296642)

[1.4.2 Constraints 16](#_Toc185296643)

[1.5 Project scope: 17](#_Toc185296644)

[2 Requirements Analysis 19](#_Toc185296645)

[2.1 Literature review / Existing system study: 19](#_Toc185296646)

[2.1.1 Dropy.ai [1]: 19](#_Toc185296647)

[2.1.2 AutoDS [2]: 19](#_Toc185296648)

[2.1.3 Glitching AI [3]: 19](#_Toc185296649)

[2.1.4 Sell The Trend [4]: 19](#_Toc185296650)

[2.1.5 Inventory Source [5]: 19](#_Toc185296651)

[2.1.6 Shine Commerce [6]: 20](#_Toc185296652)

[2.2 Stakeholder’s list (Actors): 20](#_Toc185296653)

[2.2.1 Store Owner 20](#_Toc185296654)

[2.2.2 Customer 20](#_Toc185296655)

[2.2.3 Suppliers 20](#_Toc185296656)

[2.2.4 Admin 20](#_Toc185296657)

[2.3 Requirement’s elicitation 20](#_Toc185296658)

[2.3.1 Functional requirements 20](#_Toc185296659)

[2.3.2 Non-functional requirements 26](#_Toc185296660)

[2.3.3 Requirement’s Traceability Matrix 28](#_Toc185296661)

[2.4 Use Case Descriptions 29](#_Toc185296662)

[2.4.1 UC-01: User Registration 29](#_Toc185296663)

[2.4.2 UC-02: Login User 30](#_Toc185296664)

[2.4.3 UC-03: User Onboarding 30](#_Toc185296665)

[2.4.4 UC-04: Payment Integration 31](#_Toc185296666)

[2.4.5 UC-05: Real-Time Stock Updates 31](#_Toc185296667)

[2.4.6 UC-06: Low Stock Alerts 32](#_Toc185296668)

[2.4.7 UC-07: Order Processing 32](#_Toc185296669)

[2.4.8 UC-08: Automatic Invoice Generation 33](#_Toc185296670)

[2.4.9 UC-09: Product Sourcing 33](#_Toc185296671)

[2.4.10 UC-10: AI-Enhanced Product Descriptions 34](#_Toc185296672)

[2.4.11 UC-11: Store Creation 34](#_Toc185296673)

[2.4.12 UC-12: Template Selection 35](#_Toc185296674)

[2.4.13 UC-13: Customization Options 35](#_Toc185296675)

[2.4.14 UC-14: Domain Integration 36](#_Toc185296676)

[2.4.15 UC-15: Sales Report 36](#_Toc185296677)

[2.4.16 UC-16: Product Profitability Analysis 37](#_Toc185296678)

[2.5 Use case design 37](#_Toc185296679)

[2.5.1 User Registration 37](#_Toc185296680)

[2.5.2 Sign In 38](#_Toc185296681)

[2.5.3 User On-boarding 38](#_Toc185296682)

[2.5.4 Payment Integration 39](#_Toc185296683)

[2.5.5 Real-time Stock Updates 39](#_Toc185296684)

[2.5.6 Low Stock Alerts 40](#_Toc185296685)

[2.5.7 Order Processing 40](#_Toc185296686)

[2.5.8 Automatic Invoice Generation 41](#_Toc185296687)

[2.5.9 Product Sourcing 41](#_Toc185296688)

[2.5.10 AI-Enhanced Product Descriptions 42](#_Toc185296689)

[2.5.11 Store Setup 42](#_Toc185296690)

[2.5.12 Template Selection 43](#_Toc185296691)

[2.5.13 Customization Options 43](#_Toc185296692)

[2.5.14 Domain Integration 44](#_Toc185296693)

[2.5.15 Sales Report 44](#_Toc185296694)

[2.5.16 Profitability Analysis 44](#_Toc185296695)

[2.6 Software development life cycle model 45](#_Toc185296696)

[3 System Design 47](#_Toc185296697)

[3.1 Work breakdown structure (WBS) 47](#_Toc185296698)

[3.2 Activity diagram 48](#_Toc185296699)

[3.2.1 Sign Up 48](#_Toc185296700)

[3.2.2 Login 49](#_Toc185296701)

[3.2.3 Update Stocks 50](#_Toc185296702)

[3.2.4 Real Time Stock Alert 51](#_Toc185296703)

[3.2.5 Payment Integration 52](#_Toc185296704)

[3.2.6 Store Creation & Setup 53](#_Toc185296705)

[3.2.7 Product Management 54](#_Toc185296706)

[3.2.8 Generation of Invoice 55](#_Toc185296707)

[3.2.9 Order Forwarding 56](#_Toc185296708)

[3.2.10 Analytics & Reporting 57](#_Toc185296709)

[3.2.11 Domain Setup 58](#_Toc185296710)

[3.2.12 Online Payment 59](#_Toc185296711)

[3.3 Sequence diagram 60](#_Toc185296712)

[3.3.1 Sign Up 60](#_Toc185296713)

[3.3.2 Login 61](#_Toc185296714)

[3.3.3 Store Creation 62](#_Toc185296715)

[3.3.4 Product Management 63](#_Toc185296716)

[3.3.5 Order Processing 64](#_Toc185296717)

[3.3.6 Sales & Analytics View 65](#_Toc185296718)

[3.4 Software architecture 65](#_Toc185296719)

[3.5 Class diagram 67](#_Toc185296720)

[3.6 Database diagram 67](#_Toc185296721)

[3.7 Network diagram (Gantt chart) 68](#_Toc185296722)

[3.8 Collaboration diagram 68](#_Toc185296723)

[3.8.1 User Authentication 68](#_Toc185296724)

[3.8.2 Store Creation 69](#_Toc185296725)

[3.8.3 Order Processing 69](#_Toc185296726)

[3.8.4 Product Management 70](#_Toc185296727)

[3.8.5 Payment Processing 70](#_Toc185296728)

[3.8.6 Analytics & Reporting 71](#_Toc185296729)

[4 System Testing 72](#_Toc185296730)

[4.1 Test cases 72](#_Toc185296731)

[4.1.1 TC-01: User Registration 72](#_Toc185296732)

[4.1.2 TC-02: User Login 73](#_Toc185296733)

[4.1.3 TC-03: User Onboarding 73](#_Toc185296734)

[4.1.4 TC-04: Payment Integration 74](#_Toc185296735)

[4.1.5 TC-05: Real-Time Stock Updates 75](#_Toc185296736)

[4.1.6 TC-06: Low Stock Alerts 75](#_Toc185296737)

[4.1.7 TC-07: Order Processing 76](#_Toc185296738)

[4.1.8 TC-08: Automatic Invoice Generation 76](#_Toc185296739)

[4.1.9 TC-09: Product Sourcing 77](#_Toc185296740)

[4.1.10 TC-10: AI-Enhanced Product Descriptions 78](#_Toc185296741)

[4.1.11 TC-11: Store Setup 78](#_Toc185296742)

[4.1.12 TC-12: Template Selection 79](#_Toc185296743)

[4.1.13 TC-13: Customization Options 80](#_Toc185296744)

[4.1.14 TC-14: Domain Integration 80](#_Toc185296745)

[4.1.15 TC-15: Sales Report 81](#_Toc185296746)

[4.1.16 TC-16: Product Profitability Analysis 82](#_Toc185296747)

[4.2 Testing 82](#_Toc185296748)

[4.2.1 Unit Testing 82](#_Toc185296749)

[4.2.2 Integration Testing 83](#_Toc185296750)

[4.2.3 Acceptance Testing 83](#_Toc185296751)

[5 Conclusion 84](#_Toc185296752)

[5.1 Problems Faced and Lessons Learned 84](#_Toc185296753)

[5.2 Project Summary 84](#_Toc185296754)

[5.3 Future Work 85](#_Toc185296755)

[References 86](#_Toc185296756)

List of Figures

[Figure 1 UD-User Registration 37](#_Toc185103803)

[Figure 2 UD-Sign In 38](#_Toc185103804)

[Figure 3 UD-User Onboarding 38](#_Toc185103805)

[Figure 4 UD-Payment Integration 39](#_Toc185103806)

[Figure 5 UD- Real-time Stock Updates 39](#_Toc185103807)

[Figure 6 UD-Low Stock Alerts 40](#_Toc185103808)

[Figure 7 UD-Order Processing 40](#_Toc185103809)

[Figure 8 UD-Automatic Invoice Generation 41](#_Toc185103810)

[Figure 9 UD-Product Sourcing 41](#_Toc185103811)

[Figure 10 AI-Enhanced Product Descriptions 42](#_Toc185103812)

[Figure 11 UD-Store Setup 42](#_Toc185103813)

[Figure 12 UD-Template Selection 43](#_Toc185103814)

[Figure 13 UD-Customization Options 43](#_Toc185103815)

[Figure 14 UD-Domain Integration 44](#_Toc185103816)

[Figure 15 UD-Sales Report 44](#_Toc185103817)

[Figure 16 UD-Profitability Analysis 44](#_Toc185103818)

[Figure 17 SDLCM 45](#_Toc185103819)

[Figure 18 Work breakdown structure 47](#_Toc185103820)

[Figure 19 AD-Sign Up 48](#_Toc185103821)

[Figure 20 AD-Login 49](#_Toc185103822)

[Figure 21 AD-Update Stocks 50](#_Toc185103823)

[Figure 22 AD-Real Time Stock Alert 51](#_Toc185103824)

[Figure 23 AD-Payment Integration 52](#_Toc185103825)

[Figure 24 AD-Store Creation & Setup 53](#_Toc185103826)

[Figure 25 AD-Product Management 54](#_Toc185103827)

[Figure 26 AD-Generation of Invoice 55](#_Toc185103828)

[Figure 27 AD-Order Forwarding 56](#_Toc185103829)

[Figure 28 AD-Sales Details 57](#_Toc185103830)

[Figure 29 AD-Domain Setup 58](#_Toc185103831)

[Figure 30D-Online Payment 59](#_Toc185103832)

[Figure 31SD-Sign Up 60](#_Toc185103833)

[Figure 32 SD-Login 61](#_Toc185103834)

[Figure 33 SD-Store Creation 62](#_Toc185103835)

[Figure 34 SD-Product Management 63](#_Toc185103836)

[Figure 35 SD-Order Processing 64](#_Toc185103837)

[Figure 36 SD-Sales & Analytics View 65](#_Toc185103838)

[Figure 37 Software architecture Diagra 66](#_Toc185103839)

[Figure 38 Database Diagram 67](#_Toc185103840)

[Figure 39 Network diagram (Gantt chart) 68](#_Toc185103841)

[Figure 40 CD-User Authentication 68](#_Toc185103842)

[Figure 41 CD-Store Creation 69](#_Toc185103843)

[Figure 42 CD-Order Processing 69](#_Toc185103844)

[Figure 43 CD-Product Management 70](#_Toc185103845)

[Figure 44 CD-Payment Processing 70](#_Toc185103846)

[Figure 45 CD-Analytics & Reporting 71](#_Toc185103847)

List of Tables

[Table 1 FR01-01: User Registration (Sign Up) 20](#_Toc185103848)

[Table 2 FR01-02: User Login (Sign In) 21](#_Toc185103849)

[Table 3 FR01-03: User Onboarding 21](#_Toc185103850)

[Table 4 FR02: Payment Integration 22](#_Toc185103851)

[Table 5 FR03-01: Real-time Stock Updates 22](#_Toc185103852)

[Table 6 FR03-02: Low Stock Alerts 22](#_Toc185103853)

[Table 7 FR04-01: Order Processing 23](#_Toc185103854)

[Table 8 FR04-02: Automatic Invoice Generation 23](#_Toc185103855)

[Table 9 FR05-01: Product Sourcing 23](#_Toc185103856)

[Table 10 FR05-02: AI-Enhanced Product Descriptions 24](#_Toc185103857)

[Table 11 FR06-01: Store Setup 24](#_Toc185103858)

[Table 12 FR06-02: Template Selection 25](#_Toc185103859)

[Table 13 FR06-03: Customization Options 25](#_Toc185103860)

[Table 14 FR06-04: Domain Integration 25](#_Toc185103861)

[Table 15 FR07-01: Sales Report 26](#_Toc185103862)

[Table 16 FR07-02: Product Profitability Analysis 26](#_Toc185103863)

[Table 17 NFR01: Performance 26](#_Toc185103864)

[Table 18 NFR02: User Friendly 27](#_Toc185103865)

[Table 19 NFR03: Portability 27](#_Toc185103866)

[Table 20 NFR04: Accuracy 27](#_Toc185103867)

[Table 21 NFR05: Disaster Recovery 27](#_Toc185103868)

[Table 22 NFR06: Defect Maintenance 27](#_Toc185103869)

[Table 23 NFR07: Security 27](#_Toc185103870)

[Table 24 Requirement’s traceability matric 28](#_Toc185103871)

[Table 25 UC-01: User Registration 29](#_Toc185103872)

[Table 26 UC-02: Login User 30](#_Toc185103873)

[Table 27 UC-03: User Onboarding 30](#_Toc185103874)

[Table 28 UC-04: Payment Integration 31](#_Toc185103875)

[Table 29 Real-Time Stock Updates 31](#_Toc185103876)

[Table 30 UC-06: Low Stock Alerts 32](#_Toc185103877)

[Table 31 UC-07: Order Processing 32](#_Toc185103878)

[Table 32 Automatic Invoice Generation 33](#_Toc185103879)

[Table 33 UC-09: Product Sourcing 33](#_Toc185103880)

[Table 34 UC-10: AI-Enhanced Product Descriptions 34](#_Toc185103881)

[Table 35 UC-11: Store Creation 34](#_Toc185103882)

[Table 36 UC-12: Template Selection 35](#_Toc185103883)

[Table 37 UC-13: Customization Options 35](#_Toc185103884)

[Table 38 UC-14: Domain Integration 36](#_Toc185103885)

[Table 39 UC-15: Sales Report 36](#_Toc185103886)

[Table 40 UC-16: Product Profitability Analysis 37](#_Toc185103887)

[Table 41 TC-01: User Registration 72](#_Toc185103888)

[Table 42 TC-02: User Login 73](#_Toc185103889)

[Table 43 TC-03: User Onboarding 73](#_Toc185103890)

[Table 44 TC-04: Payment Integration 74](#_Toc185103891)

[Table 45 TC-05: Real-Time Stock Updates 75](#_Toc185103892)

[Table 46 TC-06: Low Stock Alerts 75](#_Toc185103893)

[Table 47 TC-07: Order Processing 76](#_Toc185103894)

[Table 48 TC-08: Automatic Invoice Generation 76](#_Toc185103895)

[Table 49 TC-09: Product Sourcing 77](#_Toc185103896)

[Table 50 TC-10: AI-Enhanced Product Descriptions 78](#_Toc185103897)

[Table 51 TC-11: Store Setup 78](#_Toc185103898)

[Table 52 TC-12: Template Selection 79](#_Toc185103899)

[Table 53 TC-13: Customization Options 80](#_Toc185103900)

[Table 54 TC-14: Domain Integration 80](#_Toc185103901)

[Table 55 TC-15: Sales Report 81](#_Toc185103902)

[Table 56 TC-16: Product Profitability Analysis 82](#_Toc185103903)

**Abstract**

DroPilot aims to revolutionize the dropshipping industry by harnessing the power of artificial intelligence (AI) to automate and optimize every key aspect of the dropshipping workflow. This platform is designed to help businesses focus on growth by managing the time-intensive processes involved in product sourcing, inventory management, order fulfillment, and customer support.

DroPilot provides an intuitive system for setting up personalized e-commerce stores using customizable templates and user-friendly design tools. It automates the identification of trending and high-performing products through AI-driven web scraping, natural language processing (NLP), and sentiment analysis. The platform imports product data, including descriptions, images, pricing, and inventory status, directly from reliable suppliers and keeps this information synchronized in real-time using webhooks and RESTful APIs. This ensures that stock levels and pricing are always accurate, minimizing the risk of overselling or underpricing.

To streamline order processing, DroPilot automates order forwarding, ensuring that customer details and shipping information are transmitted accurately to suppliers. The platform also supports automatic invoice generation, improving operational efficiency and reducing human error. By integrating advanced analytics and reporting tools, DroPilot offers insights into sales performance, profit margins, and customer trends, enabling data-driven decision-making.

The platform also features an AI-powered chatbot to provide 24/7 customer support. Using NLP, the chatbot can handle common inquiries, such as product details, and basic troubleshooting, ensuring quick and accurate responses to customer queries and enhancing overall customer satisfaction.

Additional features like photo verification using computer vision help maintain the quality of product listings by ensuring that images match descriptions. SEO optimization tools generate AI-driven product descriptions, metadata and keywords to improve search engine rankings and increase store visibility.

By combining AI and automation across these processes, DroPilot reduces manual effort, minimizes errors, and boosts the efficiency of dropshipping businesses, ultimately helping entrepreneurs scale their operations and maximize profitability.

# Project Introduction

A project introduction is a document that provides an overview of a project and its purpose, objectives, and scope. It is typically used to introduce the project to stakeholders, such as project sponsors, team members, and customers, and to provide a common understanding of the project's goals and deliverables.

## Introduction

In today’s highly competitive e-commerce industry, efficiently managing and scaling a dropshipping business requires advanced technological solutions to overcome many challenges. Dropshippers are tasked with identifying high-demand products, dynamically adjusting pricing, ensuring real-time inventory updates, and providing excellent customer experiences to remain competitive in a saturated market. Traditional manual methods are no longer sufficient to handle these complexities, emphasizing the need for a robust and automated solution.

DroPilot is an AI-driven automation system, designed to address the challenges of modern dropshipping. By using advanced technologies, DroPilot enhances operational efficiency and decision-making processes through its feature set.

Key functionalities include:

1. **Product Hunting**:  
   Utilizing advanced web scraping techniques, DroPilot automates the identification of trending and high-performing products across multiple platforms. By employing machine learning algorithms and natural language processing (NLP), the system extracts and analyzes product data such as descriptions, ratings, and reviews to pinpoint potential best-sellers. This feature helps dropshippers quickly find the best products to add to their stores.
2. **Real-Time Stock and Pricing Synchronization**:  
   DroPilot integrates seamlessly with supplier systems through webhooks, ensuring real-time synchronization of stock levels and pricing data. This dynamic linkage minimizes the risk of overselling or underpricing, as updates are pushed instantly from suppliers to the platform. DroPilot uses industry-standard RESTful APIs to ensure secure, fast, and scalable communication channels.
3. **Review Aggregation and Product Comparison**:  
   Through advanced data aggregation, DroPilot collects customer reviews and ratings from multiple sources to provide a comprehensive analysis of product performance. Sentiment analysis powered by AI categorizes reviews, allowing users to evaluate the quality, popularity, and customer satisfaction of products. Comparative analytics tools present these findings in a structured format, assisting in selecting the best products for listing.
4. **Photo Verification Using Computer Vision**:  
   DroPilot employs computer vision technology to analyze and verify the photos of listed products. This feature ensures that uploaded images match the corresponding product descriptions and specifications. By detecting discrepancies or irrelevant images, this tool maintains the quality and trustworthiness of product listings, reducing the likelihood of customer dissatisfaction.
5. **Store Creation**:  
   DroPilot provides an intuitive platform for creating and managing online stores. With customizable templates and design features, users can deploy professional storefronts quickly.
6. **Order Automation**:  
   DroPilot automates the order fulfillment process by securely transmitting order details to suppliers. The system ensures that customer details, shipping preferences, and product information are accurately sent and monitored in real-time, reducing manual intervention and errors.
7. **SEO Optimization & AI Copy-writing**:  
   DroPilot includes an SEO optimization module that analyzes product listings and generates recommendations for improved visibility. Using AI, the system generates SEO-friendly product descriptions, metadata and suggests keyword strategies to target markets. By improving search engine rankings, this feature drives organic traffic and enhances discoverability.
8. **AI-Powered Customer Support Chatbot**:  
   DroPilot includes an AI chatbot to handle customer questions and issues. The chatbot uses natural language processing (NLP) to understand queries and provide instant, accurate responses. It can manage tasks like answering order-related questions and solving basic problems.
9. **Analytics and Reporting**:  
   DroPilot provides advanced analytics and reporting tools, delivering actionable insights into key business metrics such as sales performance, profit margins, and customer trends. Visual dashboards with interactive charts and graphs enable users to monitor and assess their businesses in real time. The reporting module supports data export in formats like PDF and Excel for further analysis and decision-making.

## Objectives

The primary goal of **DroPilot** is to provide a comprehensive, user-friendly automation platform that addresses the core challenges of running a dropshipping business. By leveraging the power of AI, we aim to:

1. **Streamline Product Sourcing and Selection**  
   Automate the process of identifying, sourcing, and importing trending products from reliable suppliers.
2. **Monitor Real-Time Inventory and Pricing Management**:  
   Ensure accurate and up-to-date stock levels and pricing through real-time synchronization with suppliers.
3. **Automate Order Fulfillment and Processing:**  
   Simplify and speed up the order processing by automating the transmission of order details to suppliers.
4. **Improve Customer Service with AI-Powered Support**:  
   Enhance customer experience by providing instant and accurate responses through an AI-powered chatbot.
5. **Provide Actionable Business Insights through Analytics**:  
   Offer detailed sales and performance reports to help dropshippers make data-driven decisions.
6. **Optimize Product Listings with SEO Enhancements:**  
   Improve product visibility and ranking on search engines by generating SEO-friendly descriptions and keywords.
7. **Reduce Operational Risks and Maximize Profit Margins**:  
   Use AI to analyze supplier reliability, profit margins, and other factors to minimize risks and optimize returns.
8. **Simplify and Accelerate Decision-Making for Dropshippers**:  
   Provide intelligent, data-driven insights to streamline decision-making and enhance business efficiency.
9. **Verify Product Photos Using Computer Vision**:  
   Ensure the accuracy and relevance of product images by leveraging computer vision to detect discrepancies and maintain high-quality listings.
10. **Provide Users with Functional Online Stores:**  
    Deliver a platform that enables users to easily create fully functional online stores, complete with customizable templates and design features.

## Problem statement

Managing a dropshipping business involves multiple complex tasks, including identifying trending products, maintaining real-time stock and price updates, ensuring seamless order fulfillment, and providing exceptional customer support. Traditional manual methods are inefficient, error-prone, and time-consuming, leading to delays, poor customer experiences, and missed business opportunities. Furthermore, dropshippers struggle with sourcing reliable suppliers, managing large volumes of data, and optimizing their business operations for maximum profitability. These challenges delays the growth and scalability of dropshipping businesses, making it necessary to adopt an automated and AI-powered solution to streamline processes, reduce operational risks, and enhance overall business performance.

DroPilot resolves these challenges by offering a one-stop solution that automates critical operations and provides data-driven insights to support growth

## Assumptions & constraints

### Assumptions

1. Stable Internet Connection: A reliable internet connection is assumed for seamless data exchange with suppliers.
2. User Access to Platforms: It is assumed that users have access to the necessary platforms, such as supplier dashboards, payment gateways, and other third-party services.
3. Proper Data Formatting: It is assumed that data provided by users and suppliers will follow consistent and compatible formats for easy integration and processing.
4. AI Module Training: The AI components, such as product selection and customer support chatbots, will be trained with sufficient historical data to make accurate recommendations and responses.

### Constraints

1. External Dependency: The effectiveness of the platform is dependent on the reliability and performance of third-party services, such as payment providers etc.
2. Data Privacy and Security: Compliance with data privacy regulations, such as GDPR, is a constraint when handling sensitive user information, particularly payment data.
3. Scalability Limitations: As the user base grows, there may be challenges in maintaining system performance, requiring continuous infrastructure scaling.
4. Supplier Integration Compatibility: The integration process may be constrained by variations in the format, structure, or availability of data provided by different suppliers.
5. AI Accuracy: The accuracy of AI models, such as sentiment analysis and product recommendations, depends on the quality and diversity of training data, which may affect performance if the data is insufficient or unbalanced.
6. Cost of Integration: Implementing and maintaining third-party API integrations, such as payment gateways etc, may incur additional costs that could impact the overall budget.
7. Website Structure Changes: Frequent changes in the structure of target websites may break scraping scripts, requiring constant updates and maintenance of web scraping systems to ensure continuous data collection.
8. Rate Limiting and IP Blocking: Websites may implement rate limiting or IP blocking mechanisms to prevent scraping, which could lead to disruptions in data collection if appropriate measures (such as rotating proxies or delay strategies) are not in place.
9. Data Quality and Completeness: Web scraping may result in incomplete, inaccurate, or outdated data, as scraped information depends on the consistency and accuracy of the publicly available content on external websites.

## Project scope:

The project aims to develop and implement DroPilot, an AI-powered automation platform for dropshipping businesses. DroPilot will streamline key business processes such as product sourcing, order fulfillment, customer support, and inventory management, providing dropshippers with an intelligent, data-driven solution for optimizing their operations. Scope Includes**:**

* **Online Store Creation and Customization:**   
  Provide users with a fully functional online store that includes design features and customizable themes, allowing them to easily set up and personalize their storefront to match their brand identity.
* **Real-Time Stock and Pricing Synchronization**:  
  Integration with supplier stores to ensure real-time synchronization of stock levels and pricing, preventing overselling or underpricing.
* **Product Sourcing and Selection**:  
  Automated product identification through web scraping and AI-based analysis to source trending and profitable products from reliable suppliers.
* **Order Automation**:  
  Automation of the order fulfillment process, including the secure transmission of order details to suppliers and shipping carriers for seamless processing.
* **AI-Powered Customer Support**:  
  Development of a chatbot powered by natural language processing (NLP) to handle customer inquiries, and resolve common issues autonomously.
* **Analytics and Reporting**:  
  Provide advanced analytics dashboards for tracking business metrics such as sales performance, profit margins, and customer trends, allowing for informed decision-making.
* **SEO Optimization**:  
  Integration of an SEO module that generates SEO-friendly product descriptions, optimizes keyword strategies, and enhances product visibility on search engines.
* **Supplier Integration**:  
  Establishing secure, scalable connections with supplier stores to facilitate smooth product importation and continuous synchronization with the platform.
* **Profit Margin Optimization**:  
  AI-driven analysis of supplier reliability and profit margins to suggest optimal product selections, reducing risks and maximizing returns.
* **Comprehensive Documentation**:  
  Deliver detailed user documentation covering system setup, use cases, and scalability options.
* **Extensive Testing and Feedback**:  
  Conduct thorough testing of the platform’s features and usability, refining the system based on user feedback.

# Requirements Analysis

Requirement analysis is the process of gathering and documenting the requirements for a system or product. It involves identifying the needs and goals of the stakeholders, such as users, customers, and project sponsors, and determining how the system or product will meet those needs.

The goal of requirement analysis is to ensure that the system or product is designed and developed to meet the needs of the stakeholders. It is a crucial step in the software development process as it helps to define the scope of the project and establish a common understanding of the requirements among all team members.

## Literature review / Existing system study:

### Dropy.ai [1]:

Dropy.AI aims to simplify dropshipping by automating core tasks with AI. It helps users find products, keeps stores updated with new items, and offers an AI-driven customer support system. While the brand spy tool is useful for checking competitors’ strategies, it's not revolutionary and might not always provide a clear advantage.

### AutoDS [2]:

AutoDS is known for being easy to use, especially for beginners, but it's fairly basic. It automates routine tasks like processing orders and adjusting prices when suppliers change them. You can quickly import products from platforms like AliExpress, though it can feel limited if you're looking for more advanced customization or control.

### Glitching AI [3]:

Glitching AI offers tools to discover trending products and manage orders, but its standout feature is access to a network of suppliers. However, the platform's analytics are decent but not as in-depth as some users might want, and while the automated marketing tools are convenient, they can feel generic without much personalization.

### Sell The Trend [4]:

Sell The Trend gives access to over 7 million products and lets you fulfill orders with one click. Its NEXUS tool helps track competitors’ trends, but some may find it overwhelming due to the sheer volume of data. The built-in marketing tools are functional but won’t blow you away if you're expecting cutting-edge features.

### Inventory Source [5]:

Inventory Source is a dropshipping platform that features an integrated dropship supplier directory available for free. It automates inventory management, product data updates, and order processing, making it easy to streamline the dropshipping process and recover time to grow the business. The platform also provides integration with other e-commerce platforms.

### Shine Commerce [6]:

Shine Commerce is an e-commerce solution that offers dropshipping automation tools, including product sourcing and order fulfillment services. The platform also provides integration with other e-commerce platforms.Shine Commerce also features analytics tools to track sales performance and optimize inventory management.

## Stakeholder’s list (Actors):

A stakeholders list is a document that identifies the individuals, groups, or organizations that are stakeholders in a project or business. Stakeholders are individuals or groups that have a vested interest in the success or failure of the project or business.

### Store Owner

Store owners use DroPilot to manage dropshipping operations, including product listings, inventory, orders, and analytics, while automating routine tasks.

### Customer

Customers shop on e-commerce stores powered by DroPilot, using responsive websites and AI chatbots for inquiries, and provide feedback on products and shopping experiences.

### Suppliers

Suppliers provide products for DroPilot-powered stores, ensuring accurate information, timely order fulfillment, and quality shipping.

### Admin

Admins oversee DroPilot's operations, ensuring platform performance, user satisfaction, and compliance with regulations.

## Requirement’s elicitation

Requirement elicitation is the process of gathering the requirements for a system or product. It involves identifying the needs and goals of the stakeholders and determining how the system or product will meet those needs.

### Functional requirements

**FR01: Authentication & Onboarding**

* **FR01-01: User Registration (Sign Up)**

Table 1FR01-01: User Registration (Sign Up)

|  |  |
| --- | --- |
| **FR01-01-01** | The system shall allow users to register by providing their email, password, and basic account information. |
| **i** | The system shall validate the user information before creating an account to ensure a valid email format and a strong password policy. |
| **ii** | The system shall send an email verification link to the user after successful registration to confirm the email address |
| **iii** | The registration process shall ensure secure data handling by encrypting passwords using industry-standard encryption methods. |

* **FR01-02: User Login (Sign In)**

Table 2 FR01-02: User Login (Sign In)

|  |  |
| --- | --- |
| **FR01-02-01** | The system shall allow registered users to log in using their email and password. |
| **i** | The system shall validate user credentials to ensure that only registered users can access their accounts. |
| **ii** | The system shall provide options for password recovery through email, which includes sending a reset link to the registered email address. |
| **iii** | The login system shall protect against brute force attacks by implementing a lockout mechanism after multiple failed attempts. |

* **FR01-03: User Onboarding**

Table 3 FR01-03: User Onboarding

|  |  |
| --- | --- |
| **FR01-03-02** | The system shall guide the user through the onboarding experience to create their first store. |
| **i** | The onboarding process shall include interactive tutorials and prompts to assist users in setting up their store. |
| **ii** | The system shall offer templates and quick-start configurations to streamline the onboarding experience. |

**FR02: Payment Integration**

Table 4 FR02: Payment Integration

|  |  |
| --- | --- |
| **FR02-01** | The system shall integrate with popular payment systems to facilitate transactions. |
| **i** | The system shall support integrations with Stripe |
| **ii** | The payment integration shall ensure secure processing by complying with PCI DSS (Payment Card Industry Data Security Standard). |

**FR03: Stock Management**

* **FR03-01: Real-time Stock Updates**

Table 5 FR03-01: Real-time Stock Updates

|  |  |
| --- | --- |
| **FR03-01-01** | The system shall automatically update product stock levels from drop-shipping suppliers. |
| **i** | The system shall connect with supplier’s store to receive real-time inventory data. |
| **ii** | Stock updates shall reflect in the store’s inventory dashboard within seconds of a change from the supplier. |
| **iii** | The system shall handle stock discrepancies and notify the user of any synchronization issues. |

* **FR03-02: Low Stock Alerts**

Table 6 FR03-02: Low Stock Alerts

|  |  |
| --- | --- |
| **FR03-02-01** | The system shall notify store owners when stock for certain products is running low. |
| **i** | The system shall set a threshold for low stock alerts |
| **ii** | Notifications shall be sent via email and displayed in the store dashboard. |
| **iii** | The system shall prioritize low stock alerts for high-demand products. |

**FR04: Order Management**

* **FR04-01: Order Processing**

Table 7 FR04-01: Order Processing

|  |  |
| --- | --- |
| **FR04-01-01** | The system shall automatically forward order details to the drop-shipping supplier for fulfillment. |
| **I** | The system shall send order details to the supplier |
| **Ii** | Order processing shall include customer details, shipping preferences, and product information. |
| **Iii** | The system shall confirm successful transmission of order data to the supplier. |

* FR04-02: Automatic Invoice Generation

Table 8 FR04-02: Automatic Invoice Generation

|  |  |
| --- | --- |
| **FR04-02-01** | The system shall generate and email invoices to customers automatically after order confirmation. |
| **i** | Invoices shall include product details, pricing, and customer information. |
| **ii** | The system shall format invoices to comply with standard accounting practices. |

**FR05: Product Management**

* **FR05-01: Product Sourcing**

Table 9 FR05-01: Product Sourcing

|  |  |
| --- | --- |
| **FR05-01-01** | The system shall automatically fetch product data from drop-shipping suppliers. |
| **I** | The system shall support integration with trusted suppliers. |
| **Ii** | Product data shall include descriptions, images, and pricing. |
| **iii** | Users shall have the option to review and modify fetched product data before listing it in their store. |

* **FR05-02: AI-Enhanced Product Descriptions**

Table 10 FR05-02: AI-Enhanced Product Descriptions

|  |  |
| --- | --- |
| **FR05-02-01** | The system shall use AI to generate SEO-optimized product titles, descriptions, and tags. |
| **i** | AI-generated content shall be customizable to fit different marketing strategies. |
| **ii** | The system shall evaluate product keywords and trends to improve search engine visibility. |
| **iii** | Users shall have the option to edit AI-suggested descriptions before publishing. |

**FR06: Store Creation & Setup**

* **FR06-01: Store Setup**

Table 11 FR06-01: Store Setup

|  |  |
| --- | --- |
| **FR06-01-01** | The system shall assist users in creating a fully functional e-commerce store. |
| **i** | The setup wizard shall include prompts for branding elements, such as logos and themes. |
| **ii** | Users shall receive recommendations for optimizing their store layout and content. |

* **FR06-02: Template Selection**

Table 12 FR06-02: Template Selection

|  |  |
| --- | --- |
| **FR06-02-01** | The system shall provide users with a range of pre-designed store templates. |
| **I** | Templates shall be categorized by industry and design style. |
| **Ii** | Users shall preview templates before selecting them for their store. |
| **Iii** | Templates shall be customizable after selection. |

* FR06-03: Customization Options

Table 13 FR06-03: Customization Options

|  |  |
| --- | --- |
| **FR06-03-01** | The system shall allow users to modify the layout, colors, fonts, and overall design. |
| **i** | Customization tools shall include a user-friendly interface for real-time changes |
| **ii** | Users shall save changes and revert to previous versions if needed. |

* FR06-04: Domain Integration

Table 14 FR06-04: Domain Integration

|  |  |
| --- | --- |
| **FR06-04-01** | The system shall offer an option for users to use a custom domain or a subdomain provided by DroPilot. |
| **i** | Domain setup shall include step-by-step instructions for connecting external domains. |
| **ii** | The system shall provide SSL certificates for secure browsing. |
| **iii** | Users shall receive domain management support. |

**FR07: Analytics & Reporting**

* **FR07-01: Sales Report**

Table 15 FR07-01: Sales Report

|  |  |
| --- | --- |
| **FR06-01-01** | The system shall generate reports on daily, weekly, or monthly sales performance. |
| **I** | Sales data shall include metrics such as total revenue, best-selling products, and average order value. |
| **Ii** | Users shall have the option to export reports in standard file formats. |
| **Iii** | Reports shall include visual representations like charts and graphs for better comprehension. |

* **FR07-02: Product Profitability Analysis**

Table 16 FR07-02: Product Profitability Analysis

|  |  |
| --- | --- |
| **FR06-02-01** | The system shall offer detailed insights into product profitability, including costs and margins to help users understand financial performance. |
| **I** | Profit analysis shall include metrics such as gross and net profit calculations. |
| **ii** | The system shall automatically highlight the most profitable products and suggest potential areas for reducing costs or optimizing product margins. |
| **iii** | Users shall be able to access a detailed cost breakdown that includes product prices, shipping fees, supplier fees, and overall revenue to help them make informed decisions. |

### Non-functional requirements

* **NFR01: Performance**

Table 17 NFR01: Performance

|  |  |
| --- | --- |
| NFR01-01 | Home page must load within 10 seconds. |
| NFR01-02 | System must respond within 10 seconds on user request. |

* **NFR02: User Friendly**

Table 18 NFR02: User Friendly

|  |  |
| --- | --- |
| NFR02-01 | Display of our application will be very user friendly. |

* **NFR03: Portability**

Table 19 NFR03: Portability

|  |  |
| --- | --- |
| NFR03-01 | Our web application can be operating on any platform. (Mac, Windows, Linux) |
| NFR03-02 | Our mobile application can be operating on Android platform. |

* **NFR04: Accuracy**

Table 20 NFR04: Accuracy

|  |  |
| --- | --- |
| NFR04-01 | Our application will generate results that will be reasonably accurate. |

* **NFR05: Disaster Recovery**

Table 21 NFR05: Disaster Recovery

|  |  |
| --- | --- |
| NFR05-01 | If system crashes, all data should be recoverable within 30 minutes of the crash. |

* **NFR06: Defect Maintenance**

Table 22 NFR06: Defect Maintenance

|  |  |
| --- | --- |
| NFR06-01 | Post release bug fixing should not take more than 4 hours. |

* **NFR07: Security**

Table 23 NFR07: Security

|  |  |
| --- | --- |
| NFR07-01 | No user can access database except the Admin. |
| NFR07-02 | System must provide access only through login module to authorized users. |

### Requirement’s Traceability Matrix

Table 24 Requirement’s traceability matric

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Requirement’s Traceability Matrix** | | | | | |
| **Project Name** | DroPilot **– AI Assisted Dropshipping Automation** | | | | |
| **Project Supervisor** | **Dr. Atif Saeed** | | | | |
| **Requirement No.** | **Requirement Description** | **Use Case** | **Test Case** | **Activity Diagram** | **Sequence Diagram** |
| FR01 | User Registration (Sign Up) | UC-01 | TC-01 | AD-01 | SD-01 |
| FR02 | User  Login  (Sign In) | UC-02 | TC-02 | AD-02 | SD-02 |
| FR03 | User Onboarding | UC-03 | TC-03 | AD-01 | SD-01 |
| FR04 | Payment Integration | UC-04 | TC-04 | AD-05 | SD-05 |
| FR05 | Real-time Stock Updates | UC-05 | TC-05 | AD-04 | SD-04 |
| FR06 | Low  Stock  Alerts | UC-06 | TC-06 | AD-04 | SD-04 |
| FR07 | Order Processing | UC-07 | TC-07 | AD-09 | SD-05 |
| FR08 | Automatic Invoice Generation | UC-08 | TC-08 | AD-08 | SD-05 |
| FR09 | Product Sourcing | UC-09 | TC-09 | AD-07 | SD-04 |
| FR10 | AI-Enhanced Product Descriptions | UC-10 | TC-10 | AD-07 | SD-04 |
| FR11 | Store Setup | UC-11 | TC-11 | AD-06 | SD-03 |
| FR12 | Template Selection | UC-12 | TC-12 | AD-01 | SD-01 |
| FR13 | Customization Options | UC-13 | TC-13 | AD-01 | SD-01 |
| FR14 | Domain Integration | UC-14 | TC-14 | AD-11 | SD-03 |
| FR15 | Sales Report | UC-15 | TC-15 | AD-10 | SD-06 |
| FR16 | Product Profitability Analysis | UC-16 | TC-16 | AD-10 | SD-06 |

## Use Case Descriptions

Use case descriptions are an important part of the software development process as they help to define the requirements for a system or product and ensure that it meets the needs of the end users. They are typically used to create user stories or acceptance criteria, which are used to guide the development and testing of the system or product.

### UC-01: User Registration

Table 25 UC-01: User Registration

|  |  |
| --- | --- |
| **Use Case ID** | 1 |
| **Name** | User Registration |
| **Actors** | User, System |
| **Description** | User registers an account by providing required information. |
| **Pre-Condition** | User is not registered on the system. |
| **Post-Condition** | User account is created successfully. |
| **Normal flow of Events** | * User provides required information for registration. * System validates the information * System sends an email verification |
| **Alternative Flow** | Invalid user input leads to an error message. |
| **Exception** | System failure prevents account creation. |

### UC-02: Login User

Table 26 UC-02: Login User

|  |  |
| --- | --- |
| **Use Case ID** | 2 |
| **Name** | Login User |
| **Actors** | User, System |
| **Description** | User logs into their account using valid credentials. |
| **Pre-Condition** | User account must exist and be verified. |
| **Post-Condition** | User is logged into the system successfully. |
| **Normal flow of Events** | * User enters login credentials. * System validates credentials * If incorrect credentials are provided repeatedly, a lockout mechanism is implemented * If forgotten password, provide password recovery |
| **Alternative Flow** | Incorrect login credentials prompt an error. |
| **Exception** | System fails to authenticate due to server error. |

### UC-03: User Onboarding

Table 27 UC-03: User Onboarding

|  |  |
| --- | --- |
| **Use Case ID** | 3 |
| **Name** | User Onboarding |
| **Actors** | User, System |
| **Description** | Guide the user through the onboarding process after successful registration or login. |
| **Pre-Condition** | User is logged in. |
| **Post-Condition** | User is onboarded successfully with helpful resources. |
| **Normal flow of Events** | * System provides an onboarding guide. * System shows interactive tutorials * System offers templates or quick-start configurations |
| **Alternative Flow** |  |
| **Exception** | Tutorials or templates fail to load. |

### UC-04: Payment Integration

Table 28 UC-04: Payment Integration

|  |  |
| --- | --- |
| **Use Case ID** | 4 |
| **Name** | Payment Integration |
| **Actors** | User, System, Payment Provider |
| **Description** | User integrates payment systems such as Stripe for their store. |
| **Pre-Condition** | User is logged in. |
| **Post-Condition** | Payment system is successfully integrated. |
| **Normal flow of Events** | * System ensures secure payment processing * System complies with PCI DSS standards |
| **Alternative Flow** | Payment provider rejects integration request. |
| **Exception** | Security compliance issues cause integration failure. |

### UC-05: Real-Time Stock Updates

Table 29 Real-Time Stock Updates

|  |  |
| --- | --- |
| **Use Case ID** | 5 |
| **Name** | Real-Time Stock Updates |
| **Actors** | User, System, Supplier |
| **Description** | Automatically update product stock levels using supplier’s store. |
| **Pre-Condition** | Supplier’s store must be accessible. |
| **Post-Condition** | Stock levels are updated automatically in the system. |
| **Normal flow of Events** | * System connects with supplier’s store * System updates product stock levels. * System handles stock discrepancies if any * System notifies user of synchronization issues |
| **Alternative Flow** | Supplier’s store fails to respond. |
| **Exception** | Network issues prevent connection. |

### UC-06: Low Stock Alerts

Table 30 UC-06: Low Stock Alerts

|  |  |
| --- | --- |
| **Use Case ID** | 6 |
| **Name** | Low Stock Alerts |
| **Actors** | User (Store Owner), System |
| **Description** | Notify the user when stock levels fall below a specified threshold. |
| **Pre-Condition** | Low stock threshold is set in the system. |
| **Post-Condition** | User is notified of low stock levels. |
| **Normal flow of Events** | * System monitors stock levels. * System sends notifications when stock levels fall below the threshold * System prioritizes alerts for high-demand products |
| **Alternative Flow** |  |
| **Exception** | System fails to send notifications. |

### UC-07: Order Processing

Table 31 UC-07: Order Processing

|  |  |
| --- | --- |
| **Use Case ID** | 7 |
| **Name** | Order Processing |
| **Actors** | User, System, Supplier |
| **Description** | Forward order details to the supplier for fulfilment. |
| **Pre-Condition** | Order must be created and confirmed. |
| **Post-Condition** | Order details are securely transmitted to the supplier. |
| **Normal flow of Events** | * System compiles customer and order details. * System securely sends order details * System includes customer details and product information * System confirms successful transmission of order data. |
| **Alternative Flow** |  |
| **Exception** | Network issues or server errors prevent data transmission. |

### UC-08: Automatic Invoice Generation

Table 32 Automatic Invoice Generation

|  |  |
| --- | --- |
| **Use Case ID** | 8 |
| **Name** | Automatic Invoice Generation |
| **Actors** | System, Customer |
| **Description** | Automatically generate invoices upon order confirmation. |
| **Pre-Condition** | Order must be confirmed. |
| **Post-Condition** | Invoice is generated and sent to the customer. |
| **Normal flow of Events** | * System generates an invoice after order confirmation. * System includes product details, pricing, and customer information * System formats invoice according to accounting standards * Invoice is sent to the customer’s email. |
| **Alternative Flow** |  |
| **Exception** | System fails to generate the invoice. |

### UC-09: Product Sourcing

Table 33 UC-09: Product Sourcing

|  |  |
| --- | --- |
| **Use Case ID** | 9 |
| **Name** | Product Sourcing |
| **Actors** | System, Supplier |
| **Description** | Automatically fetch product data from supplier systems. |
| **Pre-Condition** | System must be connected to the supplier’s store. |
| **Post-Condition** | Product data is fetched and available for review. |
| **Normal flow of Events** | * System connects to supplier’s store. * System fetches product descriptions, images, and pricing * User reviews and modifies fetched product data |
| **Alternative Flow** |  |
| **Exception** | Connection issues prevent data fetching. |

### UC-10: AI-Enhanced Product Descriptions

Table 34 UC-10: AI-Enhanced Product Descriptions

|  |  |
| --- | --- |
| **Use Case ID** | 10 |
| **Name** | AI-Enhanced Product Descriptions |
| **Actors** | User, System |
| **Description** | AI generates SEO-friendly product descriptions for enhanced marketing. |
| **Pre-Condition** | Product details must be available in the system. |
| **Post-Condition** | SEO-optimized product descriptions are generated and editable by the user. |
| **Normal flow of Events** | * System generates SEO-optimized product descriptions using AI. * System analyzes keywords and trends for improved SEO * User edits AI-suggested descriptions |
| **Alternative Flow** |  |
| **Exception** | AI module fails to generate descriptions. |

### UC-11: Store Creation

Table 35 UC-11: Store Creation

|  |  |
| --- | --- |
| **Use Case ID** | 11 |
| **Name** | Store Creation |
| **Actors** | User, System |
| **Description** | System helps the user set up an e-commerce store. |
| **Pre-Condition** | User must be logged into the system. |
| **Post-Condition** | Store is created. |
| **Normal flow of Events** | * User initiates the store creation process. * System prompts the user to provide store preferences * System generates product listings |
| **Alternative Flow** |  |
| **Exception** |  |

### UC-12: Template Selection

Table 36 UC-12: Template Selection

|  |  |
| --- | --- |
| **Use Case ID** | 12 |
| **Name** | Template Selection |
| **Actors** | User, System |
| **Description** | Provide users with pre-designed templates categorized by style, which they can preview and select. |
| **Pre-Condition** | System must have a repository of store templates. |
| **Post-Condition** | Selected template is applied to the user's store. |
| **Normal flow of Events** | * System displays available templates categorized by industry and design style. * User previews templates. * User selects a template, which is applied to the store. * User customizes the template post-selection. |
| **Alternative Flow** |  |
| **Exception** | System fails to load or display template options. |

### UC-13: Customization Options

Table 37 UC-13: Customization Options

|  |  |
| --- | --- |
| **Use Case ID** | 13 |
| **Name** | Customization Options |
| **Actors** | User, System |
| **Description** | Enable the user to customize the store's design through an intuitive interface. |
| **Pre-Condition** | User must have selected a store template. |
| **Post-Condition** | Customizations are saved and applied to the store. |
| **Normal flow of Events** | * User accesses customization options. * System provides a user-friendly interface for real-time changes * User modifies layout, colors, fonts, and other design elements. * User saves changes or reverts to the previous version |
| **Alternative Flow** | User keeps the default template without customization. |
| **Exception** | System fails to apply or save changes due to validation errors or technical issues. |

### UC-14: Domain Integration

Table 38 UC-14: Domain Integration

|  |  |
| --- | --- |
| **Use Case ID** | 14 |
| **Name** | Domain Integration |
| **Actors** | User, System |
| **Description** | Allow the user to connect a custom domain or use a subdomain provided by the system. |
| **Pre-Condition** | Domain registration and SSL integration features must be active. |
| **Post-Condition** | Domain is integrated, and the store is accessible via the chosen domain. |
| **Normal flow of Events** | * User chooses between a custom domain or a DroPilot-provided subdomain. * System provides step-by-step instructions for connecting external domains * System integrates SSL certificates for secure browsing * System provides ongoing domain management support |
| **Alternative Flow** | User opts not to integrate a custom domain. |
| **Exception** | Domain setup fails due to incorrect configurations. |

### UC-15: Sales Report

Table 39 UC-15: Sales Report

|  |  |
| --- | --- |
| **Use Case ID** | 15 |
| **Name** | Sales Report |
| **Actors** | User, System |
| **Description** | Provide detailed sales reports with metrics like revenue, best-selling products, and order value. |
| **Pre-Condition** | Sales data must be recorded in the system. |
| **Post-Condition** | User can view and export sales reports. |
| **Normal flow of Events** | * User selects a reporting period (daily, weekly, monthly). * System generates the sales report, including key metrics like total revenue, best-selling products, and average order value * System provides visual representations like charts and * User exports the report in standard file formats. |
| **Alternative Flow** | User customizes the reporting period or filters data. |
| **Exception** | Insufficient data prevents report generation. |

### UC-16: Product Profitability Analysis

Table 40 UC-16: Product Profitability Analysis

|  |  |
| --- | --- |
| **Use Case ID** | 16 |
| **Name** | Product Profitability Analysis |
| **Actors** | User, System |
| **Description** | Analyze profitability metrics for products and suggest cost optimizations. |
| **Pre-Condition** | Product and sales data must be available in the system. |
| **Post-Condition** | Profitability insights are available for review. |
| **Normal flow of Events** | * System calculates gross and net profit for each product * System provides a detailed cost breakdown. * System highlights the most profitable products. |
| **Alternative Flow** |  |
| **Exception** | Missing or incomplete data affects the accuracy of profitability analysis. |

## Use case design

### User Registration



Figure 1 UD-User Registration

### Sign In



Figure 2 UD-Sign In

### User On-boarding



Figure 3 UD-User Onboarding

### Payment Integration



Figure 4 UD-Payment Integration

### Real-time Stock Updates



Figure 5 UD- Real-time Stock Updates

### Low Stock Alerts



Figure 6 UD-Low Stock Alerts

### Order Processing



Figure 7 UD-Order Processing

### Automatic Invoice Generation



Figure 8 UD-Automatic Invoice Generation

### Product Sourcing



Figure 9 UD-Product Sourcing

### AI-Enhanced Product Descriptions



Figure 10 AI-Enhanced Product Descriptions

### Store Setup



Figure 11 UD-Store Setup

### Template Selection



Figure 12 UD-Template Selection

### Customization Options



Figure 13 UD-Customization Options

### Domain Integration



Figure 14 UD-Domain Integration

### Sales Report



Figure 15 UD-Sales Report

### Profitability Analysis



Figure 16 UD-Profitability Analysis

## Software development life cycle model

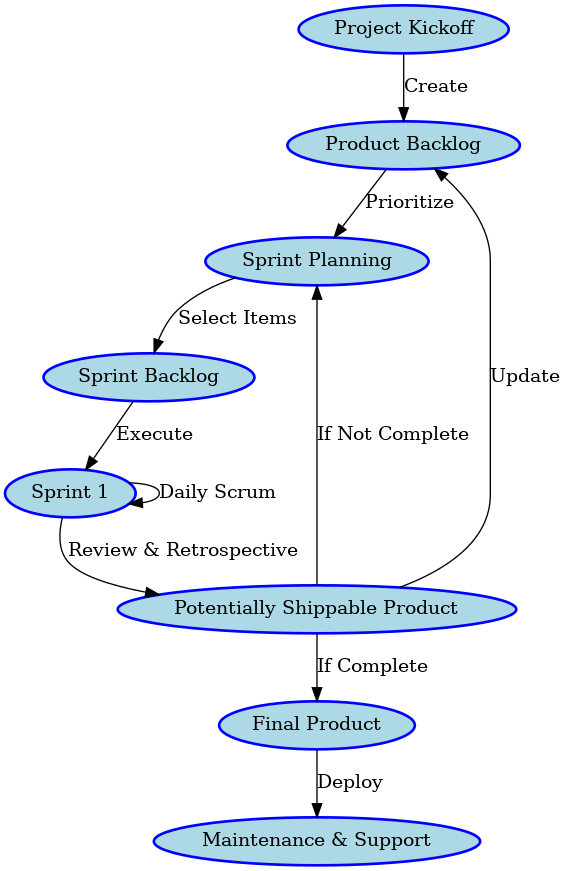
****

Figure 17 SDLCM

This diagram explains the Agile process. It starts with the Project Kickoff**,** where a list of tasks (Product Backlog) is created and organized. Then, important tasks are chosen during Sprint Planning and worked on in a sprint with daily meetings. After the sprint, the work is reviewed, and either more tasks are done or theFinal Product is completed. The finished product is then deployed and supported.

**Reasons:**

* **Iterative Development:** Allows for incremental development of features, which is crucial for a complex system with multiple functionalities.
* **Flexibility:** Can adapt to changing requirements or market needs, which is important for an e-commerce platform.
* **Continuous Feedback:** Regular sprints and reviews allow for continuous improvement and alignment with user needs.
* **Faster Time-to-Market:** Core features can be developed and released quickly, with additional features added in subsequent sprints.
* **Risk Mitigation:** Regular testing and reviews help identify and address issues early in the development process.

# System Design

## Work breakdown structure (WBS)



Figure 18 Work breakdown structure

## Activity diagram

### Sign Up



Figure 19 AD-Sign Up

### Login



Figure 20 AD-Login

### Update Stocks



Figure 21 AD-Update Stocks

### Real Time Stock Alert



Figure 22 AD-Real Time Stock Alert

### Payment Integration



Figure 23 AD-Payment Integration

### Store Creation & Setup



Figure 24 AD-Store Creation & Setup

### Product Management



Figure 25 AD-Product Management

### Generation of Invoice



Figure 26 AD-Generation of Invoice

### Order Forwarding



Figure 27 AD-Order Forwarding

### Analytics & Reporting



Figure 28 AD-Sales Details

### Domain Setup



Figure 29 AD-Domain Setup

### Online Payment



Figure 30D-Online Payment

## Sequence diagram

### Sign Up



Figure 31SD-Sign Up

### Login



Figure 32 SD-Login

### Store Creation



Figure 33 SD-Store Creation

### Product Management



Figure 34 SD-Product Management

### Order Processing



Figure 35 SD-Order Processing

### Sales & Analytics View



Figure 36 SD-Sales & Analytics View

## Software architecture

* Scalability:
* Services can be scaled independently to handle varying loads, optimizing resources and cost.
* Critical components like user authentication or payment processing can be scaled without affecting the entire system.
* Flexibility in Technology:
* Allows choosing the best technology stack for each service based on its requirements.
* Enables gradual migration to new technologies without overhauling the entire system.
* Fault Isolation:
* Failure in one service (e.g., payment service) does not bring down the entire application.
* Reduces system downtime and improves reliability.
* Independent Deployment:
* Teams can deploy updates to individual services without affecting others.
* Minimizes downtime and speeds up the release cycle.
* Improved Maintainability:
* Smaller, focused codebases make it easier to debug, test, and maintain services.
* Reduces technical debt and improves developer productivity.



Figure 37 Software architecture Diagram

## Class diagram

Not applicable Due to:

**System-Wide Design:** Class diagrams are less useful for capturing inter-service communication or overall system architecture in microservices. For this, architecture diagrams, sequence diagrams, or API contract diagrams are more appropriate.

**Dynamic Interactions:** Since microservices rely heavily on communication patterns (e.g., REST, gRPC, message queues), class diagrams do not effectively capture these dynamic behaviours.

## Database diagram



Figure 38 Database Diagram

## Network diagram (Gantt chart)

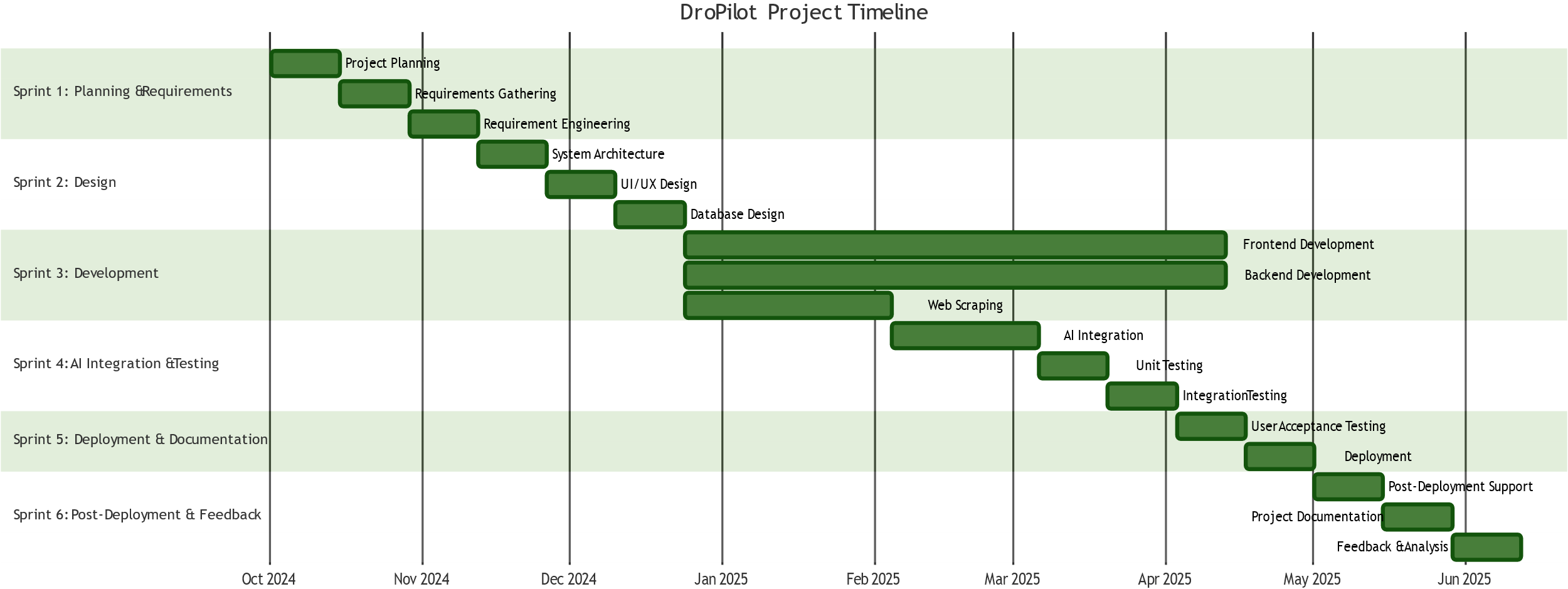


Figure 39 Network diagram (Gantt chart)

## Collaboration diagram

### User Authentication



Figure 40 CD-User Authentication

### Store Creation



Figure 41 CD-Store Creation

### Order Processing



Figure 42 CD-Order Processing

### Product Management



Figure 43 CD-Product Management

### Payment Processing



Figure 44 CD-Payment Processing

### Analytics & Reporting



Figure 45 CD-Analytics & Reporting

# System Testing

System testing is a type of software testing that focuses on testing a complete and integrated software product or system. It aims to validate that the system meets the specified requirements and is fit for purpose. System testing is usually done after the unit testing and integration testing phases, and it involves testing the system as a whole.

## Test cases

Test cases are sets of conditions or variables under which a tester will determine whether an application, system, or component is working correctly. Test cases are an important part of the software testing process as they help to ensure that an application, system, or component is functioning correctly and meeting the requirements of the stakeholders. They are typically created by the tester and reviewed by the development team to ensure that they are comprehensive and accurate.

### TC-01: User Registration

Table 41 TC-01: User Registration

|  |  |
| --- | --- |
| **Test Case ID** | TC-01 |
| **Application Name** | DroPilot |
| **Use Case(s)** | User Registration |
| **Created By** | Abdul Hanan |
| **Test Case Description** | Verify that a new user can register successfully using valid details. |
| **Action/Test Steps** | 1. Navigate to the Sign-Up page.  2. Enter valid details (Username, Email, Password).  3. Click on the "Sign Up" button. |
| **Test Data** | Username: test\_user  Email: test@example.com  Password: Password123 |
| **Pre-Conditions** | The user must not already have an account. |
| **Post-Conditions** | User should receive an email verification link. |
| **Expected Result** | Account is created, and email verification is sent. |
| **Actual Result** |  |
| **Status** |  |

### TC-02: User Login

Table 42 TC-02: User Login

|  |  |
| --- | --- |
| **Test Case ID** | TC-02 |
| **Application Name** | DroPilot |
| **Use Case(s)** | User Login |
| **Created By** | Yahya Irfan |
| **Test Case Description** | Verify that a registered user can log in successfully. |
| **Action/Test Steps** | 1. Navigate to the Login page.  2. Enter valid credentials (Email, Password).  3. Click on the "Sign In" button. |
| **Test Data** | Email: test@example.com  Password: Password123 |
| **Pre-Conditions** | User must have an active account. |
| **Post-Conditions** | User is redirected to the dashboard. |
| **Expected Result** | User is logged in successfully. |
| **Actual Result** |  |
| **Status** |  |

### TC-03: User Onboarding

Table 43 TC-03: User Onboarding

|  |  |
| --- | --- |
| **Test Case ID** | TC-03 |
| **Application Name** | DroPilot |
| **Use Case(s)** | User Onboarding |
| **Created By** | Bushra Hasan |
| **Test Case Description** | Verify that the onboarding flow guides the user through the setup process. |
| **Action/Test Steps** | 1. Log in with valid credentials.  2. Follow the onboarding prompts.  3. Select a template and configure basic store settings. |
| **Test Data** | N/A |
| **Pre-Conditions** | User must log in for the first time. |
| **Post-Conditions** | User completes onboarding and is redirected to the dashboard. |
| **Expected Result** | Onboarding steps are successfully completed |
| **Actual Result** |  |
| **Status** |  |

### TC-04: Payment Integration

Table 44 TC-04: Payment Integration

|  |  |
| --- | --- |
| **Test Case ID** | TC-04 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Payment Integration |
| **Created By** | Abdul Hanan |
| **Test Case Description** | Verify that the Stripe payment integration processes a payment successfully through the checkout page. |
| **Action/Test Steps** | 1. Navigate to the application’s checkout page. 2. Add an item to the cart (if applicable). 3. Fill in the required billing details. 4. Select "Credit/Debit Card" as the payment method. 5. Enter test card details provided by Stripe (e.g., 4242 4242 4242 4242 for valid transactions). 6. Submit the payment form. |
| **Test Data** | * Test Card Number: 4242 4242 4242 4242 * Expiry Date: 12/34 * CVV: 123 * Billing Address: [Test Address] * Other test card details provided in the Stripe documentation. |
| **Pre-Conditions** | Stripe API keys are correctly configured in the application. |
| **Post-Conditions** | A confirmation email/receipt is sent. |
| **Expected Result** | Payment is processed successfully. |
| **Actual Result** |  |
| **Status** |  |

### TC-05: Real-Time Stock Updates

Table 45 TC-05: Real-Time Stock Updates

|  |  |
| --- | --- |
| **Test Case ID** | TC-05 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Real-time Stock Updates |
| **Created By** | Yahya Irfan |
| **Test Case Description** | Verify that stock levels are updated automatically through supplier’s store. |
| **Action/Test Steps** | 1. Configure supplier integration.  2. Trigger stock synchronization.  3. Verify updated stock levels in the dashboard. |
| **Test Data** | N/A |
| **Pre-Conditions** | Supplier’s store must be active. |
| **Post-Conditions** | Stock levels are synchronized successfully. |
| **Expected Result** | Stock updates are reflected in real-time. |
| **Actual Result** |  |
| **Status** |  |

### TC-06: Low Stock Alerts

Table 46 TC-06: Low Stock Alerts

|  |  |
| --- | --- |
| **Test Case ID** | TC-06 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Low Stock Alerts |
| **Created By** | Bushra Hasan |
| **Test Case Description** | Verify that the system sends low stock alerts when thresholds are reached. |
| **Action/Test Steps** | 1. Set a low stock threshold for a product.  2. Reduce product stock below the threshold.  3. Check for alerts (e.g., email or notification). |
| **Test Data** | Product: T-Shirt  Threshold: 5 |
| **Pre-Conditions** | Stock levels must be above the threshold initially. |
| **Post-Conditions** | Low stock notifications are sent to the user. |
| **Expected Result** | System generates and sends low stock alerts. |
| **Actual Result** |  |
| **Status** |  |

### TC-07: Order Processing

Table 47 TC-07: Order Processing

|  |  |
| --- | --- |
| **Test Case ID** | TC-07 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Order Processing |
| **Created By** | Abdul Hanan |
| **Test Case Description** | Verify that the system successfully forwards order details to the supplier. |
| **Action/Test Steps** | 1. Place an order as a customer.  2. Confirm that the order is forwarded to the supplier.  3. Validate the transmitted order details. |
| **Test Data** | Order: Laptop  Customer: John Doe  Shipping: Standard |
| **Pre-Conditions** | Supplier's store must be active. |
| **Post-Conditions** | Order details are securely forwarded to the supplier, and confirmation is logged |
| **Expected Result** | Order is forwarded successfully, and the system confirms transmission |
| **Actual Result** |  |
| **Status** |  |

### TC-08: Automatic Invoice Generation

Table 48 TC-08: Automatic Invoice Generation

|  |  |
| --- | --- |
| **Test Case ID** | TC-8 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Automatic invoice Generation |
| **Created By** | Yahya Irfan |
| **Test Case Description** | Verify that the system generates and stores an invoice after an order is confirmed |
| **Action/Test Steps** | 1. Confirm an order.  2. Check the generated invoice in the user account. |
| **Test Data** | Order: Books  Price: $50 |
| **Pre-Conditions** | An order must be confirmed. |
| **Post-Conditions** | The invoice is generated and stored in the user’s account. |
| **Expected Result** | Invoice includes accurate details (product, price, customer, etc.) and follows proper formatting. |
| **Actual Result** |  |
| **Status** |  |

### TC-09: Product Sourcing

Table 49 TC-09: Product Sourcing

|  |  |
| --- | --- |
| **Test Case ID** | TC-09 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Product Sourcing |
| **Created By** | Bushra Hasan |
| **Test Case Description** | Verify that product data is fetched from supplier systems automatically. |
| **Action/Test Steps** | 1. Connect to a supplier’s store.  2.Fetch product data.  3.Validate the received product details. |
| **Test Data** | Supplier: Gifther.pk  Product: Shoes |
| **Pre-Conditions** | Supplier's store must be active. |
| **Post-Conditions** | Product data is added to the inventory. |
| **Expected Result** | Product data (name, description, pricing) is fetched and displayed accurately. |
| **Actual Result** |  |
| **Status** |  |

### TC-10: AI-Enhanced Product Descriptions

Table 50 TC-10: AI-Enhanced Product Descriptions

|  |  |
| --- | --- |
| **Test Case ID** | TC-10 |
| **Application Name** | DroPilot |
| **Use Case(s)** | AI-Enhanced Product Descriptions |
| **Created By** | Abdul Hanan |
| **Test Case Description** | Verify that AI generates SEO-optimized product descriptions and allows user customization. |
| **Action/Test Steps** | 1. Select a product.  2. Generate an AI-enhanced product description.  3. Edit the AI-generated content and save it. |
| **Test Data** | Product: Backpack  Keywords: Durable, Waterproof |
| **Pre-Conditions** | The AI model must be integrated. |
| **Post-Conditions** | Customizations are saved and displayed. |
| **Expected Result** | AI generates descriptions based on the given product and keywords. Users can edit and save their changes. |
| **Actual Result** |  |
| **Status** |  |

### TC-11: Store Setup

Table 51 TC-11: Store Setup

|  |  |
| --- | --- |
| **Test Case ID** | TC-11 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Store Setup |
| **Created By** | Yahya Irfan |
| **Test Case Description** | Verify that the system assists  in creating an e-commerce store. |
| **Action/Test Steps** | 1. Access the store setup feature. 2. Input preferences for products, branding, and themes. 3. Check the generated product listings. |
| **Test Data** | Preferences: - Industry: Fashion - Theme: Minimalist - Branding: Logo and pastel color palette |
| **Pre-Conditions** | User account must be active with the appropriate permissions. |
| **Post-Conditions** | The system generates a functional draft store based on user inputs. |
| **Expected Result** | The system provides product listings, branding suggestions, and layout recommendations based on user preferences. |
| **Actual Result** |  |
| **Status** |  |

### TC-12: Template Selection

Table 52 TC-12: Template Selection

|  |  |
| --- | --- |
| **Test Case ID** | TC-12 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Template Selection |
| **Created By** | Bushra Hasan |
| **Test Case Description** | Verify that the user can select and preview templates based on industry and design style. |
| **Action/Test Steps** | 1. Navigate to the template selection page. 2. Browse through the template categories. 3. Preview selected templates. 4. Finalize and apply a template to the store. |
| **Test Data** | Template Type: Industry – Fashion Design Style: Minimalist |
| **Pre-Conditions** | Template options must be available in the system. |
| **Post-Conditions** | The selected template is applied to the store. |
| **Expected Result** | The system categorizes, previews, and applies the template successfully. |
| **Actual Result** |  |
| **Status** |  |

### TC-13: Customization Options

Table 53 TC-13: Customization Options

|  |  |
| --- | --- |
| **Test Case ID** | TC-13 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Customization Options |
| **Created By** | Abdul Hanan |
| **Test Case Description** | Verify that the system allows users to modify store layouts, colors, fonts, and design in real-time, with the ability to save and revert changes. |
| **Action/Test Steps** | 1. Navigate to the store customization section. 2. Modify layout, colors, and fonts using the provided interface. 3. Check for live preview of changes. 4. Save the changes and verify their persistence. 5. Revert changes. |
| **Test Data** | Layout: Two-column design Colors: Blue and white theme Fonts: Roboto |
| **Pre-Conditions** | The store must be active. |
| **Post-Conditions** | Customizations are successfully applied and saved. |
| **Expected Result** | The system provides a user-friendly interface for modifications, saves changes, and supports reverting and advanced customization. |
| **Actual Result** |  |
| **Status** |  |

### TC-14: Domain Integration

Table 54 TC-14: Domain Integration

|  |  |
| --- | --- |
| **Test Case ID** | TC-14 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Domain Integration |
| **Created By** | Bushra Hasan |
| **Test Case Description** | Verify that users can integrate custom domains or subdomains and connect external domains with SSL certificates. |
| **Action/Test Steps** | 1. Navigate to the domain management section. 2. Select an option to use a custom domain or subdomain. 3. Follow the step-by-step instructions to connect an external domain. 4. Verify SSL certificate activation for secure browsing. 5. Test domain management features such as updating or removing a domain. |
| **Test Data** | Custom Domain: www.mystore.com |
| **Pre-Conditions** | The store must have domain management capabilities, and the user must own the domain. |
| **Post-Conditions** | The custom domain is successfully integrated and secured with SSL. |
| **Expected Result** | The system integrates domains seamlessly, provides SSL certificates, and supports management tasks. |
| **Actual Result** |  |
| **Status** |  |

### TC-15: Sales Report

Table 55 TC-15: Sales Report

|  |  |
| --- | --- |
| **Test Case ID** | TC-15 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Sales Report |
| **Created By** | Yahya Irfan |
| **Test Case Description** | Verify that the system generates sales reports with detailed metrics and visualizations. |
| **Action/Test Steps** | 1. Navigate to the analytics and reporting section. 2. Select the sales report for a specific time frame (e.g., weekly). 3. Verify metrics like total revenue, best-selling products, and average order value. 4. Export the report. 5. Check for visual representations such as graphs and charts. |
| **Test Data** | Time Frame: Weekly |
| **Pre-Conditions** | Sales data must be available for the selected time frame. |
| **Post-Conditions** | The user receives a comprehensive report with accurate data. |
| **Expected Result** | The system generates a report with correct metrics, visual representations, and export functionality. |
| **Actual Result** |  |
| **Status** |  |

### TC-16: Product Profitability Analysis

Table 56 TC-16: Product Profitability Analysis

|  |  |
| --- | --- |
| **Test Case ID** | TC-16 |
| **Application Name** | DroPilot |
| **Use Case(s)** | Product Profitability Analysis |
| **Created By** | Abdul Hanan |
| **Test Case Description** | Verify that the system provides detailed profitability insights for products. |
| **Action/Test Steps** | 1. Navigate to the analytics and reporting section. 2. Open the product profitability analysis feature. 3. Verify the gross and net profit metrics. 4. Check for detailed cost breakdowns. 5. Identify the most profitable products and suggested optimization areas. |
| **Test Data** | Product: Sneakers |
| **Pre-Conditions** | Accurate cost and sales data must be available. |
| **Post-Conditions** | Insights on profitability and cost breakdown are displayed. |
| **Expected Result** | The system provides clear and actionable insights on product profitability. |
| **Actual Result** |  |
| **Status** |  |

## Testing

Testing is the process of evaluating a system or its components with the intent to find whether it satisfies the specified requirements or not. It can also be used to identify any missing or incomplete requirements. Testing is a critical part of the software development process as it helps to ensure that the system is of high quality and fit for its intended purpose.

Effective testing is essential for ensuring the quality and reliability of a system. It is important to carefully plan and execute the testing process to ensure that all aspects of the system are thoroughly tested and any issues are identified and addressed.

There are different approaches to testing, including:

### Unit Testing

In unit testing, we tested all the modules of system separately in following phases:

* Black Box Testing

Inputs and outputs are made for testing purpose in this phase.

* White Box Testing

Code and design are tested in this phase.

### Integration Testing

In integration testing, we combine all the dependent modules and starts testing them.

**• Bottom-up testing:** In this phase, we are testing the system modules from bottom to top. First, we test the base modules and then at the end we go for testing the first/top module.

**• Top-down testing:** In this phase, we are testing the system modules from top to bottom. First, we test the top modules and then at the end we go for testing the last module of system.

### Acceptance Testing

Here we will test that our system is complete and verified that is our system providing us accurate result which are we expecting.

# Conclusion

## Problems Faced and Lessons Learned

In the development of DroPilot, several potential challenges are anticipated, which will require careful planning and strategic solutions to overcome:

1. **Third-Party Integration Issues**: Integrating third party APIs and payment gateways may present difficulties due to inconsistencies in data structures, rate limits, and occasional downtimes. It will be essential to design robust error-handling mechanisms and fallback strategies to maintain system reliability.
2. **Data Quality Concerns**: Web scraping for product data may yield incomplete, outdated, or inconsistent information. Implementing data validation techniques and employing AI-driven cleaning and verification processes will be crucial to ensuring high data quality.
3. **Scalability and Performance**: As the platform grows and data volume increases, maintaining system performance may become challenging. Optimizing database queries, employing caching solutions, and ensuring the infrastructure can scale dynamically will help address potential bottlenecks.
4. **Security and Compliance**: Handling sensitive user data, including payment information, will require adherence to data protection regulations like **GDPR** and **PCI DSS**. Ensuring data encryption, secure authentication, and access control will be critical to mitigating security risks.
5. **User Experience (UX) Design**: Developing a user-friendly interface that meets the needs of diverse dropshippers may require iterative feedback and multiple design refinements. Prioritizing UX design and usability testing will be key to enhancing platform adoption and satisfaction.

By anticipating these challenges, the team can better prepare strategies and solutions to ensure the successful development and deployment of **DroPilot**.

## Project Summary

DroPilot aims to be an AI-driven automation platform designed to streamline and optimize core processes in dropshipping businesses. The platform's features are intended to reduce manual effort, minimize operational risks, and enhance decision-making through intelligent automation. Key features of **DroPilot** include:

* Store Creation and Customization: Allows users to quickly set up and personalize their online stores using intuitive templates and design tools.
* AI-Powered Product Hunting: Automates the identification of trending products using web scraping and machine learning techniques.
* Real-Time Stock and Pricing Synchronization: Ensures up-to-date inventory and pricing through seamless integrations and webhooks.
* Order Fulfilment Automation: Streamlines the fulfilment process by securely transmitting order details to suppliers.
* AI Customer Support Chatbot: Provides instant, AI-powered customer support to enhance user experience.
* SEO Optimization: Generates SEO-friendly product descriptions and keywords to boost store visibility.
* Advanced Analytics and Reporting: Offers actionable insights and detailed reports to support data-driven decisions.

By leveraging AI and automation, DroPilot seeks to address the key challenges faced by modern dropshipping businesses and provide an efficient, scalable solution for store owners.

## Future Work

To further enhance DroPilot, several future developments are planned:

1. Advanced Predictive Analytics: Enhancing AI models to predict product trends and customer demands with greater accuracy.
2. Multi-Language Support: Expanding the chatbot and user interface to support multiple languages for a global user base.
3. Augmented Reality (AR) Integration: Allowing customers to visualize products in real-world settings before purchasing.
4. Enhanced Security Measures: Introducing two-factor authentication (2FA) and advanced fraud detection systems to strengthen platform security.

These planned enhancements will ensure DroPilot remains adaptable, innovative, and capable of meeting the evolving needs of dropshipping businesses in an ever-competitive market.

# References

|  |  |
| --- | --- |
| [1] | “Dropy.ai™ - the future of ai dropshipping,” Dropy AI, [Online]. Available: https://www.dropy.ai/. [Accessed 15 September 2024]. |
| [2] | “AutoDS the automated dropshipping tool for your store,” AutoDS, [Online]. Available: https://www.autods.com/. [Accessed 18 September 2024]. |
| [3] | “Glitching AI - the Ultimate AI dropshipping tool,” Glitching AI, [Online]. Available: https://www.glitching.ai/. [Accessed 20 September 2024]. |
| [4] | “Sell The Trend: AI Dropshipping,” Sell The Trend, [Online]. Available: https://www.sellthetrend.com/. [Accessed 22 September 2024]. |
| [5] | “Dropshipping Supplier Directory & Automation Software,” Inventory Source, [Online]. Available: https://www.inventorysource.com.. [Accessed 28 September 2024]. |
| [6] | “Shine Commerce - Your Partner in Dropshipping Success,” Shine Commerce, [Online]. Available: https://www.shinecommerce.com. [Accessed 10 September 2024]. |

