GREEN LEAF INFORMATION MANAGEMENT SYSTEM

PROJECT REPORT

SRI LANKA INSTITUTE OF INFORMATION TECHNOLOGY

IT2080 -INFROMATION TECHNOLOGY PROJECT

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May 2023

Declaration

This project report is our original work and the content is not plagiarized from any other resource. References for all the content taken from external resources are correctly cited. To the best of our knowledge, this report does not contain any material published or written by third parties, except as acknowledged in the text.

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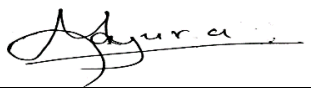
IT21243226	Sellapperuma M.S	
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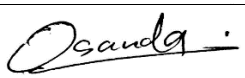
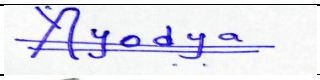
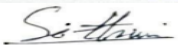
IT21224652	Manathunga M.A.O. S	
IT21270338	Dahanayake R. A	
IT21239298	Bandara E.M.S. S	
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Date: 2023.05.20

Abstract

An overview of a proposed project for the Gold Buds Uva Tea factory, a tea production and export company located in the Badulla district of Sri Lanka. The project aims to improve efficiency and eliminate issues in the tea production and management process by implementing a computer-based system. The company follows a comprehensive process for tea production, starting from the acquisition of raw materials to the packaging and storage of the final tea products in the warehouse. However, manual paperwork calculations and potential errors have highlighted the need for an enhanced system. The proposed project focuses on key areas such as raw material transport management, supplier and quantity management, payment management, warehouse management, customer and order management, machine management, financial management, time scheduling, and target management. Each of these areas will be implemented as subsystems using computer-based systems. By digitizing processes and adopting the client's specified approach, the project aims to streamline operations, reduce errors, and enhance overall efficiency in the Gold Buds Uva Tea factory.

Acknowledgement

The project we completed for the topic Information Technology Project in our second year and second semester is described in this paper. The members of the itp_wd_b02_g01_t21group would like to extend their sincere gratitude to everyone who helped us finish our project job successfully by offering sound advice and crucial support. We would like to extend our sincere gratitude to all of the lecturers and instructors associated with the Information Technology Project (ITP) module, particularly Ms. Geethanjali Wimalaratne and MR. Jeewaka Perera. Their suggestions and words of support provided us the bravery we needed to complete this project successfully right away. Their overwhelming assistance enabled us to successfully meet their criteria. Last but not least, thanks to everyone who contributed their best efforts and dedication to making the project a success. Their diligent work this semester culminated in the creation of this website.

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INTRODUCTION

Background

The Gold Buds Uva Tea factory, located in the Badulla district of Sri Lanka, is a developing company involved in the production and exportation of tea. Tea production has been a significant industry in Sri Lanka since its introduction in 1867, with the central highlands and southern areas of the island being prime locations for tea cultivation. The UVA province, where the factory is situated, is known for its tea plantations, which serve as a livelihood for many people in the region.

The company follows a comprehensive process for tea production. They acquire raw materials from suppliers using their freight lorries, transporting them to their factory for further processing. The quality of the tea leaves is carefully tested at the factory before they proceed to the manufacturing process. Through a series of intricate steps, the tea leaves are prepared for packaging, adhering to standardized methods. Once the packaging process is completed, the packed materials are stored in the warehouse. The warehouse plays a crucial role in the company's operations, serving as a storage facility for the final tea products. The products remain in the warehouse until orders are confirmed and authorized by the primary customers. This ensures that the inventory is readily available for timely deliveries.

Mr. E.M. Ishan Rathnayake, the managing director of Gold Buds Uva Tea, recognizes the need for a computer-based system to enhance efficiency and eliminate issues such as mistakes, loss of details, and fraud. The proposed project aims to address various aspects of the tea production and management process, as per the client's requirements. The project focuses on several key areas, including raw material transport management, supplier and quantity management, payment management, warehouse management, customer and order management, machine management, financial management, time scheduling, and target management. Each of these areas is identified as a subsystem that will be implemented using computer-based systems. By digitizing the manual paperwork calculations and adopting the client's specified approach, the project aims to streamline operations, reduce errors, and enhance overall efficiency.

Problem and Motivation

The major problem faced by the client is the lack of a proper communication channel between the factory and the raw material suppliers. As a factory, they rely on manual record-keeping by storing most details in books. The quantity of raw materials provided by the suppliers daily is written in logbooks. However, this manual system poses several challenges. Firstly, there is a risk of data loss or misplacement due to various reasons. For example, during rainy periods, the books may get wet, and the written details could be difficult to identify. Moreover, the factory may experience losses due to fraudulent activities that can go unnoticed in the manual recording process.

Additionally, retrieving recorded details becomes a cumbersome task for administrators in the company. Searching for the relevant book takes a lot of time and effort, and there is a possibility of misplacing certain documents. This lack of organized documentation hampers efficient decision-making and analysis within the factory.

On the supplier side, there is also a communication gap with the factory. They do not have a means to contact the factory directly, which can lead to delays or miscommunication regarding the supply of raw materials. The quantity of raw materials they provide is recorded in a book, but there is a risk of forgetting to bring the book on certain occasions. To overcome this, a small sheet is given to them on that particular day to indicate the provided raw material amount. However, losing this sheet becomes problematic for the suppliers, especially at the end of the month when they need to calculate the total amount of raw materials provided for payment purposes.

Literature Review

This investigation focuses on the current research and developments in Information Management Systems (IMS) as they relate to tea factories. The analysis covers various aspects of tea plant operations, including inventory control, production scheduling, quality assurance, traceability, and decision support systems. By identifying trends, obstacles, and possibilities in this field, the study aims to build an efficient and effective IMS specifically designed for tea manufacturers.

The review reveals several challenges and failures observed in earlier investigations of IMS, such as insufficient data entry and analysis, lack of maintenance and development leading to outdated technology, and inadequate system user training. These issues can result in inaccurate or incomplete data, reduced system effectiveness, and a lack of trust in the system's accuracy and reliability. Inadequate resources dedicated to system maintenance and support can also hinder long-term functionality and success.

Furthermore, poor data quality, limited integration with other systems or processes, and insufficient employee training have been identified as causes of failures in tea factory management systems. However, the Green Leaf Information Management System project, which is the focus of this review, has not experienced any failures thus far. To enhance system performance and address potential issues, the project team suggests several strategies. These include using QR codes for accurate data collection, implementing automated notifications to prevent omissions and improve task management, analyzing data for future planning and decision-making, and employing automated calculations to minimize errors.

The goal of the Online Tea Factory Management System is to develop a reliable and efficient information management system for tea factories by addressing these challenges and implementing the suggested tactics. By doing so, tea manufacturers can enhance operational effectiveness, improve product quality, ensure traceability, and make informed decisions to achieve success in the tea business

Aim and Objectives

Aim

The main aim of the project is to solve the company's existing problems, enhance overall quality, and facilitate business expansion through system upgrades and the introduction of an online platform. The upgraded system will encompass various essential functions, including raw material transport management, supplier and quantity management, payment management, warehouse management, customer and order management, machine management, financial management, time scheduling, and target management. By integrating these functions, the updated system will enable the company to address its challenges effectively, improve operational efficiency, and connect with a broader range of suppliers. The project remains flexible to accommodate any necessary requirements, ultimately resulting in an advanced and comprehensive system tailored to the company's specific needs.

Objective

1. Reduce labor time: The aim is to decrease the amount of time spent on manual calculations by implementing automated processes.

2. Maintain higher data precision: The objective is to ensure accuracy and reliability of data by minimizing errors and inconsistencies.

3. Easy sub-system management: The goal is to have a system that is straightforward to manage and operate for efficient functioning of various subsystems.

4. Adapt to globalization: The aim is to make the company's processes and systems compatible with global standards and practices.

Solution Overview

It was difficult for the business to run their system and communicate with consumers properly. They made the decision to switch to a computer-based approach in order to address this. They have built a QR code system to communicate directly with clients and suppliers. Each supplier received a distinct QR code, which the officer in charge of gathering raw materials could scan to enter the information. The problem with this strategy was that there was no backup plan in place in case a provider forgot to deliver their QR code. This made it impossible to keep track of the raw materials supplied on a given day.

The business came up with a novel fix for this problem by developing a mobile view. The quantity of raw materials given might now be manually entered by the officer and entered into the system after searching for the supplier ID. The number of raw materials supplied by suppliers was listed in a report sent to them at the end of each month.

All manufacturing information was recorded into the computer system in order to streamline operations, prevent manual recording errors, and potential fraud during the raw material collection phase. A tracking system was also put in place to improve accuracy and reduce the likelihood of fraud. Additionally, this technology made it simpler for administrators to do record searches, streamlining general administration procedures.

Methodology

A structured methodology is used to construct a tea factory information management system. This methodology includes several phases, such as study, requirement analysis, design, implementation, and testing. The system's goals are established during the study phase, and data is obtained through interviews and conversations with important stakeholders. Research is done on best practices from related businesses as well as an analysis of the current system.

User requirements are defined and divided into functional and non-functional characteristics during the requirement analysis process. Requirements are ranked in order of importance while taking restrictions and dependencies into account.

The system architecture, which includes the hardware, software, and network infrastructure, is defined during the design process. To guarantee effective data administration and a user-friendly experience, the database structure and user interface have been established. Also taken into consideration are integration points with outside systems.

The system is developed during the implementation phase using the design specifications. Testing is done thoroughly, and this includes unit testing, integration testing, and data migration, if necessary. User acceptability testing and performance testing are carried out during the testing phase to confirm the system's functionality, usability, and security. Any problems or weaknesses are fixed, and suitable security measures are put in place.

The system is finally implemented during the deployment phase, and end users receive the appropriate instruction and assistance. Ongoing inspection and maintenance guarantee the system's functionality and deal with any potential problems. In conclusion, the approach for a tea factory information management system details researching the needs, evaluating current systems, creating the architecture, putting the system into practice, testing it, and deploying it with the appropriate support and training.

Git Repo Link :

https://github.com/SLIITITP/y2_s2_wd_it_01-itp_wd_b02_g01_t21.git

REQUIREMENTS

Table 2. 1 functional requirements

Functional Requirement	Stakeholders
Send location data	Driver
Enter details	Transport manager /Machine manager/Supplier payment manager/Financial manager/Customer and order manager /warehouse manager
Track vehicle	Transport manager
Generate report	Transport manager / Supplier manager/Quantity manager/Supplier payment manager/Warehouse manager/Order and customer manager/Machine manager / Finance manager / Time scheduling and time manager
Send daily amount of tea leaves provided	Supplier management
Read quantity of tea leaves	Supplier management
Register supplier	Supplier management
Manage daily quantity	Quantity manager
Read supplier provide quantity	Supplier payment manager
Insert unit price of tea leaves	Supplier payment manager
Generate QR - code	Warehouse manager
Read product details	Customer and order manager
Analyze final product details	Customer and order manager
Receive income details	Financial manager
Receive expense details	Financial manager
Calculate net profit	Financial manager
Create timetable	Time scheduling and target manager

Table 2. 2 nonfunctional requirement

Non-functional requirement	Stakeholder
Availability	Payment manager / warehouse manager/customer and order manager /machine manager/finance manager
security	Payment manager/finance manager/warehouse manager / quantity manager
usability	Warehouse manager / finance manager
Performance	Transport manager / Supplier manager/Quantity manager/Supplier payment manager/Warehouse manager/Order and customer manager/Machine manager / Finance manager / Time scheduling and time manager
Accuracy	Transport manager / Supplier manager/Quantity manager/Supplier payment manager/Warehouse manager/Order and customer manager/Machine manager / Finance manager / Time scheduling and time manager
Maintainability	Machine manager
reliability	Transport manager / Supplier manager/Quantity manager/Supplier payment manager/Warehouse manager/Order and customer manager/Machine manager / Finance manager / Time scheduling and time manager
Efficiency	Transport manager / Supplier manager/Quantity manager/Supplier payment manager/Warehouse manager/Order and customer manager/Machine manager / Finance manager / Time scheduling and time manager
Localization	Transport and raw material manager / time scheduling and target manager / customer and order manager/machine manager

Requirements modelling

Activity diagram

I. IT21240942

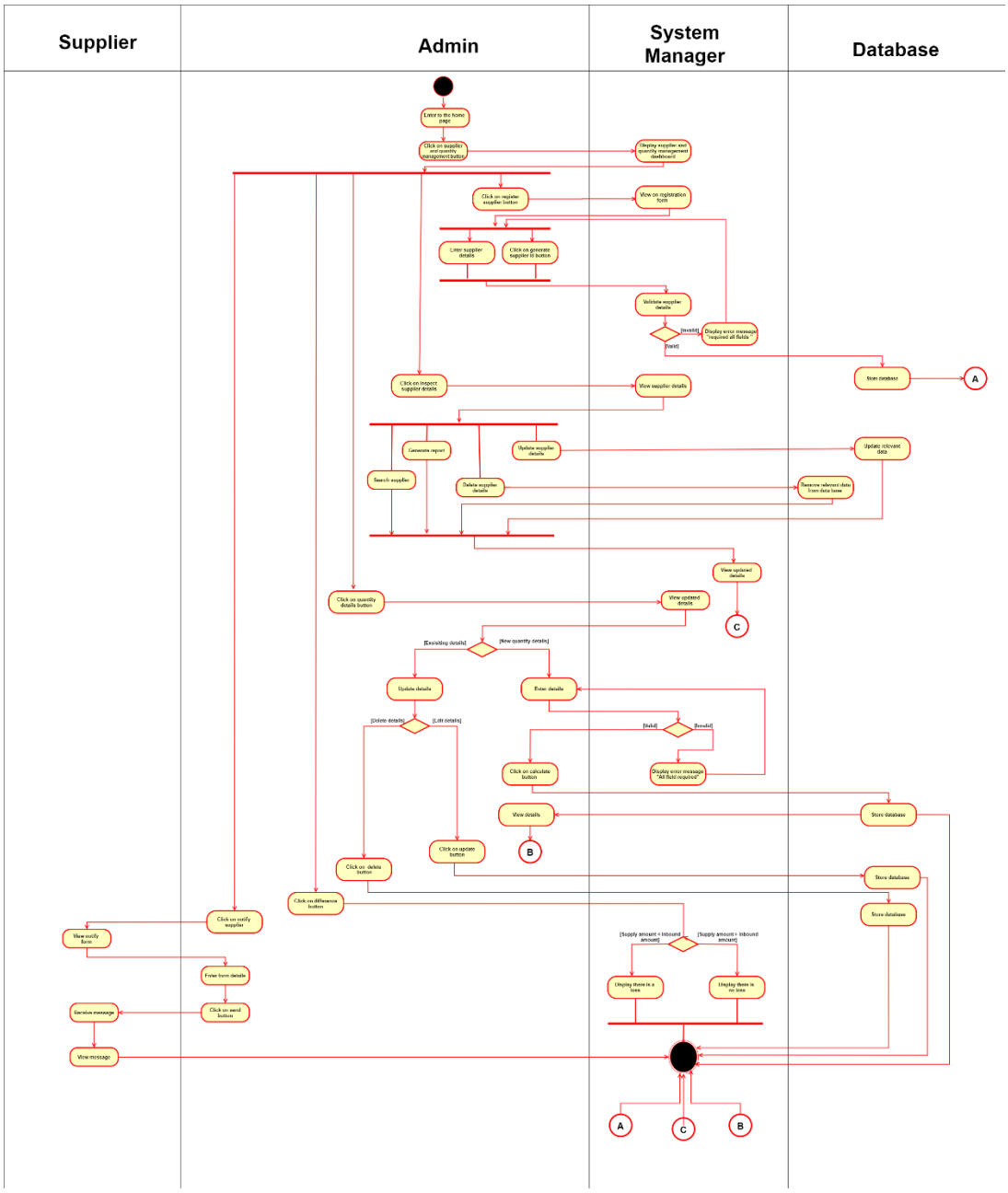


Figure2. 1 activity diagram supplier and quantity management

II. IT21243226

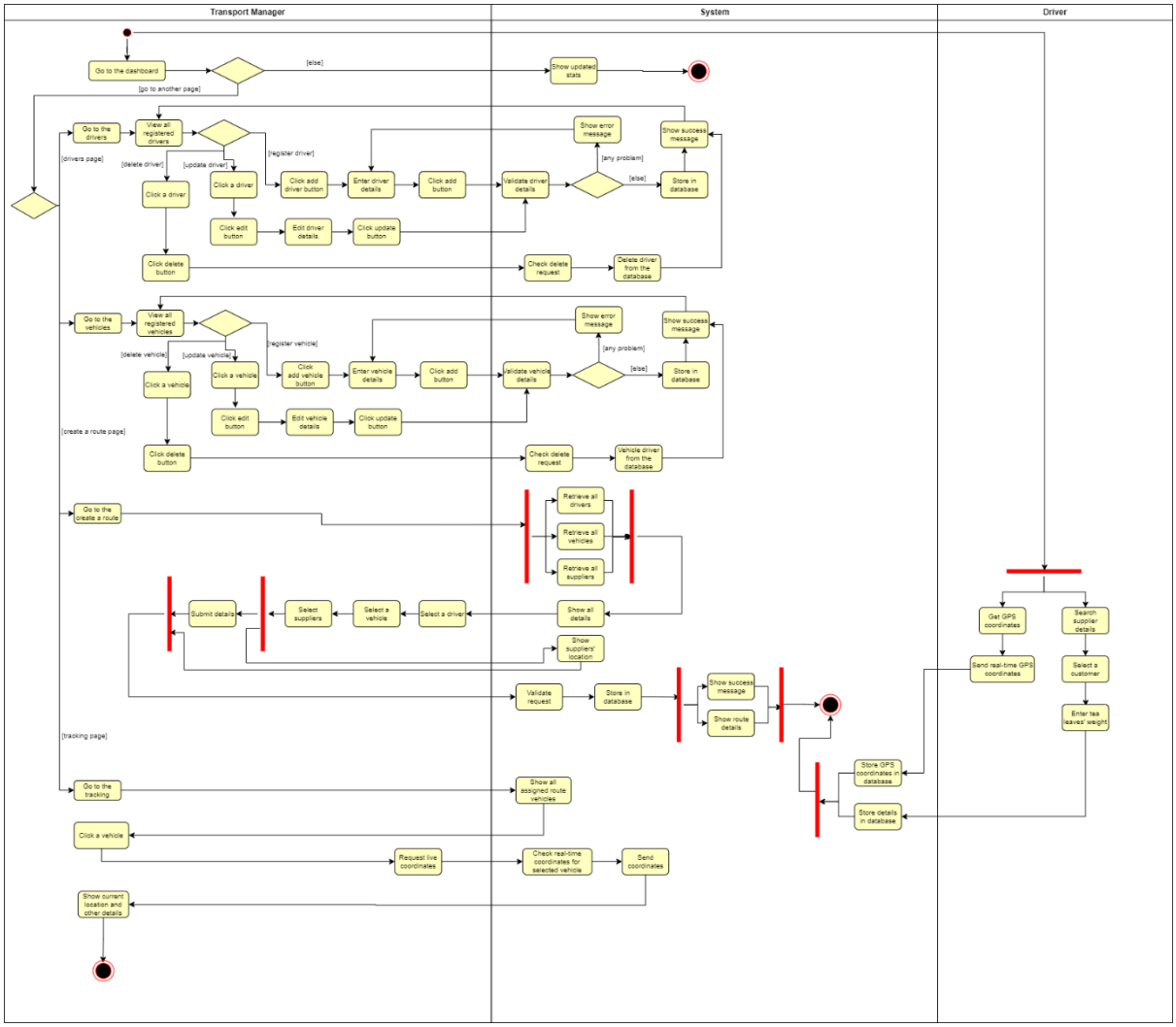


Figure2. 2 activity diagram Raw material transport

III. IT21270338

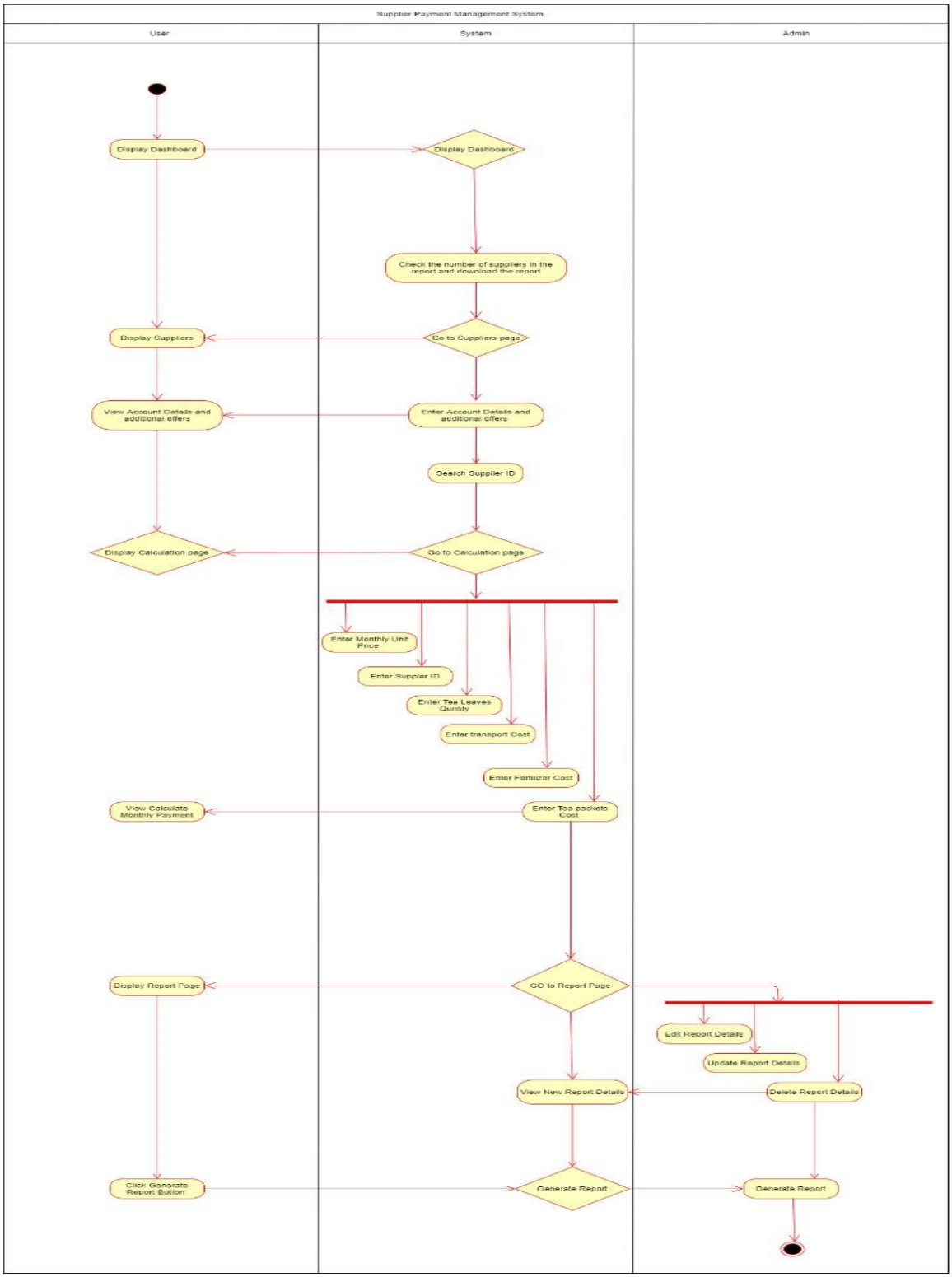


Figure2. 3 activity diagram supplier payment diagram

IV. IT21239298

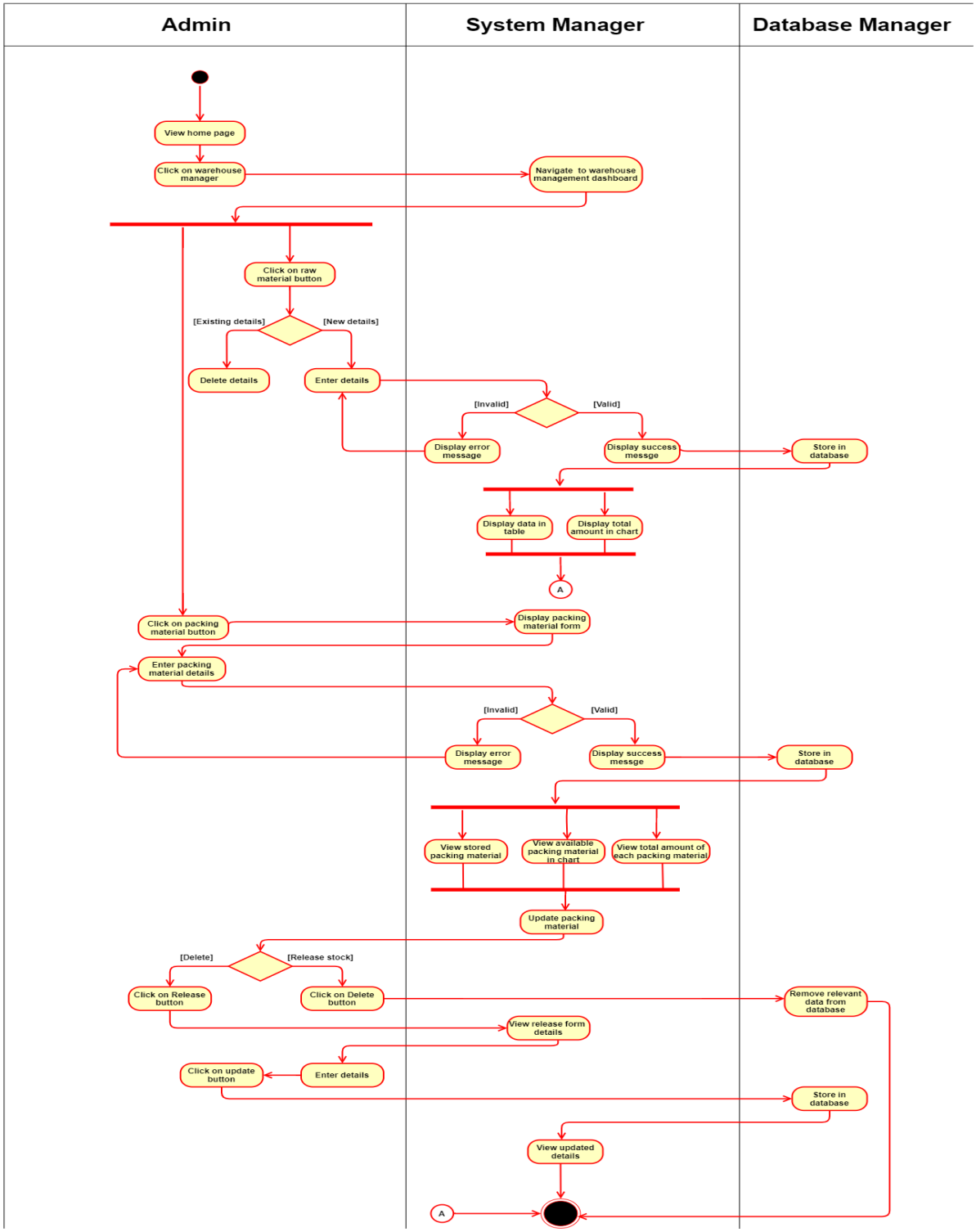


Figure2. 4 activity diagram warehouse management

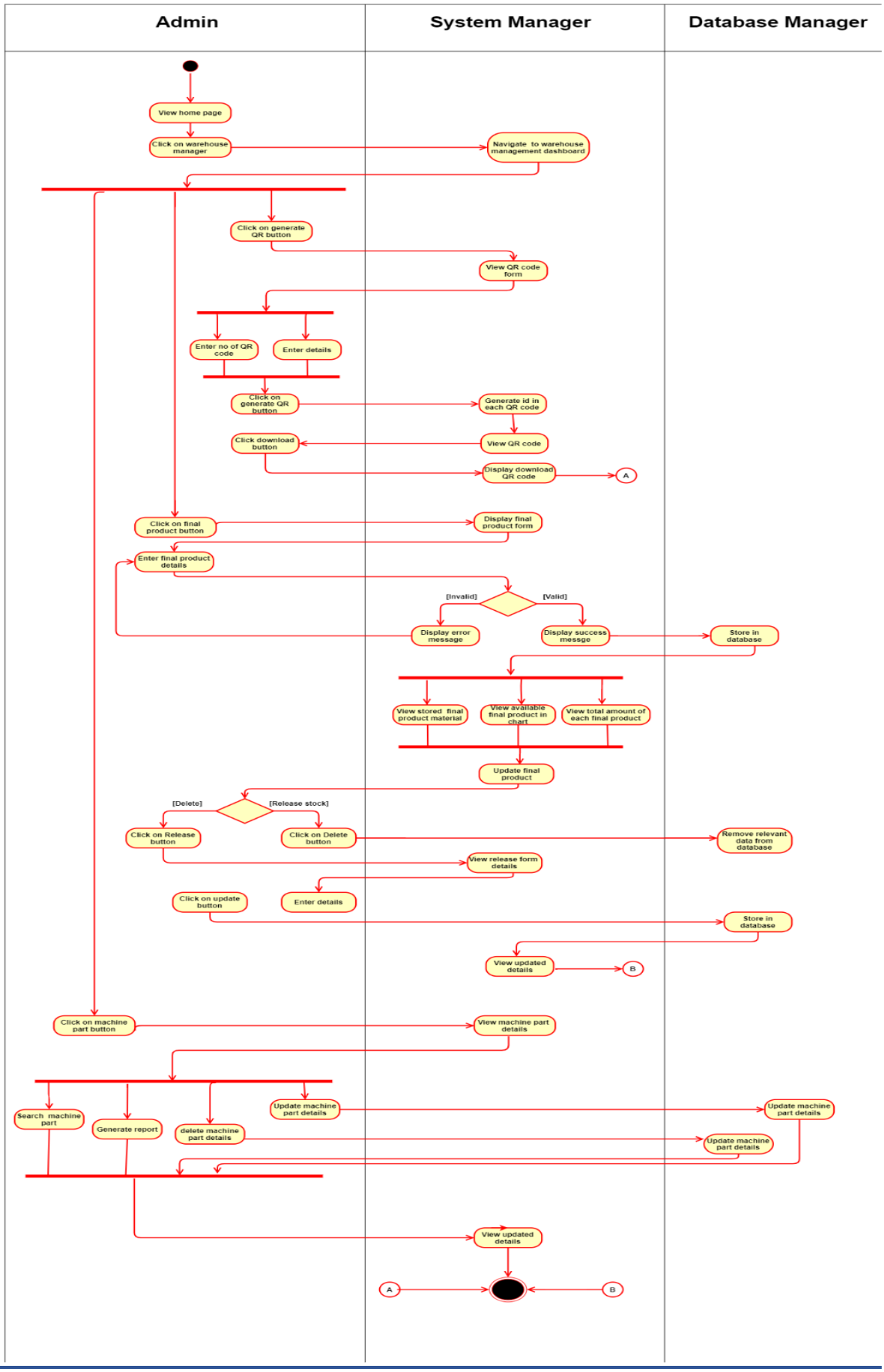


Figure2. 5 activity diagram warehouse management

V. IT21255588

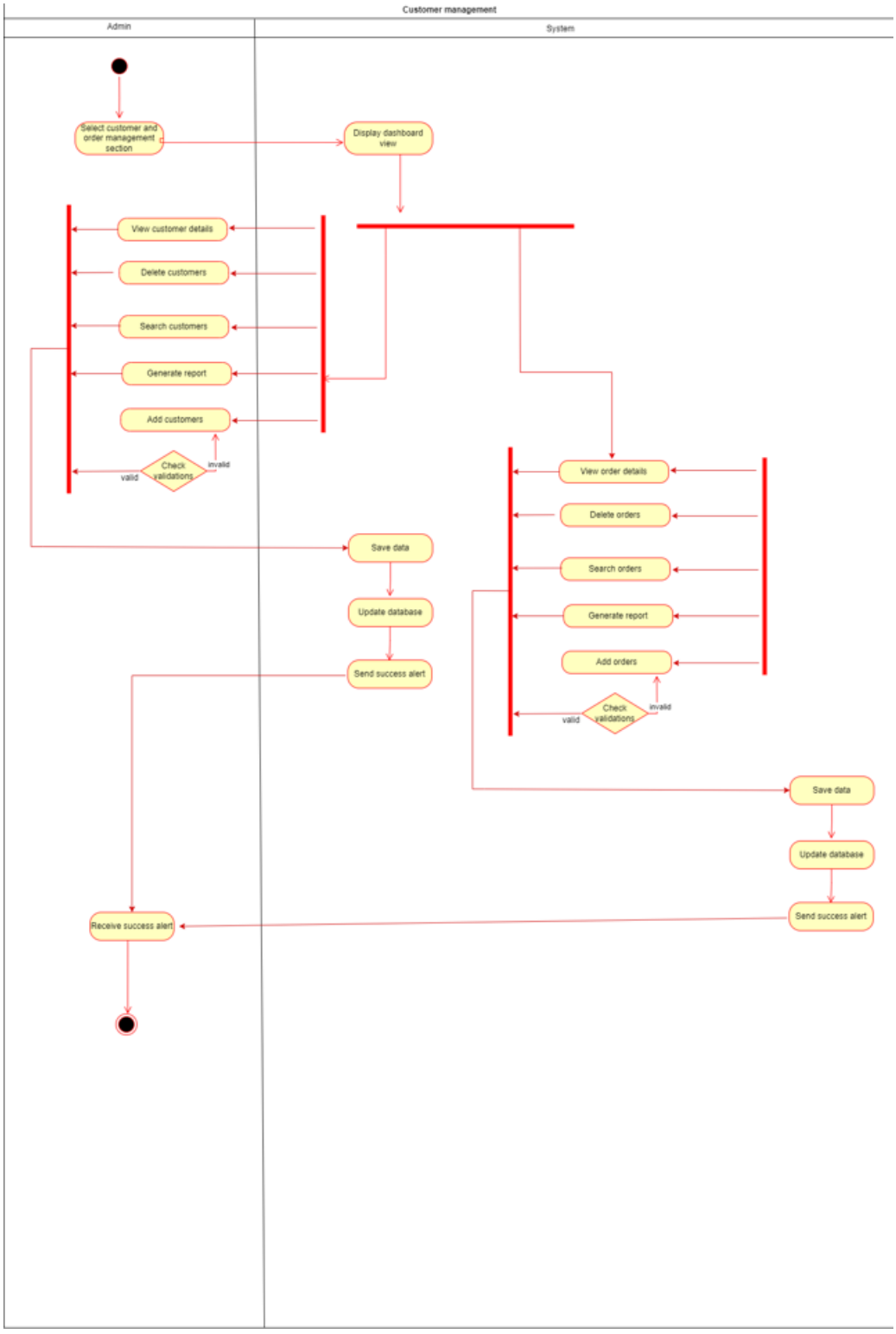


Figure2. 6 activity diagram customer management

VI. IT21232022

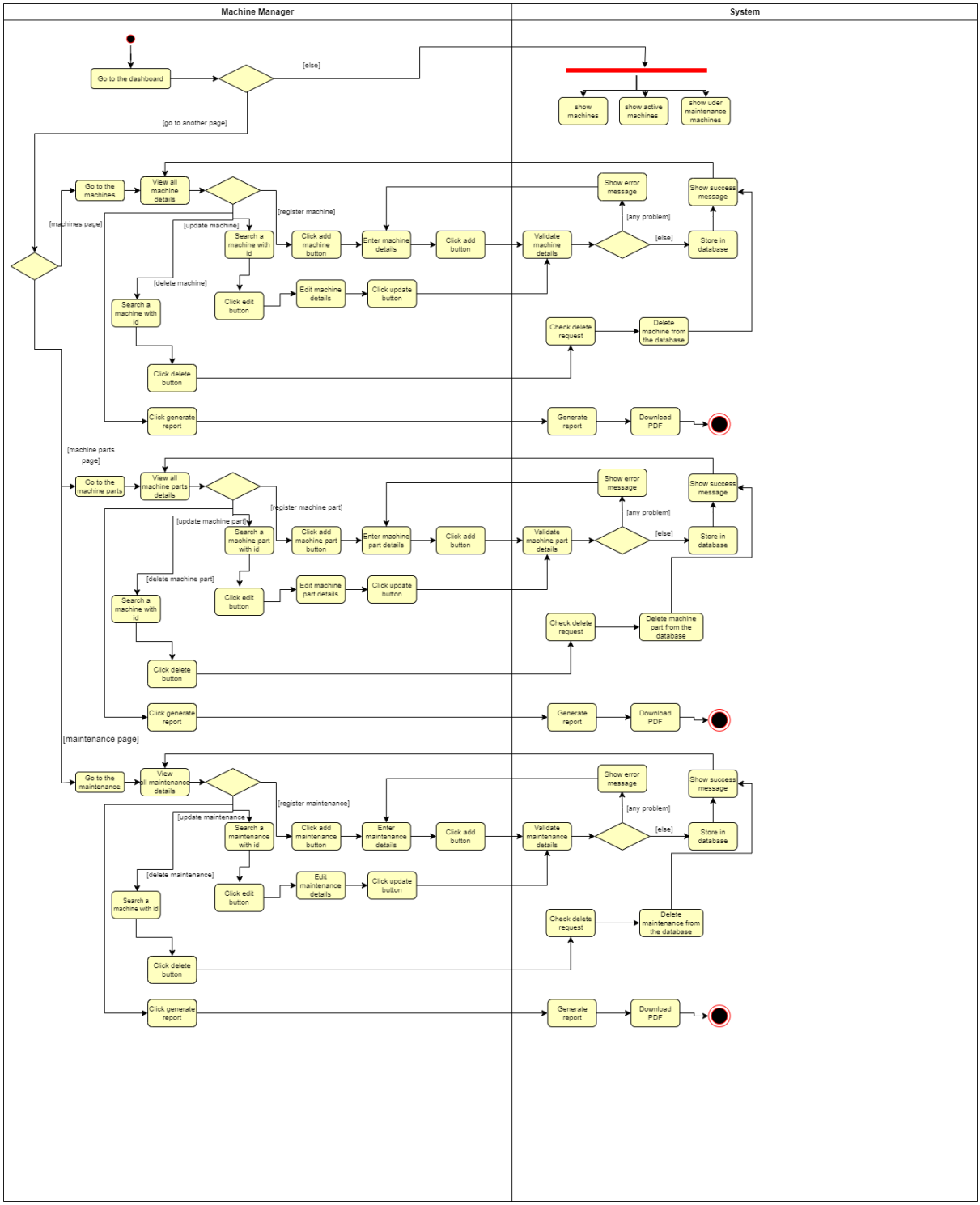


Figure2. 7 activity diagram machine management

VII. IT21232336

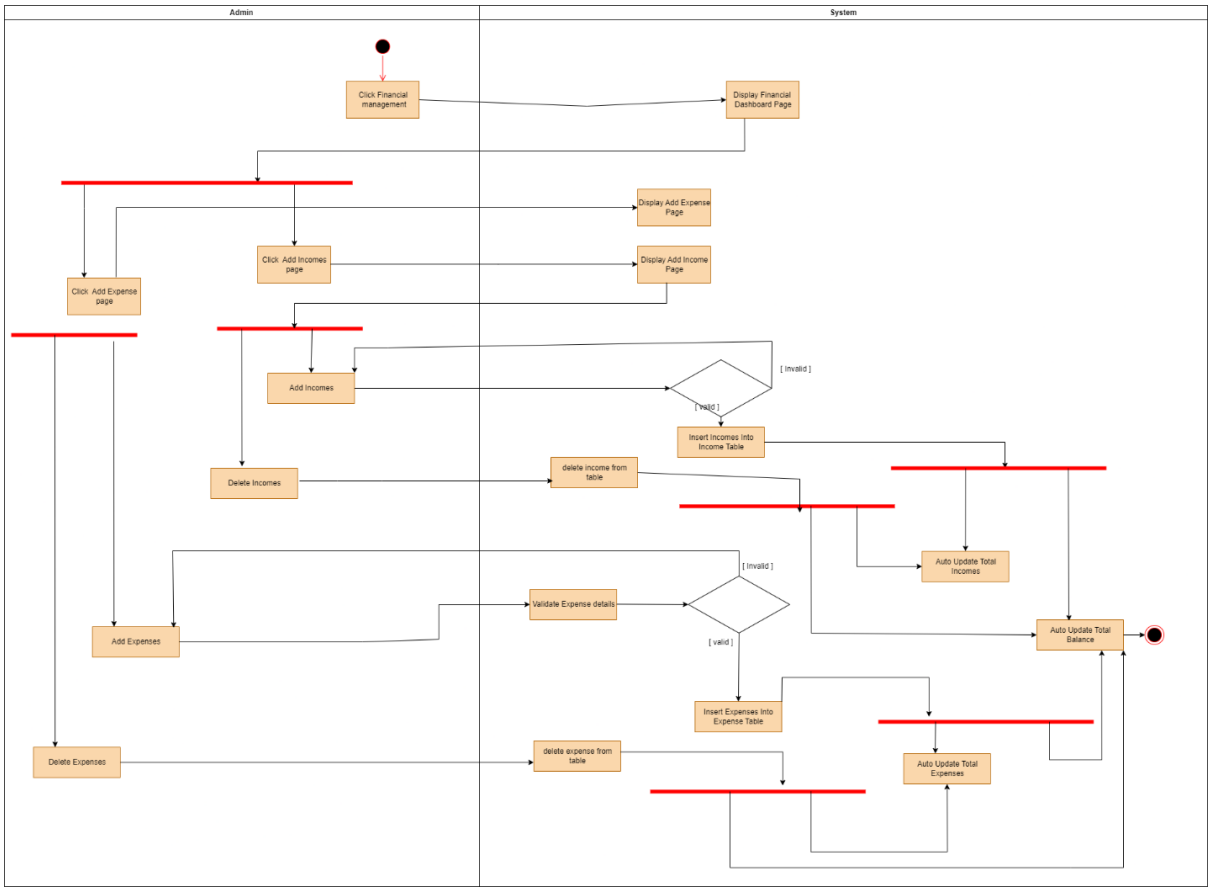


Figure2. 8 activity diagram finance management

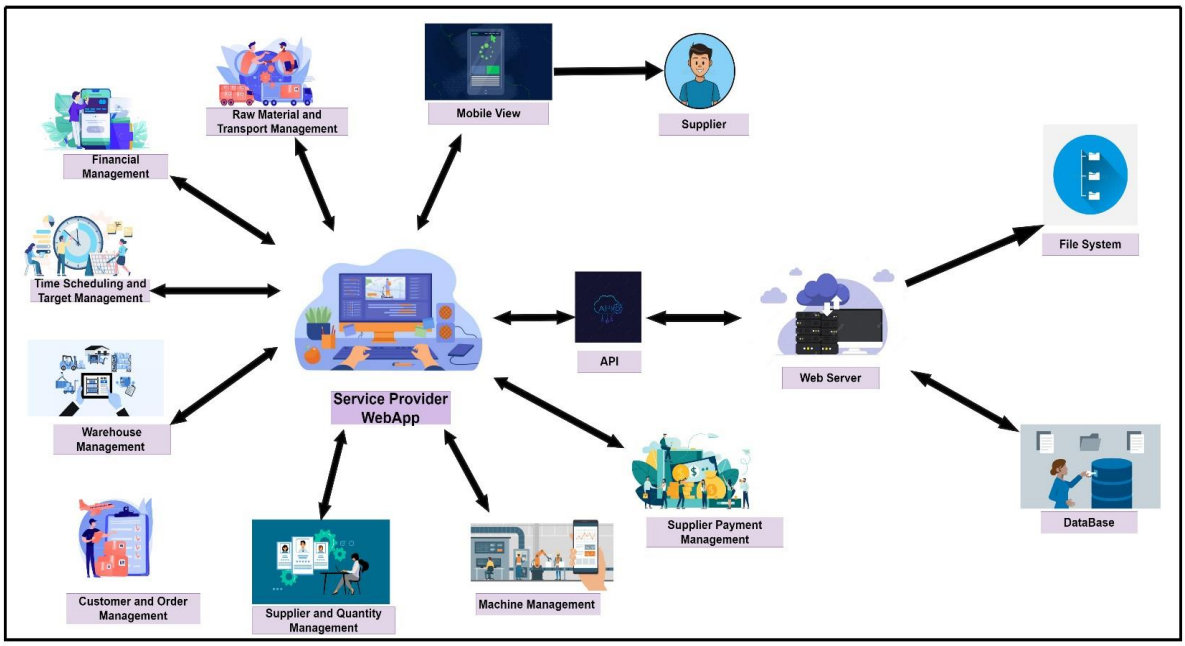
VIII. IT21224652

Figure2. 9 activity diagram target and timetable management

Design and Development

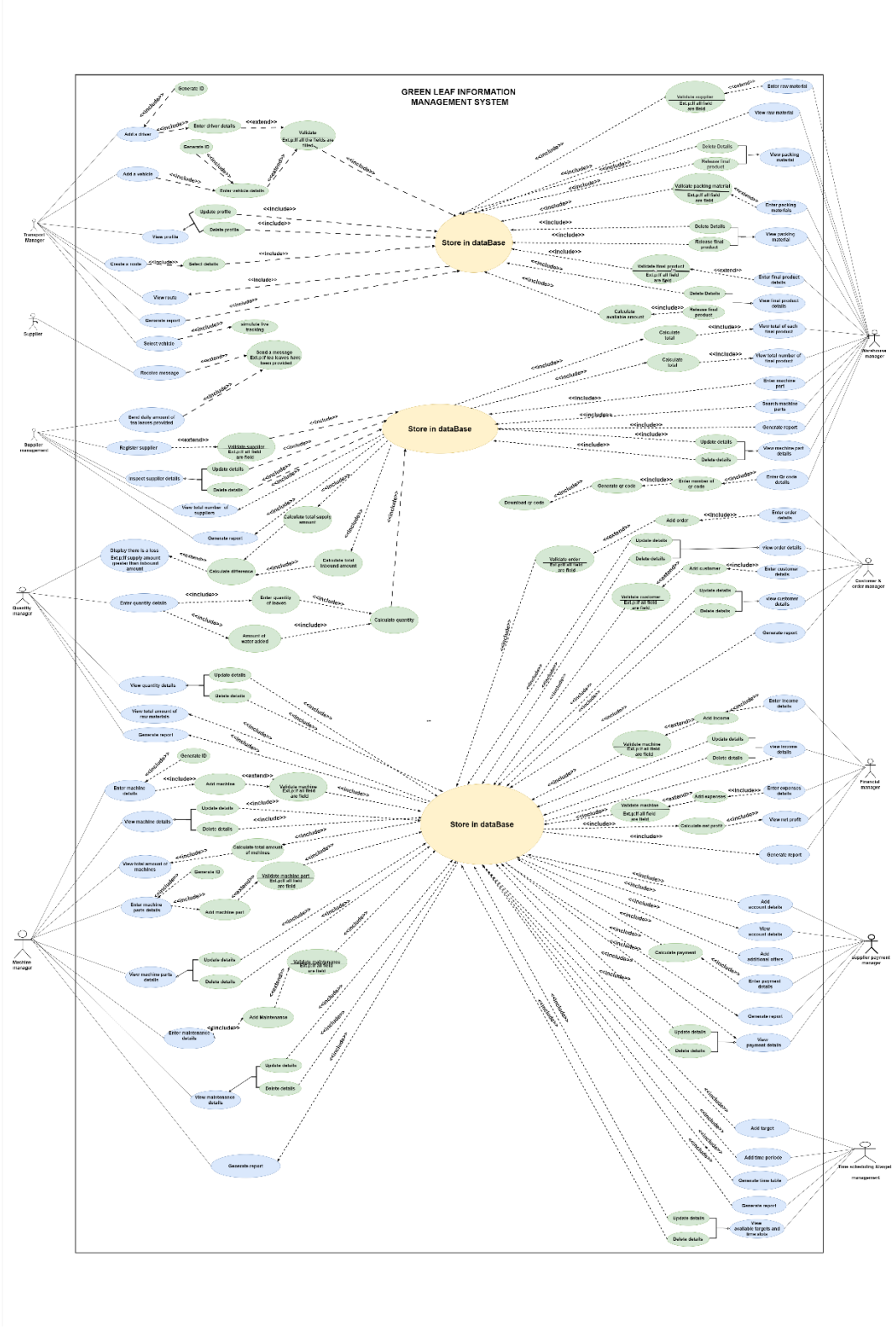
Diagrams Of Components

System overview



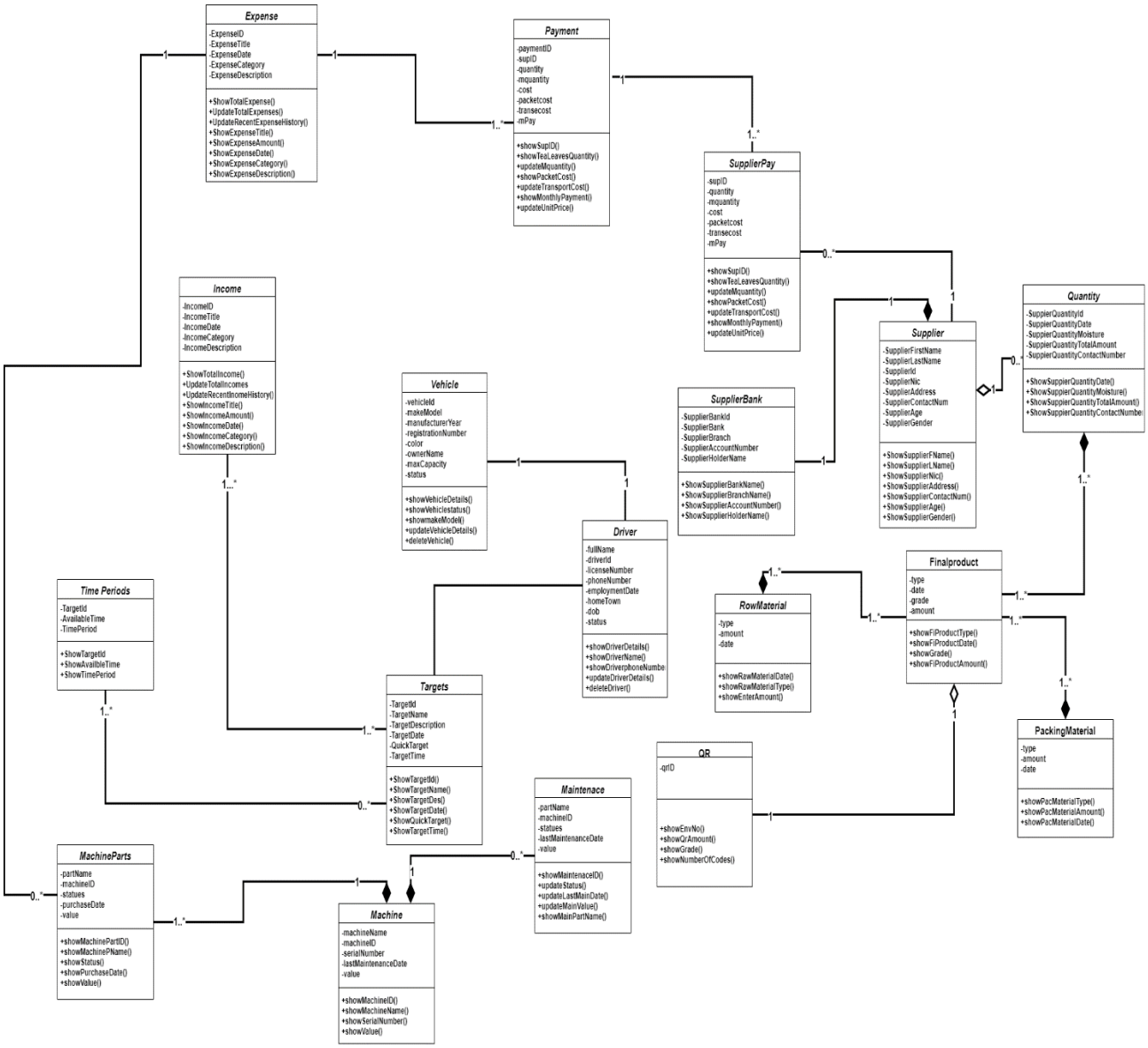
Figuren3. 1 system overview

Use case diagram



Figuren3. 2 use case diagram

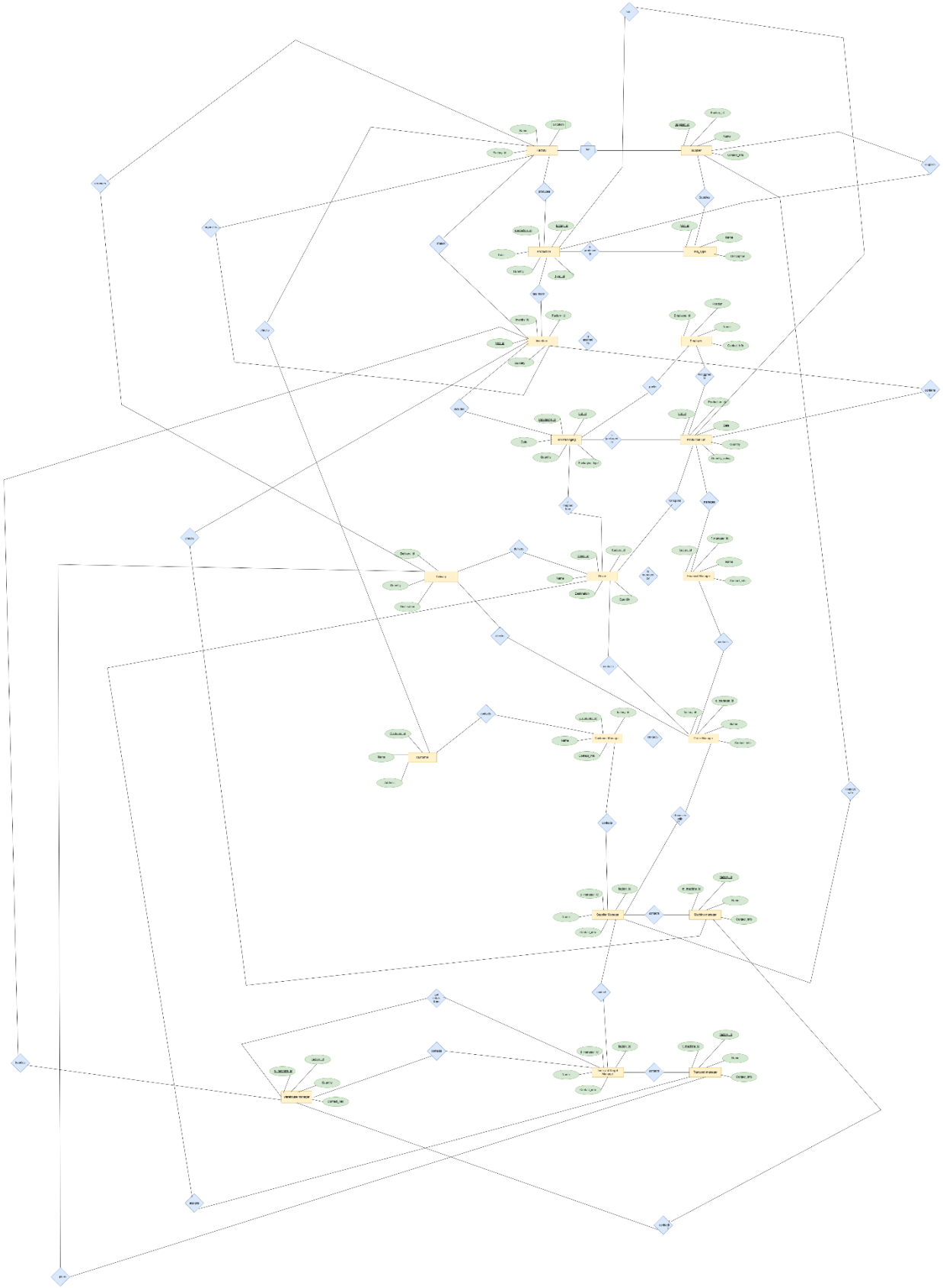
Class diagram



Figuren3. 3 class diagram

User interfaces (click)

EER Diagram



Figuren3. 4 ERR diagram

Processes Workflows

Figuren3. 5 grant chat

Database

Necessary Implementation Details:

MongoDB, Express, React, and Node.js are all components of the MERN stack, which is used to create the Tea Factory Management System. A complete and effective foundation for creating a solid web application is offered by this stack. Due to its scalability and versatility, MongoDB is chosen as the DBMS since it enables the storing and retrieval of data in a document-oriented manner. While React.js's component-based design is in charge of creating the user experience, Express.js takes care of routing and API endpoints. The backend runtime environment, which uses Node.js, enables server-side logic and communication with the MongoDB database.

Choice of DBMS and Implementation Languages:

The Tea Factory Management System chose MongoDB as its DBMS because of its versatility for managing a variety of data types and its capacity to scale as the system expands. Information on teas, inventory, manufacturing, and other topics may be easily stored and retrieved because to its document-oriented data model. The main implementation language for both frontend and backend development is JavaScript. Due to its adaptability and robust ecosystem, JavaScript is a well-liked option for web development. It provides a wide range of libraries, frameworks, and tools that improve development productivity and efficiency.

Code for Special Algorithms:

Special algorithms are used by the Tea Factory Management System to handle particular features. The Inventory Management Algorithm is one such algorithm that manages numerous inventory-related operations, including monitoring stock levels, adding new inventory items, changing numbers, and creating reports. The algorithm makes sure that inventory management is precise and current, enabling effective supply chain operations. This algorithm's code contains operations for obtaining current inventory, carrying out appropriate computations, and updating the inventory entries in the MongoDB database.

The manufacturing Planning Algorithm is another tool used, and it optimizes the manufacturing process based on variables including demand, resource availability, and production restrictions. This algorithm generates the most productive production plan to satisfy demand while reducing resource waste. To create an optimized production plan, which is subsequently saved in the MongoDB database for reference and execution, the production planning algorithm's code uses computations and optimization algorithms.

These algorithms enhance the Tea Factory Management System's intelligence and automation, simplifying processes, lowering human labor requirements, and boosting overall effectiveness. To give managers and employees of tea factories access to real-time information and assistance in making decisions, they are created using JavaScript and easily incorporated into the system's design.

TESTING

Test cases and Result

Table 4. 1 Testcase

Testing function: Supplier and Quantity Management					
Test case ID:SUP01			**Test case designed by** **ID:**IT21240942 **Name:** Wijethunga R.D.K.G		
Test Priority (High/Medium/Low)			High		
Test description: Add quantity details					
Preconditions: Supplier manager should navigate to supplier and quantity management page					
Test Steps: 1. Fill quantity details form 2. Click on calculate total button. 3. Display calculated amount. 4. Display added successfully message.					
Pass conditions: "Added successful" message should appear					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
	• Vehicle ID: V100 • Quantity:1000 • Moisture:10	Display total amount and display added successful message.	Display total amount and display added successful message.	pass	Quantity manager added quantity details and display details and total amount.
	• Vehicle ID : V100 • Quantity:-1000 • Moisture:10	Display error message Quantity must be positive number.	Redirect to the inbound quantity page	fail	

Table 4. 2 Testcase

Testing function: Supplier and Quantity Management					
Test case ID:SUP02			**Test case designed by** **ID:**IT21240942 **Name:** Wijethunga R.D.K.G		
Test Priority (High/Medium/Low)			High		
Test description: Register suppliers					
Preconditions: Supplier manager should navigate to supplier and quantity management page					
Test Steps : 1. Fill supplier registration form. 2. Click the register button. **3.** Pop up Successful alert					
Pass conditions: "Added successful" message should appear					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
	• Last name: Kaveesha • Last name: Wijethunga • NIC:200151600174 • Age:30 • Address: Badulla rd, Banadarawela • Contact number:0716446441 • Gender: Female • Bank: BOC • Branch: Badulla • Account number:142582222 • Account holder name: R.D.K.G wijethunga • Supplier ID: SUP1140	Add supplier details to the system. After adding all fields. If all details are valid, display message. "Added successfully".	Display message. "Added successfully".	pass	Supplier managers add supplier details and register suppliers.
	• Last name: " ' • Last name: Wijethunga • NIC:200151600174 • Age:30 • Address: Badulla rd, Banadarawela • Contact number:0716446441 • Gender:Femal • Bank: BOC • Branch: Badulla • Account number:142582222 • Account holder name:R.D.K.G wijethunga • Supplier ID: SUP1140	Error message showing 'please fill this'	Redirect to the register page	fail	

Table 4. 3 Testcase

Testing function: Transport and Row Material Management- Add New Driver					
Test case ID:RT001			**Test case designed by** **ID:** IT21243226 **Name:** Sellapperuma M.S		
Test Priority (High/Medium/Low)			High		
Test description: Add new driver					
Preconditions:					
Test Steps- **I.** Click the Transport and Row Material Management. **II.** Navigate to the Dashboard. **III.** Go to the driver page. **IV.** Click “Add Driver” button. **V.** Enter driver details. **VI.** Click “Add” button. **VII.** Validate driver details. **VIII.** Driver details store in database. **IX.** Show success message.					
Pass conditions:					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
Test_001	Add Driver INPUTS	If all of the given information has been verified, pressing the "Add driver" button will display the appropriate driver record.	The validations are working well. The number of drivers is immediately updated after adding a new driver, the machine page is presented, and a success message is displayed on the driver page.	Pass	• The Driver ID is successfully and automatically produced. • The database effectively stores the specified inputs. • The freshly uploaded driver records are appropriately shown on the driver page.

Table 4. 4 Testcase

Testing function: Transport and Row Material Management – Delete Vehicle					
Test case ID:RT002			**Test case designed by** **ID:** IT21243226 **Name:** Sellapperuma M.S		
Test Priority (High/Medium/Low)			High		
Test description: Delete Machine					
Preconditions:					
Test Steps- **I.** Click the Transport and Row Material Management. **II.** Navigate to the Dashboard. **III.** Go to the vehicle page. **IV.** Click a vehicle on the table. **V.** Click the "Delete" button. **VI.** Check the delete request. **VII.** Delete from the database. **VIII.** Shoe success message.					
Pass conditions:					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
Test_004		The vehicle record will be erased and removed from the vehicle table if the procedure is successful.	The vehicle table displays the surviving vehicle records following the deletion of the vehicle record.	Pass	• The erase button functions perfectly. • Only the relevant record is successfully deleted after pressing the delete button. • A success notice stating that the Vehicle has been successfully erased from the database is shown.

Table 4. 5 Testcase

Testing function: Supplier Payment management					
Test case ID:SP001			**Test case designed by** **ID:** IT21270338 **Name:** Dhanayake R.A		
Test Priority (High/Medium/Low)			High		
Test description: Verify that the system displays correct supplier account details when the supplier ID is entered as input**.**					
Preconditions: Supplier account details are already stored in the system and the user has valid login credentials.					
Test Steps: **1.**Open the application and log in with valid credentials. 2.Click on the "Supplier" tab from the main menu. 3.Enter the supplier ID in the search field. 4.Click on the "Search" button. 5.Verify that the system displays the correct account details for the specified supplier**.**					
Pass conditions: The system displays the supplier account details correctly.					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
01	Supplier ID	Display of supplier account details	Display of supplier account details	Pass	The test passed successfully as the system displayed the correct supplier account details for the specified supplier ID.

Table 4. 6 Testcase

Testing function: Supplier payment management					
Test case ID:SP001			**Test case designed by** **ID:** IT21270338 **Name:** Dhanayake R.A		
Test Priority (High/Medium/Low)			High		
Test description: This test case is designed to verify the functionality of updating the monthly value of tea for a specified supplier**.**					
Preconditions: 01.The user must have appropriate access and permissions to update the value of tea. 02.The supplier whose monthly value of tea is to be updated must already exist in the system**.**					
Test Steps: **1. Login to the system with valid credentials.** **2. Navigate to the supplier management section.** **3. Search for the supplier whose monthly value of tea is to be updated.** **4. Click on the "Edit" button next to the supplier's details.** **5. Enter the new monthly value of tea in the applicable field.** **6. Save the changes made to the supplier record.**					
Pass conditions: 01.The system should allow the user to enter a new monthly value of tea for the specified supplier. 02.The system should save the updated monthly value of tea for the specified supplier.					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
01	New monthly value of tea	The monthly value of tea for 01 should be updated	The monthly value of tea for 01 has been updated	Pass	This test case has been executed successfully without any issues.

Table 4. 7 Testcase

Testing function: Supplier payment management					
Test case ID:SP001			**Test case designed by** **ID:** IT21270338 **Name:** Dhanayake R.A		
Test Priority (High/Medium/Low)			High		
Test description: This test case is designed to ensure that allowance calculation for tea leaves suppliers is working accurately.					
Preconditions: 1. The system must be logged in. 2. The supplier ID must be valid and exist in the system. 3. The weight of tea buds supplied must be accurate. 4. Allowance details must be provided.					
Test Steps: 1. Enter a valid supplier ID. 2. Enter the weight of tea buds supplied. 3. Enter allowance details. 4. Click on the 'Calculate Payment' button. 5. Verify that the total payment amount including allowances is displayed.					
Pass conditions: The total payment amount including allowances should be calculated correctly.					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
03	Supplier ID, Weight of tea buds supplied, Allowance details	Total payment amount	Total payment amount	Pass	The test passed and the calculation was accurate.

Table 4. 8 Testcase

Testing function: Warehouse management					
Test case ID:WH001			**Test case designed by** **ID:**IT21239298 **Name:** Bandara E.M.S.S		
Test Priority (High/Medium/Low)			Medium		
Test description: Add raw material details					
Preconditions: Warehouse manager should navigate to the warehouse management dashboard					
Test Steps: 1. Enter stored raw material details. 2. Click on the raw material button. 3. Pop up message "submitted successfully". 4. Update chart					
Pass conditions: "**submitted successfully**" message should appear and details updated in page					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
	• Date:5/25/2023 • Type: Grade A • Amount: 1000	Display message "submitted successfully"	Display message "submitted successfully"	pass	Warehouse manager add details successfully .updated details are shown in chart
	• Date:4/5/2023 • Type: Grade B • Amount: -45	Display error message "please enter amount and should be greater than 0"	Redirect to raw material details page .	fail	

Table 4. 9 Testcase

Testing function: Warehouse management					
Test case ID:WH002			**Test case designed by** **ID:**IT21239298 **Name:** Bandara E.M.S.S		
Test Priority (High/Medium/Low)			High		
Test description: Add packing materials					
Preconditions: Warehouse manager should navigate to the warehouse management dashboard					
Test Steps: 1. Enter stored packing material details. 2. Click on the add packing materials button. 3. Pop up message 'form submitted successfully'.					
Pass conditions: "'Form submitted successfully" message should appear , details should be updated and shown in table and chart.					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
	• Select type: Glue • Enter amount:522 • Select date:2/5/2023	Display message "form submitted successfully".	Display message "form submitted successfully" and display details in table and charts	pass	The warehouse manager adds details successfully. updated details are shown in chart
	• Select type: " " • Enter amount:522 • Select date:2/5/2023	Display error message "please select type"	Redirect to the store packing material page.	fail	

Table 4. 10 Testcase

Testing function: Warehouse management					
Test case ID:WH003			**Test case designed by** **ID:**IT21239298 **Name:** Bandara E.M.S.S		
Test Priority (High/Medium/Low)			High		
Test description: Add final product details					
Preconditions: Warehouse manager should navigate to the warehouse management dashboard					
Test Steps: 1. Fill final product details page. 2. Click on "ADD FINAL PRODUCT" **3.** Pop up message submitted successfully.					
Pass conditions: "'Form submitted successfully" message should appear, details should be updated and shown in table and chart.					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
	• Select type: Black tea. • Enter amount:600. • Select date:2/5/2023. • Enter grade: A	Display message "submitted successfully".	Display message "submitted successfully" and display details in table and charts	pass	The warehouse manager adds details successfully. updated details are shown in chart
	• Select type: "White tea " • Enter amount:600 • Enter date:2/5/2023 • Enter grade:	Display error message "please enter grade"	Redirect to the final product details page form.	fail	

Table 4. 11 Testcase

Testing function: Customer management-edit customer details.					
Test case ID:CO001			**Test case designed by** **ID:** IT21255588 **Name:** Chandrasekara CMAPK		
Test Priority (High/Medium/Low) High					
Test description: Verify the functionality of editing customer details in admin side and the admin can update customer information.					
Preconditions: 1. At least one existing customer should include in the system. 2.Admin should log in to the system.					
Test Steps 1. Navigate to customer page. 2.Select the customer. 3.Click on edit button. 4.Update customer details and save changes. 5.Verify that the changes are successfully saved in the system.					
Pass conditions Customer details are successfully updated in the database.					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
01	Valid customer ID	The customer details are successfully updated and accurately displayed in the customer table.	The system displays successful message to inform customer detail updating.	Pass	The test case executed successfully. The customer details updated in the database.

Table 4. 12 Testcase

Testing function: Order management-Cancel an order.					
Test case ID:CO002			**Test case designed by** **ID:** IT21255588 Name: Chandrasekara CMAPK		
Test Priority (High/Medium/Low)			High		
Test description: Verify the functionality of deleting an order detail in the admin side of the web application					
Preconditions: 1. Admin should log in to the system. 2.There is at least one order detail in the system.					
Test Steps	1. Navigate to the order management section. 2.Search for the desired order using date. 3.Select the order from the order results. 4.Click on the delete order option. 5.Confirm the deletion 6.Verify the order details are successfully deleted.				
Pass conditions Order details related to the deleted order are successfully deleted**.**					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
01	Click the delete button in selected order.	Delete unwanted order details from the system	Remove the related data and notify that the order deleted successfully.	Pass	Any related data or references to the order were successfully deleted. Test data and expected results may vary based on the specific requirements in the web application.

Table 4. 13 Testcase

Testing function: Machine Management- Add New Machine					
Test case ID:M001			**Test case designed by** **ID: IT21232022** **Name: Gunasekara G.H.M.**		
Test Priority (High/Medium/Low)			**High**		
Test description: Create a new machine					
Preconditions:					
Test Steps- **1.** Click the Machine Management. **2.** Navigate to the Machine Dashboard. **3.** Go to the machine page. **4.** Click “Add Machine” button. **5.** Enter machine details. **6.** Click “Add” button in form. **7.** Validate machine details. **8.** Store machine details in the database. **9.** Update total machine count in dashboard.					
Pass conditions:					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
Test_001	Add Machine Details INPUTS	Clicking the "Add machine" button will display the corresponding machine record when the machine record has been properly confirmed using the provided details.	All the validations are successfully working. After adding a new machine, immediately update the overall number of machines, display the machine page, and make sure the dashboard is updated as well.	Pass	• Successfully auto generated Machine ID. • The inputs provided are being effectively stored in the database. • Both the income page and the dashboard are showing the recently added machine records.

Table 4. 14 Testcase

Testing function: Machine Management- Delete Machine					
Test case ID:M002			**Test case designed by** **ID:** IT21232022 **Name**: Gunasekara G.H.M**.**		
Test Priority (High/Medium/Low)			High		
Test description: Delete Machine					
Preconditions:					
Test Steps- **1.** Click the Machine Management. **2.** Navigate to the Machine Dashboard. **3.** Go to the machine page **4.** Search machine with a machine ID. **5.** Click the "Delete" button. **6.** Delete machine from the database. **7.** Check the machine record list after it got deleted.					
Pass conditions:					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
Test_004		A successful execution will result in the deletion of the machine record and its disappearance from the machine table.	The machine record has been deleted, and the machine table now displays the remaining machine records.	Pass	• The delete button works as it should. • Only the relevant record is effectively erased when you click the delete button. • Successfully delete the Machine in database. Successfully update the dashboard.

Table 4. 15 Testcase

Testing function: Target and Timetable Management					
Test case ID: T001			**Test case designed by** **ID:** IT21224652 **Name:** Manathunga M A O S		
Test Priority (High/Medium/Low)			High		
Test description: Creating a timetable to add and update time periods and new targets					
Preconditions: 1. Time manager must log in to the system 2. Need necessary details to create the timetable					
Test Steps 1. Log in to the system 2. Go to the create timetable page 3. Click on Add a timetable 4. Enter new data about times and targets 5. Click on the save button and verify and save the details					
Pass conditions Timetable is successfully created					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
01	1. Valid manager ID 2. Target ID 3. Time ID 4. Timetable ID	The timetable details are successfully updated and accurately displayed in the timetable table.	The system displays a successful message to inform timetable details updating.	Pass	The test case was executed successfully. The timetable details are added and updated successfully in the database

Table 4. 16 Testcase

Testing function: Target and Timetable Management					
Test case ID: T002			**Test case designed by** **ID:** IT21224652 **Name:** Manathunga M A O S		
Test Priority (High/Medium/Low)			High		
Test description: Receive an order to create a new target					
Preconditions: 1. Time and target manager must log in to the system 2. Need necessary details to create the target					
Test Steps 1. Log in to the system 2. Go to the create target page 3. Click on Add a target 4. Enter new data about the target 5. Click on the save button and verify and save the details					
Pass conditions Target is successfully created					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
02	1. Valid manager ID 2. Target ID 3. Timetable ID	The target details are successfully updated and accurately displayed in the target table.	The system displays a successful message to inform the target details are updated.	Pass	The test case was executed successfully. The target details are added and updated successfully in the database.

Table 4. 17 Testcase

Testing function: Financial Management- Add New Income					
Test case ID:F001			**Test case designed by** **ID:**IT21232336 **Name:**Thennakoon.K.M.K.K		
Test Priority (High/Medium/Low)			High		
Test description: Create a new Income record					
Preconditions: Manager go to Add income page					
Test Steps- **I.** Click the Financial Management. **II.** Navigate to the Financial Dashboard. **III.** Click the Add Income Button Icon. **IV.** Navigate to Add Income Page. **V.** Enter new Income. **VI.** Click "Add Income" button. System update total income amount.					
Pass conditions: added income to the list					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
Test_001	Add Income Details INPUTS	If successfully validated added income record with entered details, that income record will be displayed when clicked add income button	All the validations are successfully working. After adding income, auto update the total income and it show add income page and dashboard. Then total balance will be auto updated.	Pass	• All the validations are working. • Entered inputs are successfully going to the database. • Added income records are displaying in income page and dashboard. • Total balance displaying in dashboard.

Table 4. 18 Testcase

Testing function: Financial Management- Delete Income record					
Test case ID:F002			**Test case designed by** **ID:**IT21232336 **Name:**Thennakoon.K.M.K.K		
Test Priority (High/Medium/Low)			High		
Test description: Delete Income record					
Preconditions: Add a income					
Test Steps- **I.** Click the Financial Management. **II.** Navigate to the Financial Dashboard. **III.** Click the Add Income Button Icon. **IV.** Navigate to Add Income Page. **V.** Click delete button available in Income page **VI.** Select the record to be deleted **VII.** Click relevant record's delete button **VIII.** Check the income record list after it got deleted					
Pass conditions: Disappear income from the list					
Test ID	**Test Inputs**	**Expected Outputs**	**Actual Output**	**Result**	**Comments**
Test_003		If successfully executed income record should be deleted and disappear from the income delete in interface	Income record got deleted and rest of Income records were displayed in the Income record list.	Pass	• Delete button is working as expected. • When clicked delete button that relevant record only gets deleted. • Successfully delete the Income in database.

EVALUTION AND CONCLUTION

The application's objectives have been attained in full. Due to real-time updates and automated reordering, inventory control has improved and stockouts and overstocking have decreased. Real-time analysis is made possible through production tracking, which improves productivity and resource allocation. Integrating quality control guarantees constant tea quality, enhancing brand reputation. Integration with online marketplaces has facilitated the simplification of sales management, expanding client reach and delivering crucial sales data.

One weakness that needs to be addressed is reliance on consistent internet access, which can be reduced by introducing offline capabilities and data syncing. Efficiency would increase with integration with external systems, such as accounting software and supply chain management tools. To make the most of the system's features, user support and training should be improved.

In conclusion, the online application for the Tea Factory Management System has been successful in streamlining management procedures, increasing efficiency, and optimizing tea factory operations. The need for user training, third-party integrations, and internet dependency must all be addressed for ongoing development. The program can revolutionize administration of tea factories with on-going improvements, assuring the industry's ongoing success.

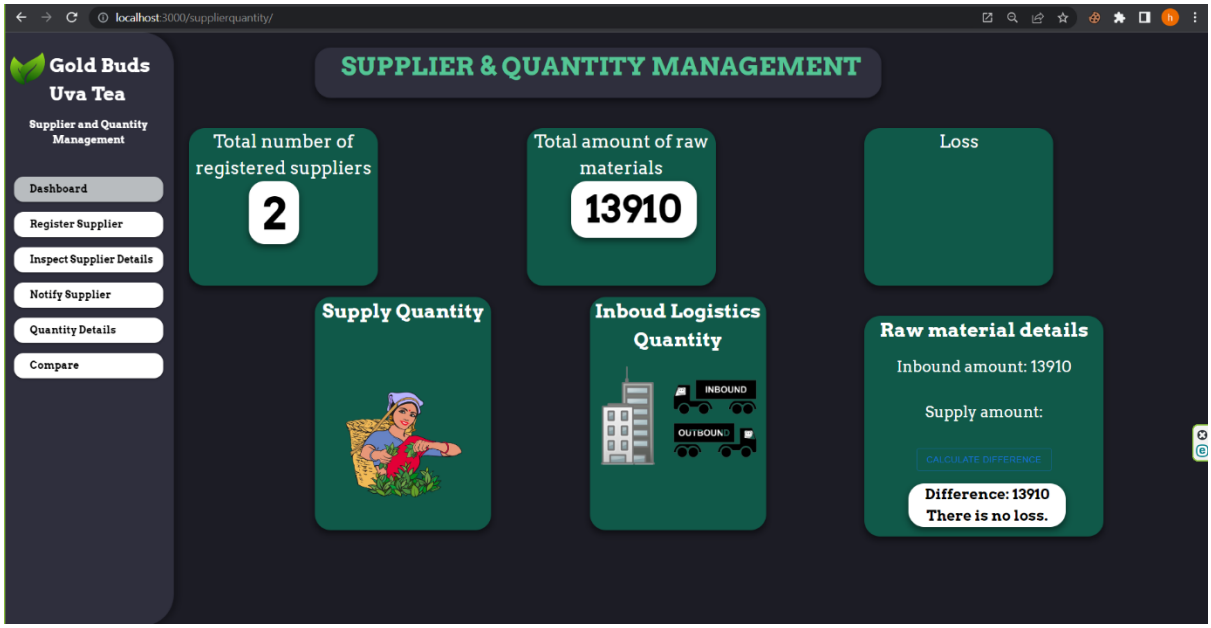
REFERENCES

1] S. M. J.S Mbogho, "WEB BASED FACTORY MANAGEMENT SYSTEMFORDEENSIDE TEA FACTOR," Course Hero, Colombo, 2010.

[2] N. N. .K.Thirumalini, "The tes processing industry," North Eastern Development Finance Corporation Ltd, 2017.

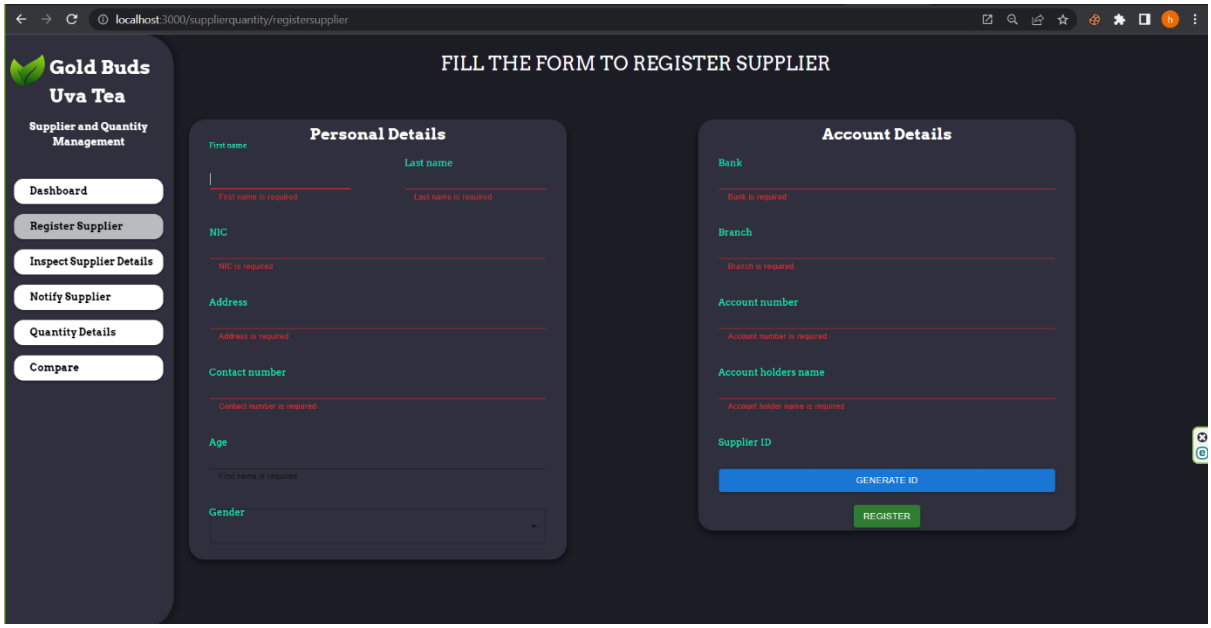
User Interfaces

IT21240942



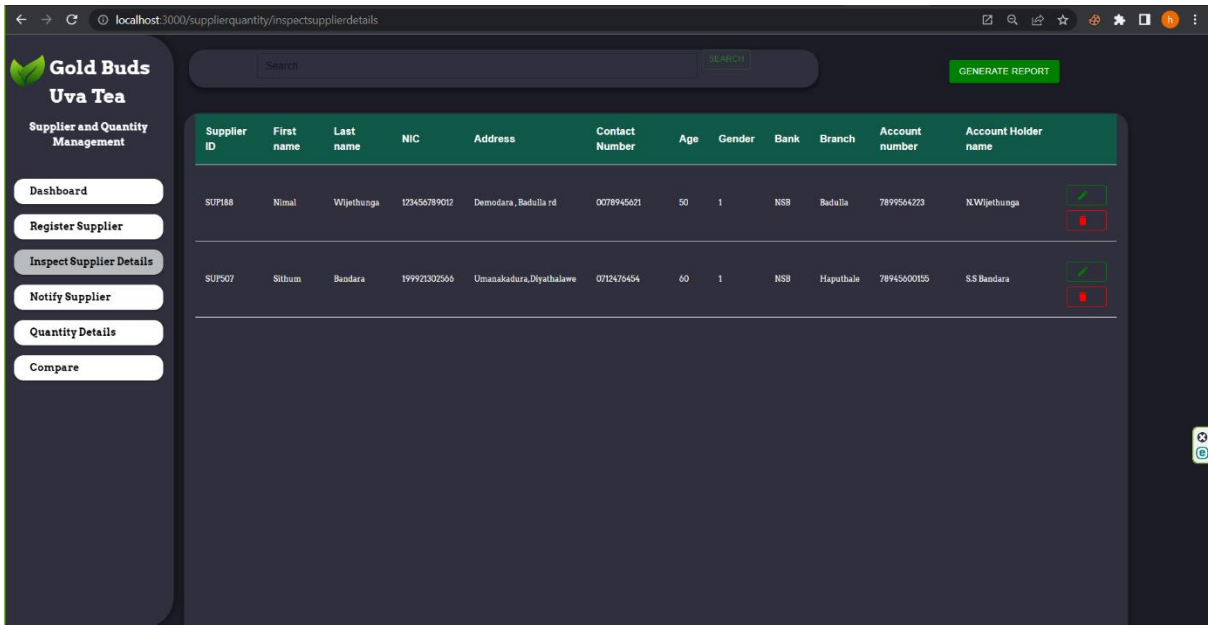
Figuren3. 6 interface

The manager manually enters the details of suppliers into the system to register them. Supplier details include information such as name, National Insurance Number (NIC), address, age, contact number, and account details.



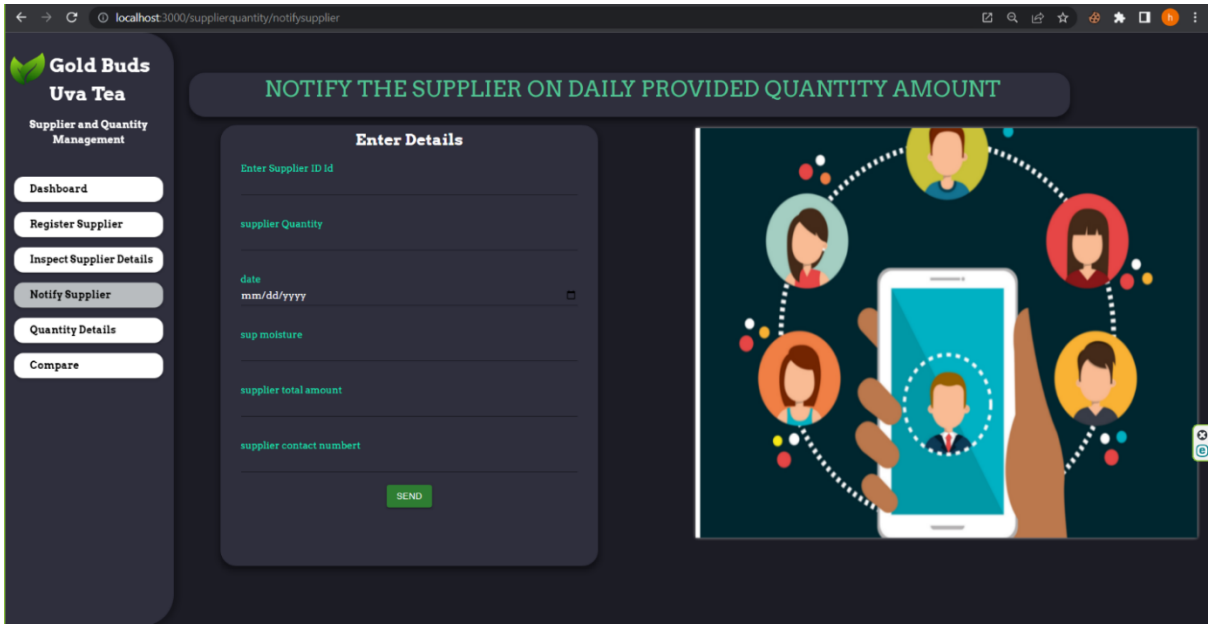
Figuren3. 7 interface

Once registered, suppliers become part of the system's database, allowing for easy management and communication



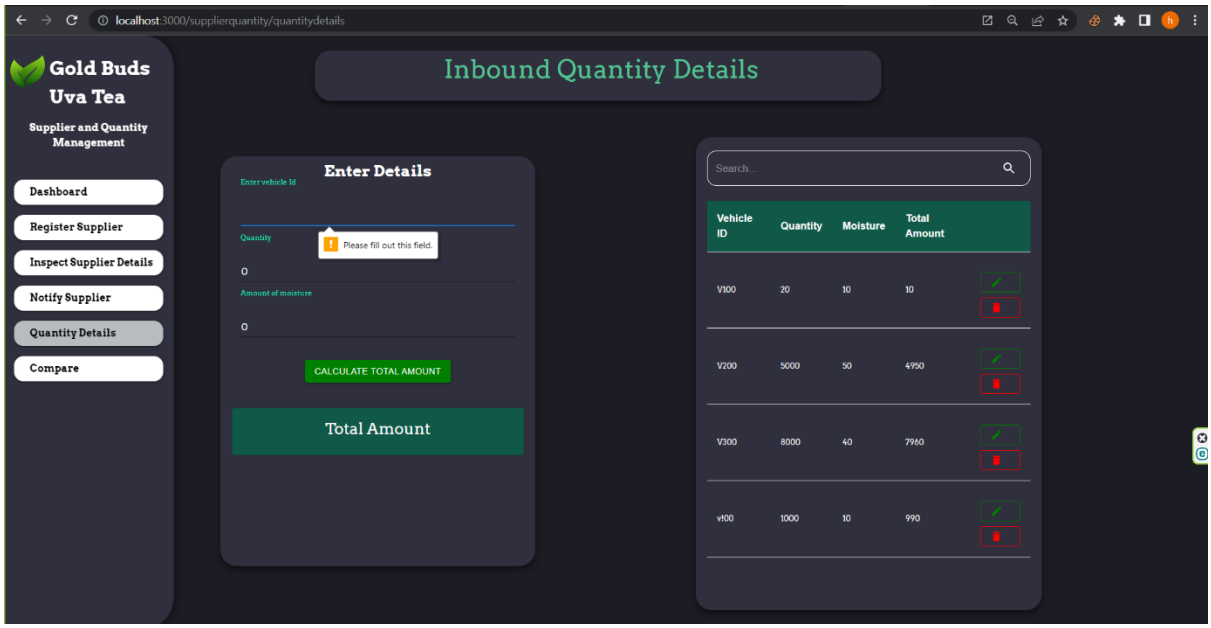
Figuren3. 8 interface

The system sends messages to suppliers on a daily basis, providing them with information about the amount of raw material they have provided to the factory.



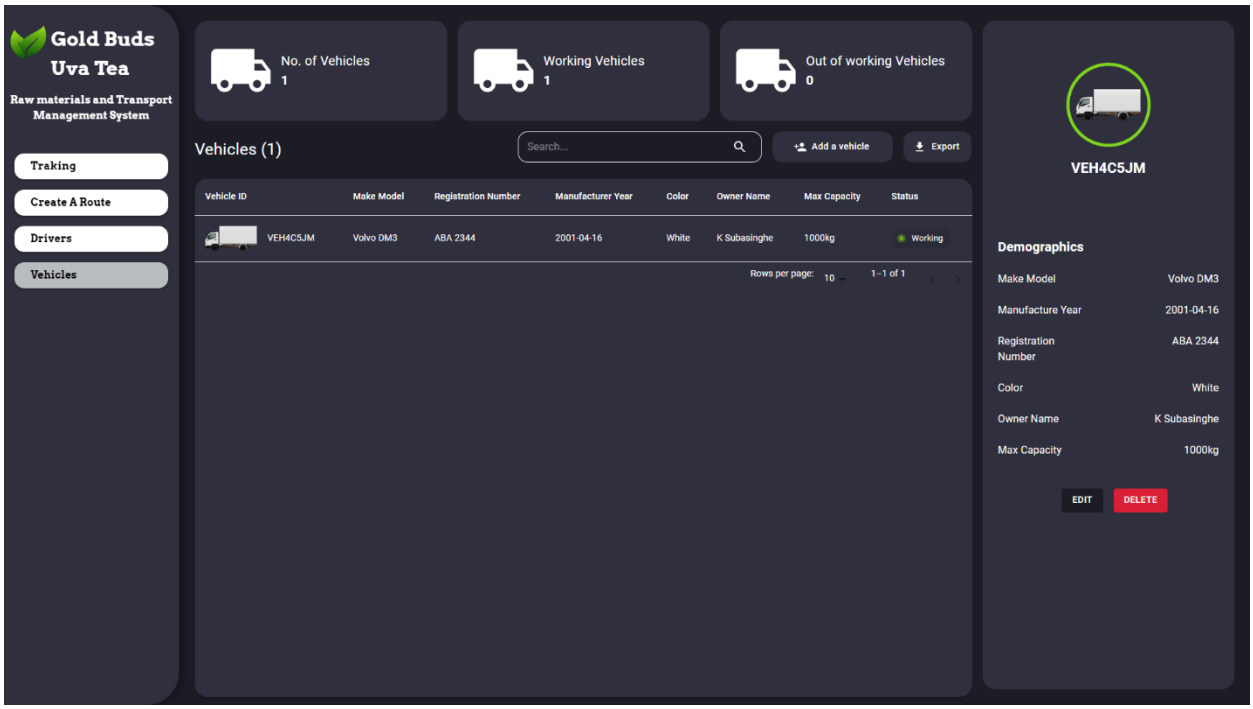
Figuren3. 9 interface

The system automatically calculates the total quantity of raw materials based on the supplied amount from each supplier. It generates reports on a monthly and daily basis, highlighting the amount of raw material provided by each supplier.



Figuren3. 10 interface

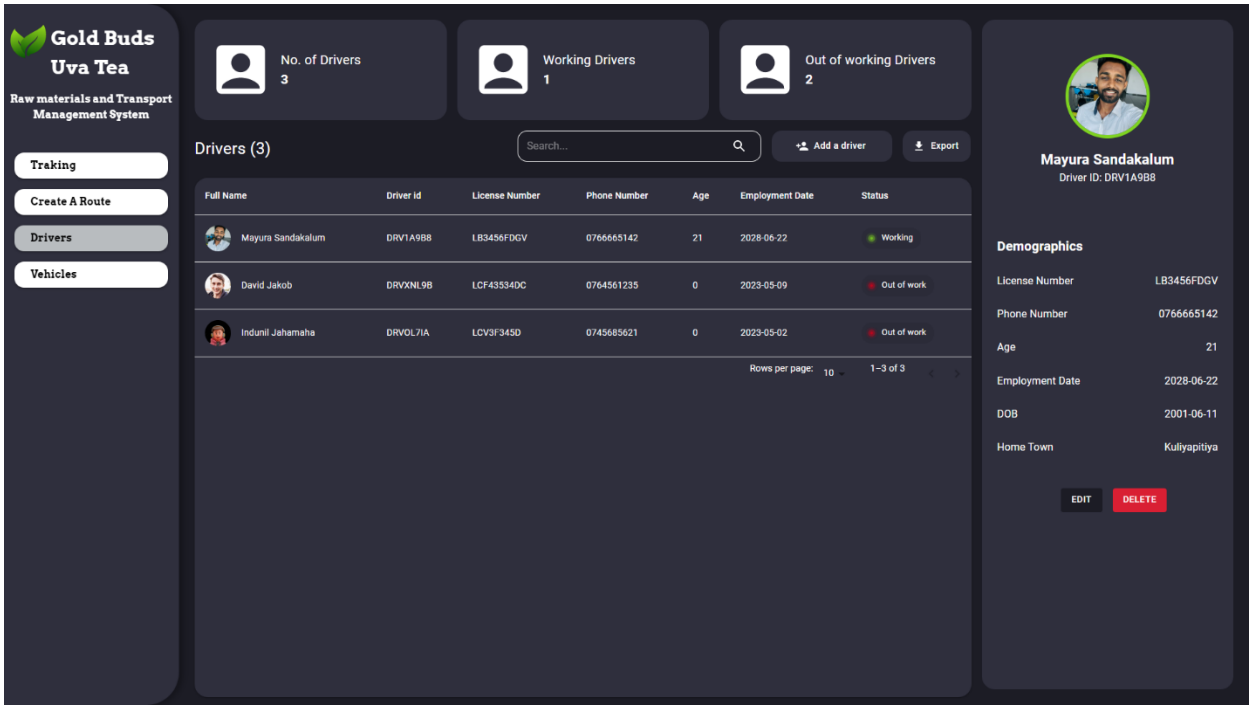
IT21243226



Figuren3. 11 interface

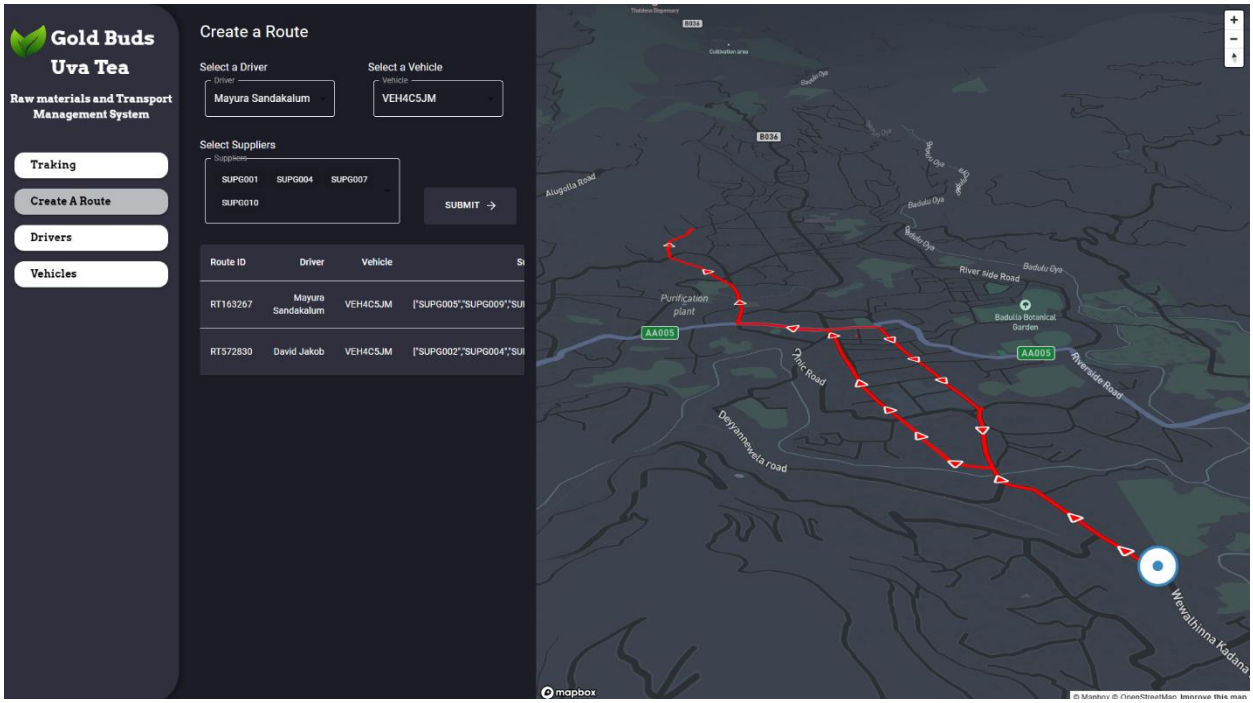
The management of vehicles inside the tea factory will be handled via this interface. You can update their data as necessary and add new vehicles to the system. Through this interface, you can quickly delete a vehicle if you need to remove it. You can find vehicles by their ID or registration number using the search option on the page as well. At the same time, according to the status of the vehicles, their

amount is shown separately. Another thing in this interface is that you can generate a report of the vehicles



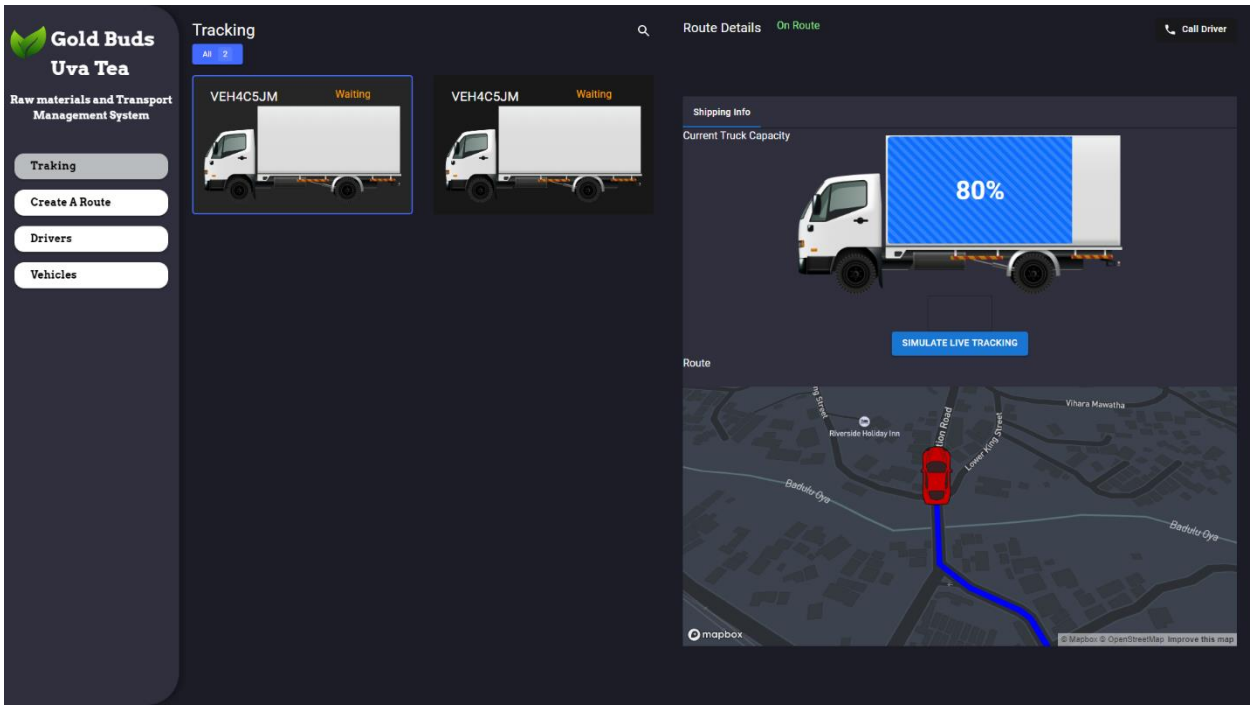
Figuren3. 12 interface

This interface is used to manage drivers. New drivers can be added here. At the same time, the information of the added drivers can be changed and updated if there is any need. And if there is a need to delete a driver, it is also possible to delete it. At the same time drivers can be searched by their id and name. At the same time, according to the status of the drivers, their amount is shown separately. Another thing in this interface is that you can generate a report of the drivers' information.



Figuren3. 13 interface

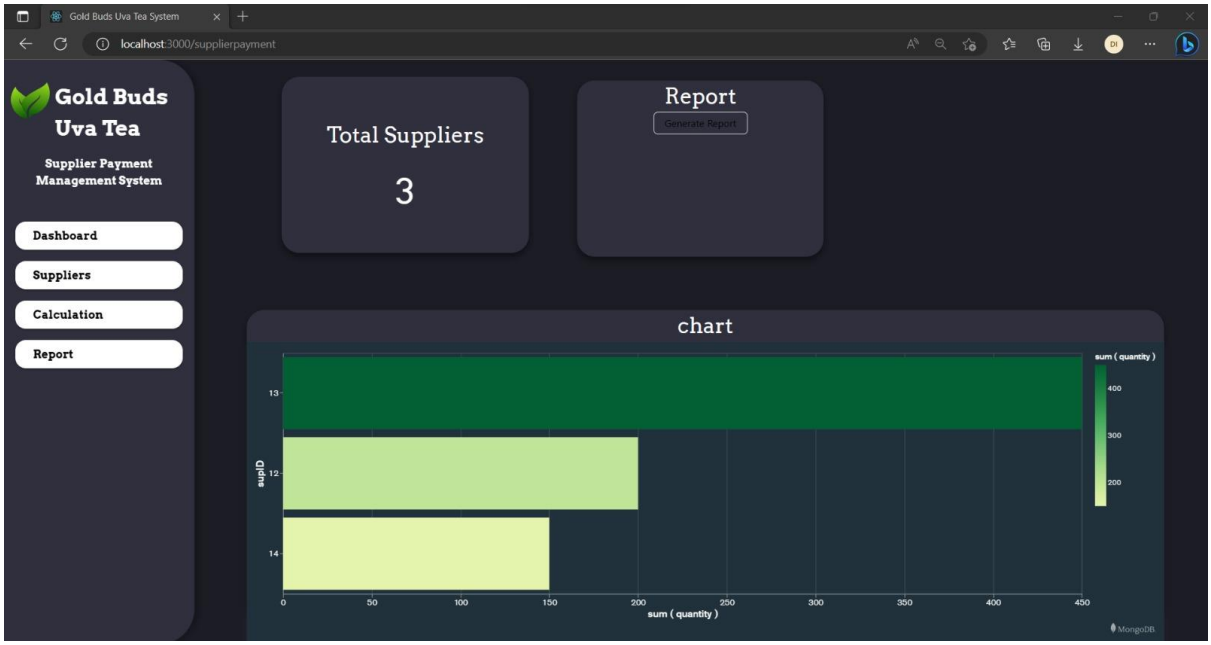
Drivers and vehicles can be assigned a route from this interface. Here, the route is determined by taking the coordinates of the registered suppliers' homes and determining the path accordingly.



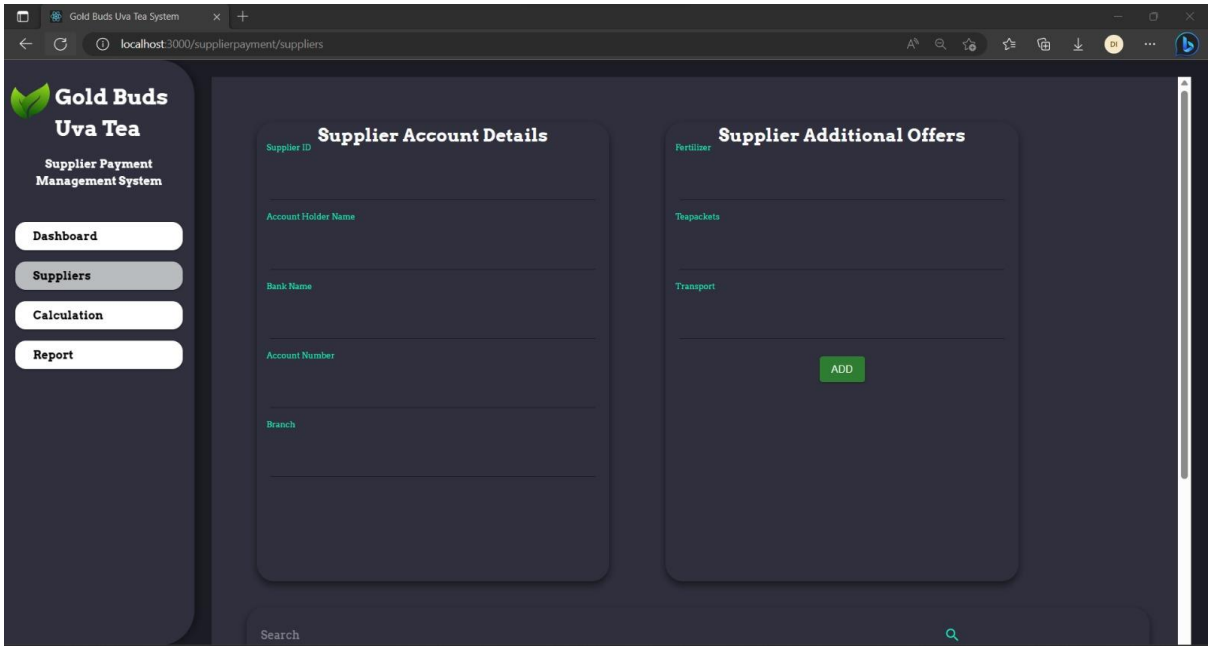
Figuren3. 14 interface

Drivers and vehicles can be assigned a route from this interface. Here the route is determined by taking the coordinates of the registered suppliers' houses and determining the path accordingly. This interface is used to study the trajectory of real-time vehicles. Each vehicle that has been assigned a route is displayed here and when clicked, it gives real-time information about its location.

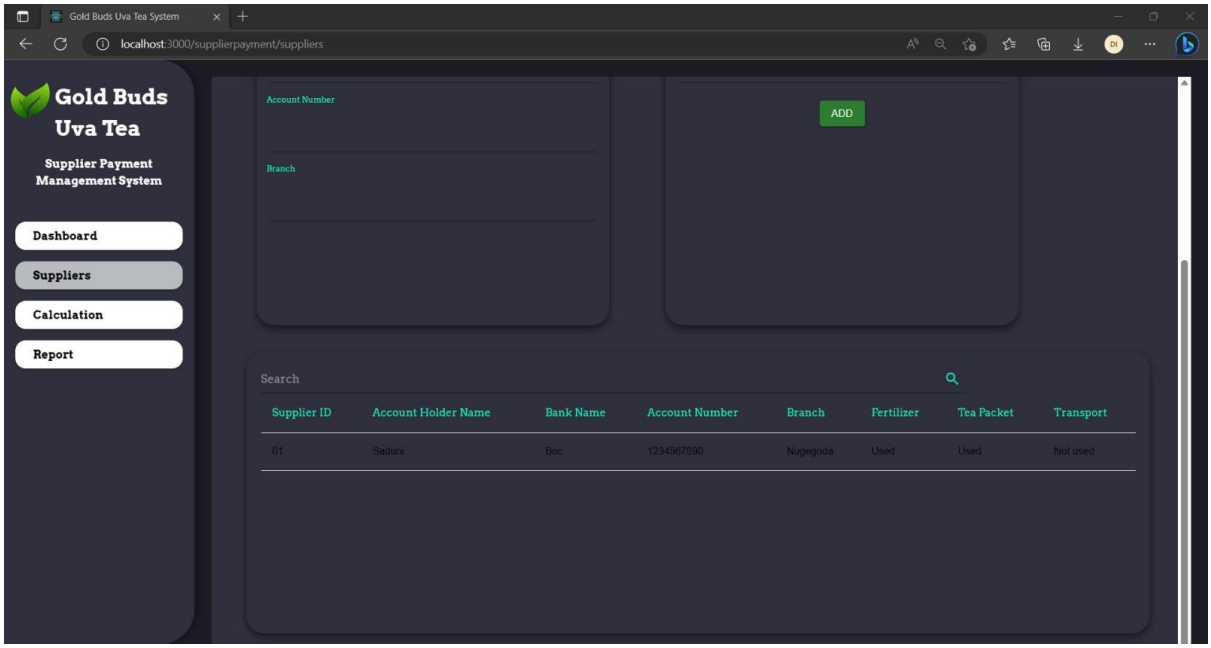
IT21270338



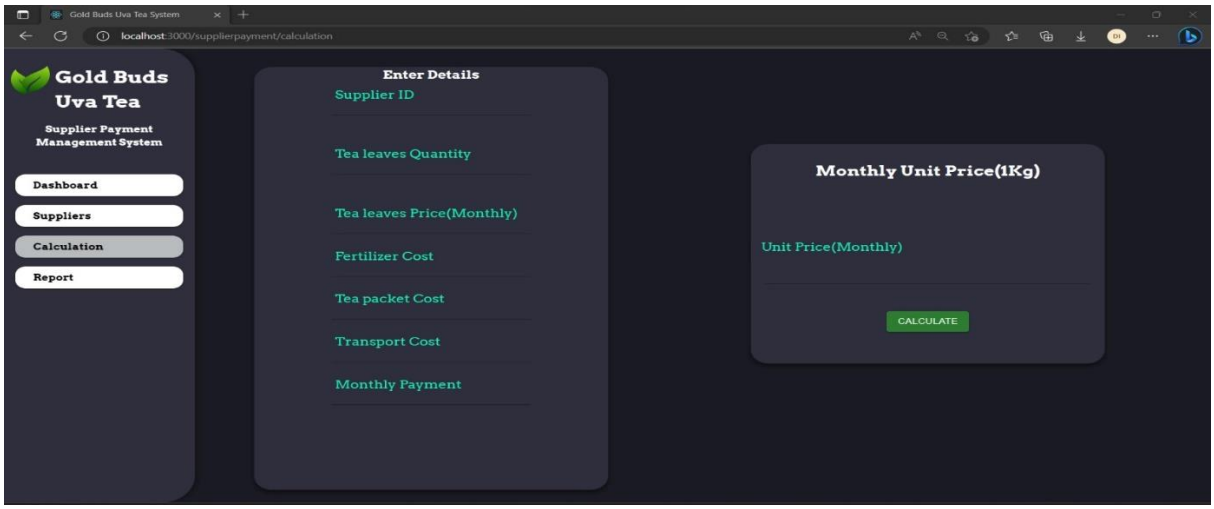
Figuren3. 15 interface



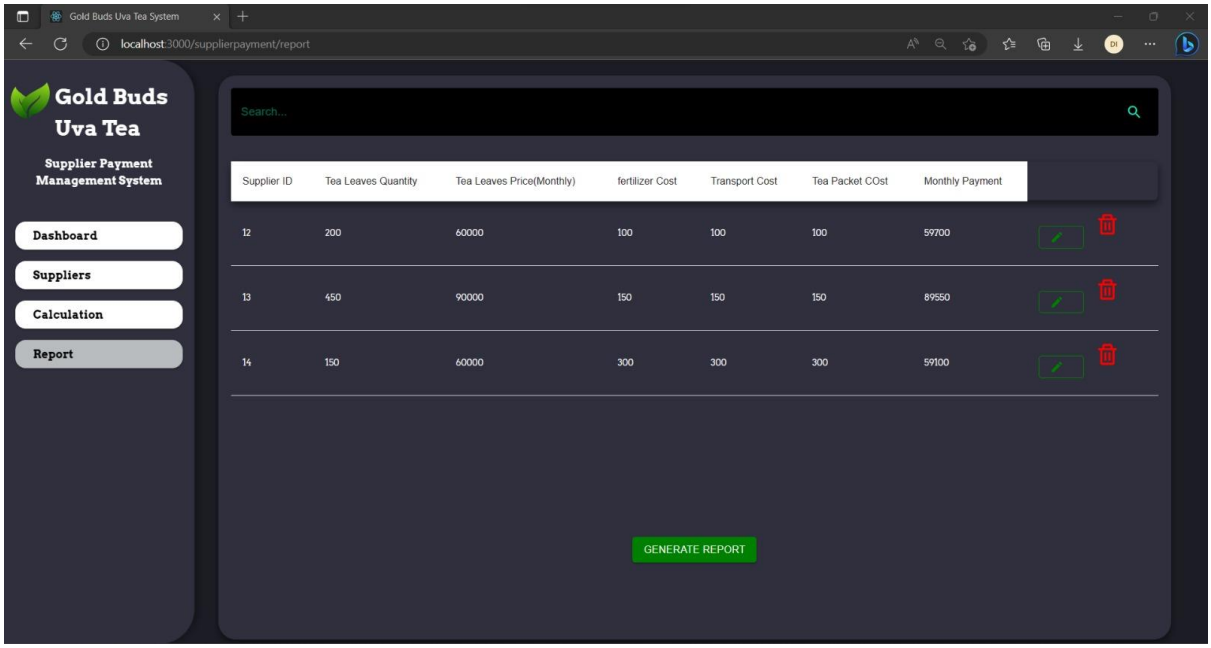
Figuren3. 16 interface



Figuren3. 17 interface



Figuren3. 18 interface

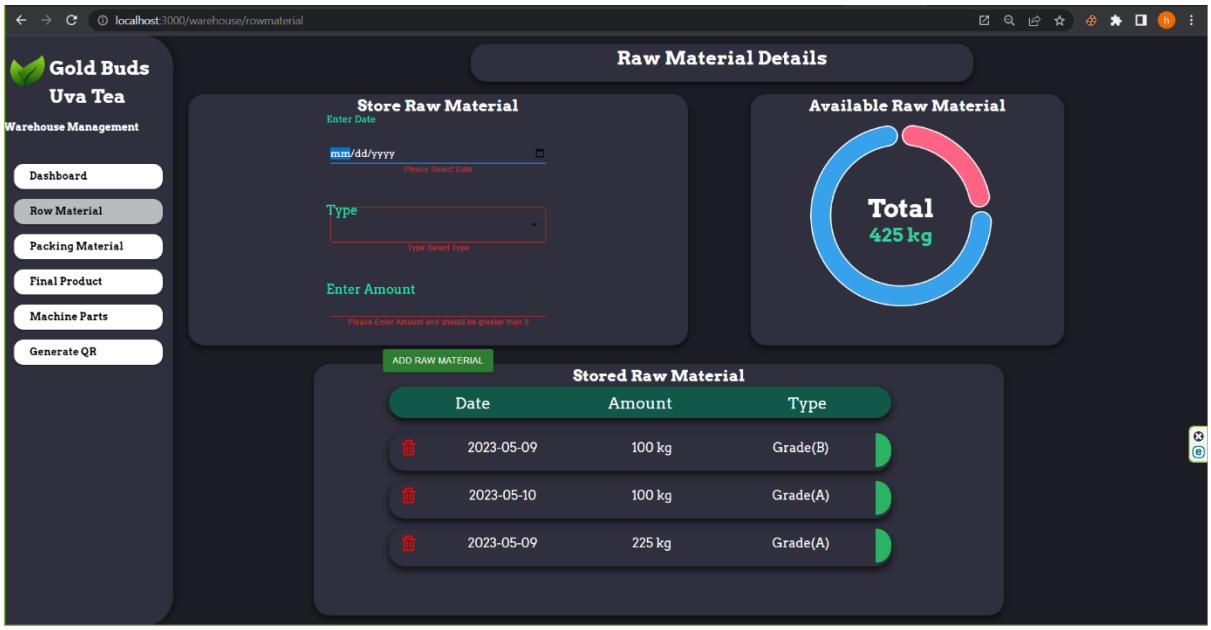


Figuren3. 19 interface

Users are sent to the dashboard, which acts as the main interface, after logging into the system. It provides access to several features and supplier-specific data. The total number of providers in the system is prominently shown on the dashboard. It also offers an organized summary of the tea leaves supplied by each source, enabling a speedy evaluation of volumes. For record-keeping or additional research, it is possible to receive a thorough report that includes all supplier and tea leaf data. Accessing a supplier's account displays their information and allows for the entry of new offerings, such as specials or promotions. These deals are included in the table below, which can be searched by supplier ID. Within the supplier's account, calculations including tea leaves, expenses, and monthly payments may be made. A thorough table is produced by entering the number of tea leaves, the price per packet, the cost of fertilizer and transportation, and the monthly unit price. The entered data, which includes the supplier's ID, the number of tea leaves, prices, and monthly unit pricing, is broken down in the table. If necessary, supplier data can be updated, changed, or removed. Location data is provided through an address search, and monthly payment amounts for certain providers are available. Customizable reports that include supplier information, tea leaf counts, prices, and monthly payments may be created and downloaded. The system provides an intuitive user interface for managing supplier accounts, figuring expenses, producing reports, and getting crucial supplier and tea leaf data.

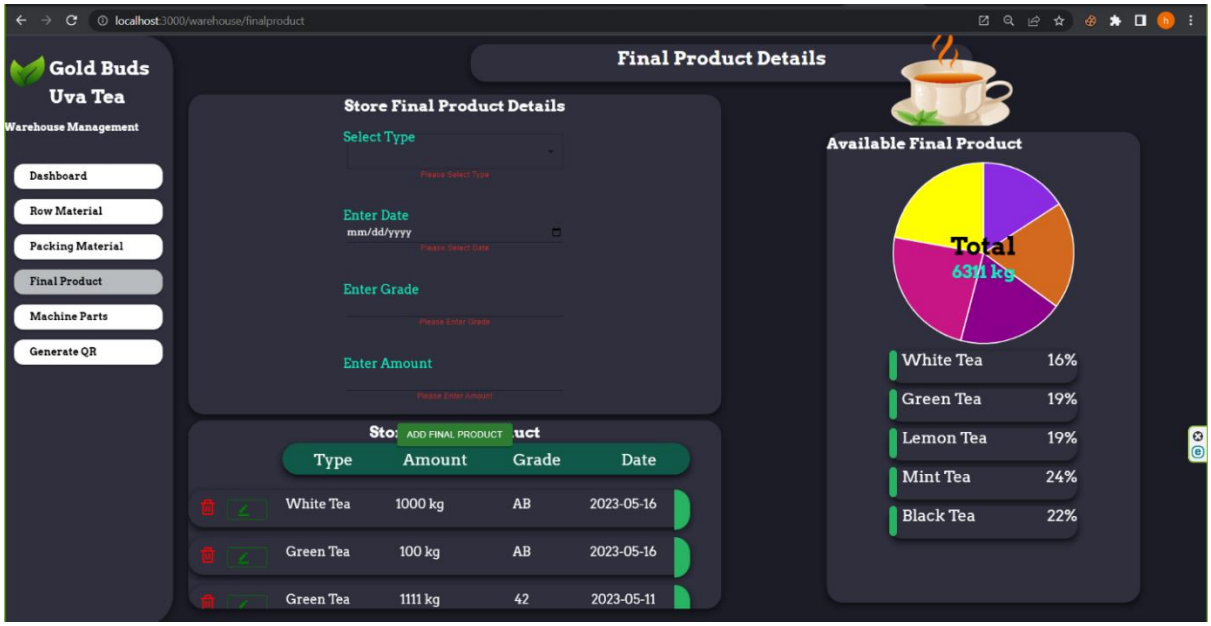
IT21239298

Figuren3. 20 interface



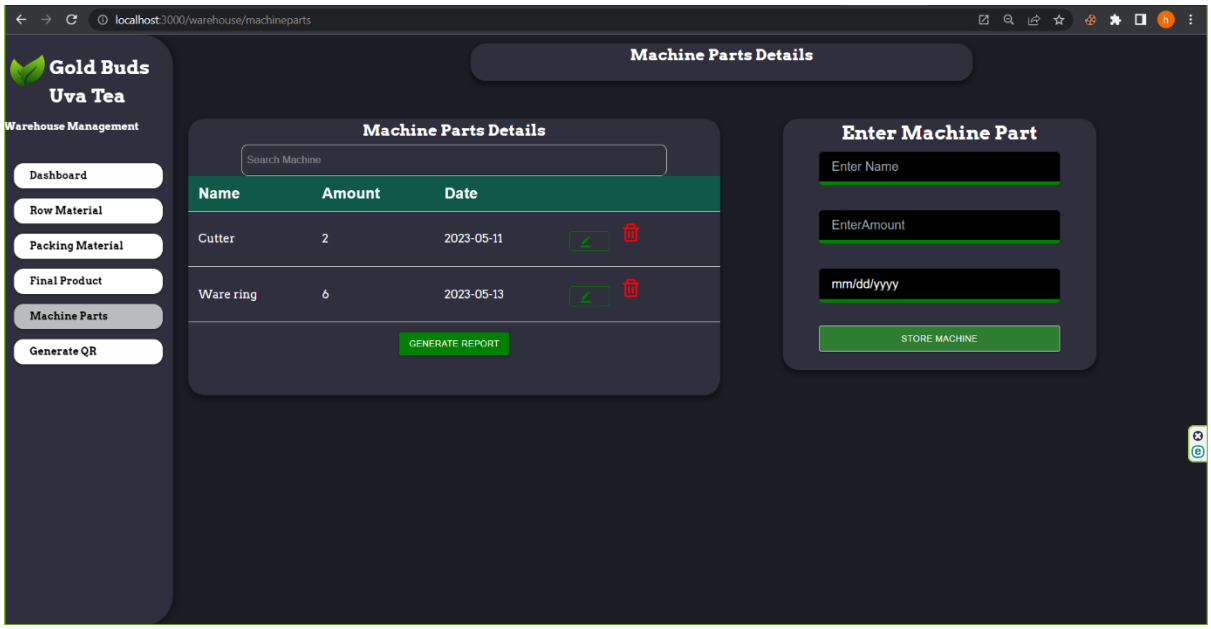
Figuren3. 21 interface

The weight of the remaining tea leaves and the date of receipt in the warehouse are entered into the system. The administrator can access the system to view the remaining amount of raw materials stored in the warehouse. After using the remaining tea leaves for production, the previously entered details can be deleted from the system.



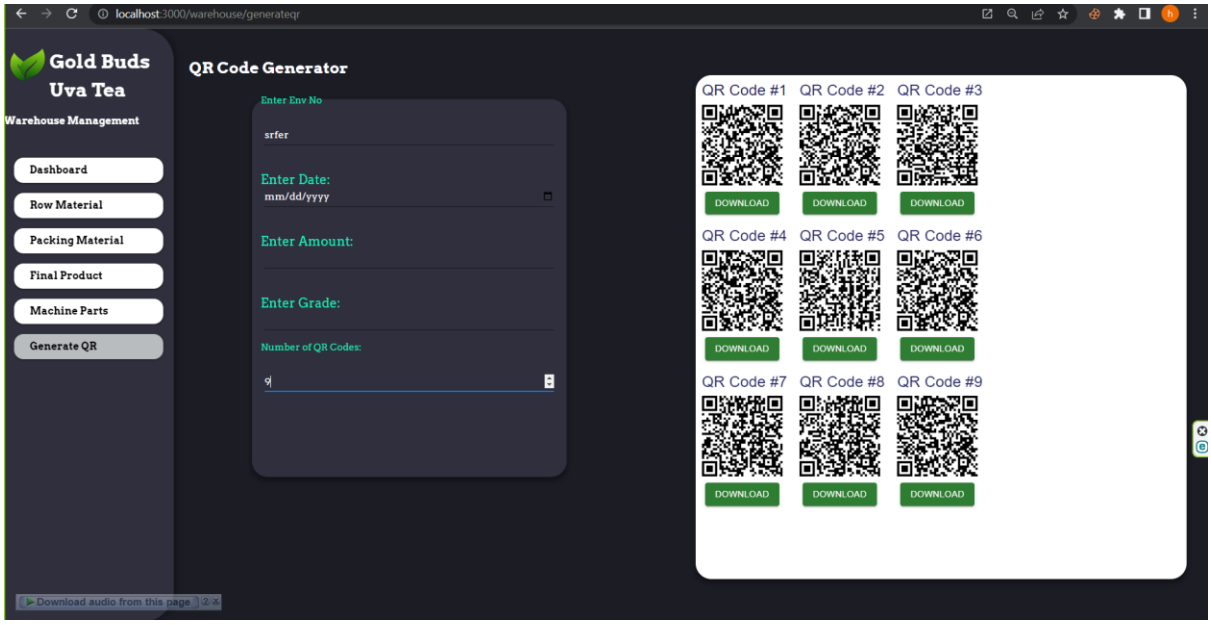
Figuren3. 22 interface

The production date and weight of each tea type (Black tea, green tea, White tea, Herbal Tea, Organic tea) stored in the warehouse are entered into the system.When final products are released based on orders, the details of the release amount and tea type are entered into the system, which automatically updates the remaining stock.



Figuren3. 23 interface

The system stores information about machine parts that need to be replaced, including their names and available quantities in the warehouse. When a machine part is released, the released amount is entered into the system, and the remaining quantity is automatically updated.



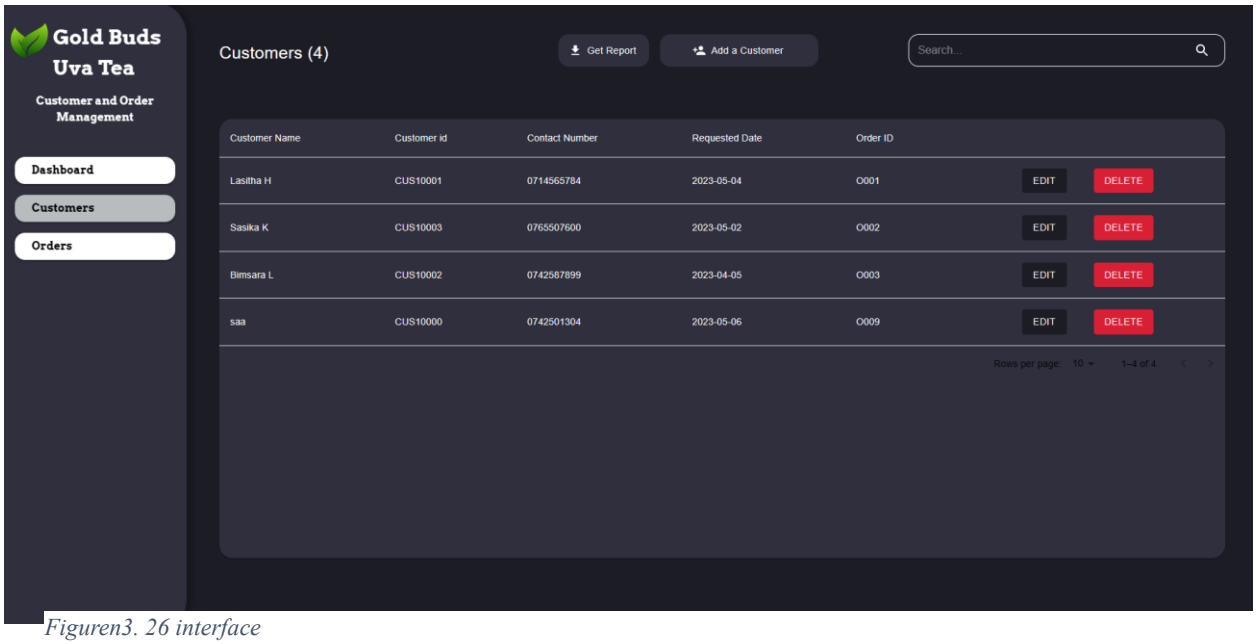
Figuren3. 24 interface

The manager can utilize the system to generate QR codes for each end product stack in the warehouse. The QR codes contain essential information about the product, such as the production date, tea type, tea grade, and a unique ID. Generating QR codes helps streamline the printing process, reduce costs associated with printing product details on sacks, and provide a user-friendly method for accessing product information.

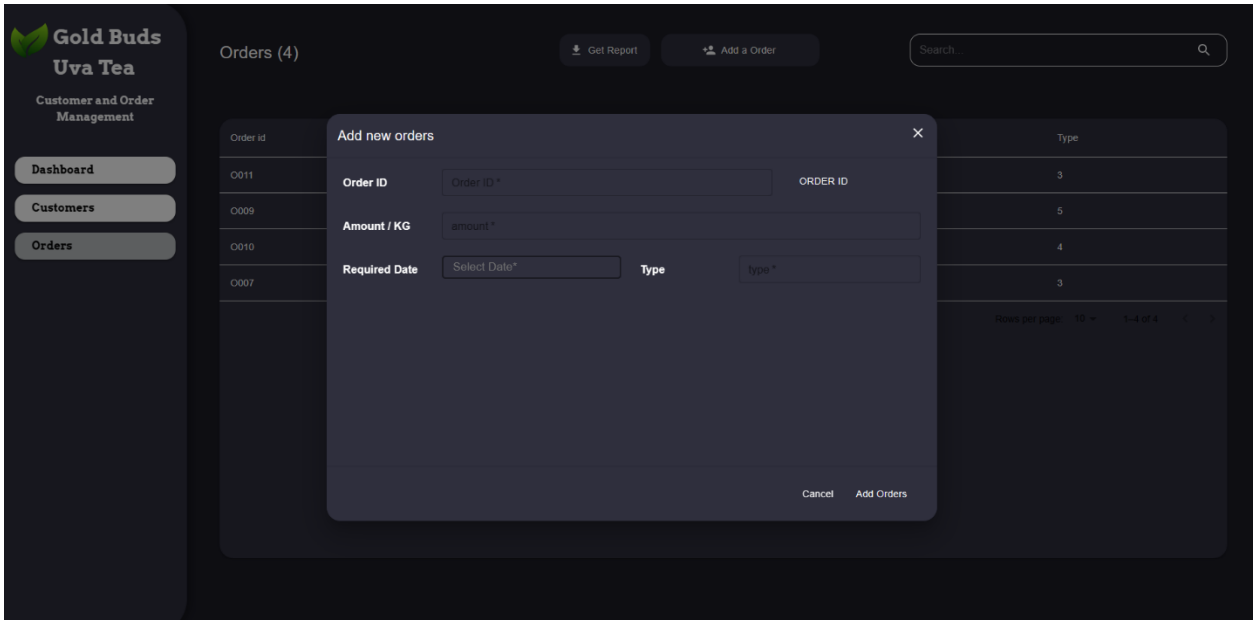
IT21255588

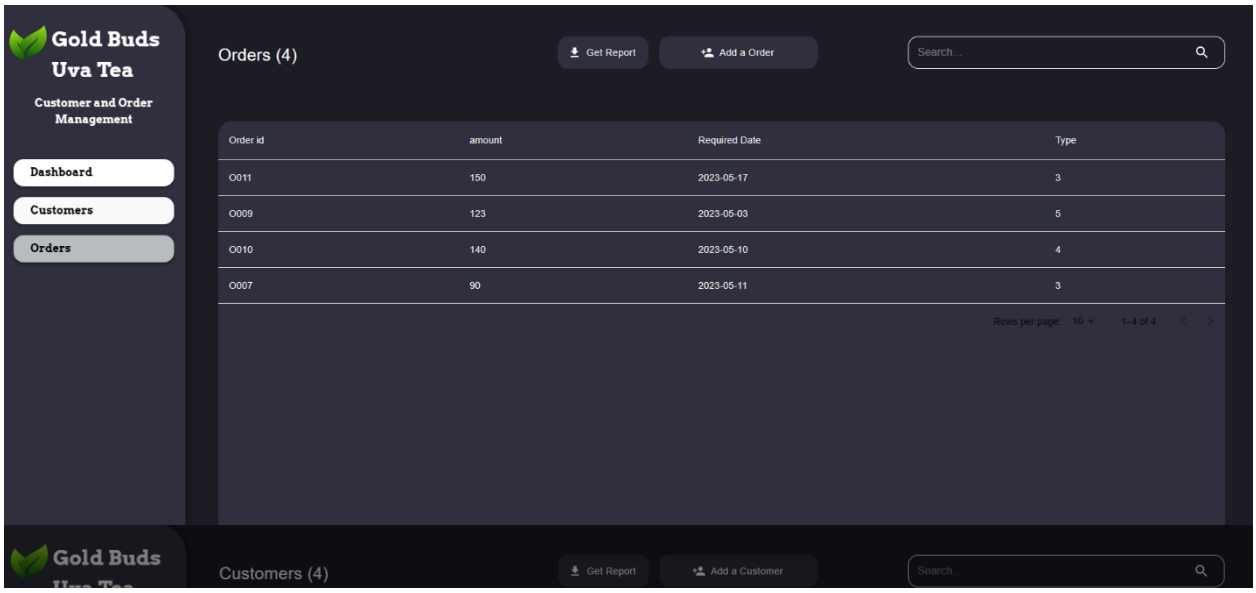
In this section, focused on managing customer data, managing order details and providing essential details to the administrators. Customer related task and order related functions are provided by the interface. The interface provides a list of registered customers and displays their details properly. Admin can sort details by using the search function. Admin can update customer information and can remove the customers from the customer list according to the desire. List of all orders placed by the customers are also displayed in the interface. Admin can manage each order and can search, update, remove orders related to their orders. Admin can generate reports related to the customers and their orders.

Figuren3. 25 interface

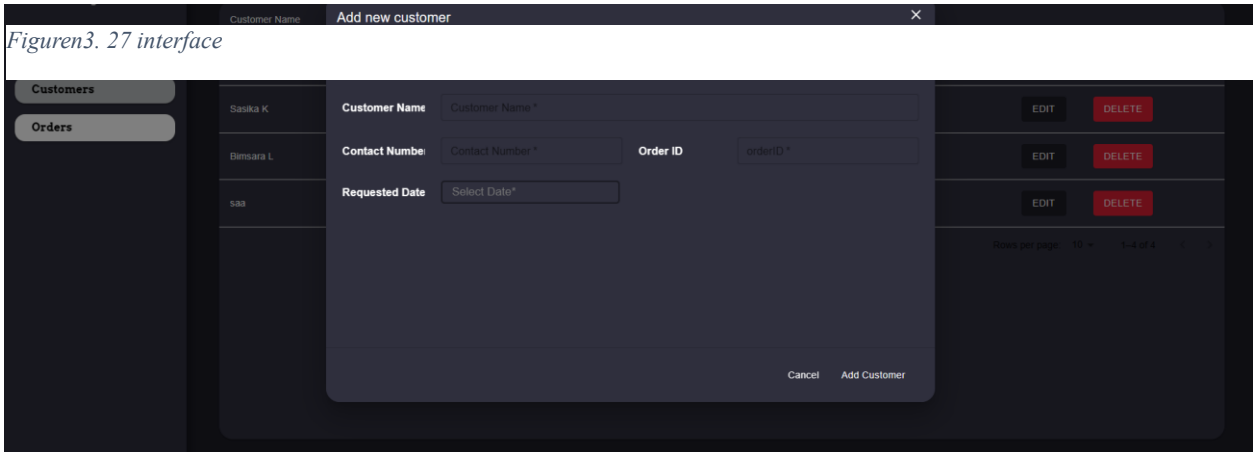


Figuren3. 26 interface



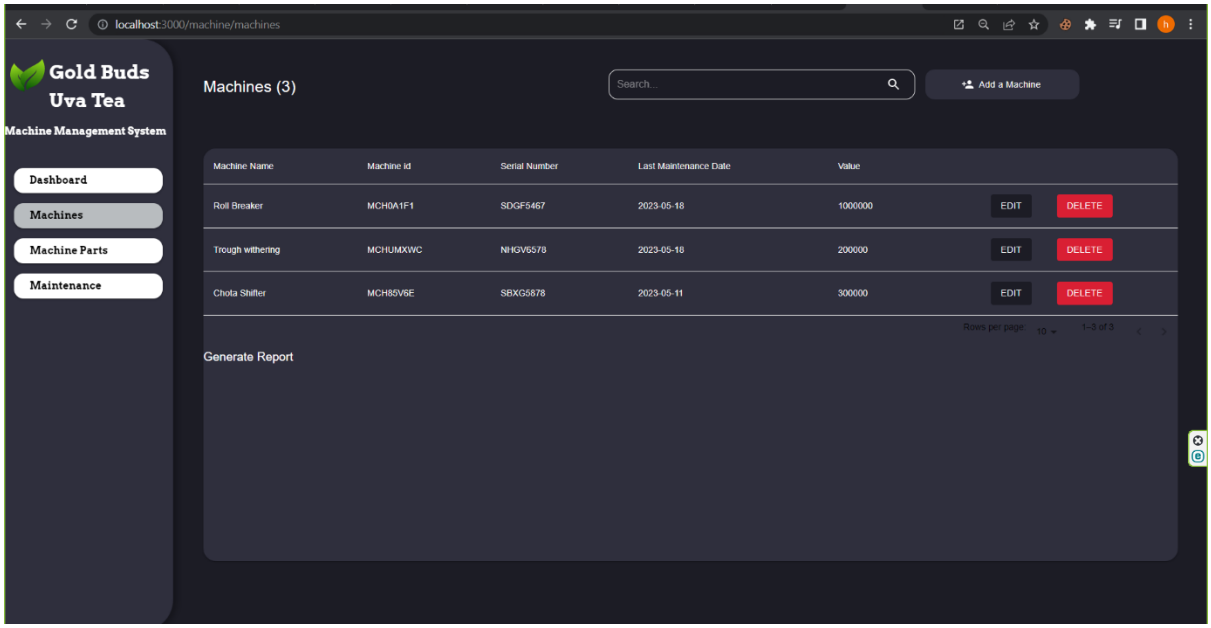


Figuren3. 29 interface



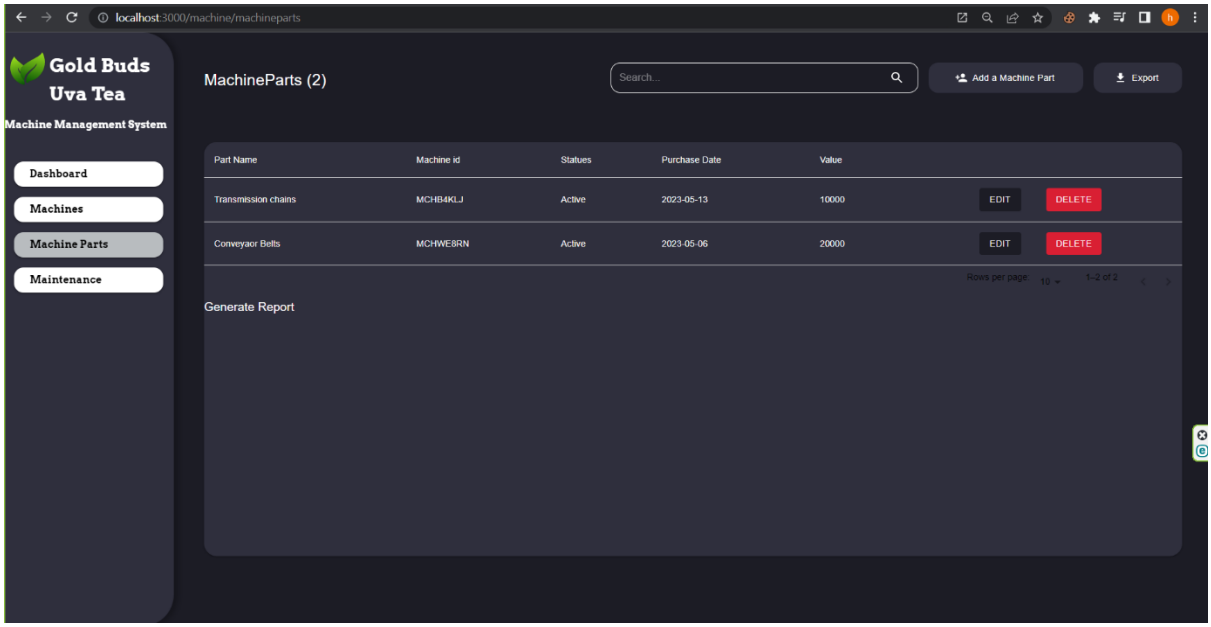
Figuren3. 27 interface

Figuren3. 289 interface



Figuren3. 30 interface

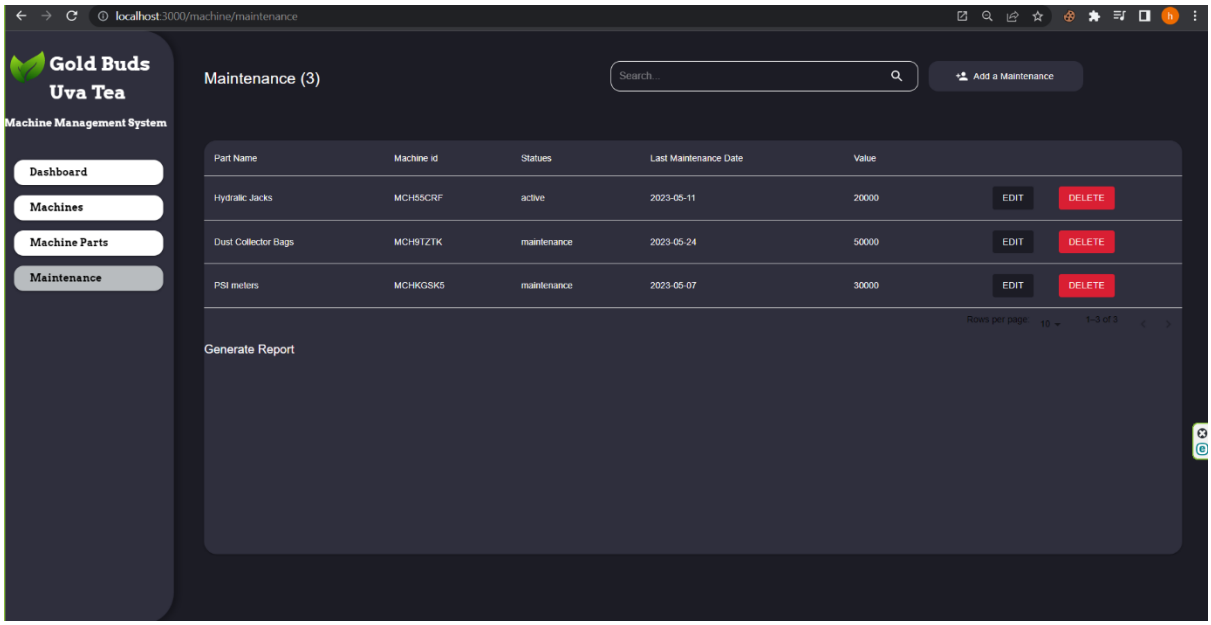
A strong tool that makes controlling machines easier is the machine management interface. It offers a simple platform for adding new machines, changing their data, and, if required, deleting them. By using their individual ID or name, you may easily search for machines, ensuring quick access to certain computers. The user interface provides a clear picture of the operating state of the devices by categorizing them neatly based on their status. Additionally, it has a useful report generating capability that enables you to create in-depth reports on machine data. This interface's extensive functions enable effective machine control and well-informed decision-making.



Figuren3. 31 interface

An effective tool for managing machine components is the machine parts management interface. It provides a simple framework for adding new machine components, changing their data, and removing them as necessary.

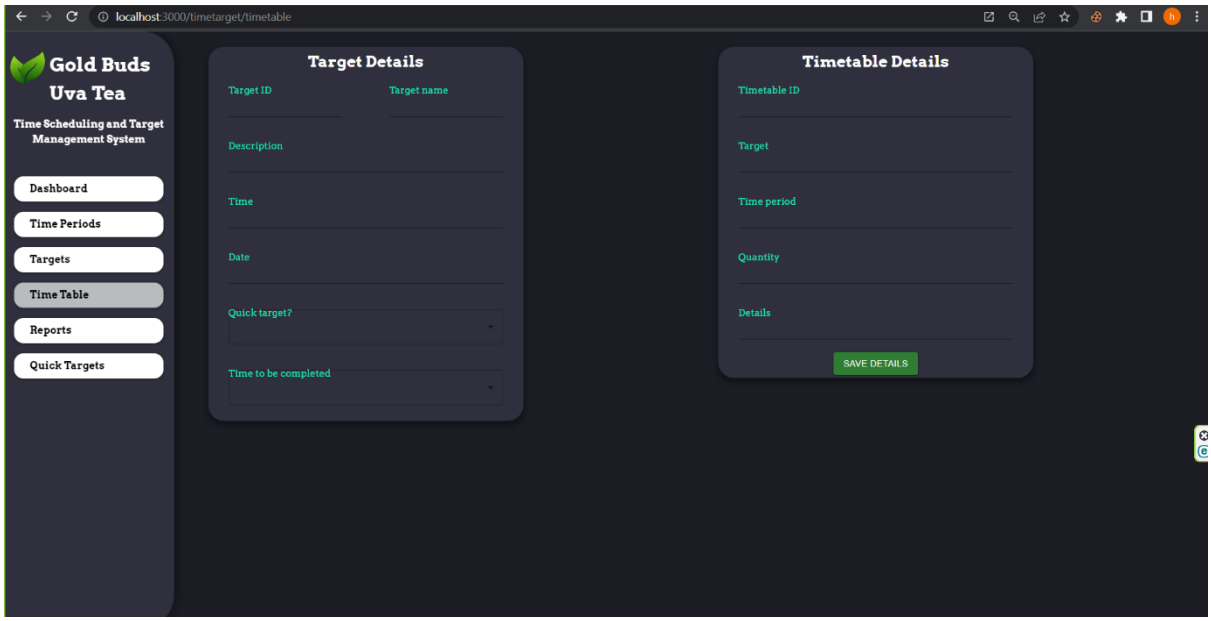
Machine parts may be quickly accessed by searching for them using their respective ID or name. The interface offers a clear picture of the size of machine parts' availability by readily displaying that information based on their state. The interface also has a reporting capability that enablesthe creation of detailed reports on machine part data. This interface accelerates the administration of machine parts and makes informed decisions easier thanks to its extensive functions.



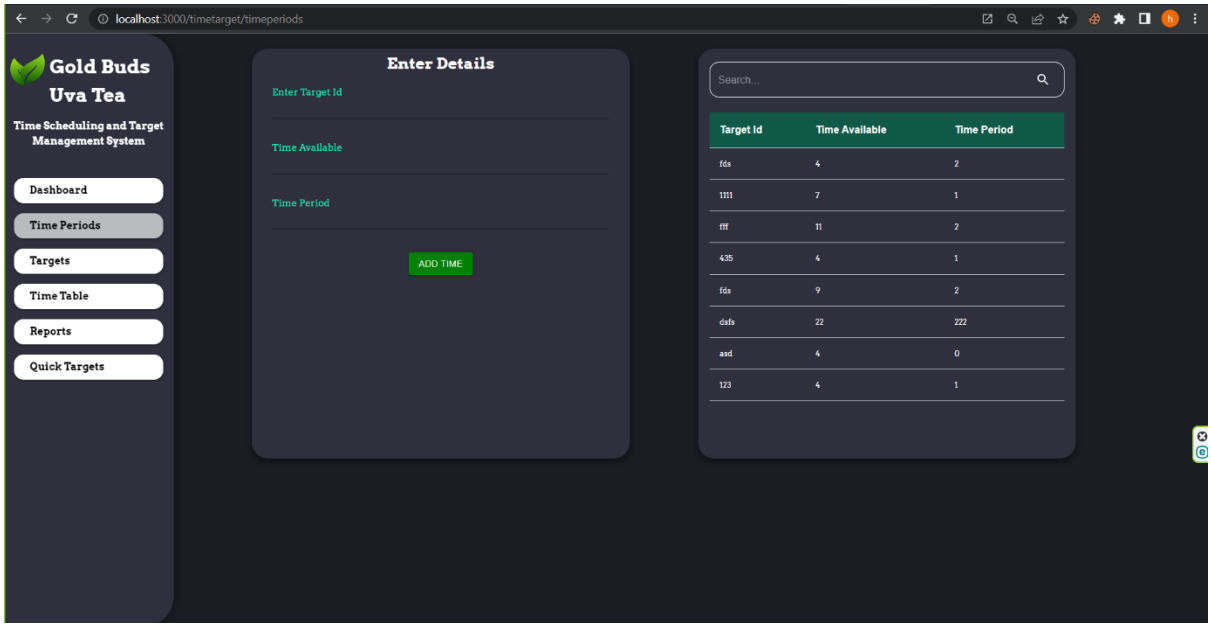
Figuren3. 32 interface

For efficiently managing maintenance chores, a central hub is provided via the maintenance management interface. It provides for the simple adjustment and update of current information as well as the seamless inclusion of new maintenance records. Maintenance entries can also be removed if necessary. The user interface provides practical search possibilities based on the unique ID or name of the maintenance, providing easy access to particular data. The interface further groups maintenance jobs according to their state, giving a clear picture of how they are progressing. The interface also has reporting capabilities that allow for the creation of detailed reports on maintenance data. This interface improves decision-making processes and facilitates maintenance management with its powerful capabilities.

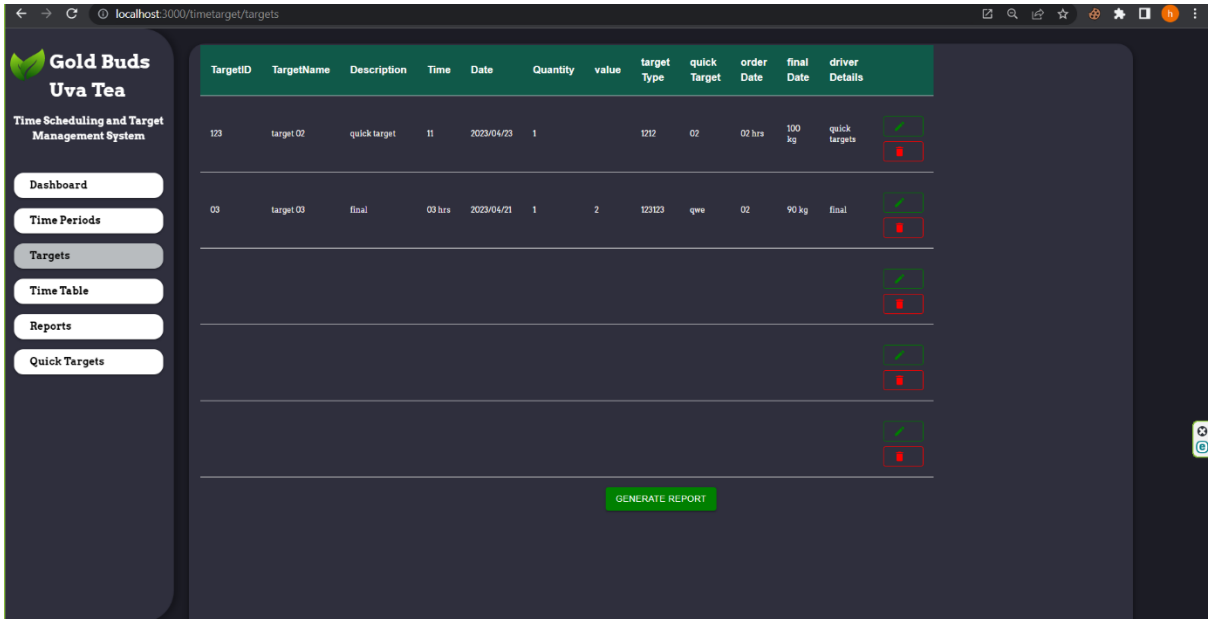
IT21224652



Figuren3. 33 interface



Figuren3. 34 interface



Figuren3. 35 interface

The Time and Target Management System is a powerful web application designed to streamline the process of creating, managing, and monitoring targets and time periods for various purposes. With its user-friendly interface and robust functionality, this application empowers users to set, update, delete, and search targets and time periods effortlessly.

Target Creation: Users can create new targets by specifying relevant details such as target name, description, and associated time period. The system provides validation checks to ensure data integrity and security.

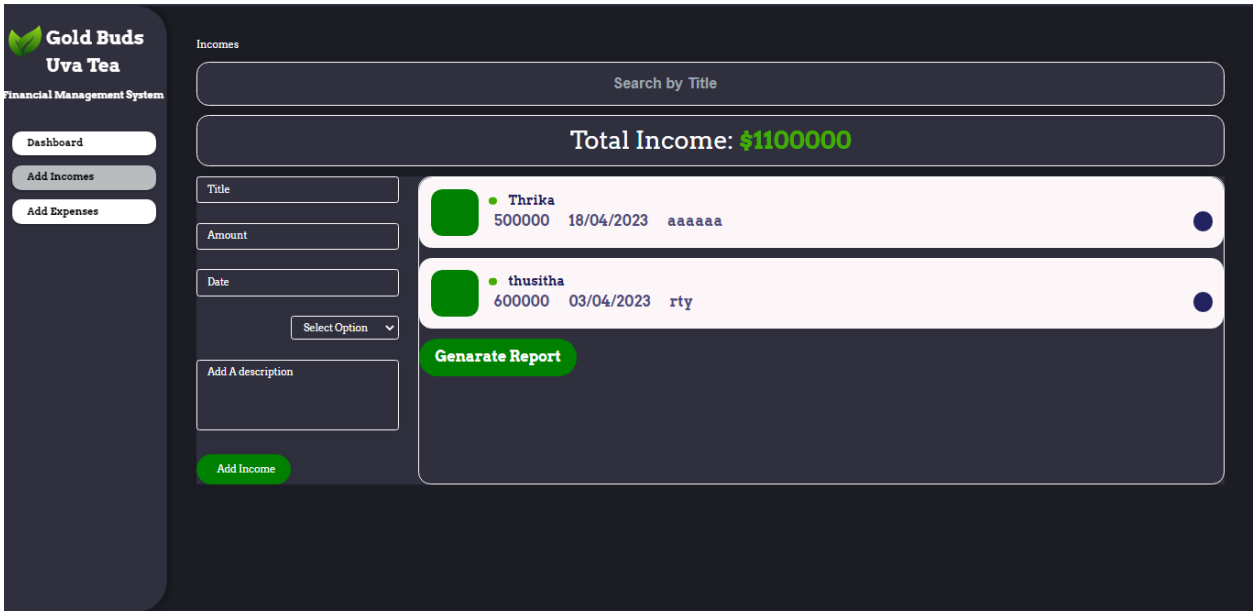
Time Period Management: The application allows users to define time periods for each target, such as start date, end date, or recurring intervals. Time periods can be easily updated or deleted as needed.The Target Management System provides comprehensive reporting capabilities, allowing users to generate detailed reports on targets and their corresponding time periods. These reports offer valuable insights and analysis, aiding in decision-making processes.

The Target Management System seamlessly integrates with both the Supplier Management System and the Transport Management System. This integration enables efficient coordination and communication between different systems, facilitating the flow of data and enhancing overall operational efficiency.

Security and Validation: The application employs robust security measures, including validation checks, to ensure data integrity and protect against unauthorized access. User authentication and authorization mechanisms are in place to safeguard sensitive information.

With the Target Management System, users can easily create, manage, and track targets and time periods, generating reports that provide valuable insights. The integration with the Supplier Management System and the Transport Management System enables seamless collaboration and data exchange, further enhancing operational efficiency. Whether it's setting goals, monitoring progress, or generating reports, this web application provides a comprehensive solution for effective target and time period management.

IT21232326



Figuren3. 36 interface

According to this interface we can get information that financial manager added an income to their system. Also, he can demount that income from the System. When, financial manager adds an income, then that total income is updated automatically. He can search for any income of this system. If the financial manager wants a get a clear report by clicking "Generate Report" button.

Figuren3. 37 interface

According to this Interface, when financial manager added an expense to their System. And also, he can demount that expense from this System. When, financial manager added an Expense, then that total Expense is updated automatically. He can search for any expenses of this system. If a financial manager wants a report about expenses, he can get a clear report by clicking “Generate Report” button.

Figuren3. 38 interface

When the financial manager added an income or an expense then the interface of this system displays the updated analysis chart of this provided information. After that we can view total income, total expense and total balance as well. In this interface we can see the recent history also. If we want to the maximum minimum income, expense that also displays in this interface.

APPENDIX

Work done by each member

Name	Student ID	Work distribution
Wijethunga R.D.K.G	IT21240942	Supplier and quantity management • User interface development. • Back-end development • Implementing related create, update, retrieve and delete function. • Creating database • Generating report
Sellapperuma M.S	IT21243226	Raw material transport management • User interface development. • Back-end development • Implementing related create, update, retrieve and delete function. • Creating database • Generating report
Chandrasekara C.M.A.P.K	IT21255588	Order and customer management • User interface development. • Back-end development • Implementing related create, update, retrieve and delete function. • Creating database • Generating report
Manathunga M.A.O.S	IT21224652	Time scheduling and time management • User interface development. • Back-end development • Implementing related create, update, retrieve and delete function. • Creating database • Generating report

Dahanayake R.A	IT21270338	Supplier payment management • User interface development. • Back-end development • Implementing related create, update, retrieve and delete function. • Creating database • Generating report
Bandara E.M.S.S	IT21239298	Warehouse management • User interface development. • Back-end development • Implementing related create, update, retrieve and delete function. • Creating database • Generating report
Gunasekara G.H.M	IT21232022	Machine management • User interface development. • Back-end development • Implementing related create, update, retrieve and delete function. • Creating database • Generating report
Thennakoon K.M.K.K	IT21232336	Finance management • User interface development. • Back-end development • Implementing related create, update, retrieve and delete function. • Creating database • Generating report