Sri Lanka Institute of Information Technology

Grocery stores Management System

Project Proposal

Information Technology Project (IT2080)

2022

Group ID: ITP_WD_B04_G07

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01.Introduction

Problem and Motivation

In grocery stores, a wide range of activities take place each day long. To deliver a high-quality service to clients and consumers who interact regularly with their services, a considerable amount of data needs to be stored and managed. The manual completion of this labor-intensive task takes time. The management of information, along with other service-related processes and information, must be done via an online-based system as online-based services advance. Services are much more efficient, dependable, accurate, and safe due to the trend toward using automated systems for company operations.

Most of the community has turned to online stores and services due to the pandemic crisis [1]. Online-based platforms thus offer both buyers and sellers a convenient and hygienic purchasing experience. Farmers and wholesalers who are struggling to sell their products due to competition [2], can register with the system directly and generate income from selling their products at a reasonable price; Individuals who are willing to start a new business can open a store using our brand name. They can register, request products, and sell goods through the online system with a well-developed customer base. Customers who purchase goods through the system can have them delivered to their residences from the nearest store and receive discounts, special offers, and other benefits. Part-time job seekers can have the benefit of applying for a position as a delivery service driver.

Major Problems and solutions

Not getting a reasonable price for products -

- Farmers typically must engage with intermediary vendors for exorbitant amounts when selling their products. Farmers can directly sell their products for reasonable rates through a system like this.

Poor customer base due to not renowned brand name -

- With a single, known brand name, this helps individuals to start a new business with a widely distributed customer base.

Lack of Job opportunities for part-time job seekers-

- Sri Lankans are suffering from severe economic issues because of the pandemic. Most students and low-income individuals who are looking for work can take advantage of the option to work as part-time delivery people.

Lack of efficiency and reliability of using manual system-

- As compared to automated systems, manual systems can never match their efficiency and dependability.

Benefits of the System

- providing a reasonable price for farmers
- online platform opportunities
- Job Offers
- Real – time data
- Availability
    - 24/7 Availability of service
- Easy and Accurate
    - Storing data and accessing it is more accurate.
- Reduce Cost
    - Less money needed than using a manual system and help in increasing the profit.
- Data security
- Ease of Management
    - Easy to manage day-to-day information.
- Improve Effectiveness and reliability.

Aim and Objectives

Due to the problems, we have decided to develop an online grocery store management system. The system is reliable, easy to use, and makes it easier for clients and consumers to do their daily duties. Providing efficient standards and confidentiality between clients and customers is the objective. This system will keep track of all employees, clients, registered customers, stores, stocks, and other company-related information. This system is useful for automating a variety of grocery store functions, including financial management, marketing management, delivery management, and store management. The system maintains a list of all the details on the functions and manages them with the utmost assurance. Also, this system utilizes databases to complete the necessary tasks and keep all relevant data and information.

02.Product Scope

This system will cover every aspect of managing a grocery business. By providing new functions into a single system, this system will improve productivity by eliminating all existing flows. This system will manage stock and inventory in an effective manner. Maintain a record of all the details pertaining to a product, including its distributor, buyer details, transport costs, and all the stock and inventory information. This system records all the financial data required for financial management, including drop in revenue and profit details, accounting, and fund details. This system oversees all the registered store information as well as the request information. This system includes all registered clients and other company-related information. Registered users can make online deliveries to their residences by using our delivery service. Also, this system will include all data and marketing management tasks for business promotion. This system consists of,

1. Customer Management
2. Financial Management
3. Order Management
4. Stock and Inventory Management
5. Supplier and Purchases Management
6. Stores Management
7. Delivery Management
8. Marketing and Customer Relationship Management
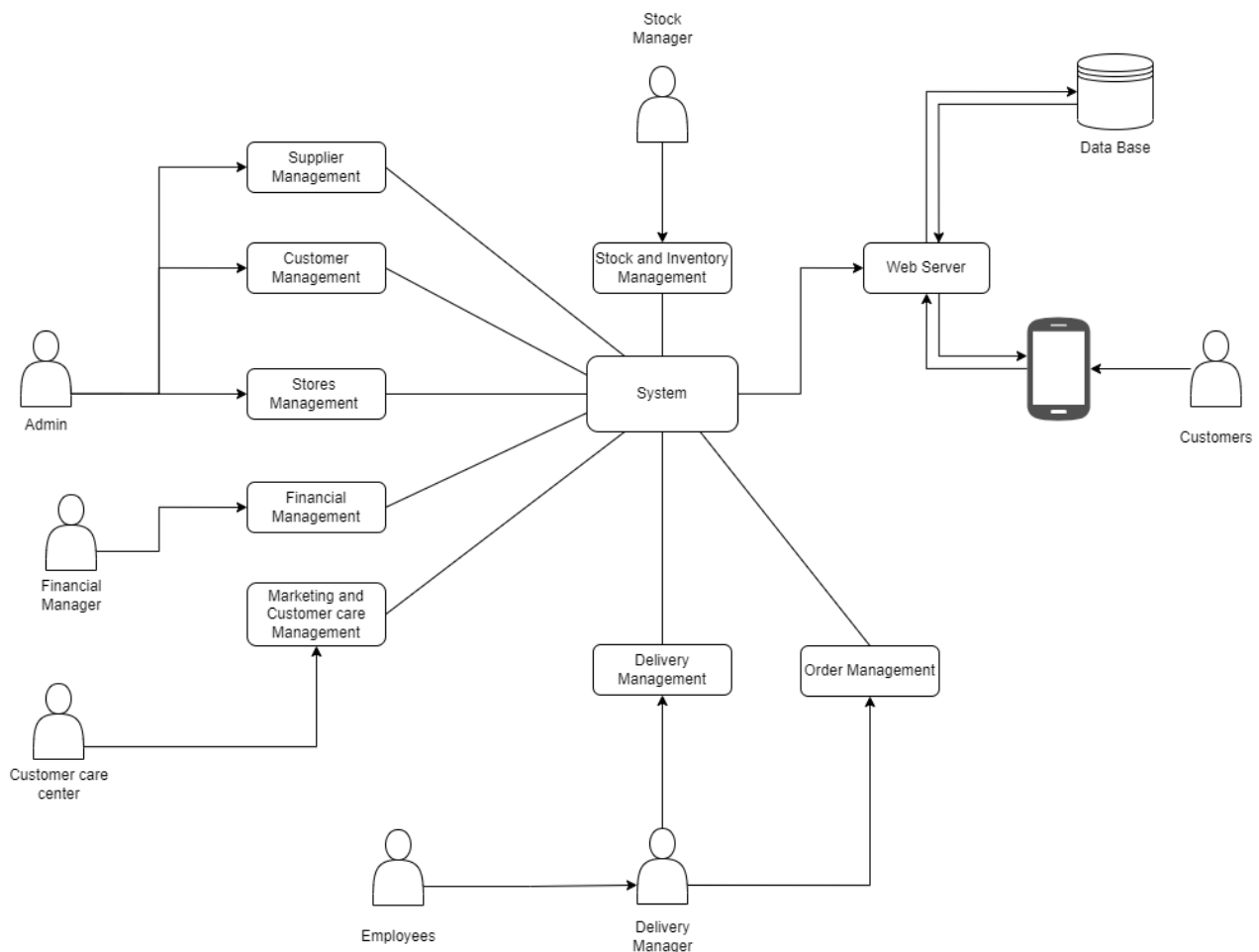
03.System Functions

Stock and Inventory Management

Stock and inventory management is mainly based on managing all the items in the system. This basically stores information about stocks and other related information. The system stock manager is responsible for managing this information and updating it whenever necessary. Manager can Add, Delete, Update, and view all the information regarding stocks. All stock gets Unique id before stocking them in shelfs this will help in what gets sold through registers. All registered and unregistered users can view all the items available to sell at the moment and registered customers can order items via application. To add stocks to the list there should be information that needed to be saved in the database of that particular item.

- Item Type
- Item ID
- Expire date.
- No of Items bought.
- Price
- Wight / volume

In addition to this information there can be some non-directly related information stored under this function. Whenever there is new stock arrival, the manager should update the details. And keep details about remaining stocks. At the end of the month Store manager generate the Stock report for that every month.

Delivery Management

Delivery management mainly considered the management of delivery persons of the system and investigate their workload to achieve the Goals of the Company. Delivery persons can gain rating points from customers.

Delivery Person must Enter emp ID and Password. Therefore, System Can Prevent Unauthorized Access. If Not in the database, Delivery Person Have to Register to the Grocery System. When Delivery Person Registering to the system, System Has to Get Following Details from the Delivery Person.

- First Name
- Last Name
- Date of Birth
- Contact Number
- Email Address
- Home Address
- Delivery Person Type
- Delivery Person Position

After End of The Month, System Will Generate Registered Delivery Person report monthly. Report contains total number of working days throughout the Month and salary.

Order Management

First, the customer has to login to the system by using login details. Then the customer can browse through the content and can add items that he/she wishes to purchase into the shopping cart and can edit it if needed. Customer can view his/her order details if necessary. The customer can cancel the order within 15 minutes from the time the purchase was made, and the customer will be prompted with an error message upon clicking the 'Cancel order' button after 15 minutes.

The delivery manager can view the order list through the system. According to the order id he can delete or update the orders if necessary.

 The customer can proceed with the payments once he/she decides to purchase an item.

The payment is made by the following details:

- payment method
- promo code
- phone number
- Home Address

The customer order status will be displayed and allowing it to be tracked. If any delays occur with the delivery, the customer will be notified through a text message. The estimated delivery time will be updated accordingly.

Marketing Management

This functionality manages marketing aspects of the company including customer relationship management. For every registered Customer, loyalty points will be calculated and updated starting from the date and time the Customer first registered. When loyalty points are earned for 1 year (for example 2000 points), the Customer receives discounts and promotions on their purchases. By entering the promo code for any discount given during the billing, Customers can activate the promo code and receive the designated discounts. Customers can also View notices related to discounts provided by the store, which are uploaded to the system by a Customer Care admin.

A medium to post any comments and reviews based on customer experience is also available. Customers can simply write their review and select 'Post' to upload it, which will be sent to a Customer Care admin to View and provide replies if necessary.

The Customer Care admin can Add, Update and Remove notices and advertisements on discounts and promotions given by the store. The admin can provide replies to messages and reviews received by the Customer.

The following details should be provided for a Customer Care admin to login to the system.

- Username
- Password

The Customer Care admin can Add, Update and Remove notices and advertisements on discounts and promotions given by the store. The admin can provide replies to messages and reviews received by the Customer.

Customer Management

Customer management is an important function of the grocery store management system. Customer registration is important for businesses because it allows them to collect customer data, personalize the customer experience, provide targeted marketing, enable order tracking, and improve security measures. A customer should register with the system so that he can get a better e-shopping experience and the supermarket management can provide them with a better service. First the customer should register to the system by giving the,

- First name
- Last name
- Address
- Email address
- phone number
- Username
- Password

Already registered customers can log in to the system by giving their username and password. The customer management administrator can view all the details of the customers registered to the system. He can add customers directly to the system. He has the right to delete customers from the system.

Financial Management

Financial management is the process of managing organizational money to achieve its goals. It involves planning, organizing, and controlling financial activities such as budgeting, accounting, analysis, and reporting to maximize value for the organization and its shareholders. Following these actions will affects the profitability, Growth, and wellbeing of the organization. And it's important to maintain a good balance between equity and debt. Once the funds are raised through different sources and sales, the next important function to execute is allocating the funds in a proper manner.

Managers are granted administrative privileges in the system to manage all insights. To access the finance directory, they must first access the root directory and then log in using their staff ID and password as login credentials. Once they are logged in, they are authorized to make changes in the system. The system generates reports related to customer transactions and maintains records of sales invoices.

- Calculate the net profit at the end of month.

- Keeping reports all the assets.

- Keeping records of incomes and expenses.

- Keeping records of income statements and cash flow statements.

At the end of the month, A full report will generate for future analysis.

Store Management

Individuals who are willing to start a business and do not have a proper customer base and an online platform can register with this system and open a store using our brand name. They can buy items for a reasonable price from us, as well as gain profit by selling them to the customers.

Store management of this system ensures that it manages all the stores that are registered to the system and fulfils their requests on time.

The stock manager stands for handling requests which are asked by the retail stores and for reporting details and any issues to the department store.

The stock manager must register to the system by entering Staff ID and Password.

When the manager discovered there are new stores who registered to the system and some stores have requested items for their stores from the system following details should be stored and analyzed by the manager for a better service.

When new stores registered to the system. necessary

- Store name
- Store owner name
- Mobile number
- Store address
- Items in the store

When stores request items.

- Store name
- Store address
- Items needed.
- Amount

The admin is responsible for adding new stores to the system, generating the annual report on registered stores and weekly report of requests made. The stock manager is responsible for the requested items for the stores.

Supplier Management

All the network of suppliers' (farmers' and whole sellers') data is managed by this function. This function also enables us to keep track of the information about our suppliers, including their size (large scale / small scale), the items we buy, and the amount. And by providing the following information, the admin will be able to amend, remove, and add suppliers:

- Supplier ID.
- Name.
- Type (Large scale / small scale).
- Product.

The admin can add purchase record by providing the following information. This function gives buy reports with total cost, Item Quantity, and other information.

- Date.
- Product.
- Customer.
- Quantity.

04.Non-Functional Requirements

Security

- The initially suggested system consists of a check system where customers may pay their bills, and the security of these payment details should be managed by keeping them guarded and limiting access to private information to authorized individuals only.

Reliability

- The system must be capable of managing all company processes without experiencing performance issues. directing all company operations within the constraints imposed, without requiring ongoing maintenance.

Scalability

- If the client is expanding their business, it is important to increase the performance parallelly to the expansion performance should not be decreased with the demand.

Availability

- The system must be constantly reachable from everywhere and must perform properly when in use. Customers that experience frequent system maintenance may be unsatisfied, and the procedure may incur additional expenditures.

Ease of use

- Even without assistance from a specialist, the client will be able to utilize it. It ought to be simple to control and comprehend.

Speed

- The system must be responsive; otherwise, the customer won't be satisfied with the result, and it will cost a lot of money to get it back to where it should be.

05.Literature Review

When examining companies like Airbnb [3], uber eats [4], keells [5] the main strategy that affects all those businesses is inventory management, buying and selling. The main goal of building this system is to support people who are unable to sell their products for reasonable prices, help small businesses to create a proper customer base, provide job opportunities for job seekers, and manage the inside functions in a supermarket in an efficient way. We do maintain a slight gap between our purchasing and selling prices so that we can sell more goods. We also intend to let customers weigh their own supermarket purchases, particularly when buying fruits, vegetables, meat, and seafood. As a result, we won't need to allocate as many personnel to that duty, which will help us save operational costs. Direct purchases from the manufacturer are more beneficial both for us and themselves when making purchases for the store. When prices are tagged with a smaller margin, more items will be sold, which will result in more purchases from the supplier, which will help when bargaining. This will also enable us to increase the number of quickly moving goods in the store. Utilize offers and discounts to attract customers to purchase daily necessities and combine fast-moving goods with stationery or slowly moving objects to create package deals.

06.Methodologies

Requirements engineering methods.

Requirements elicitation and analysis

By looking at existing systems, all the criteria for this system were discovered, and we want to construct a completely functional, highly reliable, and efficient grocery store management system.

Requirements specification

- User stories
- Use case diagram
- Activity diagram

Design methods

Object Oriented Design

Structural Models

- Class Diagram

Dynamic models

- Use case diagram.
- Activity diagram
- Sequence diagram

draw.io is used as the tool to design these diagrams.

07.Development tools and technologies

MERN Stack (MongoDB, Express, React, Node)

- MongoDB – document database (cloud Database)
- Express.js – Node.js web framework (Back end)
- React.js – a client-side JavaScript Framework (Front end)
- Node.js – the premier JavaScript web server (Back end)
- Development IDE – Visual Studio Code

08.Testing methods

- Integration testing
- System Testing

09.Gantt chart

#	Task	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Duration(weeks)															
1	Charter creation	█															
2	Project proposal document creation		█														
3	Project proposal presentation		█														
4	UI designing			█													
5	ER diagram creation			█													
6	Stock & Inventory Management					█	█	█	█	█	█	█	█	█			
7	Purchase & Sales Management					█	█	█	█	█	█	█	█	█			
8	Financial Management					█	█	█	█	█	█	█	█	█			
9	stores Management					█	█	█	█	█	█	█	█	█			
10	Delivery Management					█	█	█	█	█	█	█	█	█			
11	Marketing Management					█	█	█	█	█	█	█	█	█			
12	Staff Management					█	█	█	█	█	█	█	█	█			
13	Client Management					█	█	█	█	█	█	█	█	█			
14	Testing														█	█	
15	Evaluation														█	█	

10. Work Breakdown Chart

	Student ID & Name with initials	Brief Description of the Function
1	IT21161056 Peiris M. M. A. E	**Inventory and Stock Management** • **Add** stock details, stock sample details of every item. • **Update** stock and inventory details, update the current stock details according to remaining items. • **Delete** unwanted records of stocks and inventory. • **Retrieve** all the information about remaining stocks. • Generate monthly **report** of stocks and inventory according to sales details.
2	IT21185298 Premathilaka S. P. D. M	**Supplier Management** • **Add** suppliers to the system. • **Update** supplier information and supply information • **Delete** resigned suppliers from the system. • **Add** purchase record to the system. • **Update** purchase information • **Delete** purchase records if necessary. • **Generate** supplier details and supply details **report** every month. • **Retrieve** all suppliers list and purchase records.
3	IT21162732 Jayathunge K. A. D. T. R	**Delivery Management** • **Add** delivery people to the system. • **Update** delivery persons profiles. • **Delete** non-existent staff members from the system. • Generate annual **report** of registered delivery persons. • **Retrieve** all the existing delivery persons information.

4	IT21159794 Liyanaarachchi V. K	**Customer Management**
		Add registered customers to the system. **Update** customer information **Delete** customers from the system. **Generate** customer details report. **Retrieve** all existing customer information monthly
5	IT21160066 Perakum K. K. P	**Order Management**
		Add items to the cart. **Update** order details **Delete** orders. **Generate** weekly order details report.
6	IT21161674 Gunasekera H. D. P. M	**Financial Management**
		Add financial records. **Update** financial records. **Delete** unnecessary records if needed. - Calculate monthly income and expenses and **Generate** reports. **Retrieve** financial information monthly.

7	IT21162664 Weerasinghe W. P. D. J. N	**Store Management**
		• **Add** stores to the system.
		• **Update** store details.
		• **Delete** stores.
		• **Generate** annual report of registered stores.
		• **Retrieve** all the details of the stores.
		• **Add** item requests from stores.
		• **Delete** requests.
		• **Generate** weekly request report.
		• **Retrieve** all the details of the requests made by stores.
8	IT21162732 Kumara W. H. T. S	**Marketing customer relationship Management**
		• **View** all customer feedback.
		• Admin can **delete** inappropriate comments.
		• Customers can **add** feedback.
		• **Update** comments.
		• **Delete** feedback.
		• **Add** promotion notices and points to the system.
		• **Delete** promotion notices and points from the system.
		• **Update** points and notices
		• **Generate** reports on promotion details.
		• **Retrieve** all the details about given promotions and discounts monthly

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