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An Undergraduate Internship/Project on Topic Happy Haat Inventory Management System

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An Undergraduate Internship/Project on Topic Happy Haat Inventory Management System

By

Pingkon Augustine Rozario

Student ID: **1730297**

Summer, 2023

Supervisor:
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October 10, 2023

Dissertation submitted in partial fulfillment for the degree
of Bachelor of Science in Computer Science

Department of Computer Science & Engineering
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Attestation

This is to certify that the report is completed by me, PINGKON AUGUSTINE ROZARIO (ID: 1730297), submitted in partial fulfillment of the requirement for the Degree of Computer Science and Engineering from Independent University, Bangladesh (IUB). It has been completed under the guidance of Md. Mahmudul Kabir Peyal. I also certify that all my work is genuine which I have learned during my internship. All the sources of information used in this project and report have been duly acknowledged in it.

Signature Date: 10 October 2023

PINGKON AUGUSTINE ROZARIO

Name

Acknowledgement

I would like to firstly like to thank the God for giving me the endurance and the ability to work hard, and for giving me the ability to write this report and for giving me the chance to be able to do my internship at FarmImagination. Also, my parents for their unconditional love and support that has sustained, nurtured, and got me ready for this challenge. I would like to thank my honorable faculty and supervisor Md Mahmudul Kabir Peyal, Research \& Development Officer, Department of Computer Science Engineering, Independent University, Bangladesh, for his invaluable guidance, patience, time, constructive criticism and thoughtful advice regarding various aspects of my internship and preparation of this report. Then I would like to express my gratitude to MR. Ahmed EBC, Director of Operations \& Finance, for giving me the opportunity to complete my internship at FarmImagination, for his guidance and support in this three-month internship program. The learning and experiences I have gathered here have helped me a lot as a web app developer, system analyst and resource planning and this will surely help me in the next phase of life. I would also like to express my gratitude to all my colleagues for helping me throughout and making the internship process so much enjoyable.

Letter of Transmittal

10 October, 2023
Md. Mahmudul Kabir Peyal
Research & Development Officer,
Department of Computer Science and Engineering,
Independent University, Bangladesh

Subject: Letter of Transmittal for Internship Report, Summer 2023

Dear Sir,

It is a matter of great pleasure for me to submit my internship report regarding obtaining your kind approval. I, Pingkon Augustine Rozario have completed my internship program and this report during my summer 2023 semester. This report is based on my experience and the work I did at FarmImagination during my internship. The primary goal for my internship was to gain experience in different technology related fields of the company, starting with research and development, documentation, content writing, web development and to get acquainted with best practices. Over the period of my internship at FarmImagination, I found out that I learned and applied a lot of new skills and technologies. The company comprises a small team for development, who learn, collaborate, and innovate together. I hope, this report will be informative enough to fulfill your expectation and I would like to thank you for giving me an opportunity to submit this report.

I hope, this report will be informative enough to fulfill your expectation and I would like to thank you for giving me an opportunity to submit this report.

Sincerely,

Pingkon Augustine Rozario
ID: 1730297
Department of Computer Science Engineering
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Evaluation Committee

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Panel Members

Panel Member-3 Name: Marzan Binte Hassan	Panel Member-4 Name: Mahir Al Kamal

Office Use

Program Coordinator Name: Subrata Kumar Dey	Head of Department Computer Science & Engineering Name: Mahady Hasan

Abstract

An optimal inventory management level of a business can only be maintained with an inventory management system. This provides real-time stock level visibility and allows a business to know exactly how much inventory is present. The objective of this paper is to develop an inventory management system (IMS) for Happy Haat using Laravel a PHP framework, and MySQL as the database management system. Laravel version 10.0, PHP version 8.1.2 and composer 2.5.8. The system consists of applications for employees. The application involves tracking and controlling the organic products of Happy Haat from the point of acquisition to the point of consumption or sale. This application closely monitors the quantity of the products available in the warehouse and those which are dispatched. At the same time this application keeps the track of inventory transactions, including purchases, sales and adjustments. As Happy Haat is a concern of FarmImagination, it is an online platform for selling organic products. This report discusses about the inventory management system that plays a vital role in improving operational efficiency that serves the purpose of Happy Haat also its design, testing and benefits it provides.

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Chapter 1

Introduction

1.1 Overview/Background of the Work

FarmImagination is an agro based company founded in 2020. They plan to build farms beyond imagination. Their initiative is to build farm needed for Bangladesh. FarmImagination has a 5 layered vertical farm hydroponic agriculture situated in Mirpur Dhaka Bangladesh. They research, develop and implement innovative urban farming. They do contract farming and sell organic fruits and vegetables. They want to reduce import dependency of vegetables and fruits thus prevent currency drain. FarmImagination's selection of fruits and vegetables produce are to be grown in an organic, pesticide free environment. They also train interested farmers on those farming systems to create a revolution in farming. [1] FarmImagination has an online selling platform called "Happy Haat" (www.happyhaat.com).

An inventory management system (IMS) is a software application or a tool to track a company's inventory, which includes raw materials, finished products, and other items in production or sales process. This application or tool allows to keep a real-time record of all items in stock and their quantities and their locations within the warehouses. It facilitates the processing of sales orders and ensures accurate item deductions from the inventory. This also provides reports and analytics which helps the company to take decisions regarding the items, enhances supply chain operations and helps to reduce stockouts. As a result, it keeps the company more efficient and financially sound.

For the developing the inventory management system we will be using VS Code (Visual Studio Code), with laravel framework via xampp. Visual Studio code is a free open source text editor by Microsoft. VS Code has some powerful features that made the VS Code one of the most popular development environment tools. [2]

1.2 Objectives

The primary goal of my work is to create an independent project for an inventory management system on a web application, where this project will later be implemented in the company's business.

It has happened so many times, the accurate track of the products were not maintained. Without the proper system lead to delays or errors in order fulfillment. Without this system, it became a challenge for the company to accurately value the inventory and report it correctly in the time of stock out. Also lead to inappropriate purchasing decisions and also became challenging to accurately value inventory and report it correctly in the financial statements. The trace of the flow to the items from farmers to the warehouse were not under control and quiet visible to the authority. And this lead the company to struggle to optimize operations and improve profitability.

Inventory management system is to be built for especially for the warehouse managers of the business to keep the track of the products and purchases to be made. In this particular system the managers will be able to not only track the products, they will also be able to input information and trace of the product keeping the record from where and for how much cost the product was purchased from whom.

1.3 Scopes

There is an admin module in this system, who enters the details about the farmers (suppliers), customers, units and products. This system will be installed and implemented in various warehouses (child warehouse). The admin will add information like the product details, customer details and farmer details. The warehouse managers will keep the track of the products of the warehouses under their supervision. This system will keep the track of the movement of the items throughout the supply chain.

- **Administrator Login**: The whole system is controlled by an administrator, administrator log into the system giving the authentication details such as username and password. After login into the system, he/she can see the farmers, customers and the stock currently available to the warehouses. The farmer details and customer details are name, address, mobile number and email address. The product details are the quantity, farmer to be received from and product description. An administrator can also add new farmer, customer and product in the databases.

- **Warehouse Manager Login**: The user can login to the system in this module by providing his/her credentials. He/she can request for the stock for their own warehouse from the mother warehouse. After the manager receives products

in his/her warehouse, they have to accept the products received from the mother warehouse.

- **Product Search**es: After successfully logging into the system, the administrator and the managers can search for the product individually. The quantity and description of the product will be displayed upon the search.

- **Product Tracking**: The user can keep the track of the quantity of the product. When the product was received from the farmers and the mother warehouse.

Chapter 2

Literature Review

2.1 Relationship with Undergraduate Studies

In my under-graduation studies, I acquired a lot of theories about programming and developing an application from start to finish. Most of the courses include both theoretical and lab work. I learned how to operate in a group in lab sessions, which will benefit me in real-world scenarios where I will have to collaborate with my colleagues to complete and deliver a project. It's very similar to working on projects in a group in lab class and working on projects in the office with colleagues. Some of the academic courses that were beneficial to my professional experience include: CSE 203 Data Structure and CSE 211 Algorithms, I want to keep these courses together as they are closely related, and one depends on another. From these courses, I learned the fundamental topics about arrays, linked lists, pointers, stack, and queues, BST, and Graph theory. Learning time and space complexity is helping to create faster working and smoother applications and providing the user a great experience. During these courses, I began to solve some competitive programming problems from practice problems and various websites, where I applied my data structures and algorithms knowledge to solve critical problems, which is now greatly helping me in solving logical and functional problems in the corporate world.

CSE 213 Object-Oriented Programming, in this course, I have learned how the format of my code should look like using classes and objects. In real applications, all my work is related to classes, objects, and functions. Without knowing the core concepts of object-oriented programming, I would not be able to understand how my code is working, and fixing bugs would be impossible.

CSE303 Database Management, this was also one of the most crucial courses I had ever encountered. I learned how to design databases using UML class diagrams, making a rich picture, and six-element analysis here. Designing databases is critical and crucial because it is the core foundation of every project. Learning how to take client requirements, translate them to a database, and then create a project out of them was one of the most significant things I learned during my undergraduate studies.

CSE 309 Web Applications and Internet and CSE 464 Mobile Application Development, from these courses I learned a lot starting from HTML, CSS, Bootstrap for front-end designing including how the applications in web servers work, learning about http requests like get, post, 4 put, delete, and update requests helped me a lot

to learn the framework that I am using in my assigned project. I learned to collaborate and develop applications in a team environment and was also taught in these courses.

I learned laravel framework, and phpMyAdmin tool for MySQL for my project that was a part of my project for implementing and developing an inventory management system.

2.2 Related works

Othoba.com: Othoba.com uses an inventory management system where it can track their products and sales. It provides real-time accurate number of products in its inventory. In this app you can search for your desired product and see the quantity of the products available. It helps to understand how to manage your inventory and its demand change.

Daraz: Daraz uses an inventory management system where is can track their products and sales. It provides real-time accurate number of products in its inventory. In this app you can search for your desired product and see the quantity of the products available. It helps to understand how to manage your inventory and its demand change.

Shawpno: Shawpno uses an inventory management system where is can track their products and sales. It provides real-time accurate number of products in its inventory. In this app you can search for your desired product and see the quantity of the products available. It helps to understand how to manage your inventory and its demand change.

Agora: Agora uses an inventory management system where is can track their products and sales. It provides real-time accurate number of products in its inventory. In this app you can search for your desired product and see the quantity of the products available. It helps to understand how to manage your inventory and its demand change.

Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure

A work breakdown structure (WBS) is a systematic breakdown of a project into visible and hierarchical components, emphasizing deliverables. Project managers find it valuable as it allows them to start from the project's end goal and systematically identify all the necessary actions for a successful project completion. For this project, we've also created a WBS which reflects our workflow, visualization of scopes, responsibilities in a structured way. WBS was created for our project to be managed smoothly and more efficiently in an organized way. A top-down approach was used to produce our WBS and a phase based WBS. [3]

In the diagram Level 1 has six elements. Each of these elements are the phases of the project. The Level 2 Elements are the unique deliverables in every phase. All the lower-level components are deliverables. The project's primary steps include collecting requirements, designing, developing, testing, and deploying. The child tasks are the tasks that must be done to finish the current phase and go to the next phase. We have also made the cost calculation, resource allocation, and risk assessment, all of which are important for WBS and help us gain a better understanding of the project. A WBS also helps to avoid common project issues including missed deadlines, scope creep, and cost overruns, among others. When built as thoroughly as feasible, the WBS serves as a blueprint for completing what looks to be a difficult undertaking. However, when the project is broken down using a WBS, it becomes far more viable and approachable.

Figure 3.1: Work Breakdown Structure

3.2 Process/Activity wise Time Distribution

It is very important to accurately estimate the overall time required to accomplish the project depending on the activities to be completed. It is also important to create priorities and set goals to complete a successful project. The development phase is by far the most important because it takes the longest to complete. Because we are working in order, if one task is delayed, the rest of the tasks will be delayed as well. As a result, it is important to complete tasks according to the estimated schedule.

Table 3.1: Process/Activity wise Resource and Time Allocation

Activity	**Duration (Days)**	**Work (Percentage)**
Requirement Collection	5	7.8
Designing	7	10.9
Development	35	54.7
Testing and Feedback	12	18.8
Deployment	5	7.8
Total	64	100

3.3 Gantt Chart

The Gantt chart, extensively utilized in project management, is a highly favored and effective method for illustrating activities (tasks or events) in relation to time. On the left side of the chart, you'll find a list of these activities, while a suitable time scale is displayed along the top. Each activity is depicted by a bar, positioned and sized to show its start, duration, and end dates. This format enables a quick and clear view of diverse activities, their starting and ending times, as well as their durations. [4]

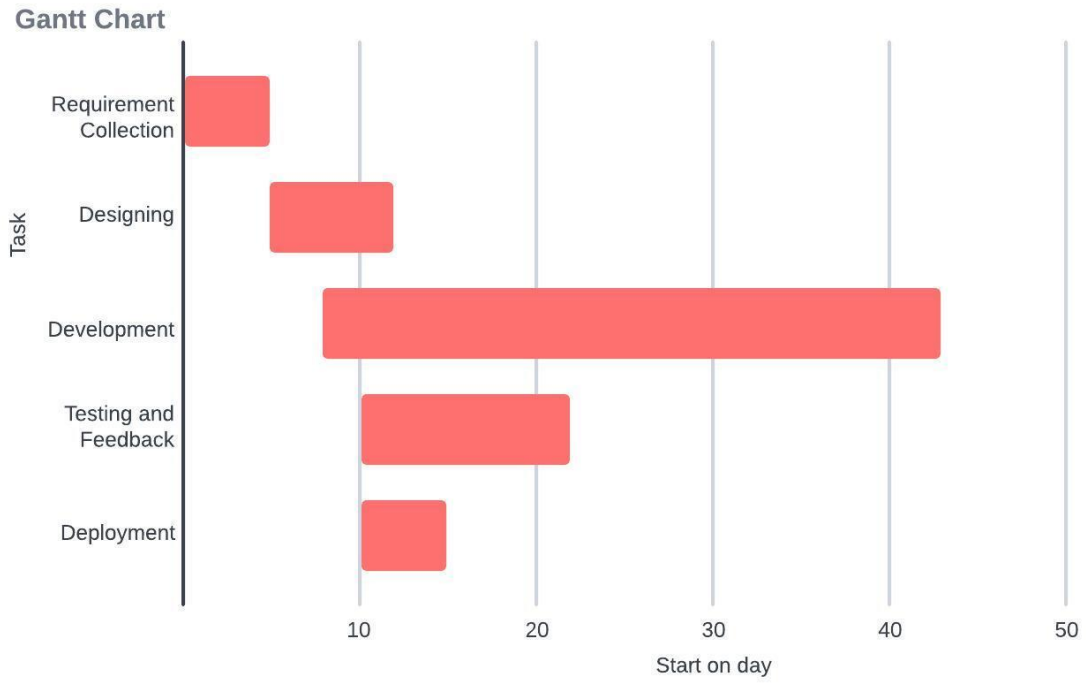

Figure 3.2: Gantt Chart

3.4 Process/Activity wise Resource Allocation

Resource allocation is the strategic planning and distribution of accessible resources in the most optimal and productive manner. Regardless of occasional scarcity, projects invariably demand resources. Thus, the project manager bears the responsibility of appropriately timing and assigning these resources throughout the project timeline. Essentially, resource allocation involves overseeing the project and designating resources to guarantee its seamless and effective execution. The table below shows how resources are allocated..

Table 3.2: Process/Activity wise Resource Allocation

Task	**Resource allocation (Percentage)**
Requirement Collection	10
Designing	20
Development	45
Testing and Feedback	15
Deployment	10
Total	100

3.5 Estimated Costing

Cost estimation is one of the most important aspects of project planning and management. It is based on the number of resources, budget and time required for the scope of the project. Since cost estimates are for cost estimates and not actual costs.

Table 3.3: Estimated costing

Work distribution	**Costing (BDT)**
Requirement Collection	10000
Designing	25000
Development	250000
Testing and Feedback	175000
Deployment	120000
Total	580000

Chapter 4

Methodology

A methodology refers to a set of strategies, practices, procedures, techniques, and guidelines used to solve problems. These are well-defined processes that provide clear instructions on the next steps, the importance of each step in the software development life cycle, and how to complete a specific phase of a project. In this project, we adhere to the approach of iterative and incremental development. This approach combines iterative design and incremental development, breaking down the software development process into manageable segments known as increments. Each increment builds upon the prior version, enabling gradual progress. Iterative software development involves repeating development activities in cycles called iterations. Following each iteration, a new version of the program is created, leading to the identification of the best product through successive iterations. Iterative and incremental software development initiates with planning and proceeds through iterative development cycles, involving continuous user feedback and incremental addition of features. The process concludes with the deployment of a refined software version at the end of each cycle.

Planning Phase: I have discussed the project with my organizational supervisor and gathered all the requirements for the various functionalities that will be included in the Web Application. I began designing the application after I have written down and clarified all the requirements and doubts that I had.

Analysis & Design Phase: I had to design the entire program in Figma, starting from the beginning to end. I demonstrated it to my organizational supervisor when I had finished designing. After the design was accepted, I went straight into the development phase.

Development Phase: As I previously mentioned, the whole application will be developed using PHP framework Laravel and XAMPP MyPhpAdmin which will make all the inventory management system fully functional. As we know laravel follows MVC architecture providing blade view which is a blade extension file. These views will be dynamic with a laravel custom admin site interacting with MySQL database. This phase may take the longest. Besides, we must provide proper authentication and authorization of all the users to maintain the proper security of the application.

Testing Phase: The testing phase is an interesting phase as more and more weird bugs come into action. So here I had to rewrite some of my code and had to keep algorithms time and space complexity to improve the speed of the application.

Evaluation Phase: This phase will help us to identify the lacking and problems of the system from a client's perspective. After getting the feedback, the Web application can be updated and made more sustainable. We can see that these approaches reduce overall risk and help the project respond quickly to changes, can quickly and easily adapt to any given change, can achieve transparency and total alignment in the development and testing phases, delivers overall higher quality products, and creates customer satisfaction from the above discussion of how to use each step of the methodology. For these reasons, I decided to employ the iterative and incremental technique to complete my project.

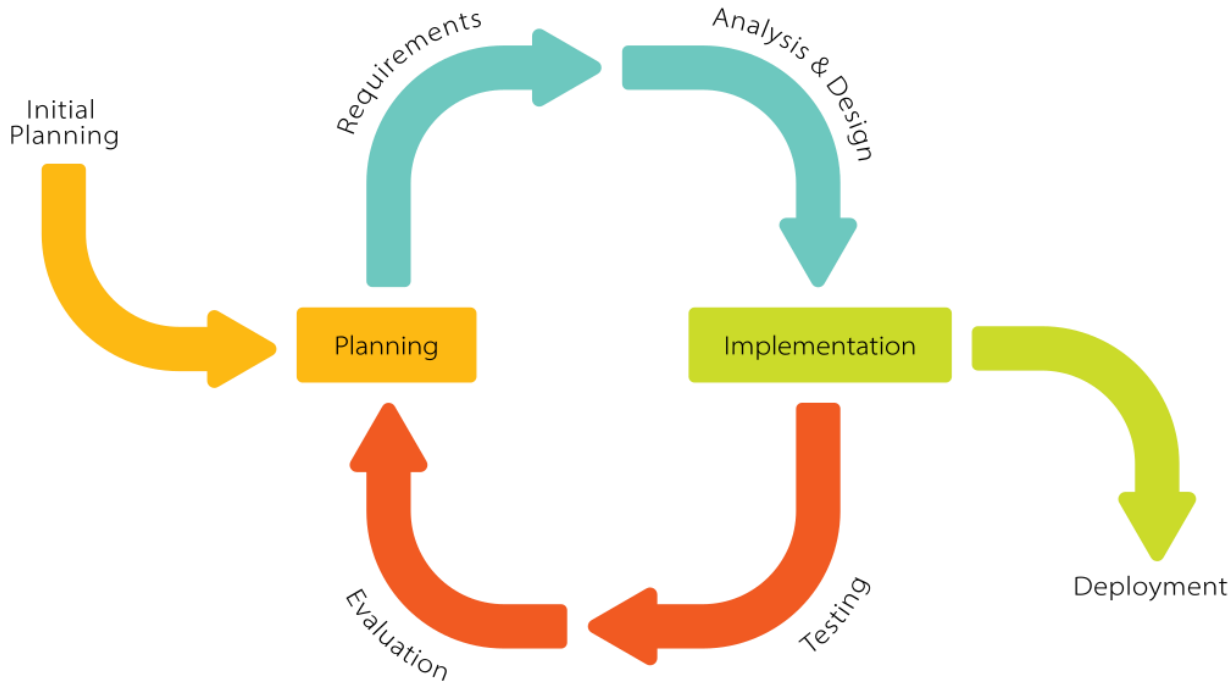

Figure 4.1: Iterative and incremental development process

Chapter 5

Body of the Project

5.1 Work Description

Happy Haat Inventory Management System is a web application used to track the inventory of the products, farmers, customers, units and purchase management and these are the features I have worked on in my internship program from laravel server.

Languages and frameworks used are:

- Lavavel (Framework)
- PHP (Backend)
- MySQL (Database)

IDE/Software used in building the project:

- Visual Studio Code
- XAMPP Control Panel

5.2 Requirement Analysis

Rich Picture

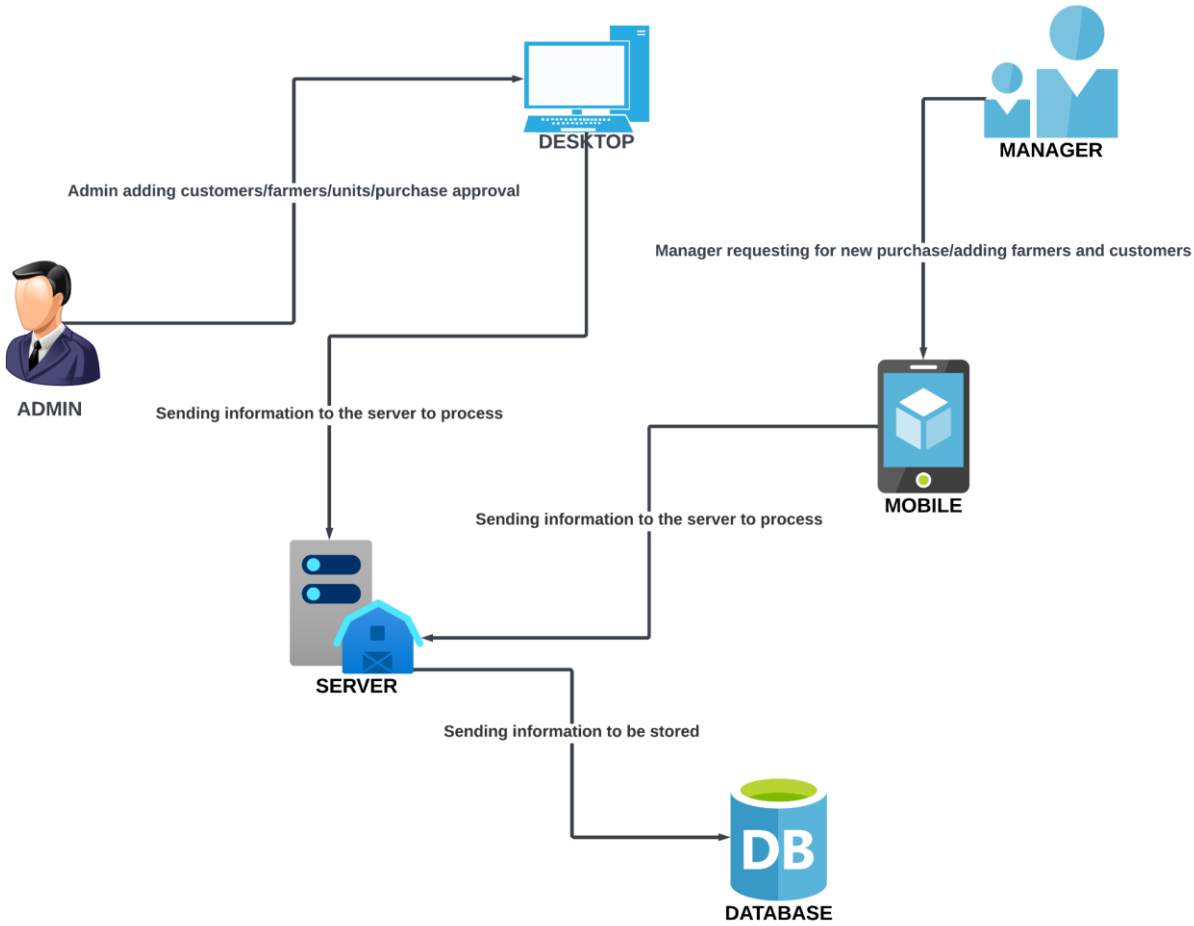

Figure 5.1: Rich Picture

Functional and Non-Functional Requirements

Functional requirement are the ones that are used by end users when the specifically request a condition that is certain according to the capacity of the system. These functions need to be included in the system by being the part of the contract. The way these are represented by the input of the system, operation, and the outcome that is required. They are mainly the user's requirements. [5]

A non-functional requirement refers to the process of how a system should be and also its usefulness. Every requirement that is not come functional requirements can be considered as non-functional requirements.

Functional Requirements:

Upon user registration, the data is stored in the database. Subsequently, during login attempts, the system verifies the accuracy of the provided email and password. Upon successful validation, a user profile is generated, and the user is directed to the dashboard. Within the dashboard, the user has the ability to add, modify, or remove information based on their granted access.

Non-Functional Requirements:

Usability: The application aims to provide a user-friendly and intuitive experience for easy user access.

Maintainability: Regular maintenance will be performed on the application to ensure it remains efficient, avoiding slowdowns and addressing any bugs promptly.\\

Reliability: The application will prioritize reliability, emphasizing system availability and uninterrupted service.

Scalability: The system will be accessible from various devices, including smartphones and aesthetically similar web applications for computers, enhancing scalability.

Security: The application will prioritize security, ensuring the safety of personal information such as phone numbers and email addresses.

5.3 System Analysis

5.3.1 Six Element Analysis

Table 5.1: Six Element Analysis

Process	Human	Non-computing Hardware	Computing Hardware	System	Database	Communication and Networking
Administrator Login	Admin	N/A	Desktop/Mobie	Windows/iOS	MySQL	Wifi/Mobile data
Manager Login	Manager	N/A	Desktop/Mobie	Windows/iOS	MySQL	Wifi/Mobile data
Manager Registration	Manager	N/A	Desktop/Mobie	Windows/iOS	MySQL	Wifi/Mobile data
Customer Data Input	Administrator andManager	N/A	Desktop/Mobie	Windows/iOS	MySQL	Wifi/Mobile data
Farmer Data Input	Administrator andManager	N/A	Desktop/Mobie	Windows/iOS	MySQL	Wifi/Mobile data
Product Data Input	Administrator andManager	N/A	Desktop/Mobie	Windows/iOS	MySQL	Wifi/Mobile data
Purchase Approval	Administrator	N/A	Desktop/Mobie	Windows/iOS	MySQL	Wifi/Mobile data

5.3.2 Feasibility Analysis

A feasibility study involves evaluating the viability and practicality of a project or system. Its purpose is to objectively analyze and assess the strengths and weaknesses of an ongoing business or a proposed initiative, as well as identify opportunities and threats within the surrounding environment. Additionally, it delves into the resources needed to execute the project and evaluates the likelihood of achieving success. [6]

Three key considerations involved in the feasibility analysis are:

Economical Feasibility: This study is conducted to assess the economic influence the system will exert on the organization. There are financial constraints regarding the allocation of funds for the research and development of the system. Expenditures need to be rationalized, and hence, the developed system adheres to the budget. This was possible by leveraging freely available technologies, with the need for purchasing being limited to customized products.

Technical Feasibility: The purpose of this study is to assess the technical viability, specifically focusing on the technical needs of the system. It's essential that any system developed does not strain the existing technical resources. Excessive demands on the client due to high technical requirements are undesirable. The goal is to create a system with modest demands, necessitating minimal or no changes for its smooth implementation.

Social Feasibility: The purpose of this study is to assess the technical viability, specifically focusing on the technical needs of the system. It's essential that any system developed does not strain the existing technical resources. Excessive demands on the client due to high technical requirements are undesirable. The goal is to create a system with modest demands, necessitating minimal or no changes for its smooth implementation.

5.3.3 Problem Solution Analysis

Many problems were encountered while completing the project and they were solved through study and analysis. Some of problems can be shortlisted and mentioned below:

System dynamic capability: the main requirement for this system was that it needed to be fully dynamic and easily customizable and while trying to fulfill this requirement the problem was detected. There were some problems while building relationships with entities. We had to go through trial and error a few times. After research and implementation this problem was solved and it was made fully dynamic so that it can adapt to any other requirements with only minor changes to the system.

Updating data: this issue arose during the development of the system’s backend. The system requires the data to update with each edit. But it was failing to do so. After the error was detected and solved, the edited data was shown error free.

5.3.4 Effect and Constraints Analysis

Each project has its own set of constraints and risks that must be managed to ensure the project's ultimate success. Project managers have three major constraints: time, scope, and budget. The triangle of project management is often known as the three limits. Extending the project's scope, for example, will almost certainly require more time and money, but shortens the project's other aspects.

Time: timetable can save money while also reducing the scope. In the development of any undertaking, time is vital. All employees in our project worked from home and gave a daily update at the end of the day. As a result, our project stayed on track, and no delays were recorded.

Cost: for a project's budget one must include both fixed and variable costs, such as materials, permits and the financial impact of project team members. The budget was previously approximate because many other estimations were previously made.

Scope: a project may have its boundaries and that is defined by the scopes available. It defines the trait the organization and the project must gain. There was no backtracking in our project because the scopes were defined from the start. It also had the procedures to carry them out.

5.4 System Design

5.4.1 UML Diagrams

UML is an architecture. Mainly used in designing and then implementing the design in the system. It stands for unified modeling language. An application code may contain a thousand lines and to track the relations is very tough. It becomes easier with this diagram and UML diagrams are divided into two parts and they are components and sub components. [7]

Use Case Diagram: A use case diagram provides a visual overview, presenting actors, a system boundary encompassing a set of use cases, communication connections between actors and users, and generalization relationships among use cases. It depicts both external factors (actors) and internal processes (use cases) that define the system's behavior.

The depicted diagram illustrates the use case diagram for the proposed system. The use case "Check classification patterns" represents the user's capability to extract rules or classification patterns from the original dataset. This use case expands on

information gain computation by dividing tuples based on information gain calculated for each attribute. The attribute with the highest information gain is selected as the splitting criterion.

Similarly, the use case "Check privacy preservation" indicates the user's ability to evaluate the privacy level within the dataset. This use case extends the concept of data generalization, as the privacy level is closely associated with the extent of data generalization.

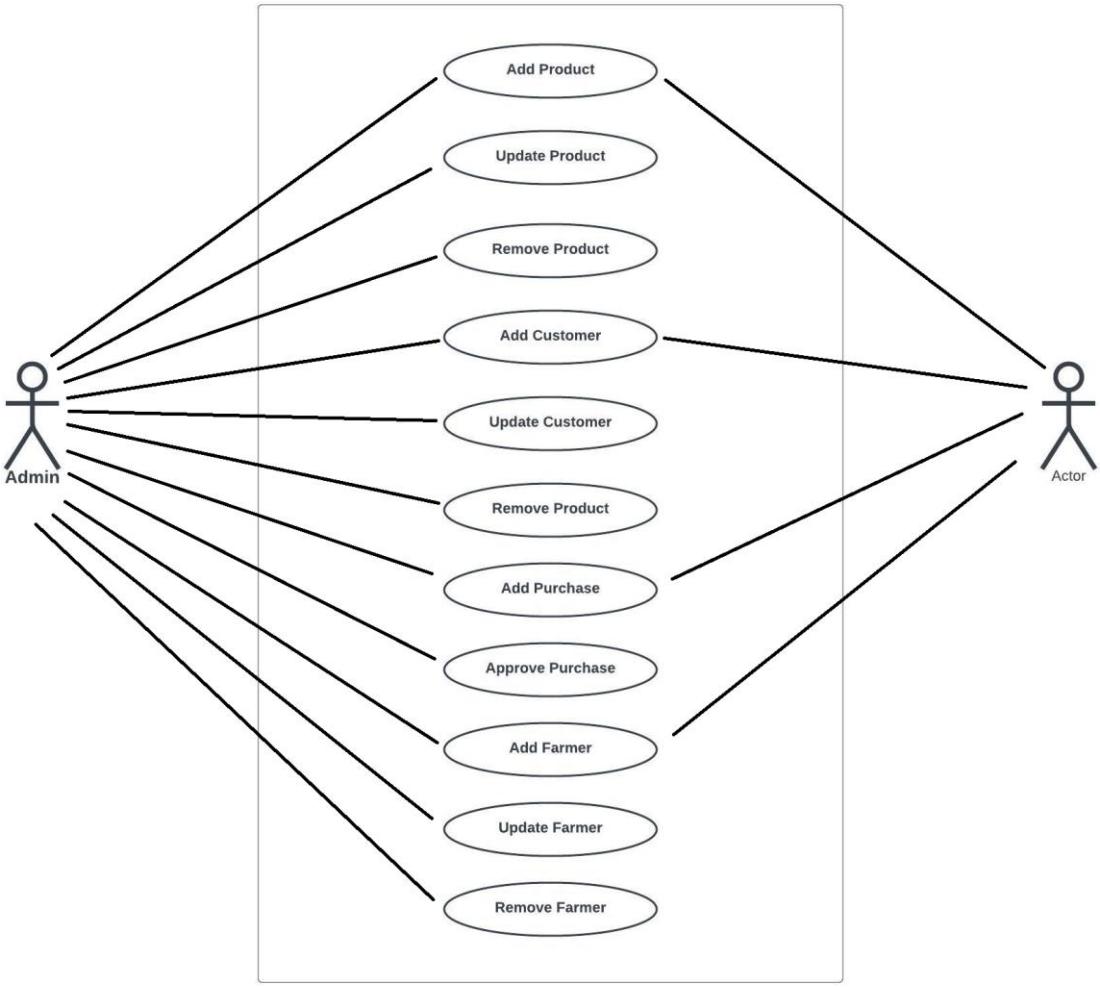

Figure 5.2: Use Diagram

Sequence Diagram

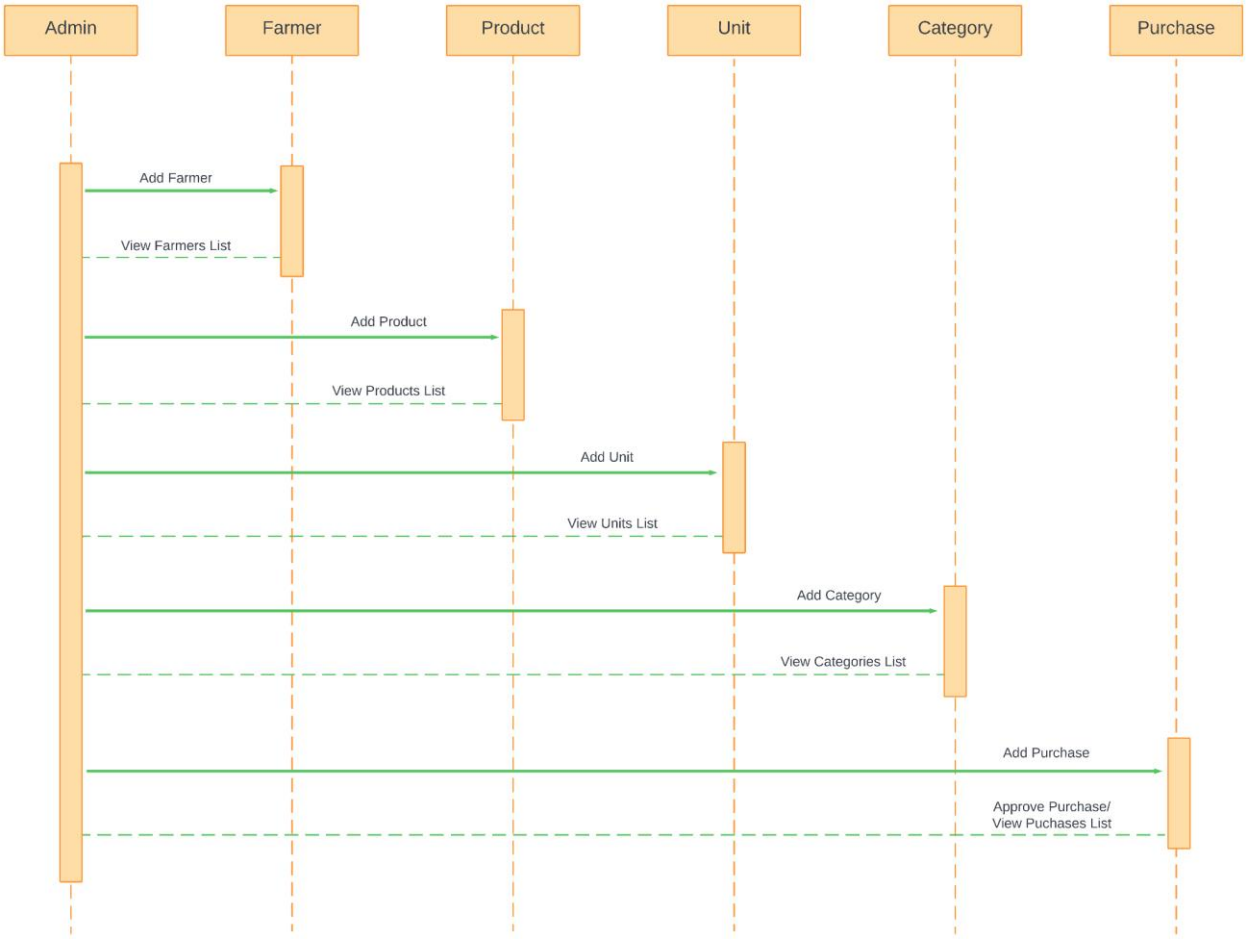

Figure 5.3: Sequence Diagram

ER Diagram

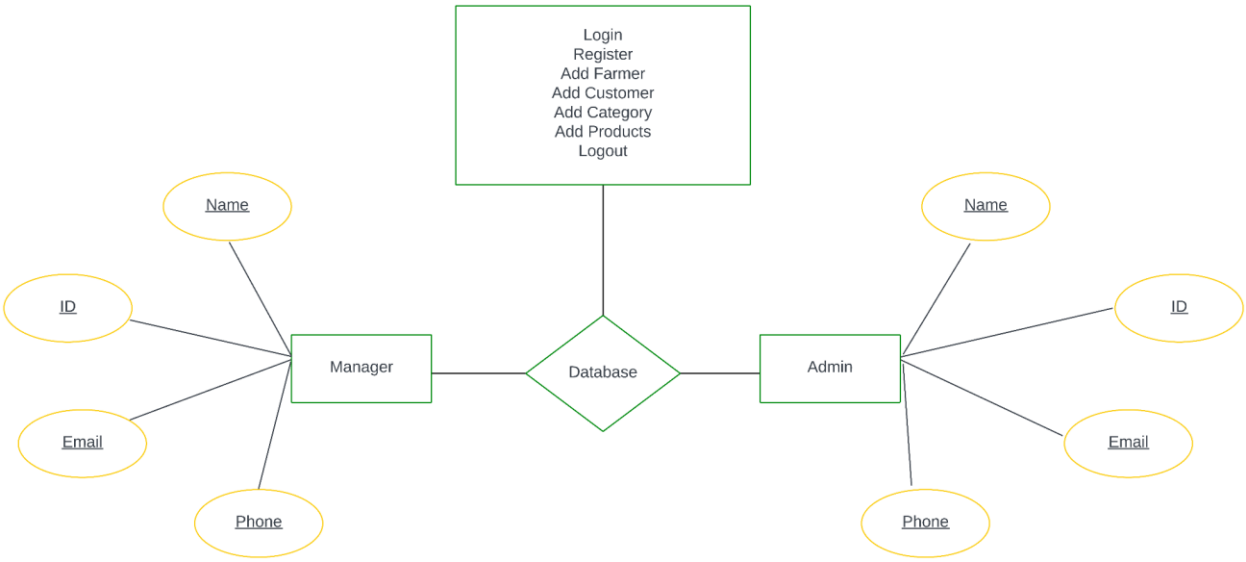

Figure 5.4: ER Diagram

Activity Diagram

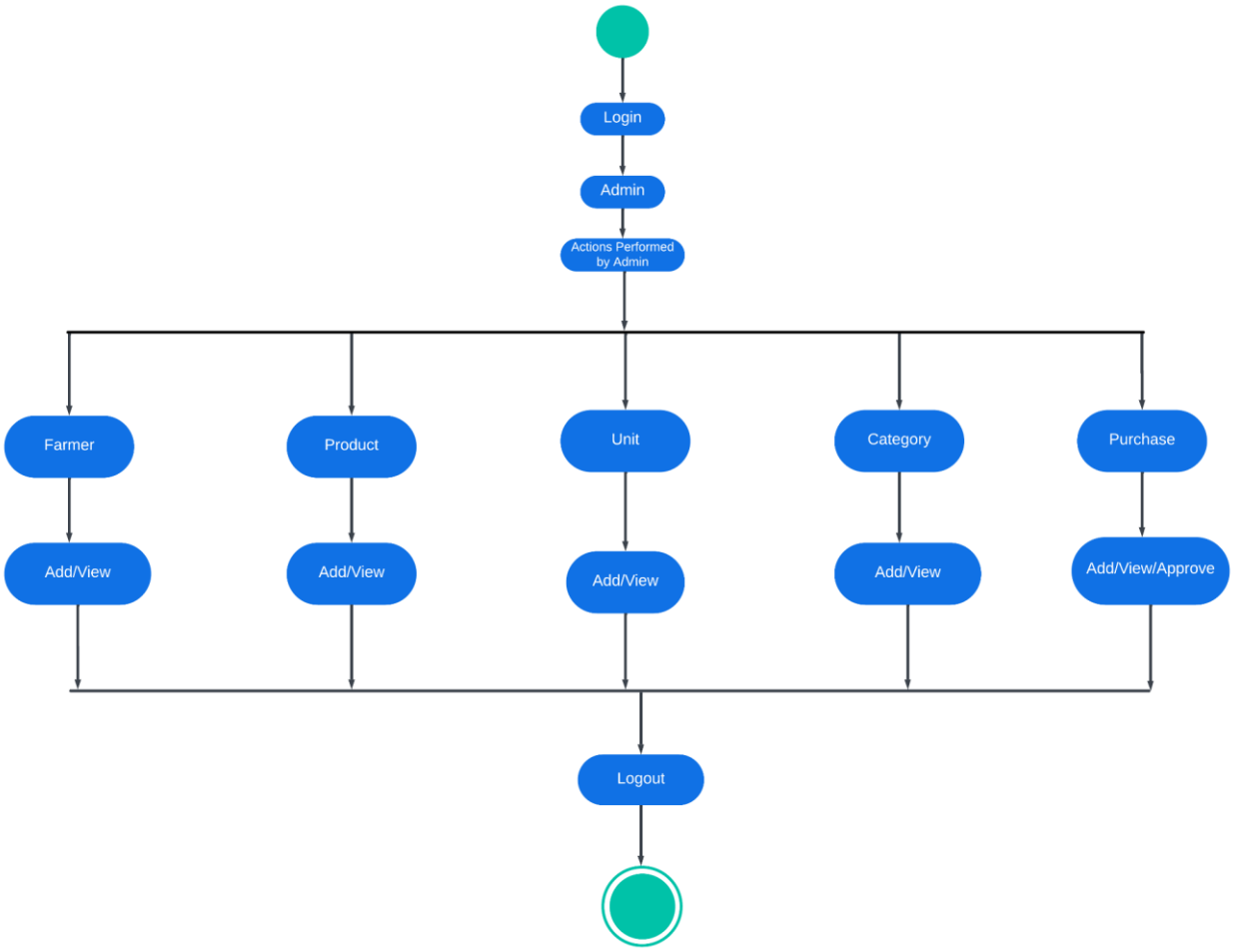

Figure 5.5: ER Diagram

Data Flow Diagram

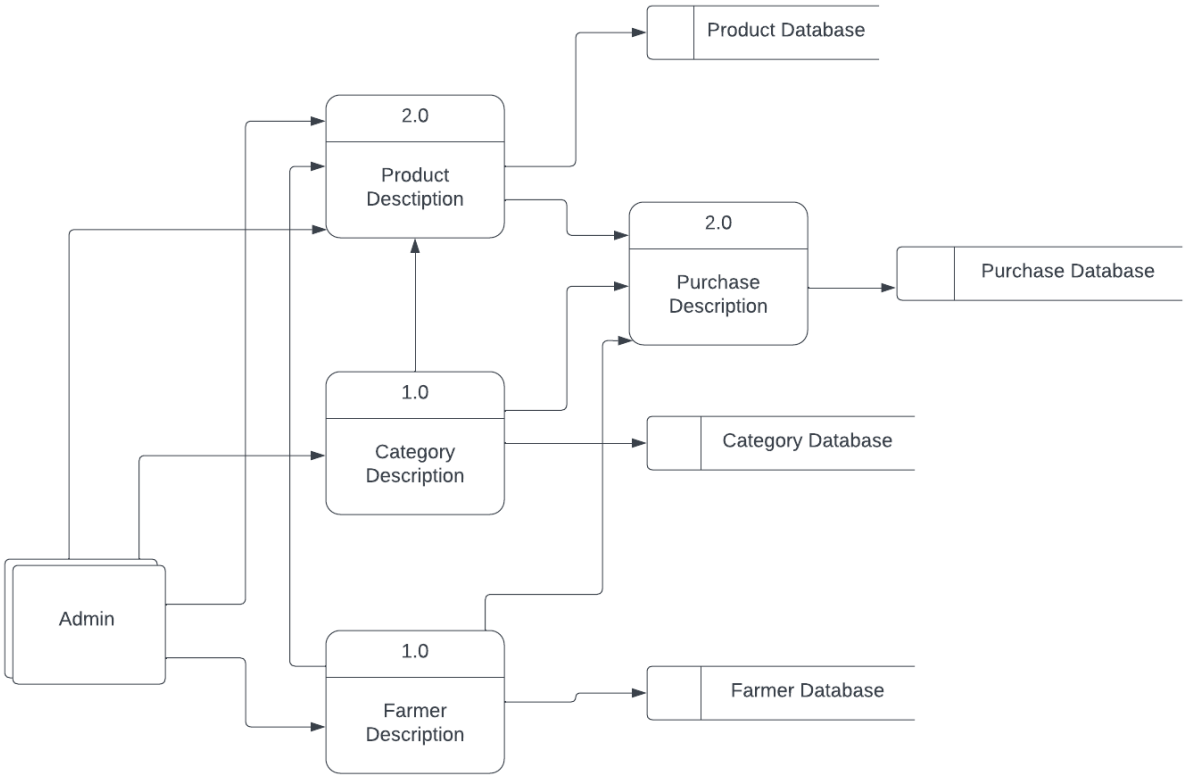

Figure 5.6: Data Flow Diagram

5.4.2 Architecture

There are several layers of an inventory management system's architecture. The application layer at its core is responsible for business logic. The business logic consists of inventory tracking, order processing and reporting. The application layer then communicates with the Database layer where the products data and transaction are stored. Web-based layer is the presentation layer which is the user interface, allowing a user to interact with the system.

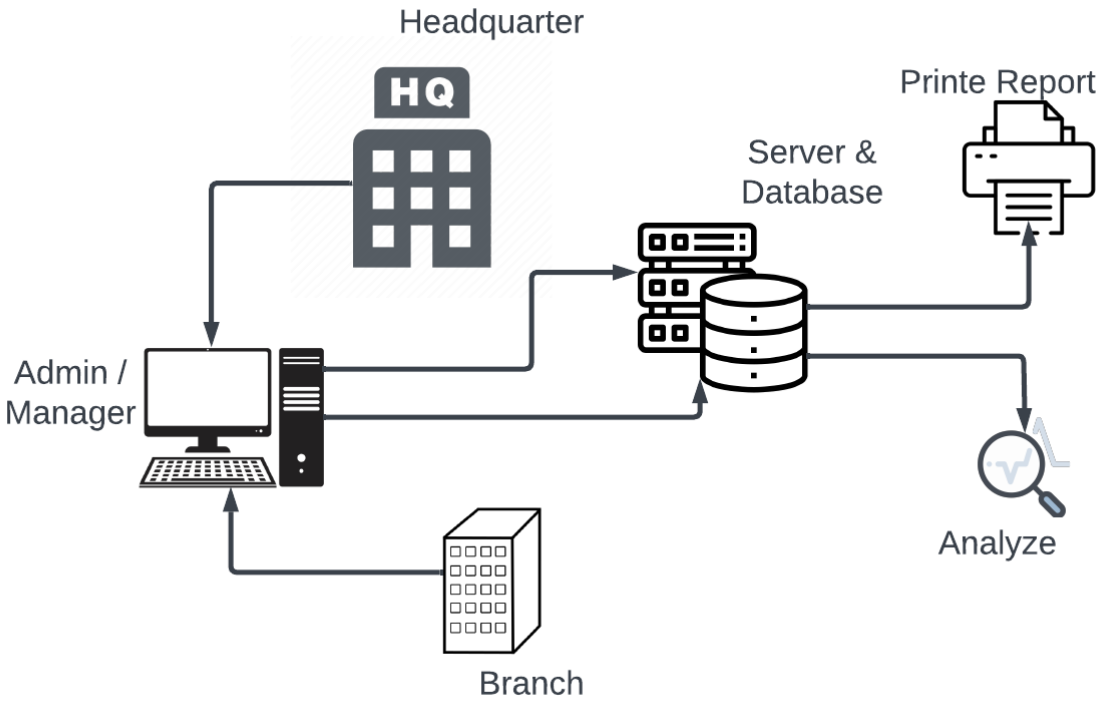

Figure 5.7: Architecture Diagram

5.5 Implementation

Frontend:

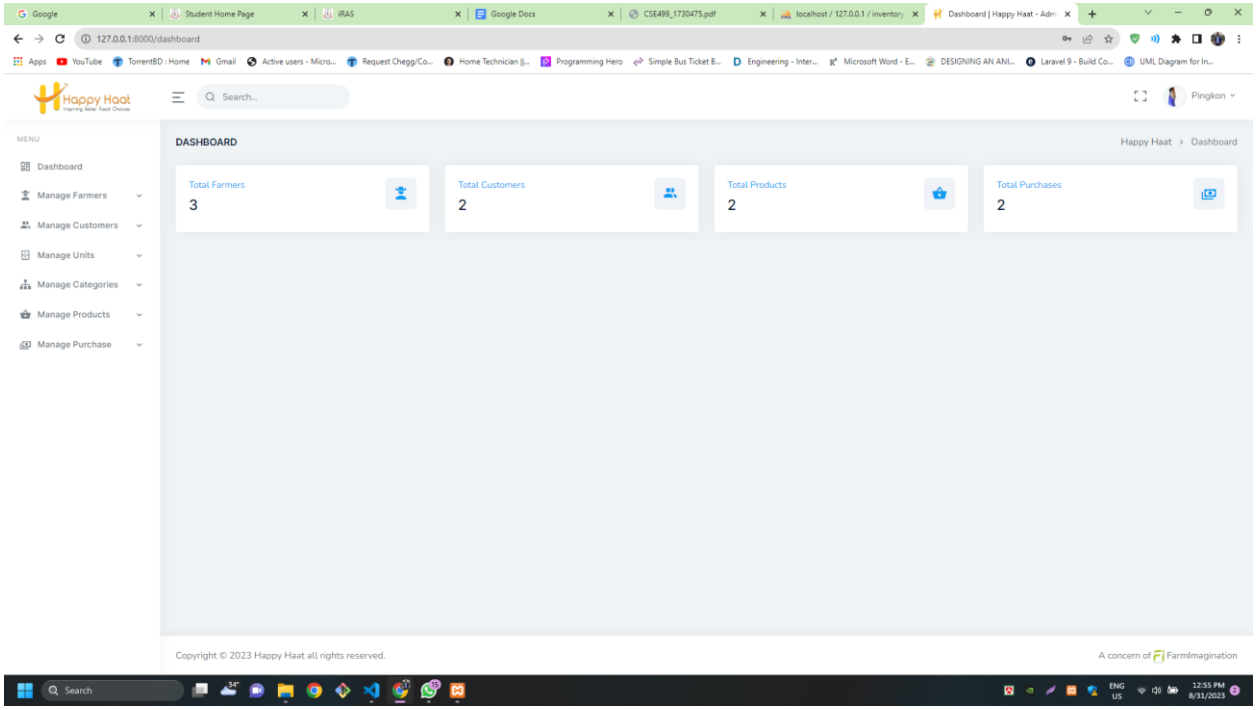

Figure 5.8: Admin Dashboard

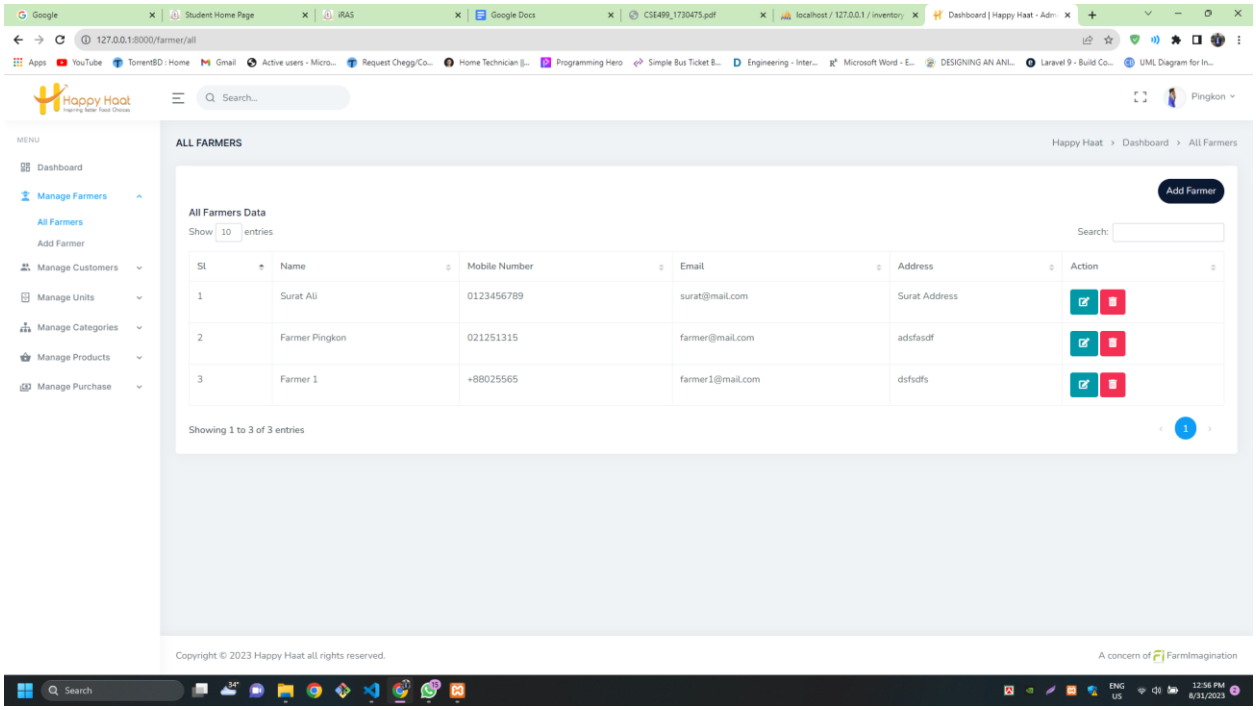

Figure 5.9: Admin view - All Farmers List View

Admin can view the list farmers. Admin has the access to edit and delete the data of the farmers.

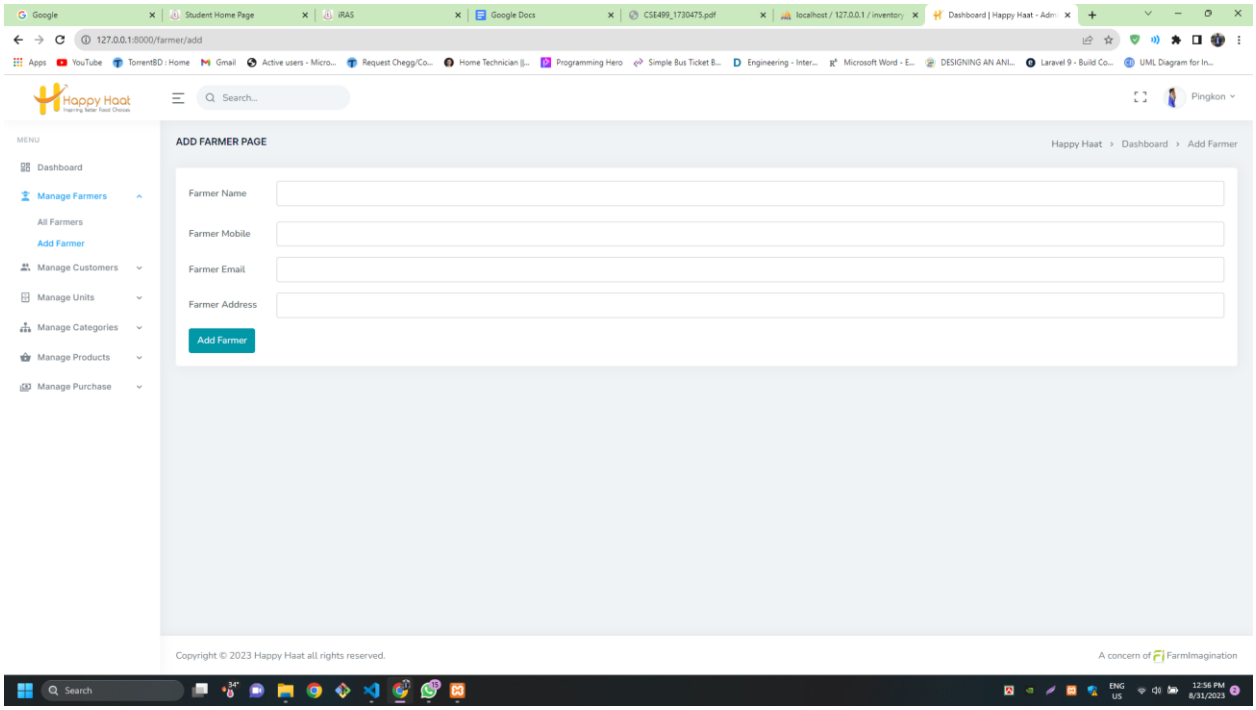

Figure 5.10: Admin - Add Farmer View

Admin can add new farmers in the database from the web application of inventory management system.

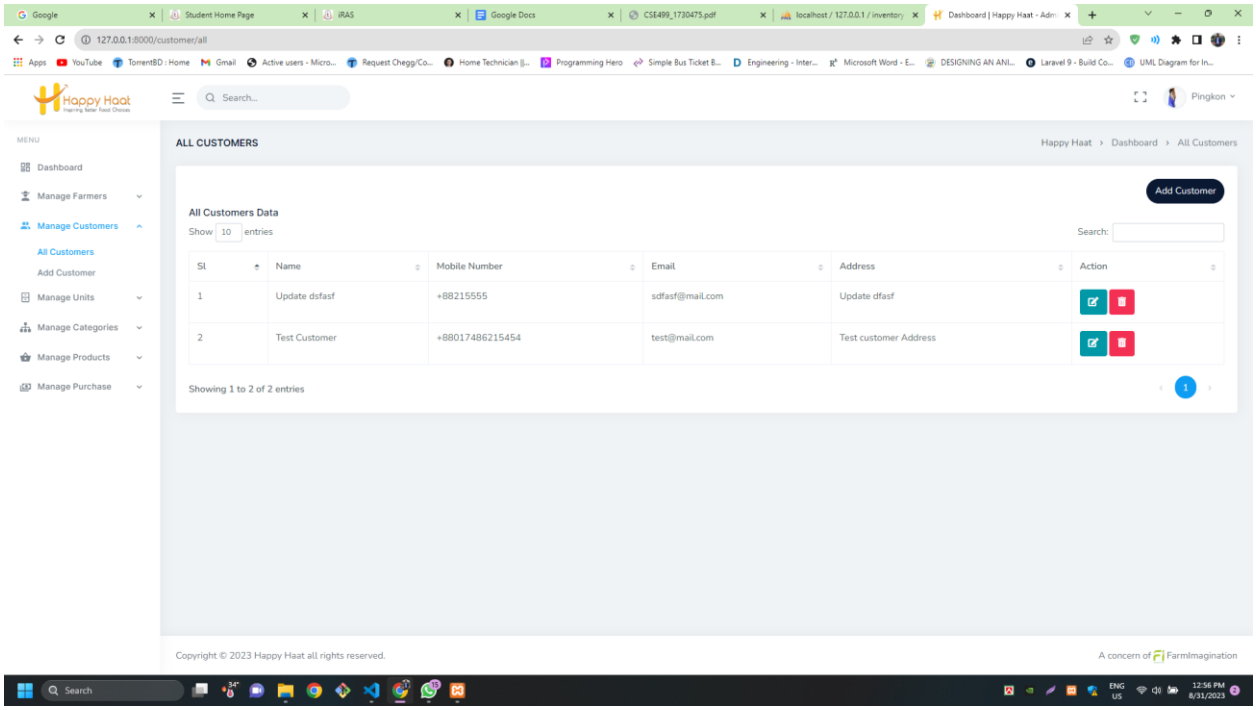

Figure 5.11: Admin - All Customers List View

Admin can view the list customers. Admin has the access to edit and delete the data of the customers upon request.

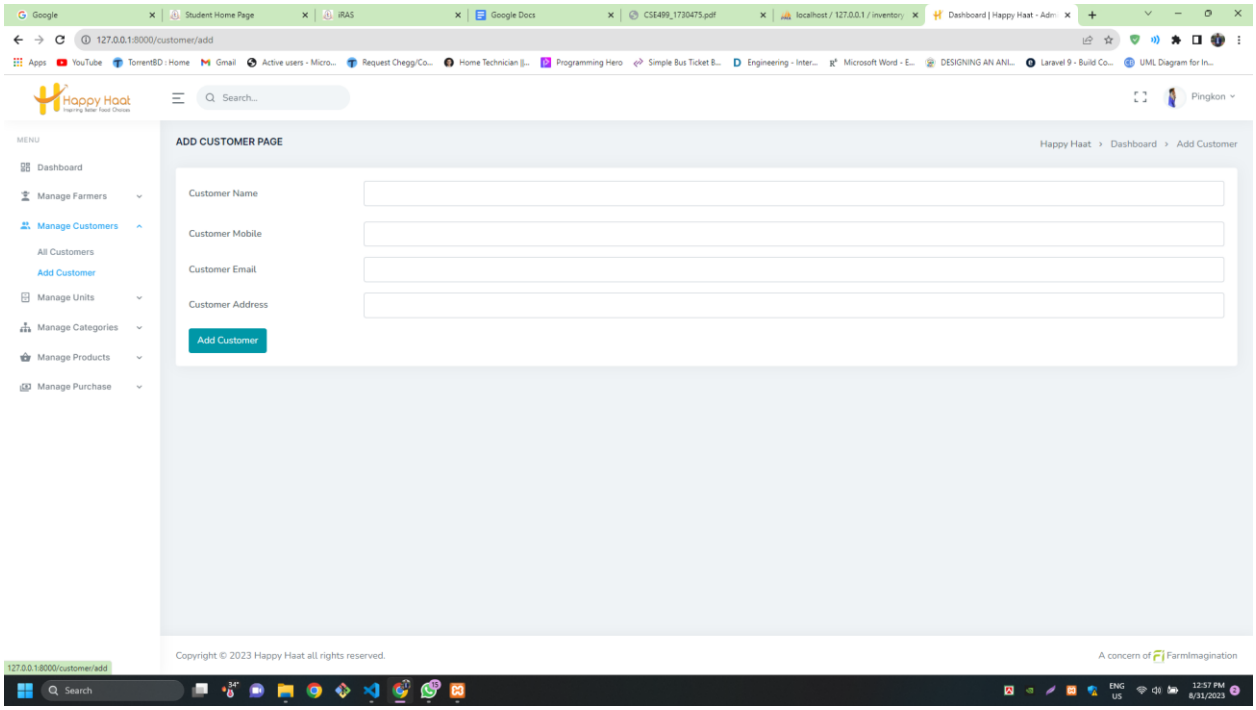

Figure 5.12: Admin - Add Customers View

Admin can add new customer in the database from the web application of inventory management system.

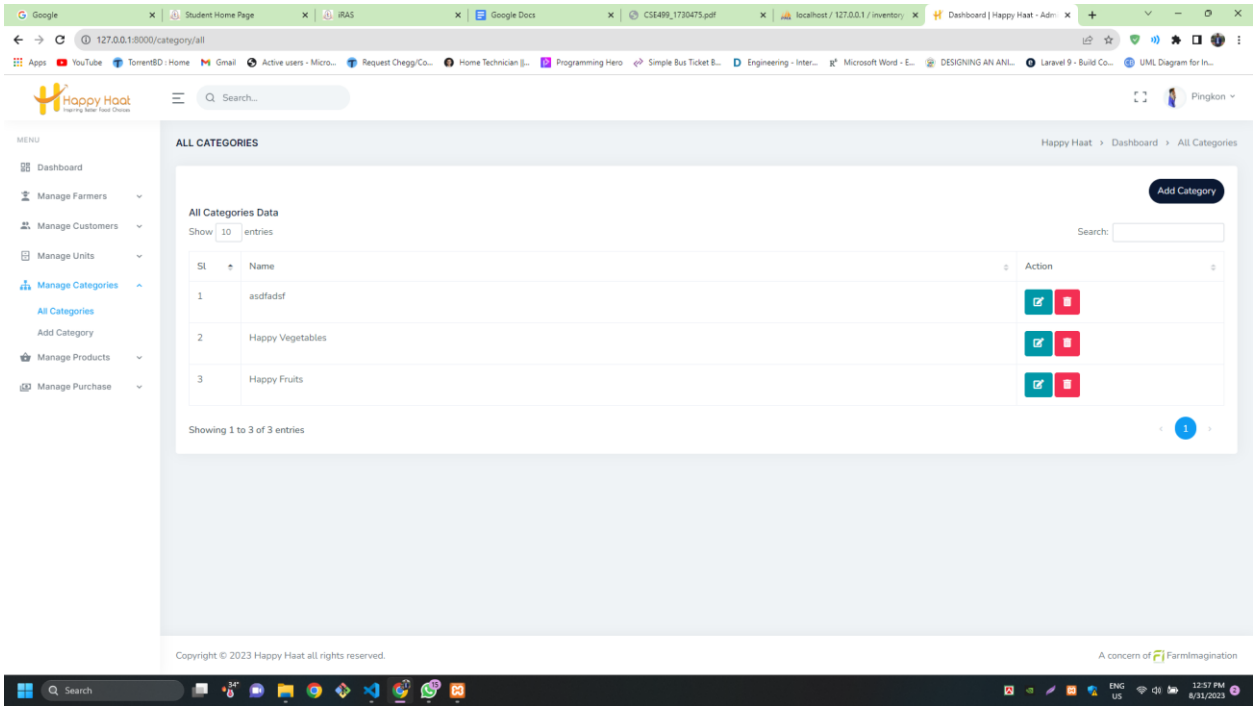

Figure 5.13: Admin - All Categories List View

Admin can view the list categories. Admin has the access to edit and delete the data of the categories if necessary.

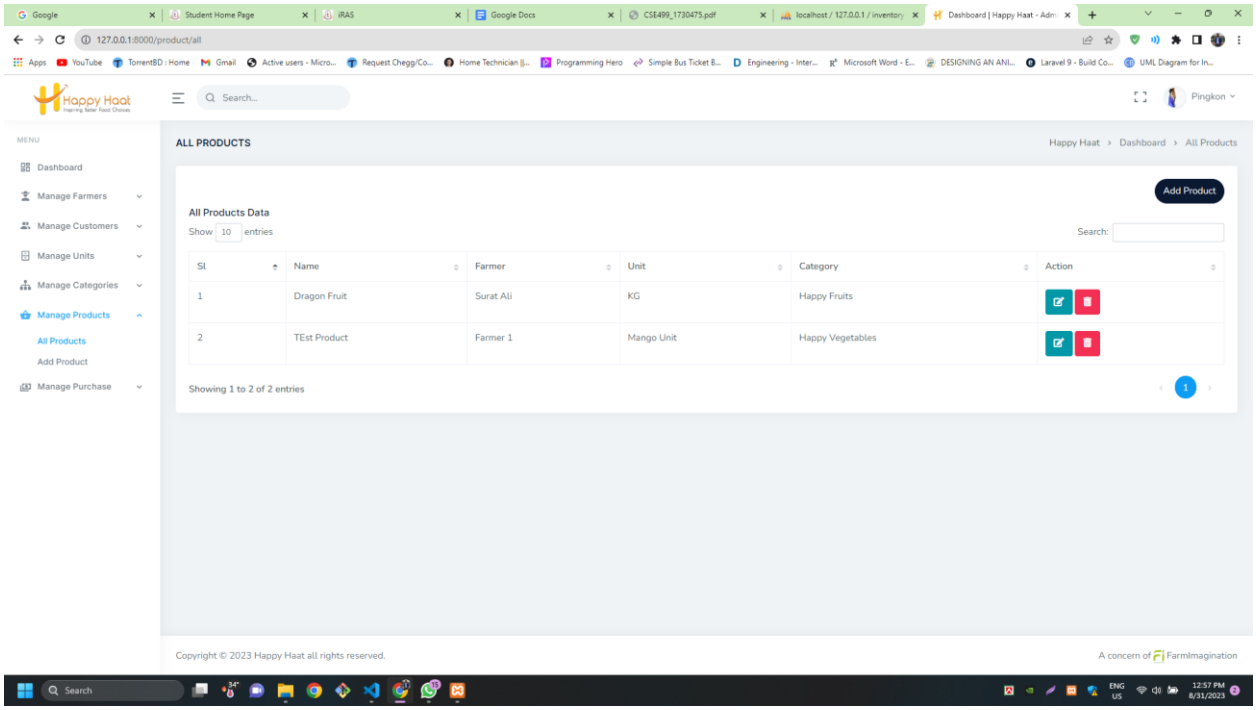

Figure 5.14: Admin - All Products List View

Admin can view the list products. Admin has the access to edit and delete the data of the products if necessary.

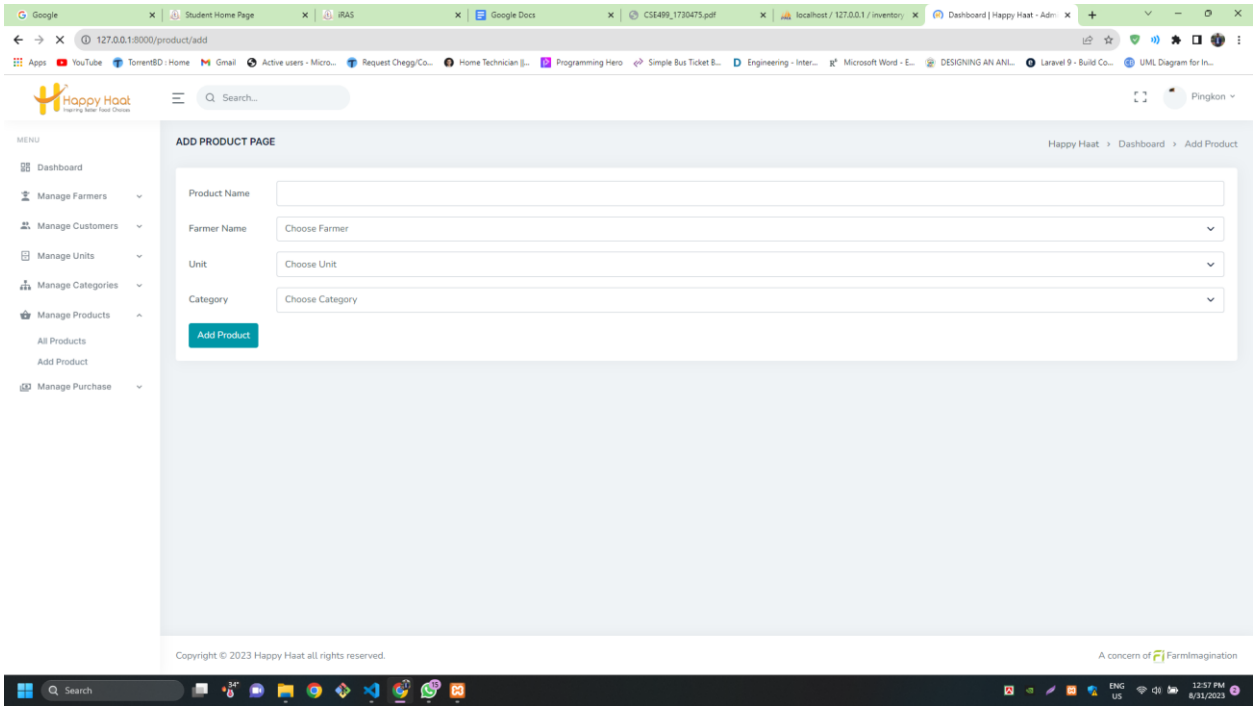

Figure 5.15: Admin - Add Products View

Admin can add new products in the database from the web application of inventory management system.

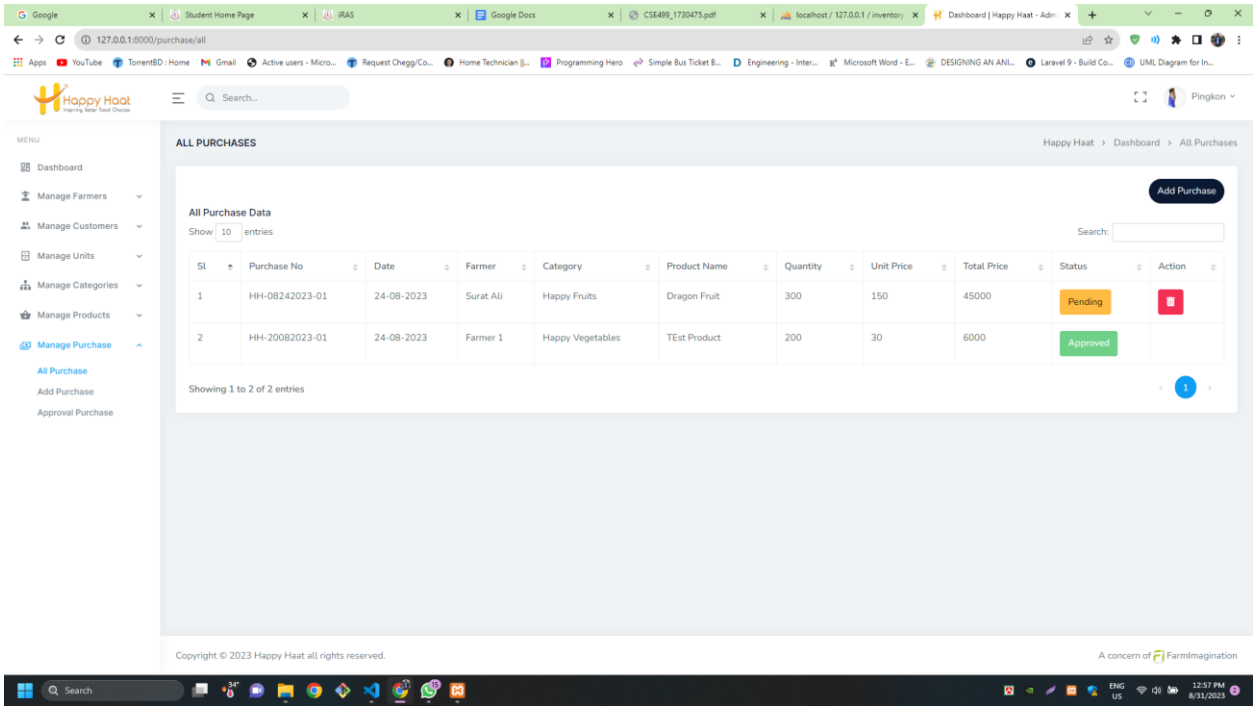

Figure 5.16: Admin - All Purchases List View

Admin can view the list purchases. Admin has the access to delete the any purchase if necessary, only if it is still in pending status.

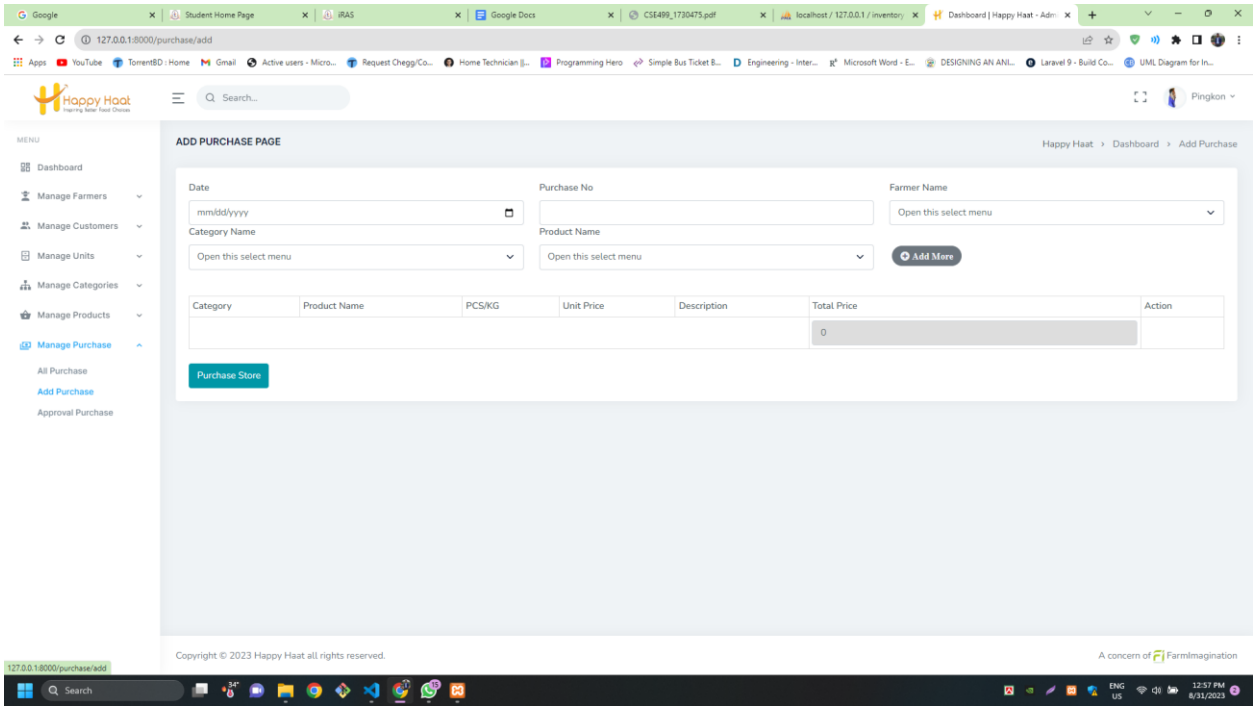

Figure 5.17: Admin - Add Purchase View

Admin can add new purchase for the inventory of the company in the database from the web application of inventory management system.

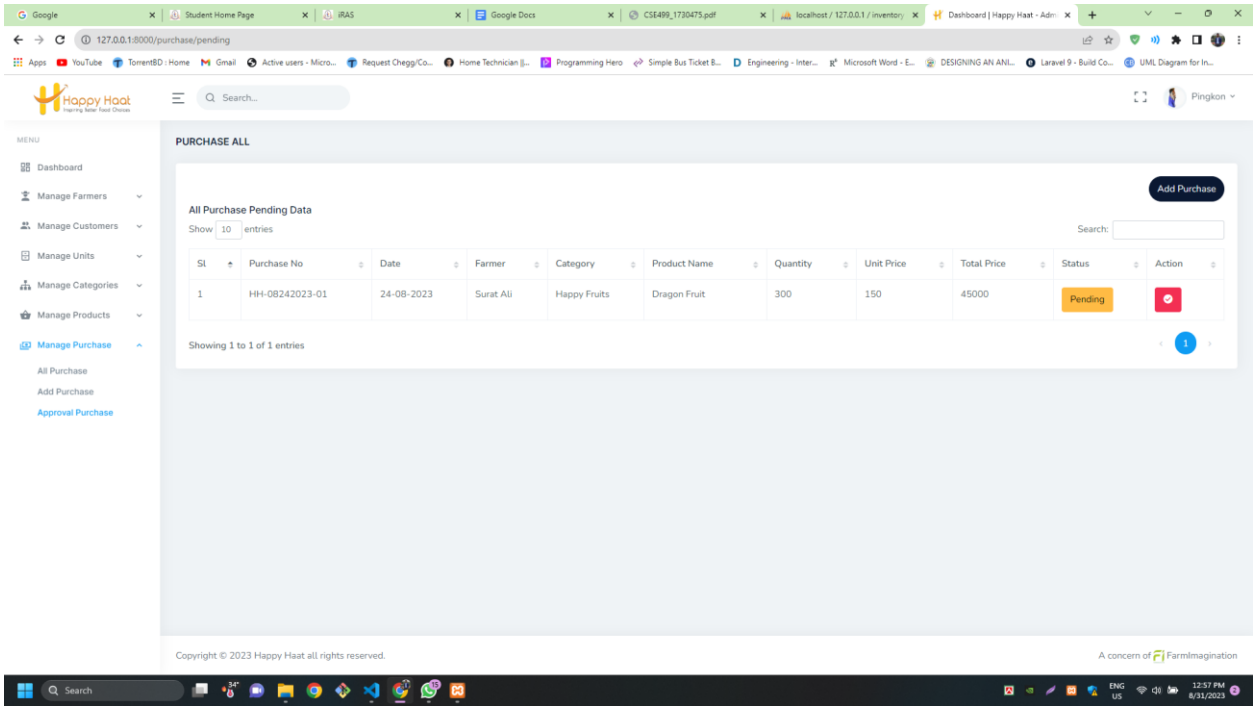

Figure 5.18: Admin - Approve Purchase View

Only admin has the access to approve any purchase that was requested by any other admin or branch managers after verification.

5.6 Testing

Backend:

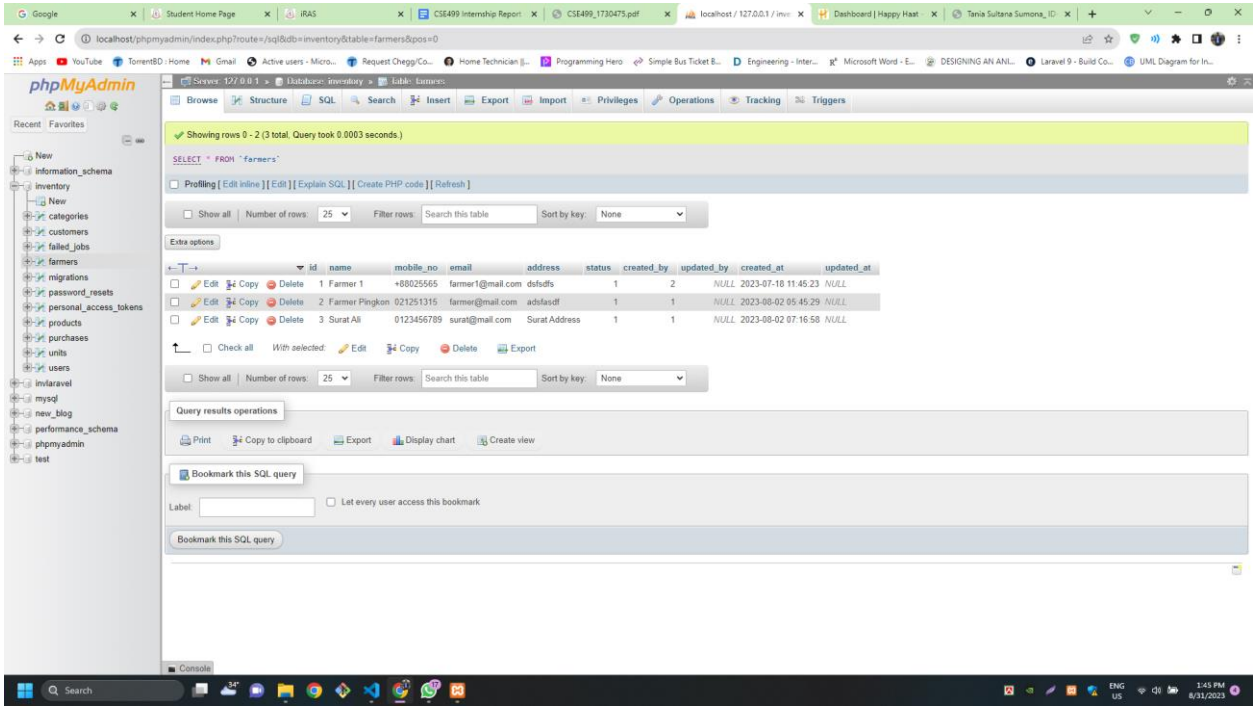

Figure 5.19: Backend - Farmers Data

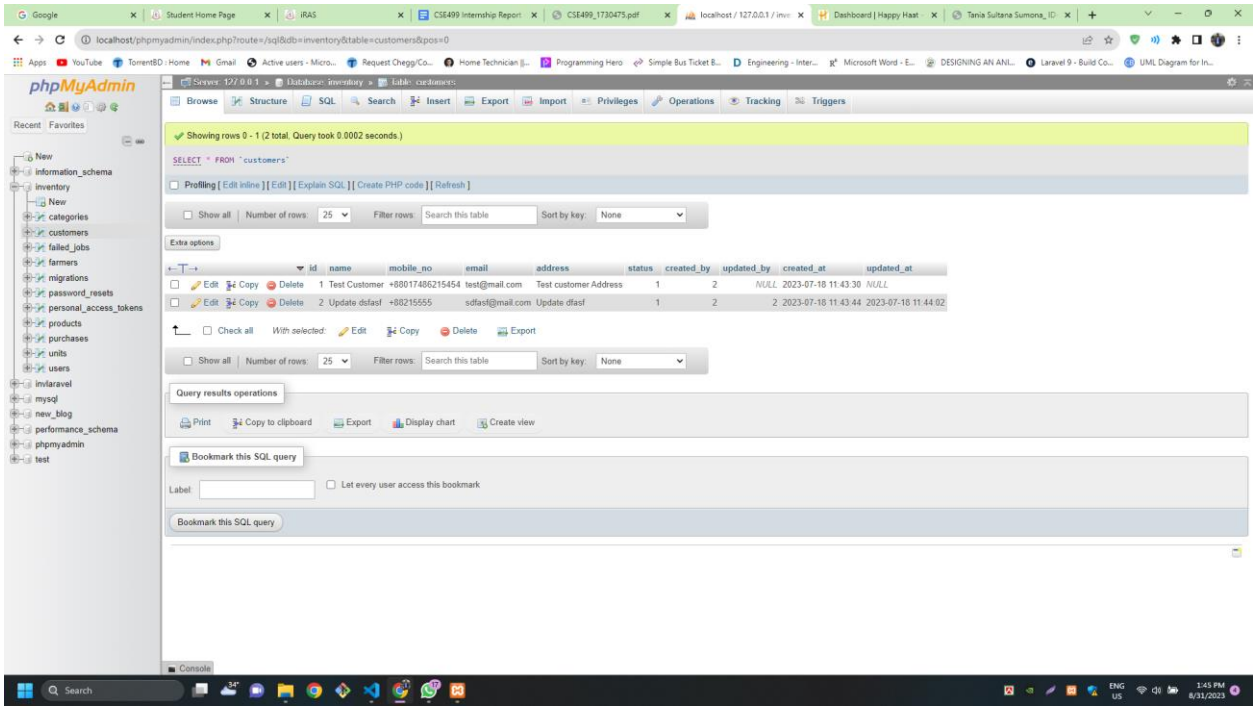

Figure 5.19: Backend - Customers Data

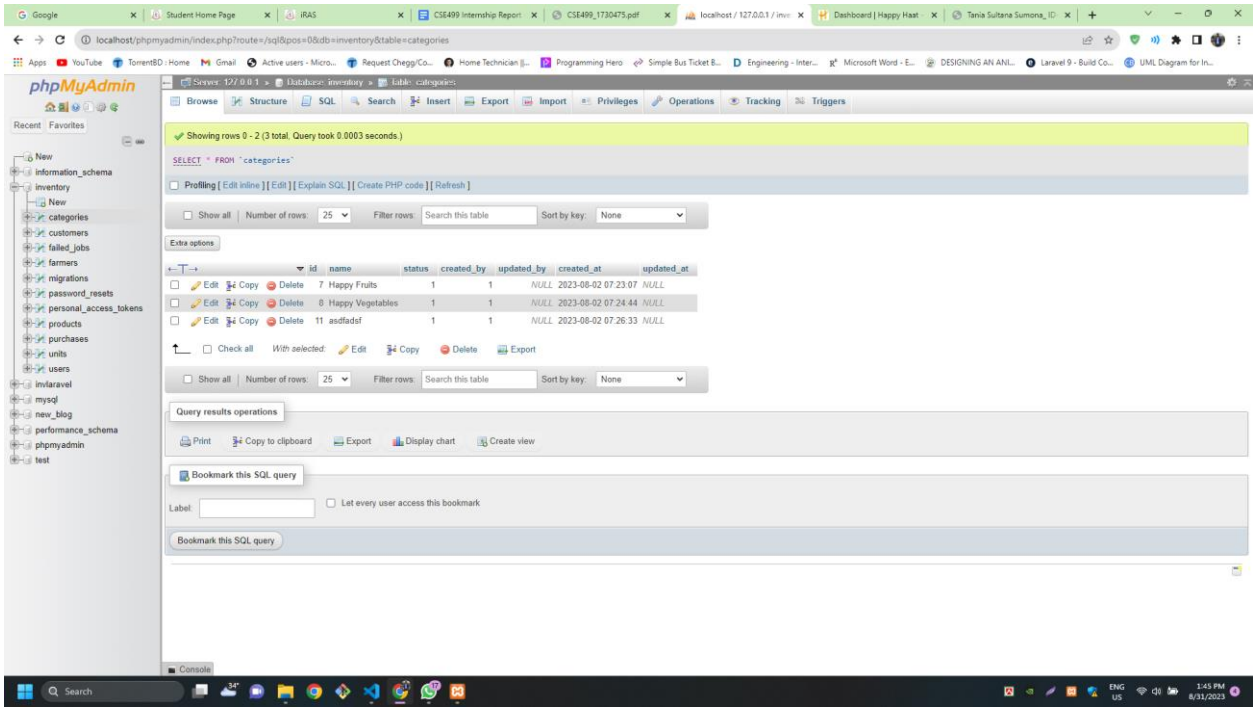

Figure 5.20: Backend - Categories Data

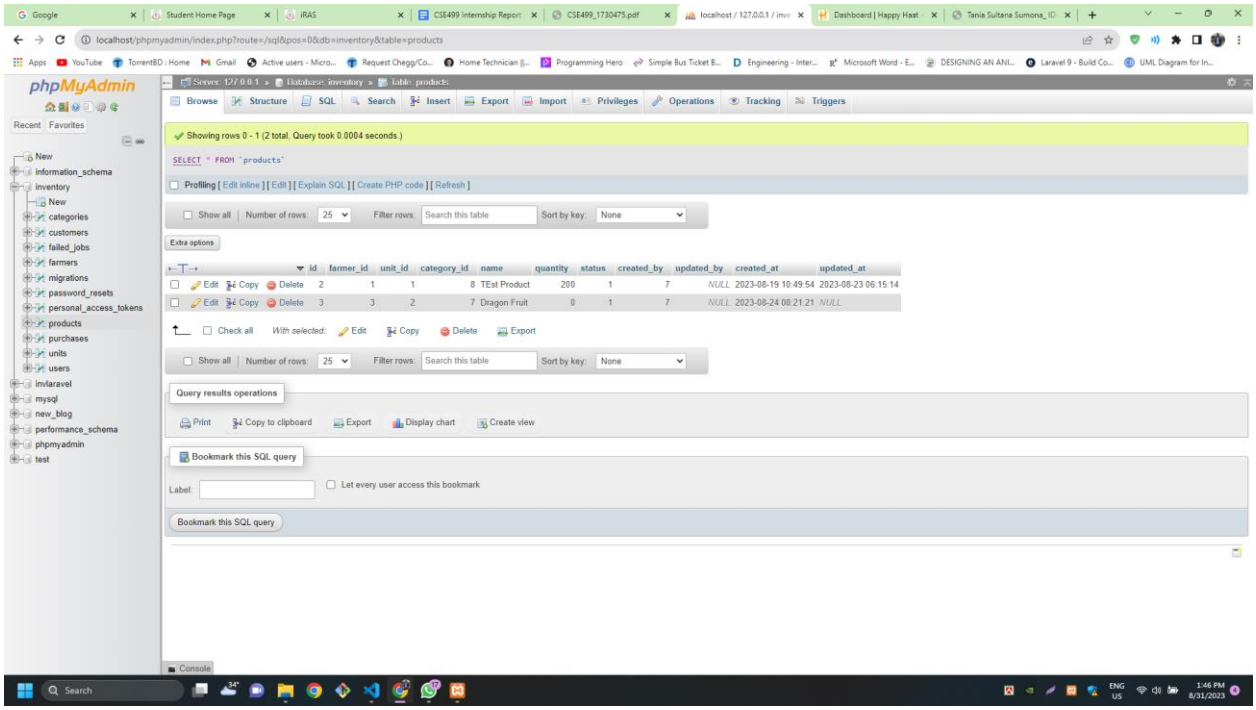

Figure 5.21: Backend - Products Data

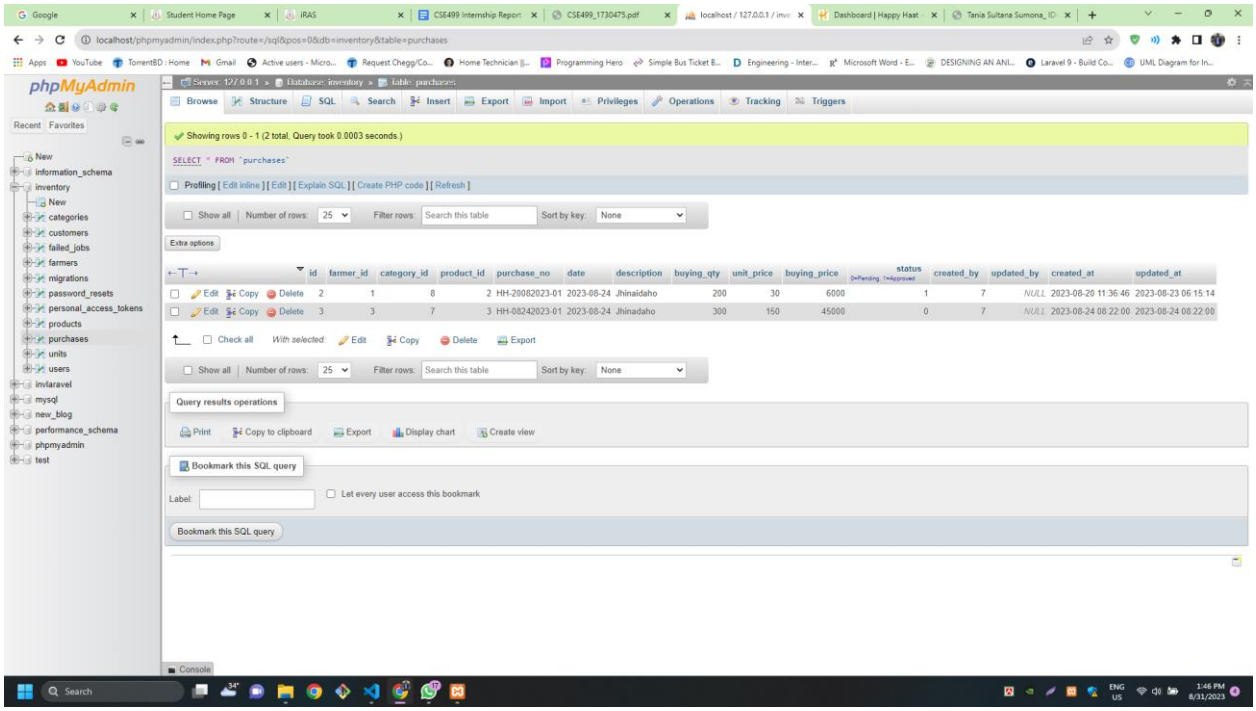

Figure 5.22: Backend - Purchases Data

Chapter 6

Results & Analysis

The system is about inventory management system. This system will serve some important services. To develop this, first I tried to understand the requirements. For this a meeting was arranged with the authorities of the office. After listening all their requirement, I asked for help from my supervisor to sum up all their requirement to identify the real problem, its objective and scope. After realizing requirement, I thought of using iterative and incremental development process for this system. I designed my work according to this model. To complete my work, I followed some extra steps, that I mentioned in the wbs of my project.

For finding out the systems possible feature I interviewed some interviewees to have their opinion. For this I chose closed ended questions to specify the answer. From requirement phase I gradually started developing my project. I did some analysis to visualize my work, as in six element analysis, feasibility analysis and many more. These analyses cleared the purpose of the system, why it is needed and its economic benefits.

With the guideline from my supervisor, I designed the general structure of the project. While doing so I faced several problems but analyzing those problem I came up with the solution. For system design I think uml diagram is the best option to visualize my work along with its main actors, roles, actions, or classes. Implementing all the possible function can really increase the productivity of the website. This project’s main objective is to make all the processes of the system more user friendly.

The services that are provided by the web application are store the farmer details, category management, product item information management and purchase management system. Admin and managers can view the whole web application. Admin and managers can see the category of the product items.

Chapter 7

Project as Engineering Problem Analysis

7.1 Sustainability of the Project/Work

In project management, sustainability refers to a business strategy that harmonizes environmental, social, and economic aspects of project-oriented tasks. It aims to fulfill current stakeholder requirements without jeopardizing or imposing excessive burdens on future generations.

7.2 Social and Environmental Effects and Analysis

An inventory management system has significant impact on social and environmental aspect. The implementation of the system in a business leads to reduced manual labour associated with inventory handling and tracking. An employee can focus on more meaningful tasks rather than daily routine checkup for inventories. The system can be used to analyze and be alert of reducing instances of stock outs rather than depending on a person.\\

An efficient inventory management system helps to minimize the wastage in supply chain. A company generates less waste by having an optimized order quantities and reduced excess inventory. The usage of this system can lead to more streamlined logistics and transportation. Fewer trips will be arranged due to reduced lead times and efficient order. Less carbon footprint can be obtained by the company by the reduction in transportation, which is a huge contribution to the environment sustainability.

7.3 Addressing Ethics and Ethical Issues

An inventory management system stores sensitive information of farmers, costumer and company purchases of products. Breaches or misuse of the data might happen if they are not well protected, and here the ethical concerns may arise. For sensitive information safeguard implementation of robust data encryption and access control is required. Ethical concerns may be raised due to unfair treatment of employees. Proper training and support must be provided by the company to ensure they are treated fairly.

Chapter 8

Lesson Learned

8.1 Sustainability of the Project/Work

Through my process of making this application I faced a lot of problems.

Understanding the Project Requirement and Office Environment: Comprehending the initial specifications was a challenge for me because, being a new team member, I had to start by familiarizing myself with their ongoing work, including their coding practices and the folder organization they employed.

Adapting to New Technologies: They had specific frameworks they favored, so I needed to acquaint myself with a few of them before commencing my tasks.

Keeping up to Speed: Being a newcomer, getting acquainted with new technologies and applying them was initially a slow learning process for me.

Identifying and Fixing Bugs: Initially, identifying a bug was challenging due to my unfamiliarity with the frameworks. Nonetheless, certain bugs required a significant amount of time to pinpoint and resolve.

8.2 Solution of those Problems

Understanding the Project Requirement and Office Environment: I learnt how to properly structure code, write the model, view, and controllers, which coding pattern to use, and how to write less code to accomplish the same amount of work.

Adapting to New Technologies: Following my regular office hours, I dedicated my evenings to self-studying Laravel technology and understanding the functionalities of Android Studio. This extra effort was essential to keep pace with my internship responsibilities, and without it, completing this project would not have been possible.

Keeping up to Speed: Initially, my work pace was sluggish as I was in the process of learning and implementing new technologies for a real-world project. However, consistent effort enabled me to improve my speed gradually.

Identifying and Fixing Bugs: At the start, I was slow in my work due to learning and incorporating new technologies into an actual project. But by maintaining a regular effort, I was able to increase my pace.

Chapter 9

Future Work & Conclusion

9.1 Future Works

As this project is still ongoing, we are planning to add more features to it for making it more user friendly as well as beneficial to the company. The company will focus more on authentic data and making it simple for regular usage. Keeping the privacy confidential.

In future the company is planning to implement bar code system for individual products to eliminate manual data entry. The company is also planning to develop mobile app for their inventory system and integrate it with their e-commerce Happy Haat platform to ensure accurate and up-to-date product availability.

9.2 Conclusion

This report is specifically created for academic purposes, aiming to meet the criteria for an industrial attachment requirement. It comprehensively addresses both direct and indirect aspects of the software industry, discussing the challenges it presents. The report offers a glimpse into the practical experiences gained during my time at the workplace. Additionally, it provides a concise overview of FarmImagination, allowing fellow students to understand the company and make informed decisions about its suitability for them.

I have done my internship with great success. I was able to work in an sector that I had no prior knowledge about. I have gained new knowledge, skills, and met so many new people throughout my internship period. I got an insight into professional's skills.

The internship is also helpful to find out what my strengths and weaknesses are. This helped me to define what skills and knowledge I must improve in the future. During my internship period, I learned about PHP, Laravel, JavaScript, etc. Now I know how i can make a responsive web application. Since, I worked with a developer's team in FarmImagination now I know how to work within a team in a company and how to communicate with other team members of the team.

During my internship period, I have faced some challenges. Some of was technical and some of was non-technical. I solved these problems by understanding and analyzing the problem type, what actually causes these kinds of problems. And now I can say that I know how to overcome any challenges and solve any kind of problem.

I could never have imagined working as a full-time web app developer before my undergraduate studies. I continued to learn new things from each of my respected faculty members, which is why I am here now. I would not be in the position I am in now if it weren't for them. I truly appreciate all of the faculty's efforts, as they attended classes early in the morning, late in the evening, and even ate lunch late to attend our classes. Our teachers, who had led us here, are the actual heroes. Thank you to all of my professors; being a software engineer would be a dream without them.

Bibliography

[1] About farmimagination.” Available at http://www.farmimagination.com/ (accessed Aug. 31, 2023).

[2] “What is visual studio code?.” Available at https://www.educative.io/answers/what-is-visual-studio-code.

[3] Work breakdown structure (wbs): The ultimate guide (with examples).” Available at https://www.projectmanager.com/guides/work-breakdown-structure (2022).

[4] R. Duke, “What is a gantt chart? gantt chart software, information, and history.”
Available at https://www.gantt.com/.

[5] P. Gorbachenko, “Functional vs non-functional requirements [updated 2021].” Available at https://enkonix.com/blog/functional-requirements-vs-non-functional/ (Apr. 09, 2021).

[6] Types of feasibility study in software project development.” Available at https://www.geeksforgeeks.org/types-of-feasibility-study-in-software-project-development (Jun. 26, 2020).

[7] “Uml - standard diagrams - tutorialspoint.” Available at https://www.tutorialspoint.com/uml/uml_standard_diagrams.htm (2019).

An Undergraduate Internship/Project on
Happy Haat Inventory Management System

By

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Summer, 2023

Consent from Supervisor

The student modified the internship final report as per the recommendations made by his/her academic supervisor and/or panel members during and/or before final viva, and the department can use this version for archiving as well as the OBE course material for CSE499.

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