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Web Based POS System and Mobile App

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## Abstract

Developed web-based point of sales system is for a company group called “Victory Motors”. It is a leading Tire business company in Sri Lanka. They are currently using a Standalone POS system which was made in year 2005. Technology is very old, and the software is not user friendly. So, they have to train employees to operate the system. Since they have many branches all over country, it is very hard to keep the connection between databases of branches using the current software. So, it's very hard to sync day-to-day inventory operations data of all the branches. This stand-alone POS system only offers offline backups. Since all the branches have their separate databases, they have to check inventory data, sales and credit amounts through branch databases one by one. Since stock handlers don't have access to the software they have to report back to the software operating person to update inventory data. Goal of this project is to implement a Web based point of sales application using a centralized database to operate all day-to-day inventory operations. All the branches can access this application using their own credentials and all the data are interconnected between branches. Additionally, a mobile app was implemented to check and update inventory data, current sales and etc. All the managers can access the mobile app using their own web app credentials.

## Keywords

POS, Web-App, Mobile-App, Web-POS, Point of Sales

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# Chapter 01

## Introduction

# 1. Introduction

## 1.1 About the Client

New Victory Motors is leading business network in Sri Lanka. Their main focus is importing tires through dealers and selling. They also have tire re-treading factories to apply new treads to worn out tires. They have 4 tire shop branches, 4 tire re-treading factories and an automobile service center.

## 1.2 Project Introduction

New Victory Motors Network is currently using a Standalone POS System. All the branches have separated POS systems with separated offline databases. Since they have many branches all over country they need a Web and Mobile based point of sales application using a centralized database to operate all day-to-day inventory operations while interconnecting branches.

## 1.3 Problems Identified and Proposed System

They are currently using a Standalone POS system which was made in year 2005. Technology is very old, and the software is not user friendly. So, they have to train employees to operate the system. Since they have many branches all over country, it is very hard to keep the connection between databases of branches using the current software. So, it's very hard to sync day-to-day inventory operations data of all the branches. This stand-alone POS system only offers offline backups. Since all the branches have their separate databases, they have to check inventory data, sales and credit amounts through branch databases one by one. Since stock handlers don't have access to the software they have to report back to the software operating person to update inventory data.

As a solution to above mentioned problems, a Web based POS system and a mobile app was proposed with features such as, Connection between all the branches via a centralized database, cloud backup services, a mobile app for stock handlers. Goal of this project is to develop a user-friendly POS App that can be operated with minimum training.

The final product should have features such as, all the branches should be able to access the POS system in one place, all the databases of those branches should be centralized, all day-to-day billing operations to be done inside a user-friendly UI, it should be easy to check and update inventory data using the Mobile App and sales records and analytic data should be displayed in a graphical manner.

#### 1.4 Objectives of the System

The proposed system will allow,

- All the branches to access their POS system in one place.
- All the databases of those branches will be centralized.
- All day-to-day billing operations to be done inside user friendly UI.
- To check and update inventory data easily using mobile App.
- To check and get analytics about daily sales using mobile App.

#### 1.5 Business Need

They are currently using a Standalone POS system which was made in year 2005. Technology is very old, and the software is not user friendly. So, they have to train employees to operate the system. Since they have many branches all over country, it is very hard to keep the connection between databases of branches using the current software. So, it's very hard to sync day-to-day inventory operations data of all the branches. This stand-alone POS system only offers offline backups. Since all the branches have their separate databases, they have to check inventory data, sales and credit amounts through branch databases one by one. Since stock handlers don't have access to the software they have to report back to the software operating person to update inventory data.

Since they have many branches all over country they need a Web and Mobile based point of sales application using a centralized database to operate all day-to-day inventory operations while interconnecting branches.

## 1.6 Business Objectives

To modernize the Point of Sales system and Inventory handling system in a way that,

- Connects all the branches via a centralized database.
- Provides cloud backup services.
- Provides a mobile app for stock handlers.
- Provides a user-friendly POS App that can be operated with minimum training.

## 1.7 Project Objectives

- According to the Web POS application system, In order to achieve the above mentioned project objectives and business objectives the research has to fulfill the following specific objectives.
  - Objective 1: Create a data structures and models.

Data structures and models will be created to get basic idea about application and how it will be worked. Also, how the back-end of the application works, how to store data in proper formats and tables. Entity relationship diagram (ERD), database and other UML diagrams will be created.

- Objective 2: Create a UI to interact between the front end and the back end.

The proposed research will be created a UI to interact between the front-end and the back end. It allows user to do work with the applications. Proper user friendly responsive UI will be created so that user can easily access the application in computers and tablets without any hesitation.

- Objective 3: Implementation of the application.

Here the implementation of the application that means the coding part will be started by referring structure and architectures. Testing part also will be carried out at the same time.

- Objective 4: Documentation and examples.

Prepare the documentation such as proposal, Project Initiation Document (PID), System Requirements Specification (SRS) for the proposed research and provide results with relevant examples.

## 1.8 Specific Objectives

- To analyze existing stand-alone POS system and find solutions for existing problems with the current system.
- To analyze requirements for the new Web based POS system.
- To analyze requirements for the Mobile App.
- To implement Web based POS system and Mobile App.
- To implement connection between branches via Web and Mobile App.
- To provide staff training.

# Chapter 02

## Research

## 2 Research

### 2.1 Literature Review

#### Cargills Food City POS System

Cargills (Ceylon) PLC is a Sri Lankan Retail, FMCG, Banking and Restaurant company which is listed on the Colombo Stock Exchange. The controlling interest in the company is held by Ceylon Theatres PLC. Cargills Food City Supermarket chain uses a web-based Point of Sales system to manage their day-to-day inventory operations and stock handling operations. They are using a centralized database to store all the inventory data and sales data of all the branches all over the country. A cashier can log into the system using their username and password. After a successful login the user will be redirected to the billing system window and cashier can only access the billing screen. Branch managers can input their credentials and get access to more extra features like sale dashboard, inventory data and etc. Superior managers can get access to features like employee data, monthly sales income, inventory logs, cashiers' login details and etc. All the customer data are also recorded in this system and loyalty cards are issued using the system.

They are using a mobile app to balance the inventory with the system. Inventory handlers use the mobile app to double check the inventory with the system. They update the inventory count using a mobile app when they load or unload the stock from the delivery trucks. All the inventory delivering and receiving invoices are issued from each branch and supply point using this web-based inventory management system. All the top-level directors and managers can access all the sales, inventory and employee data through the admin view of the system.

#### Shopify POS

Shopify is a leading point of sale device for integrating with e-commerce retailers and stores. This awesome brand's POS clients are given their own online shop. They can also manage their brands online and communicate with customers via different platforms such as social media.

Sales and order inventories, workforce monitoring and accounts, regular and weekly analytics, coupon codes and deals, and a mobile-based program to assist consumers are among

the added functions. The support team is now available 24 hours a day, 7 days a week via email, video chat, and cell.

The below are some of the most notable characteristics of this fantastic POS service provider:

- Online store
- Amazing discount offers and codes
- A free mobile application on Apple store

As a new user, you must first log into the app with your pin. If the account owner is unsure, he or she should share it with the customer. The POS home page is available until logged in. The universal search bar is available on the top left, allowing you to search for items, orders, and consumers all around the world by entering key words into the search bar. It will result in visualizing all the products listed under that specific key word. When tapped orders section, user could see all the products purchased and who purchased it. If a user types a name in the search bar, all customer information under that name would appear in customer section and once tapped the name all information regarding his purchase history from spent amount to contact number.

There is also a built-in scanner in the global search bar, which helps you to read the barcode to recognize the items mentioned in the app. On the home screen, under the search bar, a smart grid is available, allowing the user and team to navigate specific workflows that can be personalized despite current tiles.

Cart options are available on the app's right side. There, the additional choices can be found, and to clear any piece, simply choose the 'clear cart' option, while to add more or configure more, choose the 'more activities' option. Cart modifiers are used to add a buyer/discount/note or even employees, with the option of shipping the order or delivering an email to the customer to complete the transaction.

On the bottom right, you can see the communication statuses of your hardware such as Shopify admin, Bluetooth, and Wi-Fi, which helps you to verify the link at the start of each change and regularly during the day. In addition, the logged in workers name appears in the middle bottom. To change accounts, press the main menu icon and then the lock screen, which allows another member to log in with their passcode. Menu allows to access everything included in the POS App such as, orders, products, cash register etc.

Similarly, at the top of the menu, the current location where the app is running can be displayed and can be updated by settings. Hardware configuration is another critical aspect of the setting choice. During Hardware initialization, the user has the option of

selecting the hardware type when following the onscreen instructions. The Orders segment in the settings helps you to sort orders by selling form or venue. Customer segments in settings contain information for all consumers who have ordered products that can be filtered using 'Tags.' Similarly, the Products section displays all of the products that have been ordered. The register function displays the cash register. All logged-in team members are shown in the Staff choices. For any help, there is a support option available.

## Total POS

Toast POS is a cloud-hosted point-of-sale system designed exclusively for restaurants in the United States. It aims to give consumers full autonomy and visibility of their enterprise by using cutting-edge functionalities. This app is entirely tablet-based and includes all the restaurant management resources you need, such as revenue reporting, customer management, and employee success tracking. Toast POS subscriptions have a competitive price structure that starts at \$79. They also sell hardware starting at \$899.

Toast Point of Sale incorporates restaurant-specific applications, infrastructure, and payment processing on a single device. It also has a number of features such as,

- Runs on Android
- Intuitive and Easy to Use
- Restaurant Grade Hardware
- Table Management
- Real-time Feedback Alerts
- Real-time Reporting
- Digital Receipts
- Hardwired Terminals with Offline Mode
- Split Checks
- Orders Fire Directly to your KDS

Toast POS is known as bets because of a few other exclusive features used in the system.

**Service at the Table** With mobile devices designed for the restaurant environment, you can encourage your employees to spend more time with guests, accelerate service, and speed up checkout by allowing them to order and pay at the table. It facilitates, particularly through 'Toast Go,'

- Order Ready Notifications  
Take orders tableside and get notified when your order is ready
- Tableside Payments  
Take payments (EMV or Card) tableside
- Guest Feedback  
Collect and respond to guest feedback immediately

**Menu Management-** Master your menu wherever you are. Make menu updates from any terminal at your restaurant or anywhere else on your smartphone. Running a limited special? Avoid an awkward 86 with real time item countdowns so your servers and your kitchen are in sync.

**Menu Management-** Regardless of where you are, master the menu. Make menu changes on your mobile from every terminal in your restaurant or anywhere else. Do you have a limited time offer? Avoid an uncomfortable 86 by using real-time object countdowns to keep the servers and kitchen in sync.

- Cloud-based - Access and edit the menu from any browser
- Menu Countdown - Manage availability with object countdowns
- A Single Menu - Menu updates automatically reflected in house and online

**Analytics & Reporting -** With accurate analytics, you can take care of your restaurant's results. With cloud-based access to key metrics and sales performance, you can track your restaurant's performance from anywhere and on any smartphone.

- Position Overview - A consolidated view of net profits and labor costs across one or hundreds of locations.
- Sales Summary - Track results over every time span
- Product Mix - Monitor product mix and identify areas of development.

## 2.2 Technical Research

In the beginning I started the project a web application using PHP language. In the middle of the project I needed to add more functionalities, so I implemented a PHP API to PUT, POST and GET data from the database. After that I implemented a Mobile Application using Android Studio with Java Language. All the connections with the database needed to be asynchronous. So, I developed the database connections using AJAX and jQuery.

### 2.2.1 Android Operating System

“

Android is a Linux based operating system and primarily implemented for mobile and touch screen devices like smart phones, tablets, car audio system, specialized user interface for Android TV etc. Android is developed by Google. The android is a powerful operating system and it supports large number of applications in Smartphones. These applications are more comfortable and advanced for the users. The hardware that supports android software is based on ARM architecture platform. The android is an open source operating system means that it's free and any one can use it. The android has got millions of apps available that can help you managing people life one or other way and it is available low cost in market at that reason's android is very popular. Android is a freely downloadable open source software stack for mobile devices that includes an operating system, middleware and key applications based on Linux and Java. Google purchased the developer of Android in 2005, and Android was unveiled in 2007. Google released the Android code as open-source under the Apache License. Android has numerous developers writing applications (apps) all over the world. First of all the developers write their script in Java, and then download the apps from the third party sites or online stores.”

So, in that reasons, I decided to implement android base mobile application for my project and think it will be positive for users of this application. There are lot of android versions in the mobiles. Some of them are mentioned below,

**Android Versions:** Alpha, Beta, Cupcake, Donut, Éclair, Froyo, Gingerbread, Honeycomb, Ice Cream Sandwich, Jelly Bean, KitKat, Lollipop, Marshmallow, Nugget, Oreo, Pie.”

### 2.2.2 Android Software Development Kit (SDK)

“Android is an open source and the source code is available for all developers. So, it is called the Android SDK. It can be downloaded, build and work on Android in several different ways. If goal is to develop an Android application, no need to download all the source. Recommended the Android studio, JetBrains IDE or Eclipse IDE, for which there is an available Android Developer Tools (ADT) plugin. Which you can install the specific SDK, can create projects, launch emulators, finally can debug.”

### 2.2.3 Advantages of Android

“It supports various platforms like 2D and 3D. Earlier we used to watch movies and play games in almost in 2D, but nowadays various applications are using 3D format. To provide different graphics in videos, games OS should support 3D format. Android supports 2D and 3D format to provide a better advantage in videos and in games.

Android supports different languages. We can say all famous languages about more than 100. By using this feature, it is easy to adopt to different languages. Earlier in the feature phones English is to be the only language in the mobile devices.

The Java supporting feature enables developers to enhance more features. As it supports Java, operating can be developed.”

### 2.2.4 PHP

PHP is a universally useful prearranging language particularly fit to web advancement. It was initially made by Danish-Canadian software engineer Rasmus Lerdorf in 1994. The PHP reference execution is presently delivered by The PHP Group. PHP initially represented Personal Home Page, yet it currently represents the recursive initialism PHP: Hypertext Preprocessor.

PHP code is normally handled on a web worker by a PHP translator carried out as a module, a daemon or as a Common Gateway Interface (CGI) executable. On a web worker, the aftereffect of the deciphered and executed PHP code – which might be any kind of information, like produced HTML or parallel picture information – would frame the entire or part of a HTTP reaction. Different web format frameworks, web content administration frameworks, and web systems exist which can be utilized to arrange or work with the age of that reaction. Furthermore, PHP can be utilized for some, programming assignments outside of the web setting, for example, independent graphical applications and automated robot control. PHP code can likewise be straightforwardly executed from the order line.

The standard PHP translator, controlled by the Zend Engine, is free programming delivered under the PHP License. PHP has been broadly ported and can be sent on most web workers on pretty much every working framework and stage, for nothing

### 2.2.5 AJAX

Ajax (Another way to say "Asynchronous JavaScript and XML") is a bunch of web improvement strategies utilizing many web advances on the customer side to make offbeat web applications. With Ajax, web applications can send and recover information from a worker Asynchronously (behind the scenes) without meddling with the showcase and conduct of the current page. By decoupling the information trade layer from the show layer, Ajax permits pages and, likewise, web applications, to change content powerfully without the need to reload the whole page. In practice, present day executions generally use JSON rather than XML.

# Chapter 03

## Method of Approach

### 3.1 Method of Approach

#### 3.1.1 Introduction

In the previous chapter, literature review of similar systems has been discussed together with their respective advantages and disadvantages. In this chapter, we discuss the system development methodology used by the project to develop Web Based POS system. It further describes the tasks performed at each phase and respective deliverables of it. When starting the project deciding an appropriate System Developing Life Cycle was needed. This project however, can be defined as used two SDLC models like agile model.

#### 3.1.2 System Development Life Cycle (SDLC)

To develop the system “Web based POS System”, Agile Methodology was used. According to my project plan, I used the incremental approach to develop the system. So, in that case I needed to use agile methodology for implement this system. Since this is a final year research, and I had to learn about many areas such as android developments, mobile platforms, APIs, cloud technologies, frameworks etc. So, this is a risky and complex system. Therefore, agile methodology becomes the most suitable methodology to use to implement this system.

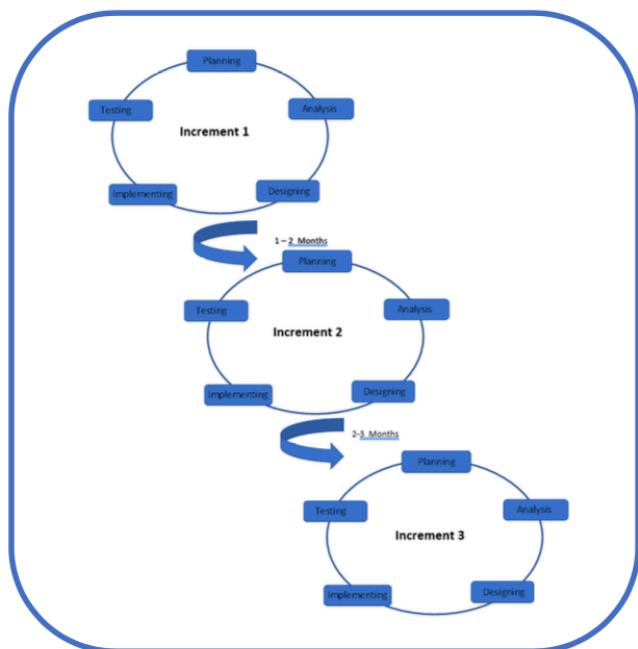


Figure 1 SDLC

### a) Planning

Development process will be focused on following steps with incremental approach,

- i. Day-to-day transaction and Inventory management processes.
- ii. Interconnection between branches.
- iii. Mobile app functions.

### b) Initial Scope

1. Current business process will be analyzed by interviews, questionnaires and observation.
2. The proposed system will allow
  - a) All the branches to access their POS system in one place.
  - b) All the databases of those branches will be centralized.
  - c) All day-to-day billing operations to be done inside user friendly UI.
  - d) To check and update inventory data easily using mobile App.
  - e) To check and get analytics about daily sales using mobile App.
3. User requirements will be gathered via interviews and by analyzing the current POS system.

A class diagram will be produced after analyzing all the system requirements, all the business processes and users' interactions with the system.

### c) Control Plan

The accompanying PRINCE2 control methods will be utilized: end-Stage reports; end-Stage survey (with supervisor); fortnightly Highlight report; Risk Management Communication plan.

### d) Communication Plan

Notwithstanding Supervisor meetings, meetings will be held toward the finish of each stage so as to talk about the end-Stage report, the following Stage plan, and to survey any specialized

expectations delivered during the stage. Feedback meetings will likewise be held after the accommodation of the two Interim reports.

### 3.1.3 Analysis

#### a) Risks and Management Strategies

*Table 1 Risks Management*

| <b>Risk</b>   | <b>Management Strategy</b>  |
|---|---|
| Difficulty using development technologies                                       | Simple apps will be made first as prototypes and then move to the project application   |
| Difficulty hosting web application  | Trial version or a limited version free hosting service will be used at the development stage and application will be finally moved to a paid server. |
| In-App Security Issues (such as Passwords)                                      | Encryption procedure will be used   |
| Customer requirement may change during the project development                  | Communicate with customer after each step of the development process and confirm if their requirements are satisfied.                                 |
| Difficulty using development technologies                                       | More easier parts were developed at first and then harder parts are developed to manage time.   |
| Difficulty restoring previous transaction data in the company to the new system | Previous POS system has a file backup feature. Output MS Access file data can be stripped using a software and load it to the new system              |
| Network security issues   | Use a well secured host for web hosting   |
| Backup and Restore issues   | Give users option to either backup to the cloud or to the local machine.  |

|                          |   |
|--------------------------|---|
| Web browser issues       | Some computers that are used in company are very old and they use very old browsers. Those computers need to be updated with the latest windows OS and google chrome browser. |
| Screen resolution issues | Responsive design is used throughout the web application.   |
| Camera issues            | New cameras will be installed to all the computers to take pictures of their customers.   |

### b) Initial Quality Plan

*Table 2 Initial Quality Plan*

| Quality Check                         | Strategy   |
|---------------------------------------|--|
| Functional requirements               | Functional requirements will be checked during end of each stage. After every stage confirmation will be done by the customer. |
| Form data validation                  | Form validation will be done while developing forms.   |
| Design validation                     | Design will be checked with many devices to ensure the product is responsive with almost every device.                         |
| System validation and user acceptance | System validation will be done at the end of the final stage of the project.   |

### c) Required Resources

- 2 new computers per shop with touch screen monitors. ( $2 \times 5$  shops = 10 computers)
- 1 computer per factories. ( $1 \times 3$  factories = 3 computers)
- 1 smartphone per manager ( $1 \times 5$  managers = 5 smartphones)
- 1 web camera per computer ( $1 \times 2 \times 5$  Shops = 10 cameras)

These resources will be required after completion of the web and mobile application in order to implement in the system

### d) Learning undertaken and required

- React JS tutorials to use in the development stage.
- Ajax tutorials to learn how to handle back-end with front-end.
- Tutorials about new technologies and ways to optimize the code and speed of the web application and database are always followed parallel to the software development process.
- Android and Flutter tutorials for development of the mobile application.

## e) Schedule

*Table 3 Schedule*

| <b>Stage</b>  | <b>Deadline</b> | <b>Products/Deliverables/Outcome</b>  |
|---|-----------------|---------------------------------------|
| 1. Initiation   | 5/11/2020       | PID                                   |
| 2. Initial stage development – Prototype (Web App)          | 30/11/2020      | Sample Prototype                      |
| 3. Initial stage development – Actual Application (Web App) | 3/1/2020        | Initial stage components              |
| 4. Increment 1  | 11/1/2021       | Interim Report 1 and Progress Video 1 |
| 5. Increment 2  | 15/2/2021       | Interim Report 2 and Progress Video 2 |
| 6. Increment 2 - b  | 20/2/2021       | Research Abstract Submission          |
| 7. Finish Web App development                               | 10/3/2021       | POS Web App                           |
| 6. Finish Mobile App development                            | 25/3/2021       | Mobile App                            |
| 7. System testing   | 25/03/2021      | Final System                          |
| 8. Complete final report                                    | 01/04/2021      | PRO303SL Report                       |

# Chapter 04

## Design

## 1. Data Flow Diagram (DFD)

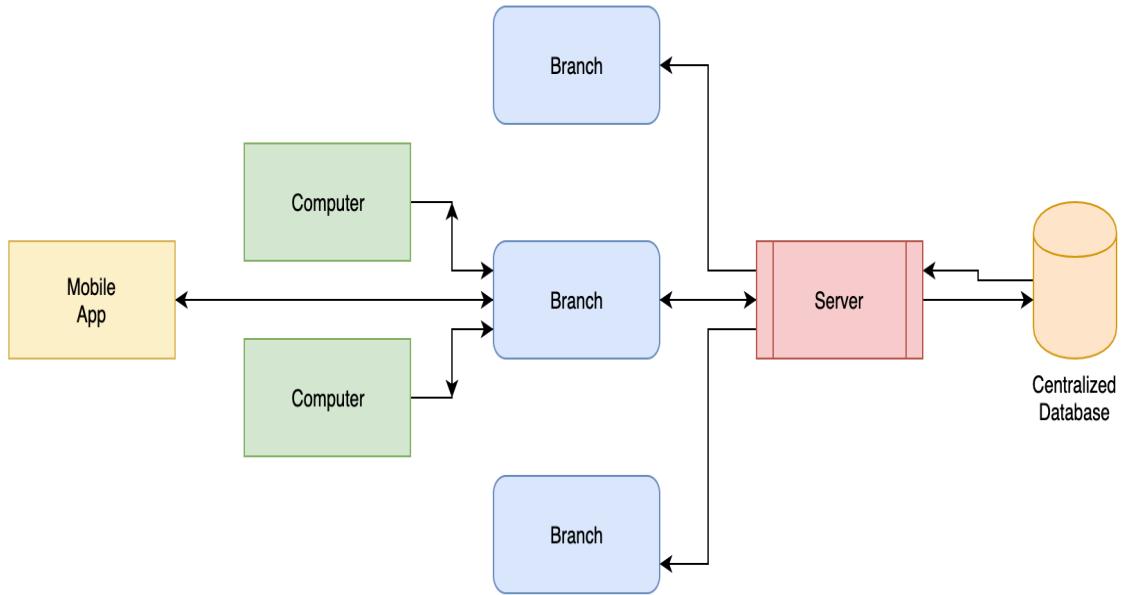


Figure 2 DFD

All the data of the POS system are located inside a Centralized Database. All the computers and mobile apps can log in to the system using their branch-oriented login details to access the data of the regarding branch.

## 2. Flow Chart

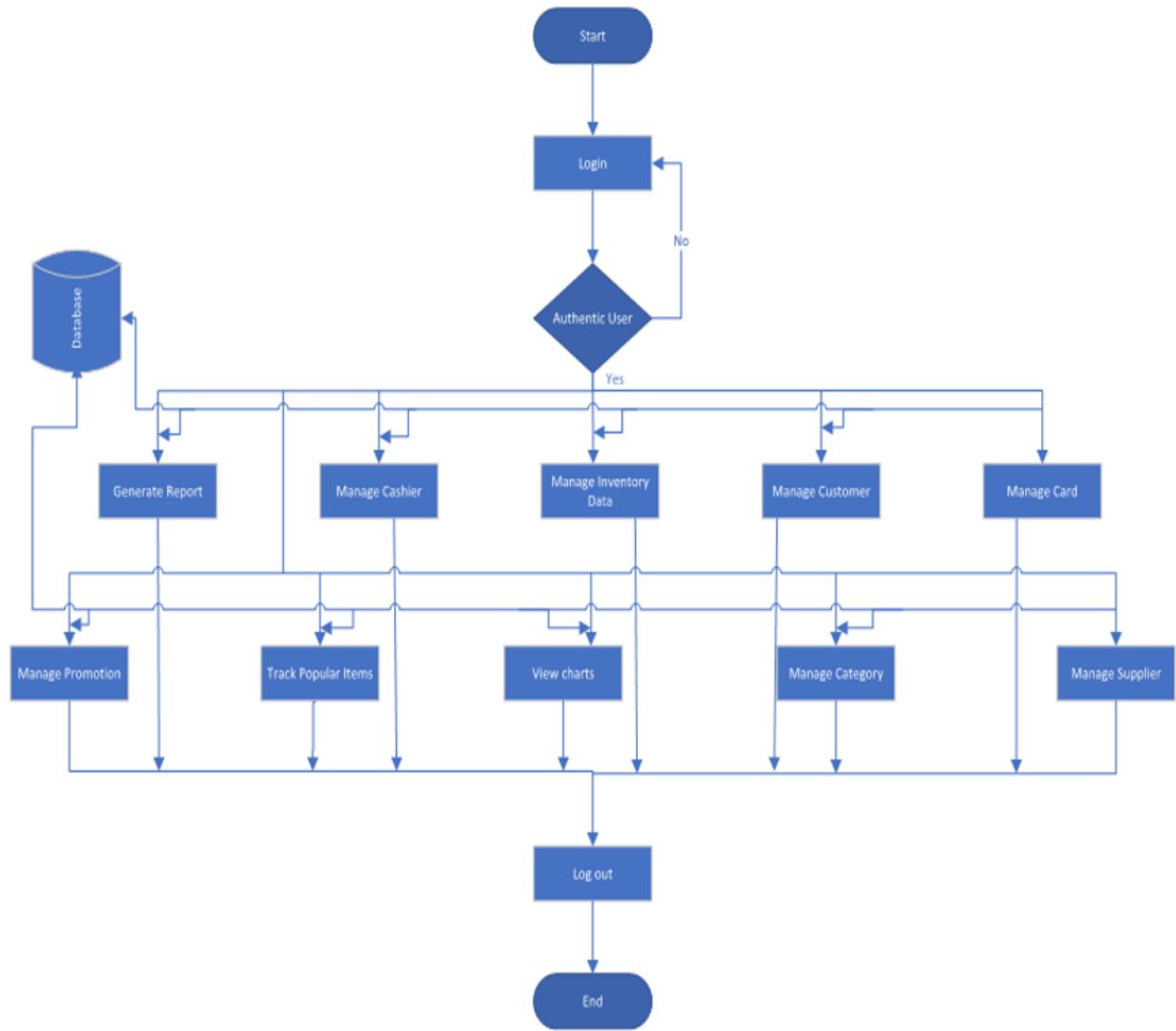


Figure Flow Chart

### 3. Use Case Diagram

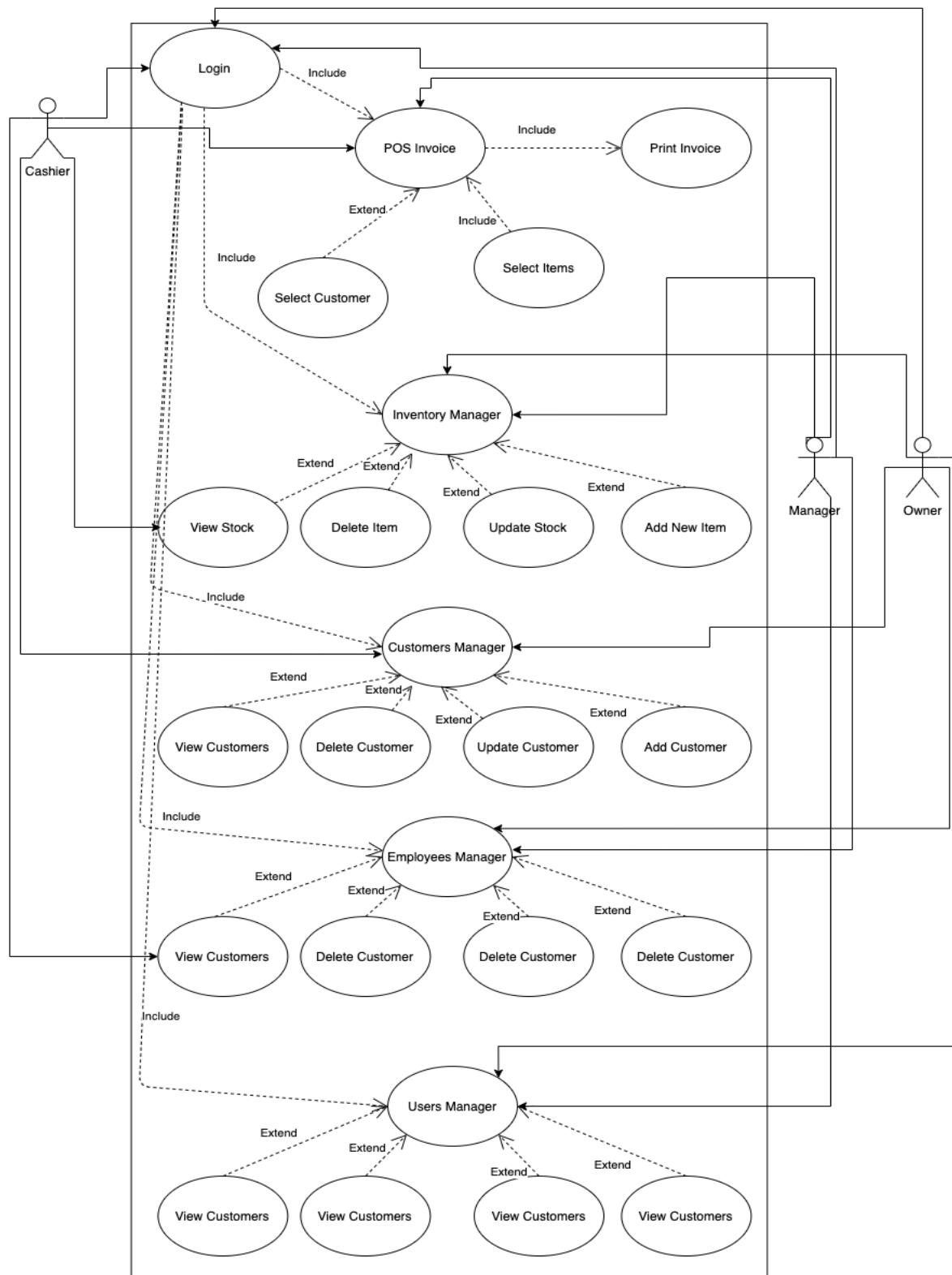


Figure 3 Use Case Diagram

#### 4. ER Diagram

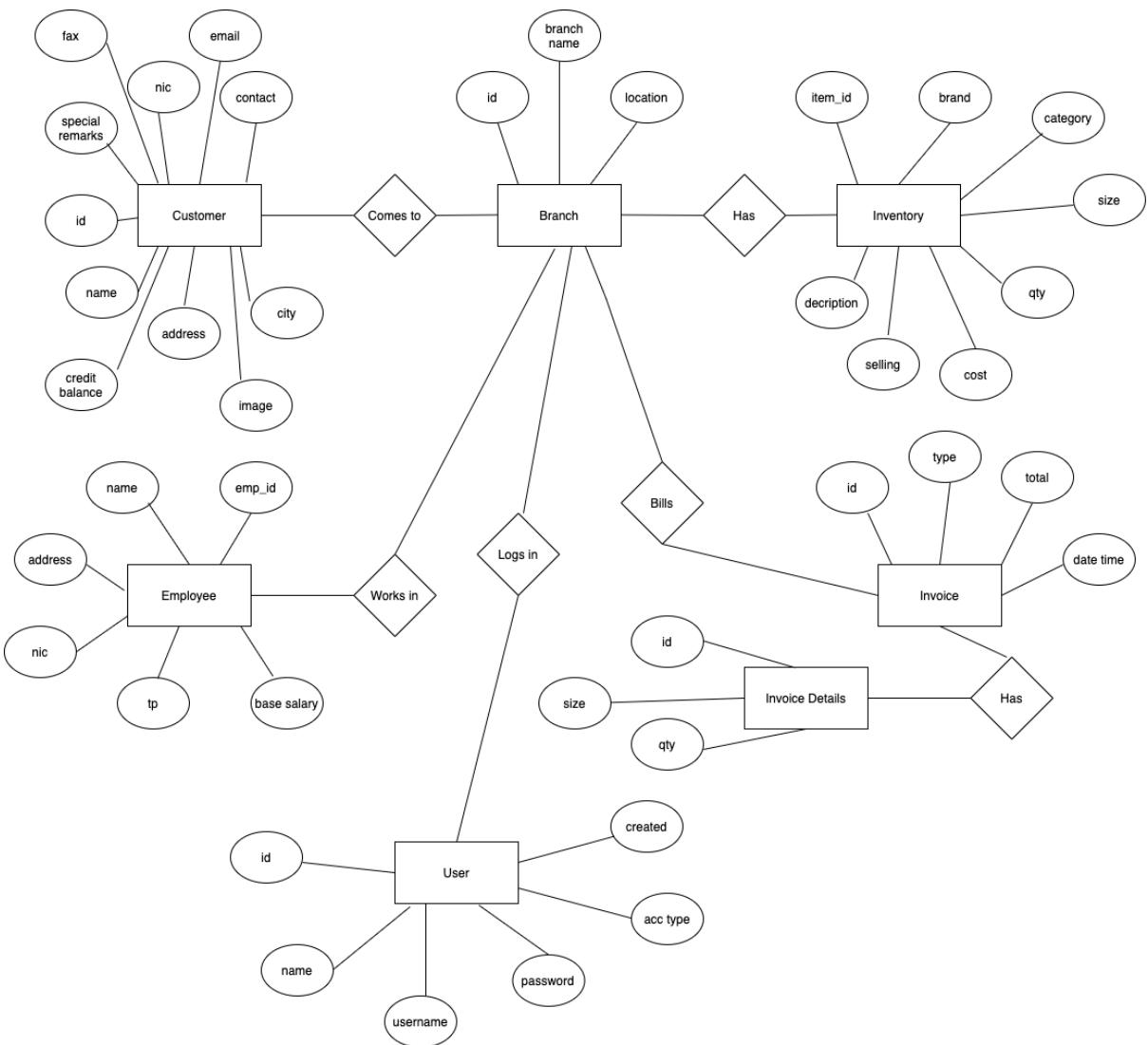


Figure 4 ER Diagram

# Chapter 05

## Implementation

## 1. Selected Technologies Evaluation

### a) PHP with HTML, CSS, Bootstrap

PHP and HTML was used to develop the web application with the support of CSS and bootstrap to improve the design of the web application. No frameworks were used, and only raw PHP was used. PHP was used to develop an API to access the database from web and mobile applications.

PHP is a universally useful prearranging language particularly fit to web advancement. It was initially made by Danish-Canadian software engineer Rasmus Lerdorf in 1994. The PHP reference execution is presently delivered by The PHP Group PHP initially represented Personal Home Page, yet it currently represents the recursive initialism PHP: Hypertext Preprocessor.

The Hypertext Markup Language, or HTML is the standard markup language for records intended to be shown in an internet browser. It tends to be helped by advancements like Cascading Style Sheets and prearranging dialects like JavaScript.

Cascading Style Sheets is a template language utilized for portraying the introduction of a report written in a markup language like HTML. CSS is a foundation innovation of the World Wide Web, close by HTML and JavaScript.

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains CSS- and JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components.

### b) AJAX and jQuery

Ajax and jQuery are used to make requests and get responses from the server using the PHP API with asynchronous communication mechanism to Create, Update, Delete and Retrieve data.

Ajax is a set of web development techniques using many web technologies on the client-side to create asynchronous web applications. With Ajax, web applications can send and

retrieve data from a server asynchronously without interfering with the display and behavior of the existing page.

jQuery is a JavaScript library intended to improve on HTML DOM tree crossing and control, just as occasion taking care of, CSS movement, and Ajax. It is free, open-source programming utilizing the tolerant MIT License. As of May 2019, jQuery is utilized by 73% of the 10 million most famous sites

c) Android Studio with JAVA

Android studio was used as the IDE for the development of the mobile application. Java was selected as the language.

Android Studio is the authority coordinated improvement climate for Google's Android working framework, based on JetBrains' IntelliJ IDEA programming and planned explicitly for Android advancement.

Java is a class-based, object-situated programming language that is intended to have as not many execution conditions as could be expected

## 2. Database

A MySQL database is used in this web application. XAMPP was used to run the apache server to develop and run the database. There are 10 tables. There are some tables like brand, sizes and categories which hold list information and they are not having any relationship with each other.

| Table              | Action  |
|--------------------|---|
| brands             | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| categories         | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| config             | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| customers_details  | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| employees          | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| inventory          | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| invoices           | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| invoice_attributes | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| sizes              | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| users              | <a href="#">Browse</a> <a href="#">Structure</a> <a href="#">Search</a> <a href="#">Insert</a> <a href="#">Empty</a> <a href="#">Drop</a> |
| 10 tables          | Sum   |

- “brands” table

| + Options                |  | item_id | brand_name |
|--------------------------|--|---------|------------|
| <input type="checkbox"/> | <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a> | 1       | CEAT       |
| <input type="checkbox"/> | <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a> | 2       | GT Radial  |
| <input type="checkbox"/> | <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a> | 3       | Nankang    |

Data for “brand” drop down menus are stored here.

- “categories” table

| + Options                |  | item_id | category           |
|--------------------------|--|---------|--------------------|
| <input type="checkbox"/> | <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a> | 1       | Passenger Vehicles |
| <input type="checkbox"/> | <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a> | 2       | Heavy Vehicles     |

Data for “Category” drop down menus are stored here.

- “config” table

| config          | value    |
|-----------------|----------|
| SALES_CHART     | bar      |
| INVENTORY_CHART | doughnut |

Configurations such as Chart types of the dashboard are stored here.

- “customer\_details” table

| Customer Details         |        |   |                   |             |          |                 |            |            |            |                          |      |  |
|--------------------------|--------|---|-------------------|-------------|----------|-----------------|------------|------------|------------|--------------------------|------|--|
|                          | cus_id | cus_name                                    | address_1         | address_2   | city     | special_remarks | nic        | contact_no | fax        | email                    | cred |  |
| <input type="checkbox"/> | 1      | Hiroon Wijekoon                             | 50,Regent Village | Balagolla   | Kengalla | Near BOI        | 981802144v | 0778652276 |            | hiroon.victory@gmail.com |      |  |
| <input type="checkbox"/> | 3      | Doramadalgama Gilan Chathurange Alvis Silva | No 12/A           | Main Rd     | Ampara   |                 | 867654298v | 0786453728 | 0257686543 |                          |      |  |
| <input type="checkbox"/> | 6      | Daham Gunasekara                            | 45/A              | Darshana Mw | Badulla  | Near Bus Stand  | 76483799V  | 0556647338 | 0552347876 | daham_d@gmail.com        |      |  |

All the customers' details are stored here.

- “employees” table

| Employee Details         |       |                         |  |          |           |           |              |              |              |                                    |  |  |
|--------------------------|-------|-------------------------|--|----------|-----------|-----------|--------------|--------------|--------------|------------------------------------|--|--|
|                          | empID | empName                 | Address1                                     | Address2 | City      | Remarks   | NIC          | Contact1     | Contact2     | img                                |  |  |
| <input type="checkbox"/> | 6     | Sample Employee223      | 3  | ad223    | city23    | 2remarks3 | 928467544v23 | 088654354323 | 026545467623 | data:image/jpeg;base64,/9j/4AAQSkZ |  |  |
| <input type="checkbox"/> | 7     | Hiroon Imalsha Wijekoon | No 50, Regent Village, Moragahapitiya State, | Kandy    | Balagolla | Near BOI  | 76483799V    | 0556647338   | 0778652276   | data:image/jpeg;base64,/9j/4AAQSkZ |  |  |

All the employees' data are saved in here.

- “inventory” table

| Inventory Details        |         |           |                    |           |     |       |               |             |  |  |
|--------------------------|---------|-----------|--------------------|-----------|-----|-------|---------------|-------------|--|--|
|                          | item_id | brand     | category           | size      | qty | cost  | selling_price | description |  |  |
| <input type="checkbox"/> | 1       | GT Radial | Passenger Vehicles | 195x50x15 | 42  | 9870  | 13500         | Thaiwan     |  |  |
| <input type="checkbox"/> | 2       | GT Radial | Heavy Vehicles     | 195x40x13 | 26  | 8771  | 11951         | Sri Lanka!  |  |  |
| <input type="checkbox"/> | 3       | CEAT      | Heavy Vehicles     | 1000x20   | 23  | 45600 | 53400         | Sri Lanka   |  |  |
| <input type="checkbox"/> | 4       | Nankang   | Passenger Vehicles | 195x45x15 | 3   | 11400 | 14500         |             |  |  |
| <input type="checkbox"/> | 6       | CEAT      | Passenger Vehicles | 195x40x13 | 7   | 7500  | 8800          |             |  |  |
| <input type="checkbox"/> | 7       | CEAT      | Passenger Vehicles | 195x45x13 | 8   | 8200  | 9300          |             |  |  |

All the inventory data are saved in here.

- “invoices” table

|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | invoice_id | 1  | cus_id           | cus_name | total | discount | total payable       | date_time | cash_recieved |
|--|--------------------------|-------------------------------|-------------------------------|---------------------------------|------------|----|------------------|----------|-------|----------|---------------------|-----------|---------------|
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 87         | 1  | Hiroon Wijekoon  | 98450    | 450   | 98000    | 2020-11-17 00:00:00 | 100000    |               |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 86         | 1  | Hiroon Wijekoon  | 32500    | 1500  | 31000    | 2020-12-16 00:00:00 | 35000     |               |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 85         | 1  | Hiroon Wijekoon  | 77000    | 2000  | 75000    | 2021-01-11 00:00:00 | 80000     |               |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 84         | 1  | Hiroon Wijekoon  | 45000    | 3000  | 42000    | 2021-02-17 00:00:00 | 50000     |               |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 83         | 1  | Hiroon Wijekoon  | 45000    | 1000  | 44000    | 2021-04-09 00:00:00 | 50000     |               |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 82         | 6  | Daham Gunasekara | 29551    | 601   | 28950    | 2021-04-30 19:04:03 | 30000     |               |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 81         | 10 |                  | 53400    | 1000  | 52400    | 2021-03-10 16:04:18 | 60000     |               |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 80         | 1  | Hiroon Wijekoon  | 67900    | 1     | 67899    | 2021-05-19 09:04:47 | 70000     |               |

All the invoices data are stored in here.

- “invoice\_attributes” table

|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | record_id | 1 | item_id                                  | item_name | unit_price | qty   | sub_total | invoice_id |
|--|--------------------------|-------------------------------|-------------------------------|---------------------------------|-----------|---|--|-----------|------------|-------|-----------|------------|
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 121       | 6 | CEAT   195x40x13   Passenger Vehicles    | 8500      | 2          | 17000 | 82        |            |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 120       | 2 | GT Radial   195x40x13   Heavy Vehicles   | 11950     | 1          | 11950 | 82        |            |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 119       | 0 | CEAT   1000x20   Heavy Vehicles          | 52400     | 1          | 52400 | 81        |            |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 118       | 0 | CEAT   1000x20   Heavy Vehicles          | 53400     | 1          | 53400 | 80        |            |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 117       | 0 | Nankang   195x45x15   Passenger Vehicles | 13500     | 1          | 13500 | 80        |            |

All the items inside the invoice are saved in here.

- “sizes” table

|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | item_id | size      |
|--|--------------------------|-------------------------------|-------------------------------|---------------------------------|---------|-----------|
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 1       | 195x40x13 |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 2       | 195x45x13 |

Data for “Size” drop down menus are stored here.

- “users” table

|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | user_id | full_name               | username  | password   | acc_type      | created_date        |
|--|--------------------------|-------------------------------|-------------------------------|---------------------------------|---------|-------------------------|-----------|--|---------------|---------------------|
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 1       | Hiroon Imaasha Wijekoon | hiroon123 | \$2y\$10\$dVa27pTjFlKomuxSsoBtdOJRTJoA4T58AcBEm8Ycaqp... | Administrator | 2020-11-07 07:09:20 |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 5       | Standard User           | user      | \$2y\$10\$SmRU6UEm8oX.nubfv7crDeYWOU3cFDh9tt1qoysIEO3... | Standard      | 2021-04-27 03:23:25 |

All the users’ data are saved in here. Users’ passwords are saved as a hash value for increased security.

### 3. Web Application

#### a) Login

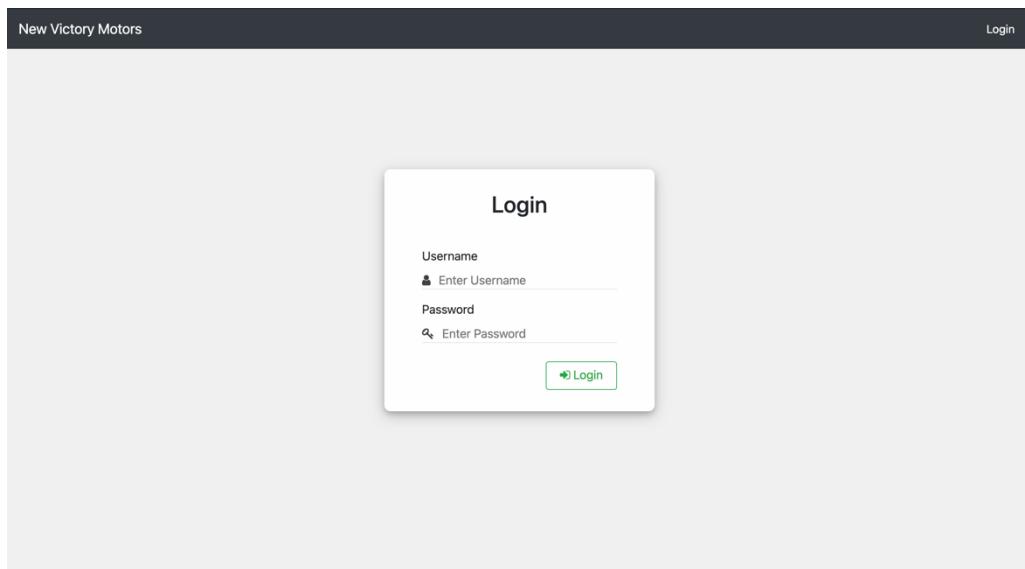


Figure 5 Web Application Login

Users can log in to system using this login window. There are 2 types of users named as “Administrator” and “Standard user”. All the username and passwords are sent to the server securely to check the credentials with the database. Password is first converted into a hash value and then sent over to the server. In the server, that hash value is compared with the hash value of passwords from the database. If the hash values match, then the user will be granted access to the system. Otherwise it shows an error message saying “username or password is incorrect”.

## b) Dashboard

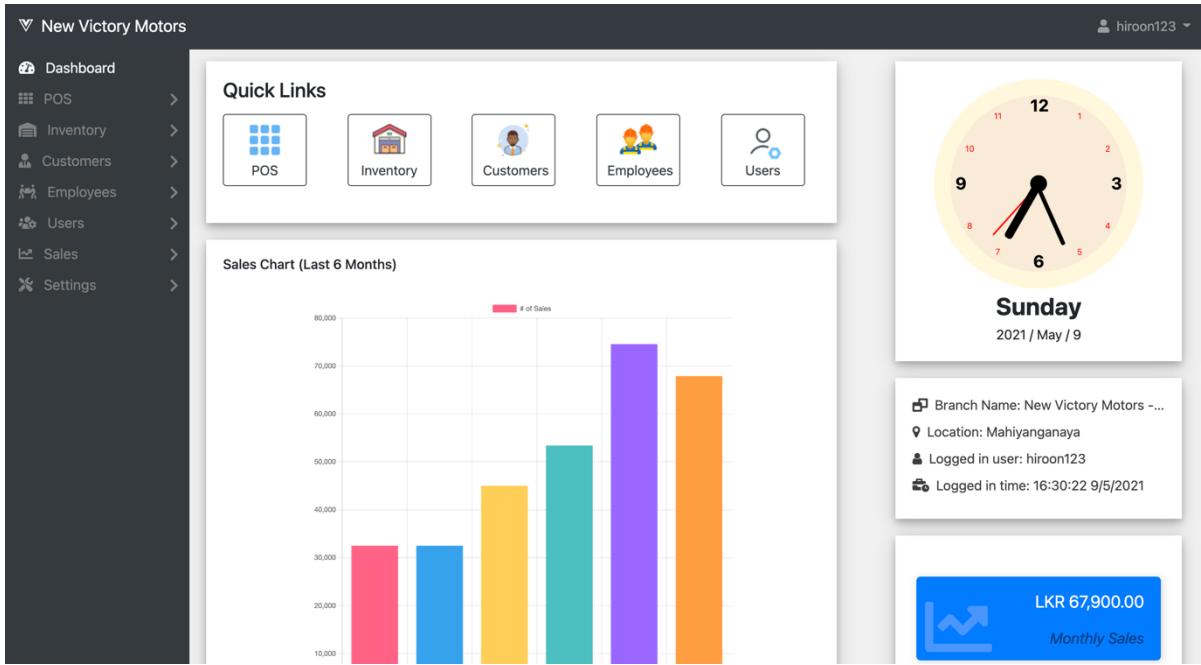
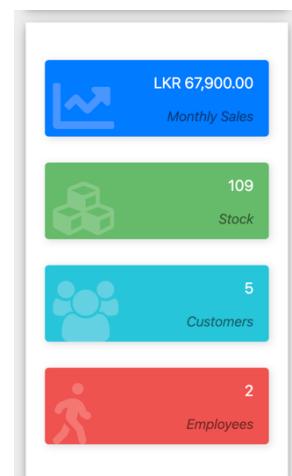


Figure 6 Dashboard

After a successful login, user will be redirected to the dashboard. In the dashboard users can get access to functions such as POS, Inventory, Customers, Employees, Users, Sales and Settings. Only Administrator accounts have access to Users, Sales and Settings. User's frequently used functions are shown in the Quick Links area. In the right side it shows an analog clock with day, date and time. Logged in user's details are shown in the box below the clock area. User's location and logged in time is also shown there.

Box below that shows information about total no of sales in that particular month, number of stock items available, number of customers who have registered with system and number of employees registered in the particular branch.



There are 2 charts shown in the dashboard,

## 1. Sales Chart

This chart shows sales data of the last six months in a graphical manner.

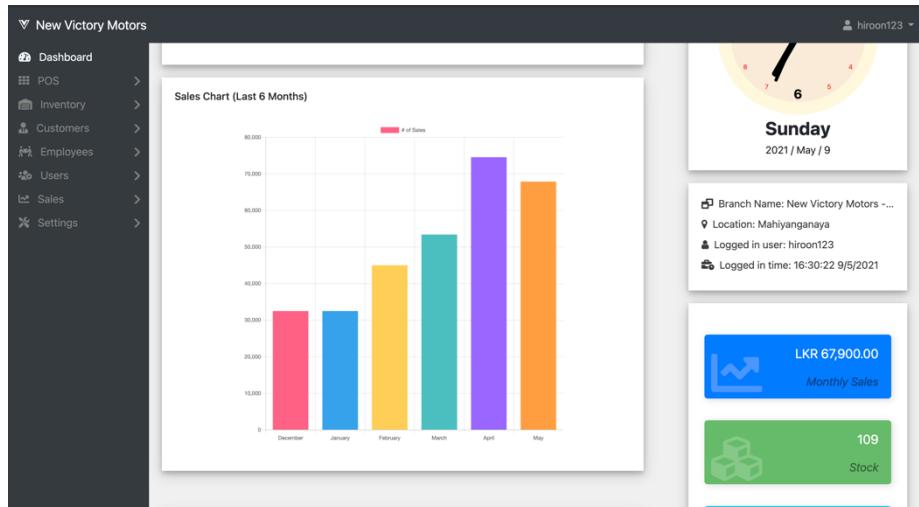


Figure 7 Dashboard View

## 2. Inventory Chart

This chart shows inventory data stock values from each and every item in the database.

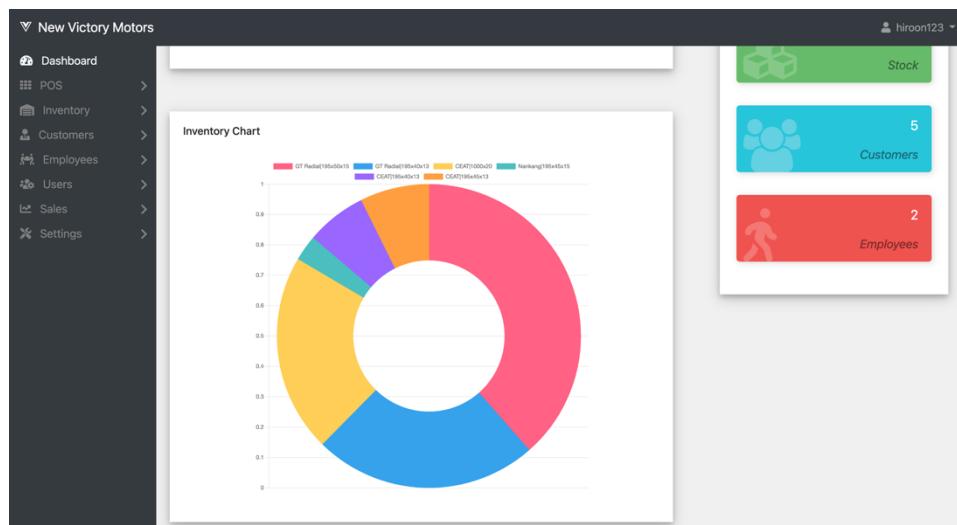


Figure 8 Dashboard View 2

All these charts are customizable inside the settings menu. All the chart types can be changed as the desire of the user.

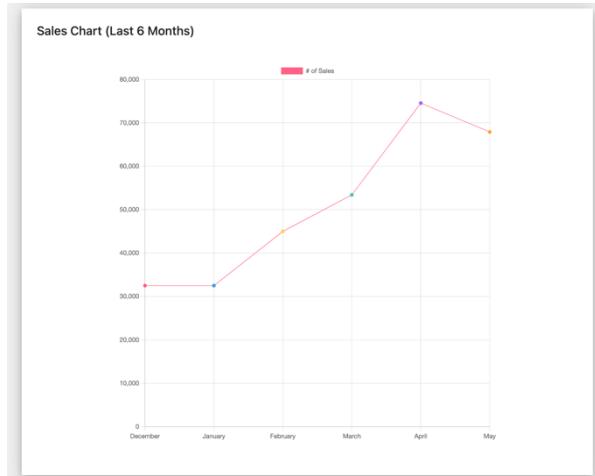


Figure 13 Line Chart

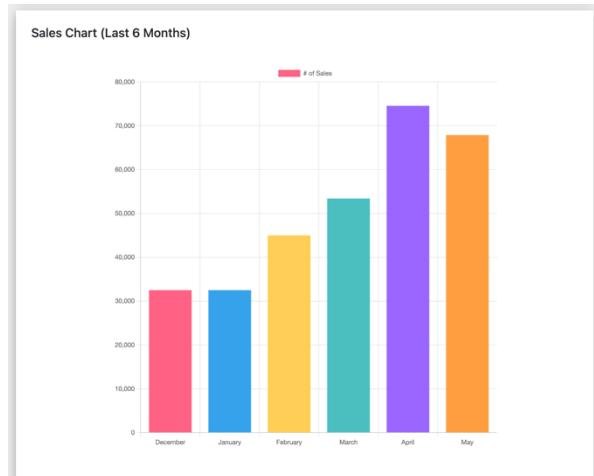


Figure 14 Bar Chart

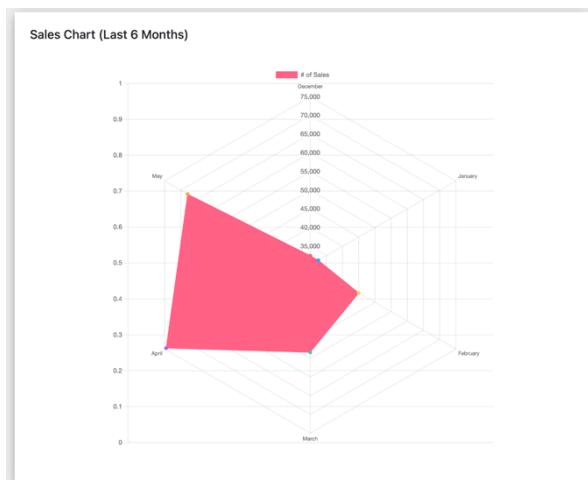


Figure 12 Area Chart

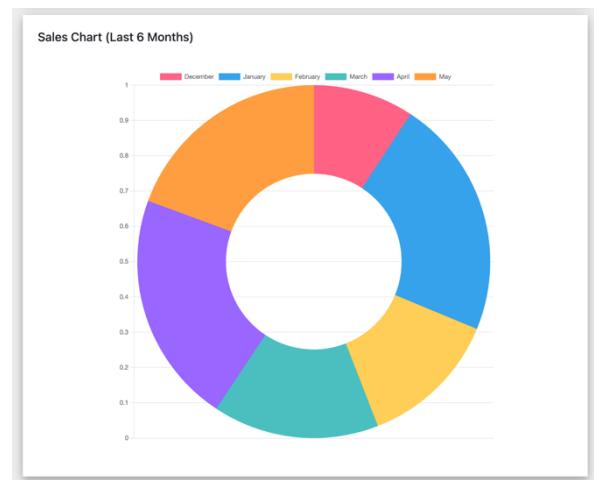


Figure 11 Donought Chart

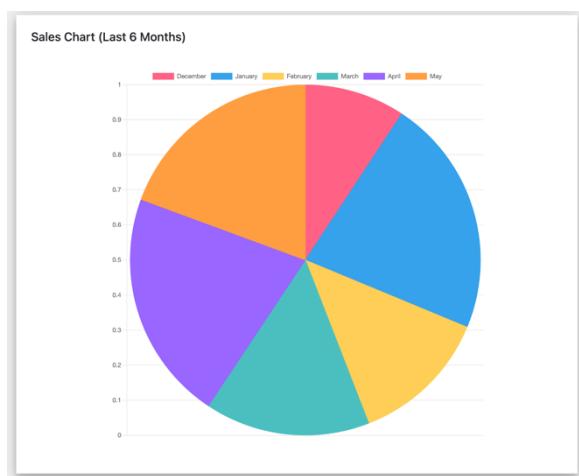


Figure 10 Pie Chart

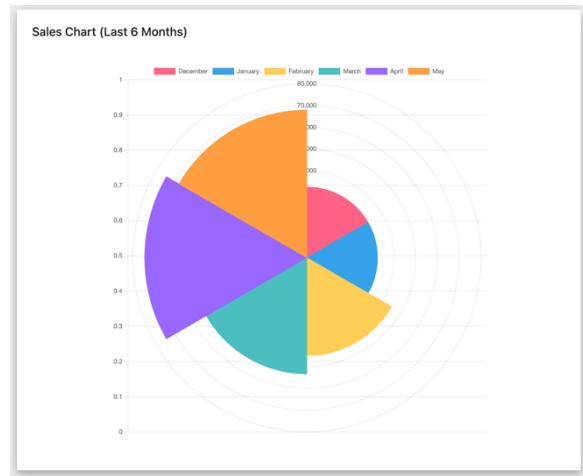


Figure 9 Chart

Users can see their logged in account details from the top right corner of the navigation bar. They can access functions such as Account Settings, View Log and Logout from the dropdown menu.

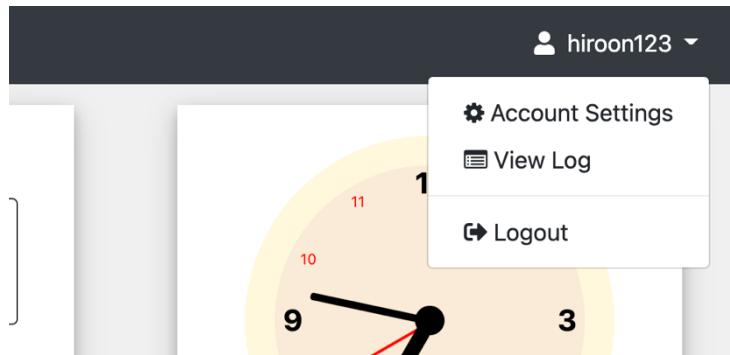


Figure 15 Navigation Dropdown

### c) POS

| Item Name | Unit Price | Qty | Sub Total |
|-----------|------------|-----|-----------|
|           |            |     |           |

Select Customer  
Walk-In Customer

Total Items: 0  
Total: 0.00  
Discount: 0.00  
Total Payable: 0.00

**Print Bill** **Payment**

Figure 16 POS

User can print invoices using this window. User can select any item from the dropdown menu by simply entering the item name, brand or size. It shows results dynamically and user doesn't have to click search or anything.

Search Item  
-- Select Item --  
195

Nankang | 195x45x15 | Passenger Vehicles  
GT Radial | 195x50x15 | Passenger Vehicles  
GT Radial | 195x40x13 | Heavy Vehicles  
CEAT | 195x40x13 | Passenger Vehicles  
CEAT | 195x45x13 | Passenger Vehicles

Figure 17 Dynamic Search - Inventory

After selecting the item, unit price will be automatically loaded into the textbox. User can either use the auto generated unit price or can enter any price to give the customer a discount. Then user can enter the quantity and click “Add” to add the item to the cart below. Also user

| Item Name                                | Unit Price | Qty | Sub Total |
|--|------------|-----|-----------|
| GT Radial   195x40x13   Heavy Vehicles   | 11,000.00  | 2   | 22,000.00 |
| Nankang   195x45x15   Passenger Vehicles | 14,500.00  | 2   | 29,000.00 |

Figure 18 Item View

can delete added items by simply selecting the “delete” button.

Total items, Total, Discount and Total Payable will be displayed inside the multi-colored box in the right side.

|               |           |
|---------------|-----------|
| Total Items   | 2         |
| Total         | 52,902.00 |
| Discount      | 1,902.00  |
| Total Payable | 51,000.00 |

Figure 19 POS Totals

User can also select the customer using the drop-down menu by simply searching the employee by their name, address or contact number.

The screenshot shows a search interface titled "Walk-In Customer". At the top is a search bar with a magnifying glass icon. Below it is a dropdown menu with the title "Walk-In Customer" highlighted in blue. The dropdown lists several customer entries:

- Hiroon Imalsha Wijekoon2 | Balagolla2 | 07786522762
- Test Name | Kengalla | 0556647338
- Daham Gunasekara | Badulla | 0556647338
- Hiroon Wijekoon | Kengalla | 0778652276

Figure 20 Customer Quick Search

After entering all the data, user can click “Payment” to collect cash from the customer. Pop up will be shown asking for the cash money value.

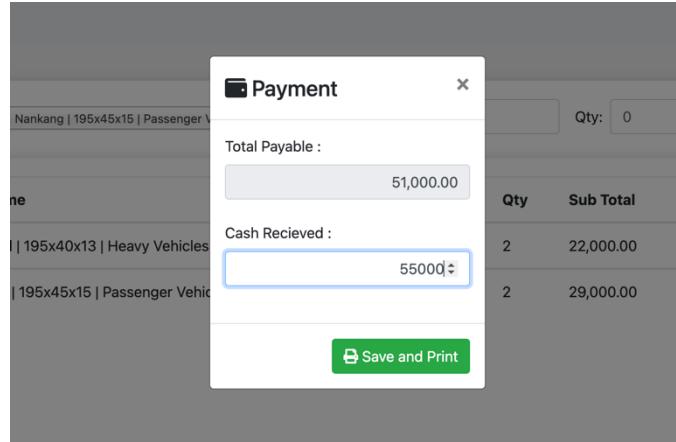


Figure 21 Payment PopUp

After selecting the “Save and Print” Button, the invoice print preview window will be shown.

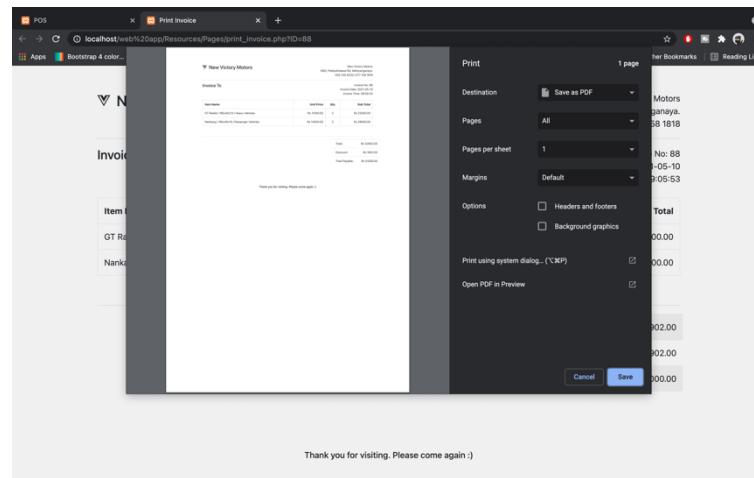


Figure 22 Print Preview

Printed Invoice will be shown as below,

**New Victory Motors**

69/2, Padiyathalawa Rd, Mahiyanganaya.  
055 225 8220 | 077 158 1818

**Invoice To**

Invoice No: 88  
Invoice Date: 2021-05-10  
Invoice Time: 09:05:53

| Item Name                                | Unit Price  | Qty | Sub Total   |
|--|-------------|-----|-------------|
| GT Radial   195x40x13   Heavy Vehicles   | Rs 11000.00 | 2   | Rs 22000.00 |
| Nankang   195x45x15   Passenger Vehicles | Rs 14500.00 | 2   | Rs 29000.00 |

Total: Rs 52902.00  
Discount: Rs 1902.00  
Total Payable: Rs 51000.00

Thank you for visiting. Please come again :)

Figure 23 Printed Invoice

#### d) Inventory

In this window user can access inventory data. User can add, update or delete inventory items and can see all the items inside the table view. User can dynamically search any item by item name, category name, brand or size.

**Inventory**

Type to search...  Search Clear + Add Item

| Size      | Brand     | Category           | Quantity | Cost  | Selling Price | Refresh |  |
|-----------|-----------|--------------------|----------|-------|---------------|---------|--|
| 195x50x15 | GT Radial | Passenger Vehicles | 42       | 9870  | 13500         |         |  |
| 195x45x15 | Nankang   | Passenger Vehicles | 3        | 11400 | 14500         |         |  |
| 195x45x13 | CEAT      | Passenger Vehicles | 8        | 8200  | 9300          |         |  |
| 195x40x13 | GT Radial | Heavy Vehicles     | 26       | 8771  | 11951         |         |  |
| 195x40x13 | CEAT      | Passenger Vehicles | 7        | 7500  | 8800          |         |  |

Figure 24 Inventory Window

User can add new item by clicking the “Add Item” button.

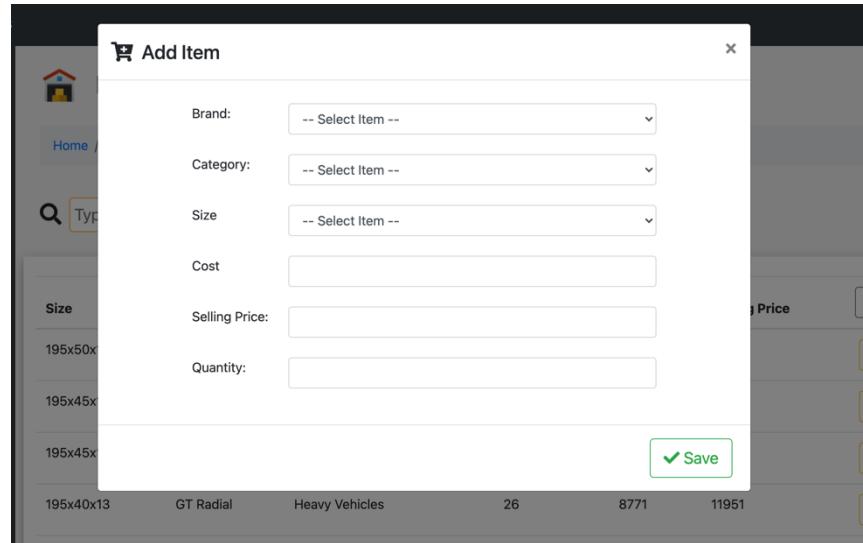


Figure 25 Add Item - Inventory

User can update an item by simply clicking the edit icon in each row.

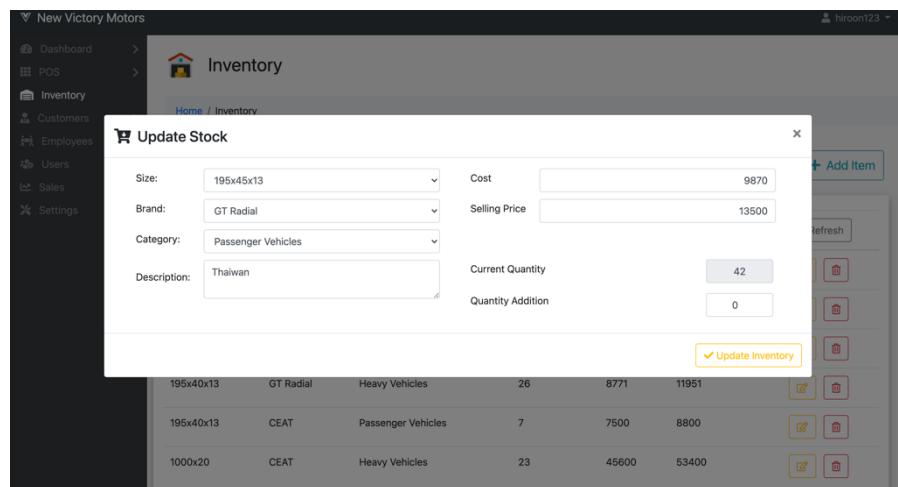


Figure 26 Update Inventory

User can add or remove item quantity by entering the Quantity Addition as a plus or minus value. User can also update any other sort of data of the item. Also, user can delete any record by simply clicking the delete button in each row.

## e) Customer Manager

The screenshot shows the 'Customer Manager' page of the 'New Victory Motors' application. The left sidebar has a 'Customers' section selected. The main area displays a table of customer data with columns: Full Name, Address Line 1, Address Line 2, City, Special Remarks, Contact Number, and actions (Edit, Delete). A search bar and an 'Add New' button are at the top.

| Full Name                | Address Line 1                               | Address Line 2 | City       | Special Remarks | Contact Number | Action |
|--------------------------|--|----------------|------------|-----------------|----------------|--------|
| Hiroon Imaisha Wijekoon2 | No 50, Regent Village, Moragahapitiya State, | Balagolla2     | Balagolla2 | Near BOI2       | 07786522762    |        |
| Test Name                | Address1                                     | 2              | Kengalla   | Near BOI        | 0556647338     |        |
| Daham Gunasekara         | 45/A   | Darshana Mw    | Badulla    | Near Bus Stand  | 0556647338     |        |
| Hiroon Wijekoon          | 50,Regent Village                            | Balagolla      | Kengalla   | Near BOI        | 0778652276     |        |
| Walk-In Customer         |  |                |            |                 |                |        |

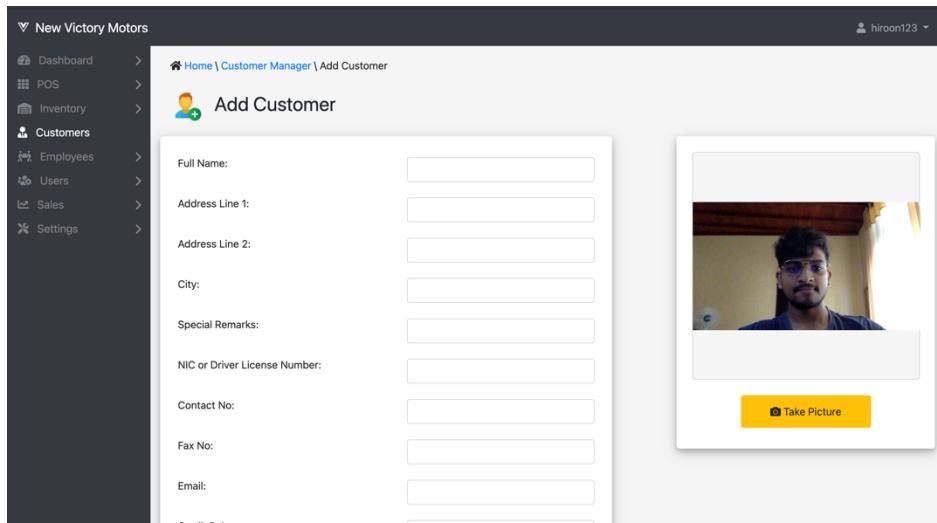
Figure 27 Customer Manager

All the customers' data will be displayed inside this window. User can search any customer by their name, address or contact number. A new customer can be added by simply clicking the “Add New” button. A new page will be opened with a form to enter new customer's data.

The screenshot shows the 'Add Customer' form. It includes fields for Full Name, Address Line 1, Address Line 2, City, Special Remarks, NIC or Driver License Number, Contact No., Fax No., and Email. To the right is a camera preview area with a 'Turn on Camera' button.

Figure 28 Add Customer

User can fill all the data of the customer and if a photo of the customer is needed, then user can click “Turn On Camera” and capture a photo of the customer.



After selecting the “Take Picture” button, customers captured image will be loaded into the image box. After entering all the data, user can select “Add Customer” to add customer to the database.

Also, user can select any customer and click “eye” icon to show their details and update.

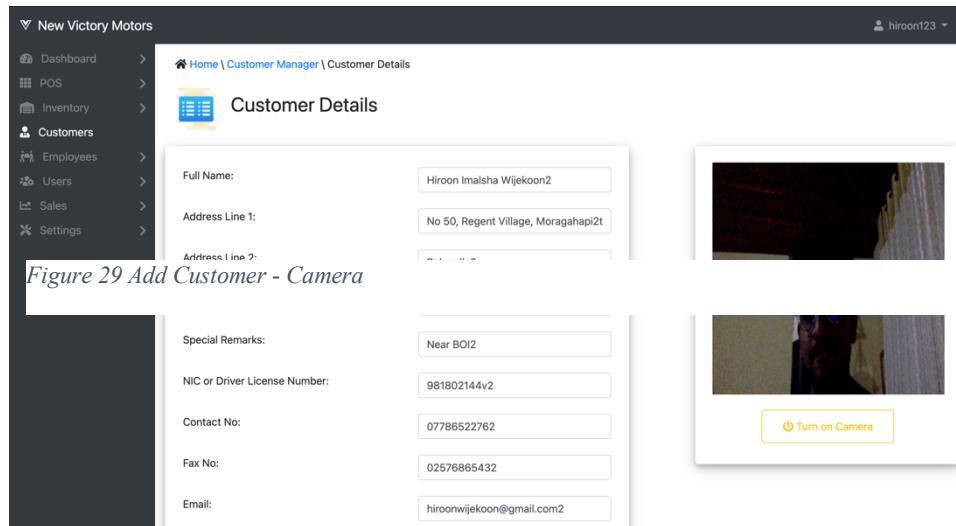


Figure 29 Add Customer - Camera

Figure 30 Update Customer

Also, user can click delete in each row to delete the selected customer from the system database.

## f) Employee Manager

The screenshot shows the 'Employee Manager' page of the New Victory Motors application. The left sidebar contains navigation links for Dashboard, POS, Inventory, Customers, Employees (selected), Users, Sales, and Settings. The main content area has a breadcrumb path 'Home \ Employee Manager'. It features a search bar with placeholder 'Type to search...', a green 'Search' button, and a 'Clear' button. A blue 'Add' button is located in the top right. Below the search bar is a table header with columns: Full Name, Address Line 1, Address Line 2, City, Contact Number 1, and Refresh. Two rows of employee data are listed:

| Full Name               | Address Line 1                               | Address Line 2 | City      | Contact Number 1 | Refresh |
|-------------------------|--|----------------|-----------|------------------|---------|
| Hiroon Imlasha Wijekoon | No 50, Regent Village, Moragahapitiya State, | Kandy          | Balagolla | 0556647338       |         |
| Sample Employee223      | 3  | ad223          | city23    | 088654354323     |         |

Figure 31 Employee Manager

All the employees' data will be displayed inside this window. User can search any employee by their name, address or contact number. A new employee can be added by simply clicking the "Add New" button. A new page will be opened with a form to enter new employee's data.

The screenshot shows the 'Add Employee' form. The left sidebar is identical to Figure 31. The main form has a title 'Add Employee' and a breadcrumb path 'Home \ Employee Manager \ Add Employee'. It contains the following input fields:

- Full Name:
- Address Line 1:
- Address Line 2:
- City:
- Special Remarks:
- NIC or Driver License Number:
- Contact No 1:
- Contact No 2:

On the right side, there is a large empty box for a camera feed with a yellow 'Turn on Camera' button below it. At the bottom is a green 'Add Employee' button.

Figure 32 Add Employee

User can fill all the data of the employee and if a photo of the employee is needed, then user can click “Turn on Camera” and capture a photo of the employee.

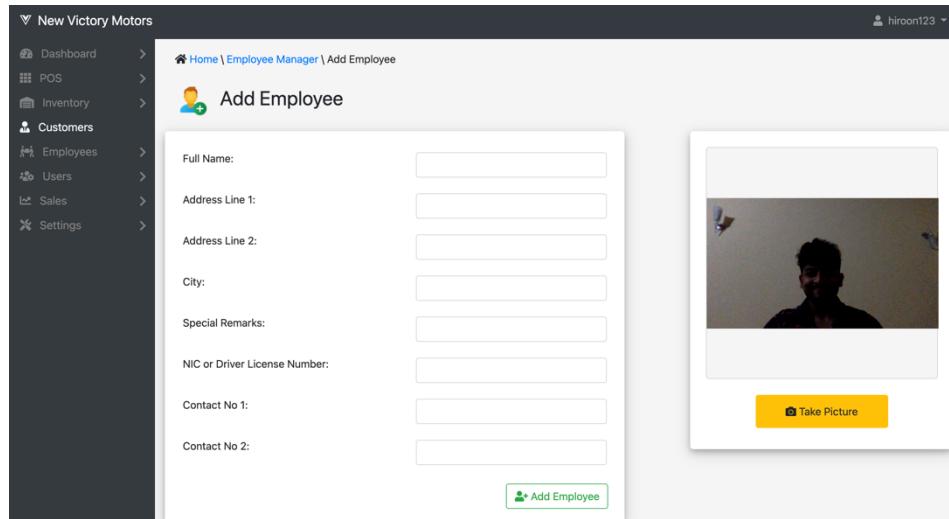


Figure 33 Add Employee - Camera

After selecting the “Take Picture” button, employee’s captured image will be loaded into the image box. After entering all the data, user can select “Add Employee” to add employee to the database.

Also, user can select any employee and click “eye” icon to show their details and update.

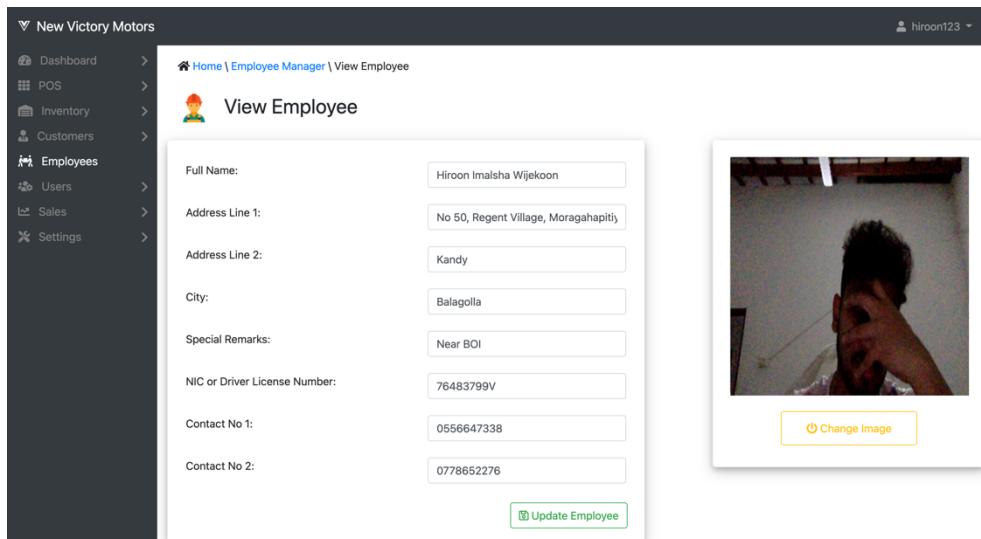


Figure 34 Update Employee

Also, user can click delete in each row to delete the selected employee from the system database.

### g) User Control Panel

The screenshot shows the 'User Control Panel' interface. On the left is a dark sidebar menu with items: Dashboard, POS, Inventory, Customers, Employees, Users (which is currently selected), Sales, and Settings. The main area has a title 'User Control Panel' with a user icon. Below it is a breadcrumb navigation 'Home / Users'. A search bar labeled 'Search' is followed by a button labeled '+ Add New'. A table lists two users:

| Name                    | Username  | Account Type  | Created Date and Time |
|-------------------------|-----------|---------------|-----------------------|
| Hiroon Imaasha Wijekoon | hiroon123 | Administrator | 2020-11-07 07:09:20   |
| Standard User           | user      | Standard      | 2021-04-27 03:23:25   |

Each row has edit and delete icons. A 'Refresh' button is also present at the top of the table.

Figure 35 User Control Panel

All the users' data will be displayed inside this window. User can search any user by their name or username. A new user can be added by simply clicking the “Add New” button. A popup will be opened with a form to enter new user's data.

The screenshot shows a modal dialog titled '+ Add New User' over the User Control Panel. The dialog contains fields for Name, Username, Password, Verify Password, and Account Type (with 'Administrator' selected). At the bottom are 'Submit' and 'Close' buttons. The background shows the same user list as Figure 35.

Figure 36 Add New User

User can click the edit icon of any user to update their details. A popup will be opened with the data related to the user. Current password is required if the user wants to change any data. If the user wants to change the password, then he/she should enter the old password first and then should enter the new password and password verification.

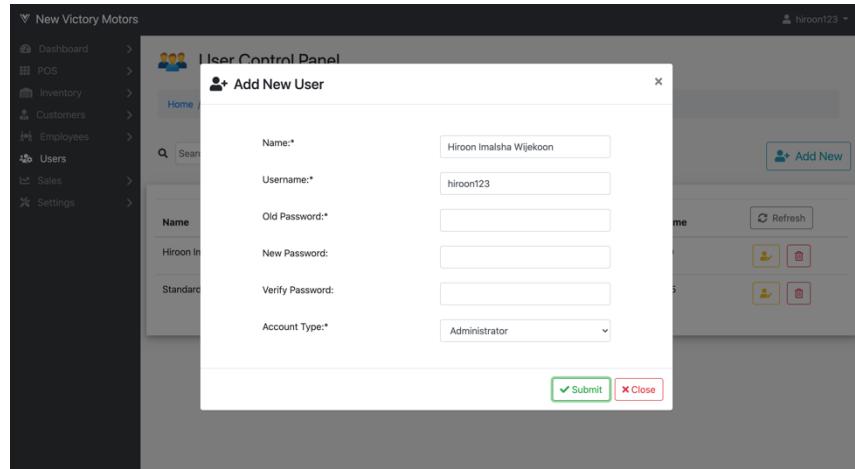


Figure 37 Update User

## h) Sales

| Sales  |                  |               |              |               |                       |  |
|--|------------------|---------------|--------------|---------------|-----------------------|--|
| Home / Sales<br>Search From : 04/10/2021 To : 05/11/2021 Refresh |                  |               |              |               |                       |  |
| Invoice ID   | Customer         | Total         | Discount     | Total Payable | Invoice Date and Time |  |
| 82   | Daham Gunasekara | LKR 29,551.00 | LKR 601.00   | LKR 28,950.00 | 2021-04-30 19:04:03   |  |
| 88   |                  | LKR 52,902.00 | LKR 1,902.00 | LKR 51,000.00 | 2021-05-10 09:05:53   |  |

Figure 38 Sales

Sales data are shown in this window. User can search any sales record by invoice ID or customer's name. User can filter using the date range to simplify the search results. In order to get the detailed view of the sales record, user has to click on the right arrow. The below screen will be displayed afterwards.

The screenshot shows the 'Invoice Details' page of the application. The left sidebar is a navigation menu with sections like Dashboard, POS, Inventory, Customers, Employees, Sales, Users, Sales, and Settings. The main content area shows the following details:

| Total:         | LKR 29,551.00 | Invoice ID:            | 82                  |
|----------------|---------------|------------------------|---------------------|
| Discount:      | LKR 601.00    | Invoice Date and Time: | 2021-04-30 19:04:03 |
| Total Payable: | LKR 28,950.00 | Customer:              | Daham Gunasekara    |
| Cash Received: | LKR 30,000.00 |                        |                     |

Below this is a table showing purchased items:

| Item Name                              | Unit Price    | Qty | Sub Total     |
|--|---------------|-----|---------------|
| GT Radial   195x40x13   Heavy Vehicles | LKR 11,950.00 | 1   | LKR 11,950.00 |
| CEAT   195x40x13   Passenger Vehicles  | LKR 8,500.00  | 2   | LKR 17,000.00 |

Figure 39 Sales Invoice Details

All the details of the invoice will be shown here and all the invoice attributes (purchased items) will be shown inside the table. User can click on the arrow after the username to get the full detail page of the user.

The screenshot shows the 'Customer Details' page of the application. The left sidebar is a navigation menu with sections like Dashboard, POS, Inventory, Customers, Employees, Users, Sales, and Settings. The main content area shows the following form fields:

|                               |                   |
|-------------------------------|-------------------|
| Full Name:                    | Daham Gunasekara  |
| Address Line 1:               | 45/A              |
| Address Line 2:               | Darshana Mw       |
| City:                         | Badulla           |
| Special Remarks:              | Near Bus Stand    |
| NIC or Driver License Number: | 76483799V         |
| Contact No:                   | 0556647338        |
| Fax No:                       | 0552347876        |
| Email:                        | daham_d@gmail.com |

To the right of the form is a large empty white area, likely a placeholder for a camera feed or another panel. At the bottom right of this area is a yellow button labeled 'Turn on Camera' with a camera icon.

Figure 40 Customer Details Window

### i) Settings

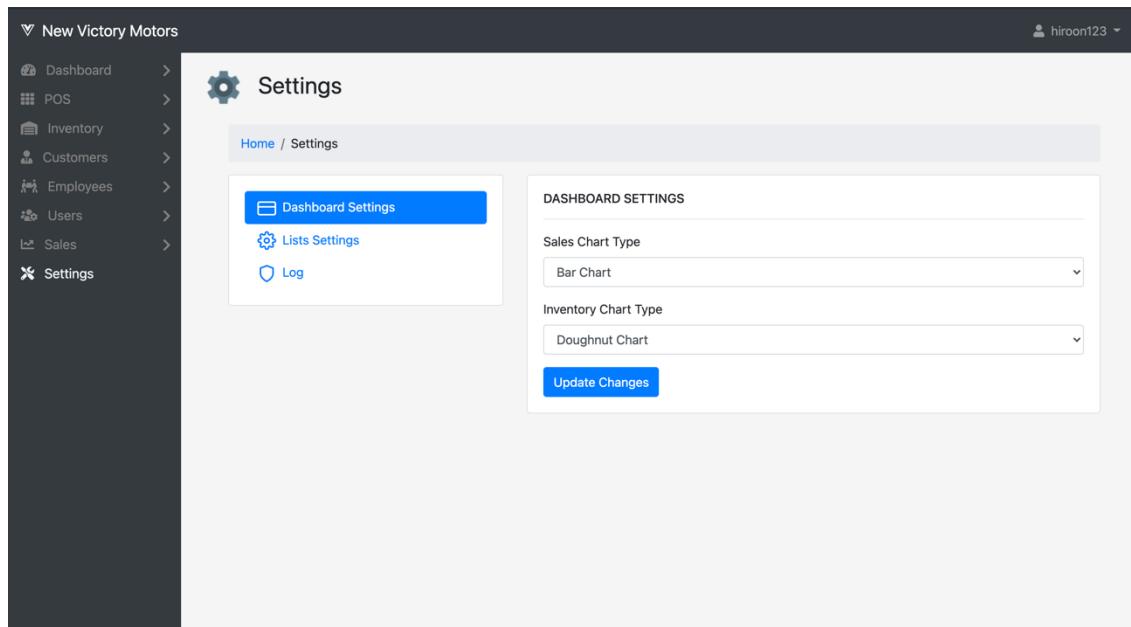


Figure 41 Settings

In Settings window, user can access to main 3 categories of settings,

- i. Dashboard Settings – Chart Types
- ii. List Settings – Add/Update/Delete Lists Items
- iii. Log

A zoomed-in view of the "Dashboard Settings" section from Figure 41. It shows two dropdown menus: "Sales Chart Type" set to "Bar Chart" and "Inventory Chart Type" set to "Doughnut Chart". A blue "Update Changes" button is at the bottom.

Figure 42 Dashboard Settings

In Dashboard Settings, user can select which type of chart should be displayed in the dashboard.

Chart selection options are as follows,



Figure 43 Chart Types

In Lists Settings, user can add / delete items to lists such as Brands List, Sizes List, Categories List and etc.

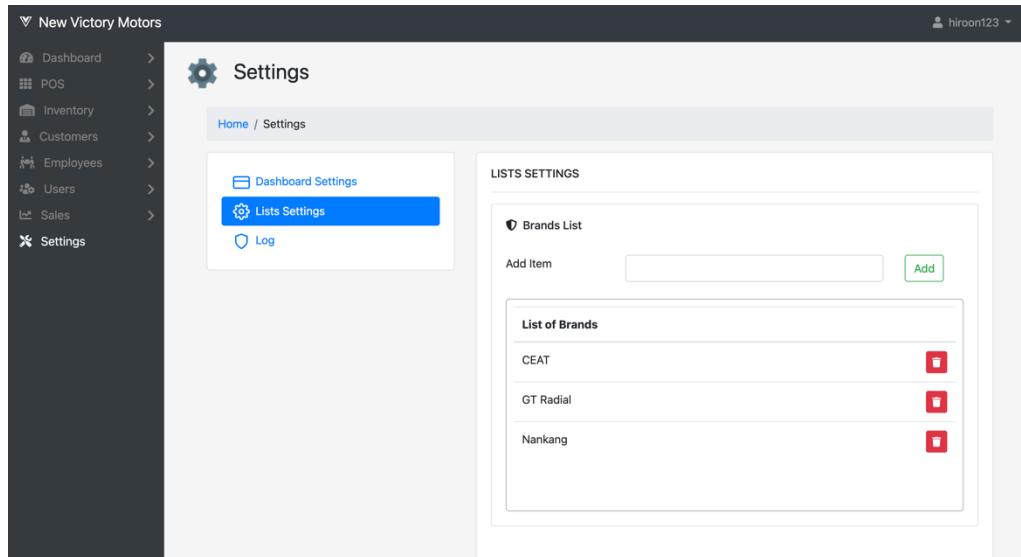


Figure 44 List Settings

To insert a new item to the list user can enter the item value inside the text box and then click “Add”.

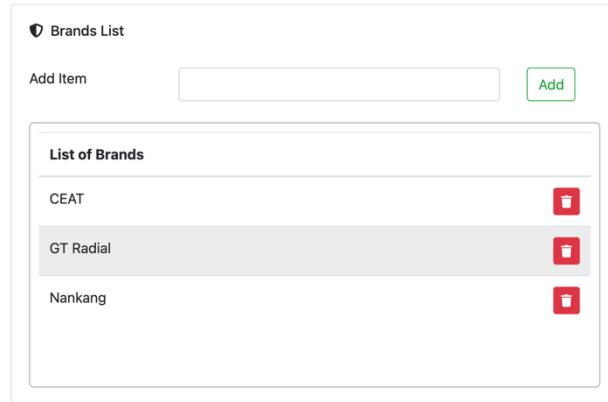


Figure 45 List Items

To delete an item, user can simply click the trash icon.

To logout of the system user has to go to the top navigation and click on the user drop down, then select “Logout”.

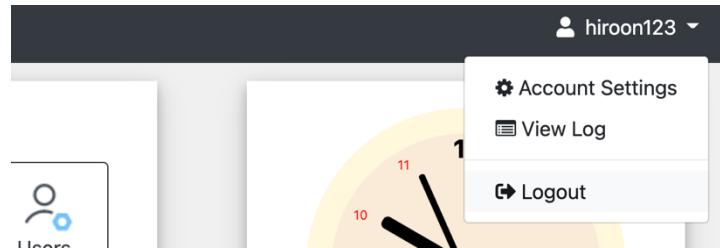


Figure 46 Navbar Dropdown 2

## 4. Mobile Application

### a. Login

User can log in to mobile app using their credentials. Once the user enters the user name and password, first the app converts the password into a hash value. Then the hash value is sent to the server securely using a PHP API and the hash value is compared with the particular user's password hash in the database. If the hash values match, then user will be granted to access the application and the dashboard of the mobile application will be shown.

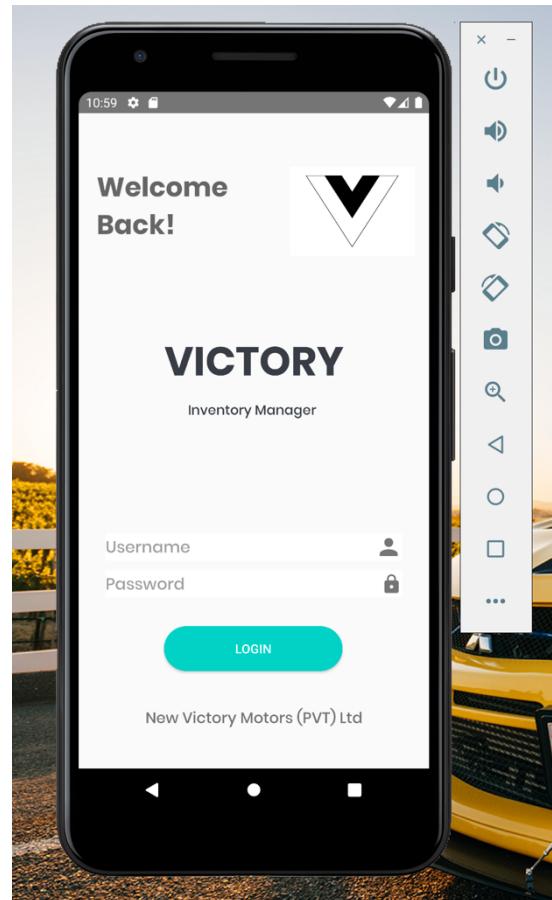


Figure 47 Mobile App Login

## b) Dashboard

All the accessible functions of the mobile will be displayed here in the dashboard. Currently it only shows Inventory List and My Account Cards. “Sales mobile view for administrators” function will be developed as a future implementation.

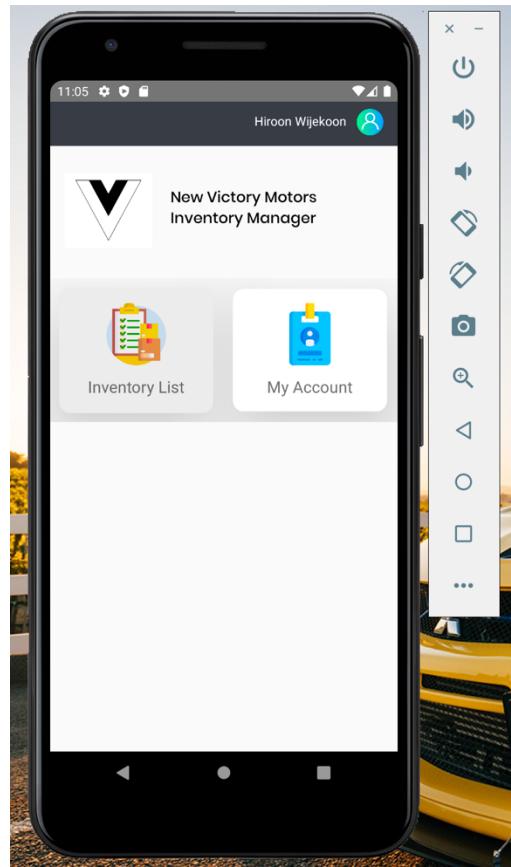


Figure 48 Mobile App - Dashboard

## c) Inventory List

Inventory list is displayed in this window. User can search any item using the item name, size or category. To select an item user simply has to tap on the item card to get the detailed view of the item.

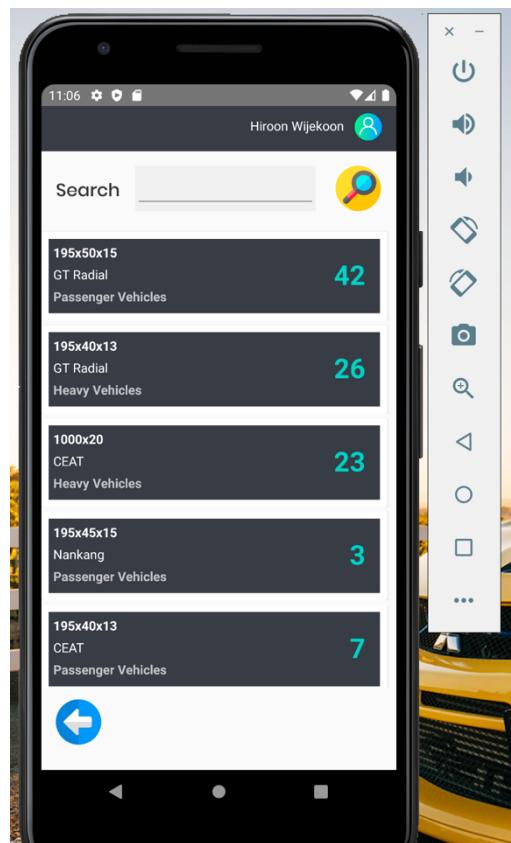


Figure 49 Mobile App - Inventory

#### d) Item Details

User can check all the details of the select item and can easily update the quantity by clicking Plus or Minus buttons. After adding the quantity change, user can click the green check button in the bottom right corner to save data.

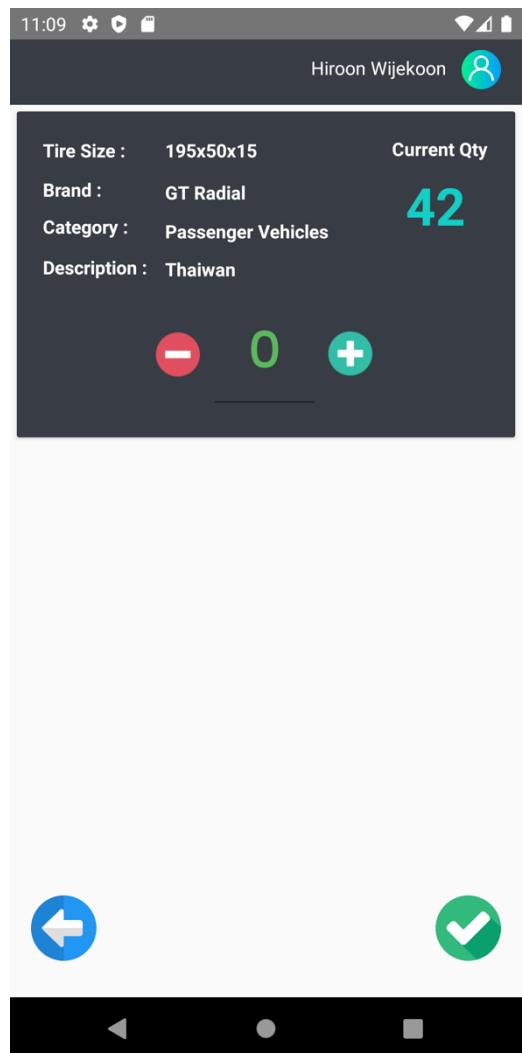


Figure 50 Mobile App - Inventory Details

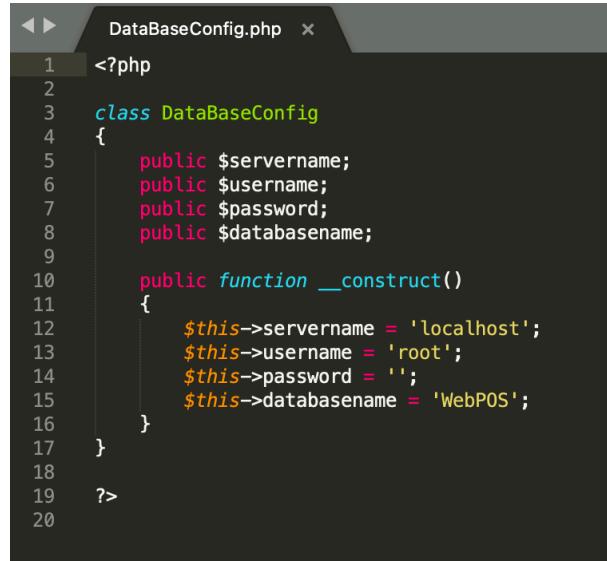
## 5. API

### a. Endpoints

- POST - /API/checkPassword.php
- GET - /API/checkUsername.php?username={username}
- GET - /API/getConfig.php?config={config}
- GET - /API/getCustomerName.php?cus\_id={id}
- GET - /API/getInvocieAttributes.php?invocie\_id={id}
- GET - /API/getInvoiceDetails.php?invoice\_id={id}
- GET - /API/getInvoicesList.php? keyword={keyword}GET - /API/getTotalSalesByMonth.php?month={month\_no}
- GET - /API/inventoryList.php
- POST - /API/login.php
- GET - /API/noOfCustomers.php
- GET - /API/noOfEmployees.php
- GET - /API/noOfStocks.php
- GET - /API/searchInventory.php?keyword={keyword}
- GET - /API/searchInvoices.php?keyword={keyword}& keyword={keyword}
- GET - /API/searchUsers.php?keyword={keyword}
- GET - /API/updateConfig.php?config={item}&value={value}
- GET - /API/updateQty.php?item\_id={item\_id}&qty={qty}
- POST - /API/updateUser.php

## b) Detailed view of classes and methods

### ➤ Database Configuration



```
<?php
class DataBaseConfig
{
    public $servername;
    public $username;
    public $password;
    public $databasename;

    public function __construct()
    {
        $this->servername = 'localhost';
        $this->username = 'root';
        $this->password = '';
        $this->databasename = 'WebPOS';
    }
}
?>
```

Figure 51 DataConfig Code

- servername – Enter the name of the server
- username – Username of the server
- password – Password of the server
- databasename - Name of the database

## ➤ API Methods

```
<?php
require "DataBaseConfig.php";

class DataBase
{
    public $connect;
    public $data;
    private $sql;
    protected $servername;
    protected $username;
    protected $password;
    protected $databasename;

    public function __construct()
    {
        $this->connect = null;
        $this->data = null;
        $this->sql = null;
        $dbc = new DataBaseConfig();
        $this->servername = $dbc->servername;
        $this->username = $dbc->username;
        $this->password = $dbc->password;
        $this->databasename = $dbc->databasename;
    }

    function dbConnect()
    {
        $this->connect = mysqli_connect($this->servername, $this->username, $this->password, $this->databasename);
        return $this->connect;
    }

    function prepareData($data)
    {
        return mysqli_real_escape_string($this->connect, stripslashes(htmlspecialchars($data)));
    }

    function logIn($table, $username, $password)
    {
        $username = $this->prepareData($username);
        $password = $this->prepareData($password);
        $this->sql = "select * from " . $table . " where username = '" . $username . "'";
        $result = mysqli_query($this->connect, $this->sql);
        $row = mysqli_fetch_assoc($result);
        if (mysqli_num_rows($result) != 0) {
            $dbusername = $row['username'];
            $dbpassword = $row['password'];
            if ($dbusername == $username && password_verify($password, $dbpassword)) {
                $login = true;
            } else $login = false;
        } else $login = false;
        return $login;
    }
}
```

Figure 52 API Methods 1

- dbConnect() – Connect Database from the API
- prepareData() – Prepare data for more security
- logIn() – Login user

```

function readAllInventory($table)
{
    $this->sql = "SELECT * FROM $table";
    $result = mysqli_query($this->connect, $this->sql);
    $data = array();
    while($row = mysqli_fetch_assoc($result))
    {
        array_push($data,$row);
    }
    echo json_encode($data);
}

function updateQty($table,$qty,$item_id)
{
    $qty = $this->prepareData($qty);
    $item_id = $this->prepareData($item_id);
    $this->sql = "UPDATE $table SET qty = '$qty' WHERE item_id='".$item_id."'";
    if(mysqli_query($this->connect,$this->sql))
    {
        return true;
    }
    else
    {
        return false;
    }
}

function searchInventory($table,$keyword)
{
    $this->sql = "SELECT * FROM $table WHERE size LIKE '%' . $keyword . '%' OR brand LIKE '%' . $keyword . '%' OR category LIKE '%' . $keyword . '%'";
    $result = mysqli_query($this->connect, $this->sql);
    $data = array();
    while($row = mysqli_fetch_assoc($result))
    {
        array_push($data,$row);
    }
    echo json_encode($data);
}

function checkPWD($table, $old_password, $user_id)
{
    $old_password = $this->prepareData($old_password);
    $user_id = $this->prepareData($user_id);
    $this->sql = "select * from " . $table . " where user_id = '" . $user_id . "'";
    $result = mysqli_query($this->connect, $this->sql);
    $row = mysqli_fetch_assoc($result);
    if (mysqli_num_rows($result) != 0) {
        $dbuserid = $row['user_id'];
        $dbpassword = $row['password'];
    }
}

```

Figure 53 API Methods 2

- `readAllInventory()` – Returns all the inventory details
- `updaetQty()` – To update the stock levels
- `searchInventory()` – Returns inventory data filtered by search keyword
- `checkPWD()` – check password hash values

```

function updateUser($table,$fullname,$username,$acc_type,$user_id)
{
    $fullname = $this->prepareData($fullname);
    $username = $this->prepareData($username);
    $acc_type = $this->prepareData($acc_type);
    $user_id = $this->prepareData($user_id);
    $this->sql = "UPDATE $table SET full_name = '" . $fullname . "',username = '" . $username . "',acc_type = '" . $acc_type . "' WHERE user_id='" . $user_id . "'";
    if(mysqli_query($this->connect,$this->sql))
    {
        return true;
    }
    else
    {
        return false;
    }
}

function updateUserPW($table,$fullname,$username,$acc_type,$user_id,$password)
{
    $fullname = $this->prepareData($fullname);
    $username = $this->prepareData($username);
    $acc_type = $this->prepareData($acc_type);
    $user_id = $this->prepareData($user_id);
    $password = password_hash($password, PASSWORD_DEFAULT);
    $this->sql = "UPDATE $table SET full_name = '" . $fullname . "',username = '" . $username . "',acc_type = '" . $acc_type . "',password = '" . $password . "'";
    if(mysqli_query($this->connect,$this->sql))
    {
        return true;
    }
    else
    {
        return false;
    }
}

function checkUsername($table,$username)
{
    $username = $this->prepareData($username);
    $this->sql = "select * from " . $table . " where username = '" . $username . "'";
    $result = mysqli_query($this->connect, $this->sql);
    $row = mysqli_fetch_assoc($result);
    if (mysqli_num_rows($result) != 0) {
        $login = true;
    } else $login = false;
    return $login;
}

function getInvoicesList($table,$date_from,$date_to)
{
    $this->sql = "SELECT * FROM $table WHERE date_time BETWEEN '" . $date_from . "' and '" . $date_to . "'";
    $result = mysqli_query($this->connect, $this->sql);
    $data = array();
}

```

Figure 54 API Methods 3

- updateUser() – update user's details
- updateUserPW() – update user's password by the web application
- checkUsername() – check id the username is available
- getInvoicesList () – return all the invoices data

```

function getInvoiceDetails($table,$invoice_id)
{
    $this->sql = "SELECT * FROM $table WHERE invoice_id=$invoice_id LIMIT 1";
    $result = mysqli_query($this->connect, $this->sql);
    $data = array();
    $numRows = mysqli_num_rows($result);
    if($numRows>0)
    {
        while($row = mysqli_fetch_assoc($result))
        {
            array_push($data,$row);
        }
    }
    echo json_encode($data);
}

function getInvoiceAttributes($table,$invoice_id)
{
    $this->sql = "SELECT * FROM $table WHERE invoice_id=$invoice_id";
    $result = mysqli_query($this->connect, $this->sql);
    $data = array();
    $numRows = mysqli_num_rows($result);
    if($numRows>0)
    {
        while($row = mysqli_fetch_assoc($result))
        {
            array_push($data,$row);
        }
    }
    echo json_encode($data);
}

function getCustomerName($table,$cus_id)
{
    $this->sql = "SELECT * FROM $table WHERE cus_id=$cus_id LIMIT 1";
    $result = mysqli_query($this->connect, $this->sql);
    $returnCusName="";
    $numRows = mysqli_num_rows($result);
    if($numRows>0)
    {
        while($row = mysqli_fetch_assoc($result))
        {
            $returnCusName= $row['cus_name'];
        }
    }
    echo json_encode($returnCusName);
}

function searchInvoices($table,$keyword,$date_from,$date_to)
{
    $this->sql = "SELECT * FROM $table WHERE invoice_id LIKE '%".$keyword."%' OR cus_name LIKE '%".$keyword."%' AND date_time BETWEEN '$date_from' AND '$date_to'";
    $result = mysqli_query($this->connect, $this->sql);
    $data = array();
}

```

Figure 55 API Methods 4

- `getInvoiceDetails()` – returns all the details of the invoice
- `getInvoiceAttributes()` – returns all the attributes of a particular invoice
- `getCustomerName()` – returns the customer's name using the customer id
- `searchInvoices()` – search invoices using keywords

```

function noOfCustomers($table)
{
    $this->sql = "SELECT Count(cus_id) FROM $table";
    $result = mysqli_query($this->connect, $this->sql);
    $data = "";
    while($row = mysqli_fetch_assoc($result))
    {
        $data = $row['Count(cus_id)'];
    }

    echo json_encode($data);
}

function noOfEmployees($table)
{
    $this->sql = "SELECT Count(empID) FROM $table";
    $result = mysqli_query($this->connect, $this->sql);
    $data = "";
    while($row = mysqli_fetch_assoc($result))
    {
        $data = $row['Count(empID)'];
    }

    echo json_encode($data);
}

function getConfig($table,$config)
{
    $this->sql = "SELECT * FROM $table WHERE config='".$config."' LIMIT 1";
    $result = mysqli_query($this->connect, $this->sql);
    $data = "";
    while($row = mysqli_fetch_assoc($result))
    {
        $data = $row['value'];
    }

    echo json_encode($data);
}

function updateConfig($table,$config,$value)
{
    $config = $this->prepareData($config);
    $value = $this->prepareData($value);
    $this->sql = "UPDATE $table SET value = '".$value."' WHERE config='".$config."'";
    if(mysqli_query($this->connect,$this->sql))
    {
        return true;
    }
    else
    {
        return false;
    }
}

```

Figure 56 API Methods 5

- noOfCustomers() – returns number of customers
- noOfEmployees() – returns number of employees
- getConfig() – returns config values
- updateConfig() – update config items

## 6. Testing

Testing was carried out by the project team with the prototype and the final system. Initially designed test scenarios were refined to suit the final product. Testing was carried out in three stages such as unit testing, integrated testing and System testing. Individual components were tested using unit testing and results were recorded. Black box testing was carried out to test complex part of the system such as stock management report generation and order processing. Other components were tested using white box testing. Bottom Up method was used in integration testing. Each and every individual component which passed unit testing was integrated and integration testing was carried out. Finally, after integrating whole system, functional system testing was carried out.

### Test Cases

Acknowledged due to the functional requirements. The test cases have been emerging when more than one functional requirements required. The following test cases refer to the requirements, situations applied to the practical scenario and how the both the input and output should be in order to correct that the system is error - free and free of bugs and it's ready to implement.

*Table 4 Test Case*

|   |  |                     |  |                 |
|---|--|---------------------|--|-----------------|
| 1 | Enter empty email field in login form in App | Error message       | Error message<br>“Enter the value for email field”.    | Test successful |
| 2 | Enter empty password field in login page     | Error message       | Error message<br>“Enter the value for password field”. | Test successful |
| 3 | Enter wrong email in login form              | Error Toast Message | Error message<br>“Enter a valid email”.                | Test successful |
| 4 | Enter wrong password field in login form     | Error message       | Error message<br>“Enter a valid password”.             | Test successful |

|    |  |                 |   |                 |
|----|--|-----------------|---|-----------------|
| 5  | Press Login Button in Login form with valid email and password.  | Success Message | Success Message<br>“Login Successfully”                 | Test successful |
| 6  | Press Login Button in Login form with wrong email and password.  | Error message   | Success Message<br>“Login Failed!”                      | Test successful |
| 7  | Enter empty full name field in customer form                     | Error message   | Error message<br>“Enter the value for Name field”.      | Test successful |
| 8  | Enter empty national identity card number field in register form | Error message   | Error message<br>“Enter the value for NIC field”.       | Test successful |
| 9  | Enter empty address field in register form                       | Error message   | Error message<br>“Enter the value for Address field”.   | Test successful |
| 10 | Enter empty mobile phone number field in register form           | Error message   | Error message<br>“Enter the value for Telephone field”. | Test successful |
| 11 | Enter empty old password   | Error message   | Error message<br>“Enter All the required fields”.       | Test successful |
| 12 | Enter not matching new passwords                                 | Error message   | Error message<br>“Passwords don’t match”.               | Test successful |

# Chapter 06

## Discussion

## 6.1 Conclusion

This section provides a brief summarization on all the topics discussed above under the heading such as Importance of this project, Limitations, Recommendations and future work. At first place importance of this project with concurrent situations has been discussed. Secondly limitation factors are discussed in brief, followed by recommendations to improve this project and enhance the performance of the system. As a conclusion, further improvements that can be made to improve the performance of the system has been discussed.

## 6.2 Limitations

There some limitations to be considered in deploying this system in to industry. The limitations are as followed.

- The user must register first, before they are using this application.
- Some fields are not validated due to the requirement of the client.
- Mobile version is not available on tablet devices
- Web Application is not optimized to view on mobile displays.

## 6.3 Future Implementations

Following objectives are to be implemented in the future,

- Sales analytics view in the mobile app.
- Export database backup as an excel file in the web application.
- Change user theme in web application.
- Auto lock system when the user leaves the computer in web application.

## 6.4 References

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- [4] <https://loyverse.com/>
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# Appendices

Project Proposal

# **Web based Point of Sales System and Mobile App**

## **Proposer**

Name: Hiroon Imalsha Wijekoon  
Index No: 10673332

## **Proposed supervisor**

Mr. Pramudya Tilkaratne

## **Project description**

Proposed web-based point of sales system is for a company group called “Victory Motors”. It is a leading Tire business company in Sri Lanka. They are currently using a Standalone POS system which was made in year 2005. Since they have many branches all over country, it is very hard to keep the connection between databases of branches using the current software. Goal of this project is to implement a Web based point of sales application using a centralized database to operate all day-to-day inventory operations. All the branches can access this application using their own credentials and all the data are interconnected between branches. Additionally, a mobile app will be implemented to check and update inventory data, current sales and etc. All the managers can access the mobile app using their own web app credentials.

## **Project keywords**

POS, Web-App, Mobile-App

## **Requirements**

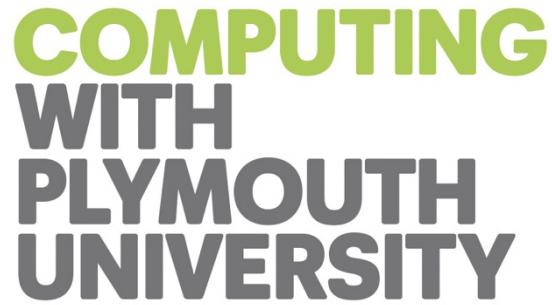
Technologies: HTML, CSS, JAVASCRIPT, PHP, React JS, SQL, Flutter

## **Finance**

No extra expenses.

## **External organizations**

New Victory Motors – Mahiyanganaya, Mawanella, Digana, Mawathagama



School of Computing and Mathematics

Project Initiation Document (PID)

PRCO303SL  
Final Stage Computing Project

BSc (Hons) in Software Engineering

Hiroon Imalsha Wijekoon

Web and Mobile Point of Sales System

2020/2021

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## Introduction

### About Us

New Victory Motors is leading business network in Sri Lanka. Their main focus is importing tires through dealers and selling. They also have tire re-treading factories to apply new treads to worn out tires. They have 4 tire shop branches, 4 tire re-treading factories and an automobile service centre.

### Introduction

New Victory Motors Network is currently using a Standalone POS System. All the branches have separated POS systems with separated offline databases. Since they have many branches all over country they need a Web and Mobile based point of sales application using a centralized database to operate all day-to-day inventory operations while interconnecting branches.

## Business Case

### Business Need

They are currently using a Standalone POS system which was made in year 2005.

Technology is very old, and the software is not user friendly. So, they have to train employees to operate the system. Since they have many branches all over country, it is very hard to keep the connection between databases of branches using the current software. So, it's very hard to sync day-to-day inventory operations data of all the branches. This stand-alone POS system only offers offline backups. Since all the branches have their separate databases, they have to check inventory data, sales and credit amounts through branch databases one by one. Since stock handlers don't have access to the software they have to report back to the software operating person to update inventory data.

### Business Objectives

To modernize the Point of Sales system and Inventory handling system in a way that,

- Connects all the branches via a centralized database.
- Provides cloud backup services.
- Provides a mobile app for stock handlers.

- Provides a user-friendly POS App that can be operated with minimum training.

## Project Objectives

1. To analyze existing stand-alone POS system and find solutions for existing problems with the current system.
2. To analyze requirements for the new Web based POS system.
3. To analyze requirements for the Mobile App.
4. To implement Web based POS system and Mobile App.
5. To implement connection between branches via Web and Mobile App.
6. To provide staff training.

## Chapter 4: Initial Scope

4. Current business process will be analyzed by interviews, questionnaires and observation.
5. The proposed system will allow
  - a) All the branches to access their POS system in one place.
  - b) All the databases of those branches will be centralized.
  - c) All day-to-day billing operations to be done inside user friendly UI.
  - d) To check and update inventory data easily using mobile App.
  - e) To check and get analytics about daily sales using mobile App.
6. User requirements will be gathered via interviews and by analyzing the current POS system.
7. A class diagram will be produced after analyzing all the system requirements, all the business processes and users' interactions with the system.

## Method of Approach

Development process will be focused on following steps with incremental approach,

- I. Day-to-day transaction and Inventory management processes.
- II. Interconnection between branches.
- III. Mobile app functions.

Technologies: PHP, MySQL, HTML, CSS, JavaScript, Bootstrap 4, Flutter / Java / Kotlin

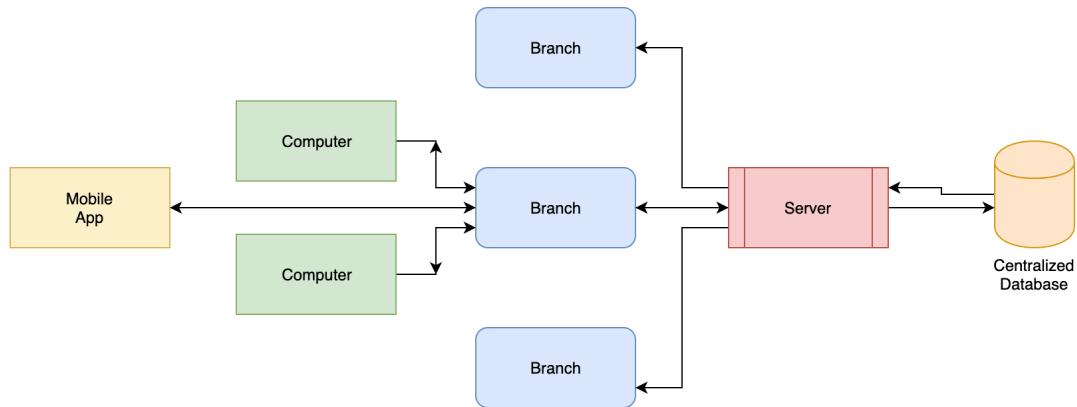


Figure 1. Diagram explaining the project

## Project Plan

### Control Plan

The accompanying PRINCE2 control methods will be utilized: end-Stage reports; end-Stage survey (with supervisor); fortnightly Highlight report; Risk Management Communication plan.

### Communication plan

Notwithstanding Supervisor meetings, meetings will be held toward the finish of each stage so as to talk about the end-Stage report, the following Stage plan, and to survey any specialized expectations delivered during the stage. Feedback meetings will likewise be held after the accommodation of the two Interim reports.

| Stage                                  | Deadline   | Products/Deliverables/Outcome |
|--|------------|-------------------------------|
| 1. Initiation                          | 11/5/2020  | PID                           |
| 2. Analyzation and Initial Development | 11/1/2021  | Interim Report 1              |
| 3. Increment 1                         | 11/1/2021  | Progress Video 1              |
| 4. Increment 2                         | 15/2/2021  | Interim Report 2              |
| 5. Research similar projects           | 15/2/2021  | Research Abstract Submission  |
| 6. Increment 3                         | 15/2/2021  | Progress Video 2              |
| 7. System testing                      | 25/03/2021 | Final System                  |
| 8. Complete final report               | 01/04/2021 | PRO303SL Report               |

## Initial Risk List

| Risk   | Management Strategy   |
|--|---|
| Difficulty using development technologies                      | Simple apps will be made first as prototypes and then move to the project application   |
| Difficulty hosting web application                             | Trial version or a limited version free hosting service will be used at the development stage and application will be finally moved to a paid server. |
| In-App Security Issues (such as Passwords)                     | Encryption procedure will be used   |
| Customer requirement may change during the project development | Communicate with customer after each step of the development process and confirm if their requirements are satisfied.                                 |

Table - Initial Risk List

## Initial Quality Plan

| Quality Check                         | Strategy   |
|---------------------------------------|--|
| Functional requirements               | Functional requirements will be checked during end of each stage. After every stage confirmation will be done by the customer. |
| Form data validation                  | Form validation will be done while developing forms.   |
| Design validation                     | Design will be checked with many devices to ensure the product is responsive with almost every device.                         |
| System validation and user acceptance | System validation will be done at the end of the final stage of the project.   |

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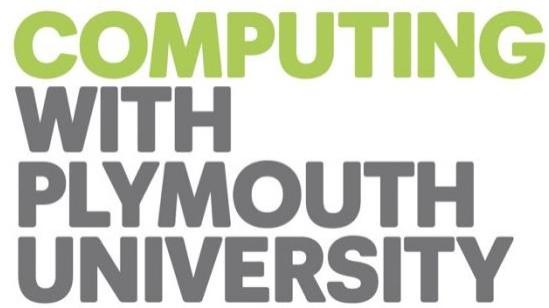
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School of Computing and Mathematics

Interim Report 1

**PRCO303SL**  
**Final Stage Computing**  
**Project**

BSc (Hons) in Software Engineering

Hiroon Imalsha Wijekoon

Web and Mobile Point of Sales System

2020/2021

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## 1. Tasks undertaken and outcomes

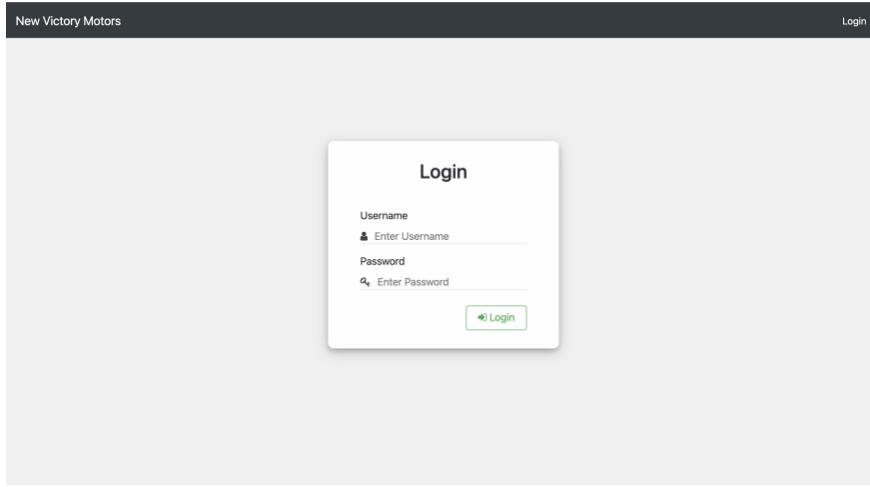
| Tasks undertaken                                     | Outcomes   |
|--|--|
| Gather day-to-day business tasks data                | Gathered all day-to-day transactions and their nature by visiting to one of their shops.   |
| Gather operational data of their factories           | Gathered operational data of their factories by going on a field visit to their factory  |
| Gather inventory handling operations data            | Gathered inventory data by analysing day-to-day inventory data   |
| Analyse the current stand-alone POS system           | Contacted the developer of their previous POS system and got a copy of their currently running POS system to analyse the business needs. |
| Design a user-friendly web interface sample template | Designed a sample web home page and got the approve from the business owner.   |
| Develop the initial stage of the web application     | Developed Login screen, Home Screen, Inventory Manager, Customer Manager, Employees Manager and User Control Panel.                      |

## 2. Products produced and product quality

### 2.1 GUI Design

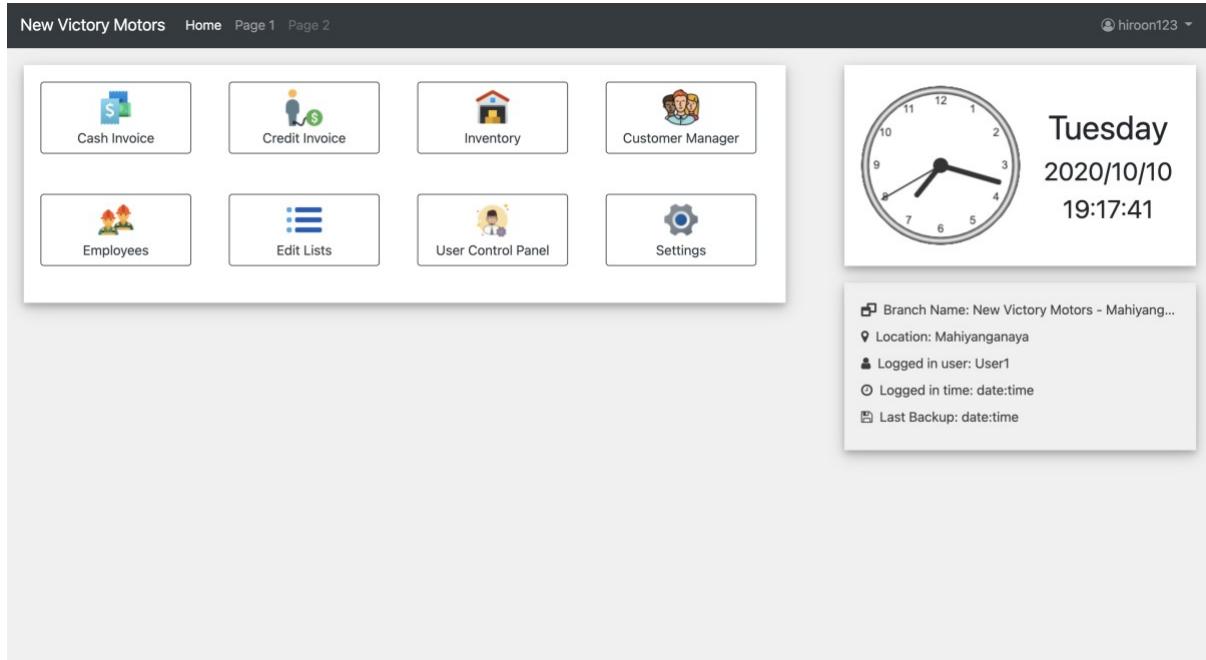
As the initial stage of the development process a sample home screen layout and sample web template have been developed and the design was confirmed by the owners of the business. After that as the first step Login Screen, Home Screen, Inventory Manager, Customer Manager, Employees Manager and User Control Panel were developed. Screen shots of currently developed pages are as follows,

o Login Screen



Passwords are encrypted and stored in the database as a hash value.

o Home Screen



Home page is developed to be very user friendly. All the functionalities of the application are displayed as tiles. Clocks are displayed in both analogue and digital style. Analogue clock was developed by using JavaScript drawings. Branch details are shown in a separate tile. Complete UI is developed to be touch screen friendly.

- o *Inventory Manager*

New Victory Motors Home hiroon123

Home | Inventory

### Inventory

Type to search...

| Size      | Brand     | Category           | Quantity | Cost  | Selling Price | <input type="button" value="Refresh"/>                                    |
|-----------|-----------|--------------------|----------|-------|---------------|---|
| 195x55x14 | CEAT      | Passenger Vehicles | 12       | 8770  | 11950         | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 195x50x15 | GT Radial | Passenger Vehicles | 7        | 9870  | 13500         | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 195x45x15 | Nankang   | Passenger Vehicles | 3        | 11400 | 14500         | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 1000x20   | CEAT      | Heavy Vehicles     | 32       | 45600 | 53400         | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |

### Search function –

195x50x15

| Size      | Brand     | Category           | Quantity | Cost | Selling Price | <input type="button" value="Refresh"/>                                    |
|-----------|-----------|--------------------|----------|------|---------------|---|
| 195x50x15 | GT Radial | Passenger Vehicles | 7        | 9870 | 13500         | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |

User can search an item using size, brand or category. Advanced searching algorithms are used in here in order to optimize performance.

### Add Item -

New Victory Motors Home hiroon123

Home | Inventory

### Inventory

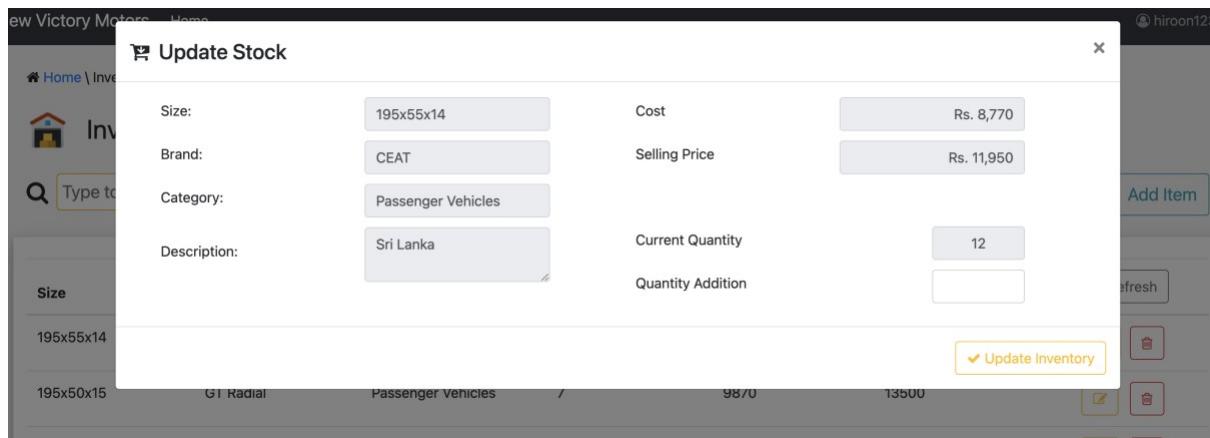
Type to search...

| Size      | Brand     | Category           | Quantity | Cost  | Selling Price | <input type="button" value="Refresh"/>                                    |
|-----------|-----------|--------------------|----------|-------|---------------|---|
| 195x55x14 | CEAT      | Passenger Vehicles | 12       | 8770  | 11950         | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 195x50x15 | GT Radial | Passenger Vehicles | 7        | 9870  | 13500         | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 195x45x15 | Nankang   | Passenger Vehicles | 3        | 11400 | 14500         | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 1000x20   | CEAT      | Heavy Vehicles     | 32       | 45600 | 53400         | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |

**Add Item**

Brand:   
Category:   
Size:   
Cost:   
Selling Price:

## Update stock –



User can update quantity by inserting a value inside Quantity Addition field. Other fields update functions are still under development.

### ○ Customer Manager

| Full Name                 | Address Line 1    | Address Line 2 | City     | Special Remarks | Contact Number | Fax Number | Actions |
|---------------------------|-------------------|----------------|----------|-----------------|----------------|------------|---------|
| Daham Gunasekara          | 45/A              | Darshana Mw    | Badulla  | Near Bus Stand  | 0556647338     | 0552347876 |         |
| Doramadalagama Gihan C... | No 12/A           | Main Rd        | Ampara   |                 | 0786453728     | 0257686543 |         |
| Hiroon Wijekoon           | 50,Regent Village | Balagolla      | Kengalla | Near BOI        | 0778652276     |            |         |

### search function-

| Full Name        | Address Line 1 | Address Line 2 | City    | Special Remarks | Contact Number | Fax Number | Actions |
|------------------|----------------|----------------|---------|-----------------|----------------|------------|---------|
| Daham Gunasekara | 45/A           | Darshana Mw    | Badulla | Near Bus Stand  | 0556647338     | 0552347876 |         |

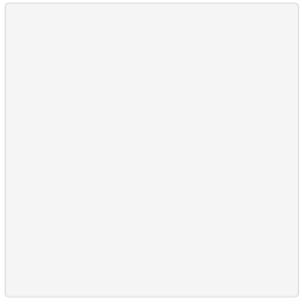
User can search using customer's Full Name, Address or City. Advanced searching algorithms are used in here in order to optimize performance.

## Add new customer –

Home \ Customer Manager \ Add Customer

### Add Customer

|                               |                      |
|-------------------------------|----------------------|
| Full Name:                    | <input type="text"/> |
| Address Line 1:               | <input type="text"/> |
| Address Line 2:               | <input type="text"/> |
| City:                         | <input type="text"/> |
| Special Remarks:              | <input type="text"/> |
| NIC or Driver License Number: | <input type="text"/> |
| Contact No:                   | <input type="text"/> |
| Fax No:                       | <input type="text"/> |
| Email:                        | <input type="text"/> |
| Credit Balance:               | <input type="text"/> |



Turn on Camera

## Camera to take pictures of customers –

Home \ Customer Manager \ Add Customer

### Add Customer

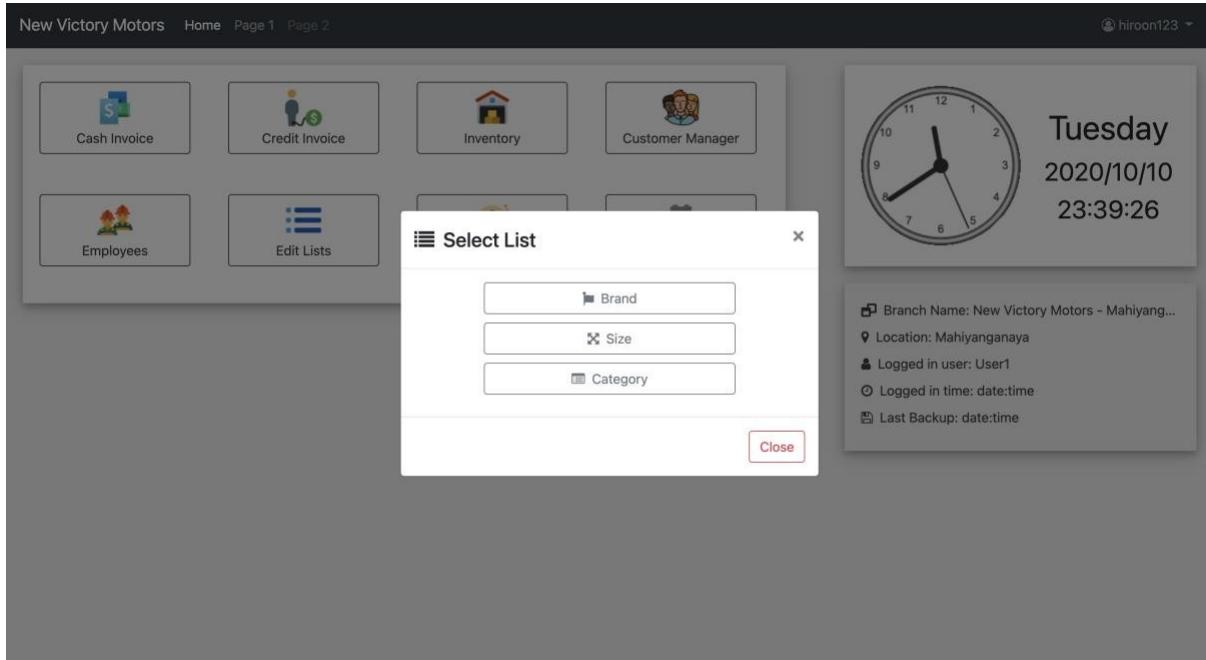
|                               |                      |
|-------------------------------|----------------------|
| Full Name:                    | <input type="text"/> |
| Address Line 1:               | <input type="text"/> |
| Address Line 2:               | <input type="text"/> |
| City:                         | <input type="text"/> |
| Special Remarks:              | <input type="text"/> |
| NIC or Driver License Number: | <input type="text"/> |
| Contact No:                   | <input type="text"/> |
| Fax No:                       | <input type="text"/> |
| Email:                        | <input type="text"/> |
| Credit Balance:               | <input type="text"/> |



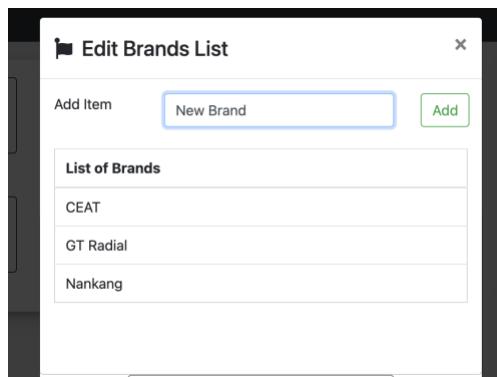
Take Picture

Camera is developed using webcam function in JavaScript. No additional libraries are used. User can first click the button under the camera to turn the camera on. Then user can click button again to take a snapshot.

○ *Edit Lists –*



User can edit all the lists used in other pages such as inventory manager and customer manager here by clicking on the relevant list name. Then user can add or delete items from those lists as below image.



- *User Control Panel –*

The screenshot shows a user control panel interface. At the top, there is a navigation bar with links for 'Home', 'Page 1', and 'Page 2'. On the right side of the top bar, there is a user profile icon labeled 'hiroon123'. Below the navigation bar, the title 'User Control Panel' is displayed next to a user icon. A search bar with placeholder text 'Type to search...' and buttons for 'Search' and 'Clear' are present. To the right of the search bar is a button labeled 'Add New'. The main content area is a table with the following columns: Name, Username, Account Type, and Created Date and Time. A single row is shown for 'Hiroon Imalsha Wijekoon' with 'hiroon123' as the username, 'Administrator' as the account type, and '2020-11-07 07:09:20' as the creation date. To the right of this row are edit and delete icons.

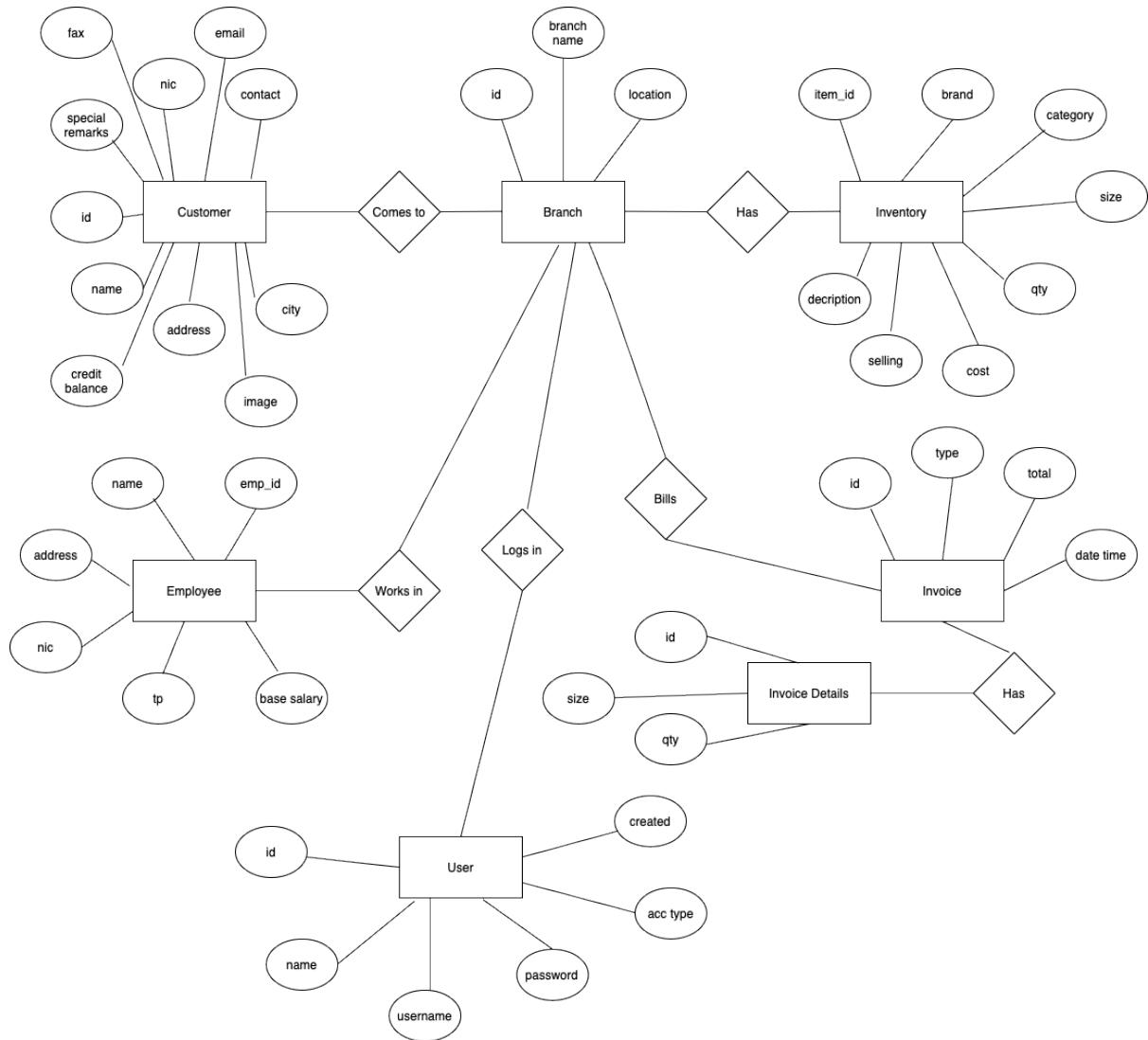
All the users in the system are managed in this page. All the passwords are first encrypted and then saved as a hash value.

#### Add new user -

The screenshot shows a modal dialog box titled 'Add New User'. The dialog contains fields for 'Name', 'Username', 'Password', 'Verify Password', and 'Account Type'. The 'Account Type' dropdown is set to 'Administrator'. At the bottom of the dialog are 'Submit' and 'Close' buttons. The background of the page shows the 'User Control Panel' interface with a single user entry for 'Hiroon Imalsha Wijekoon'.

## 2.2 Database

### ER Diagram



A MySQL database is used in this web application. Currently there are 6 fully developed tables and other tables are still under development. There are some tables like brand, sizes and categories. They hold list information and they are not having any relationship with each other.

| Table                                      | Action             |
|--|--------------------|
| <input type="checkbox"/> brands            | ★ Browse Structure |
| <input type="checkbox"/> categories        | ★ Browse Structure |
| <input type="checkbox"/> customers_details | ★ Browse Structure |
| <input type="checkbox"/> inventory         | ★ Browse Structure |
| <input type="checkbox"/> sizes             | ★ Browse Structure |
| <input type="checkbox"/> users             | ★ Browse Structure |
| <b>6 tables</b>                            | <b>Sum</b>         |

- “inventory” table

+ Options

|                          | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | item_id | brand     | category           | size      | qty | cost  | selling_price | description |
|--------------------------|-------------------------------------|-------------------------------------|---------------------------------------|---------|-----------|--------------------|-----------|-----|-------|---------------|-------------|
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 1       | GT Radial | Passenger Vehicles | 195x50x15 | 7   | 9870  | 13500         | Thailand    |
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 2       | CEAT      | Passenger Vehicles | 195x55x14 | 12  | 8770  | 11950         | Sri Lanka   |
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 3       | CEAT      | Heavy Vehicles     | 1000x20   | 32  | 45600 | 53400         | Sri Lanka   |
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 4       | Nankang   | Passenger Vehicles | 195x45x15 | 3   | 11400 | 14500         |             |

- “customer\_details” table

+ Options

|                          | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | cus_id | cus_name  | address_1         | address_2 | city        | special_remarks | nic            | contact_no | fax        | email      | cred                     |
|--------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--------|---|-------------------|-----------|-------------|-----------------|----------------|------------|------------|------------|--------------------------|
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 1      | Hiroon Wijekoon                                       | 50,Regent Village |           | Balagolla   | Kengalla        | Near BOI       | 981802144v | 0778652276 |            | hiroon.victory@gmail.com |
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 3      | Doramadalagama<br>Gihan<br>Chathuranga<br>Alvis Silva | No 12/A           |           | Main Rd     | Ampara          |                | 867654298v | 0786453728 | 0257686543 |                          |
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 6      | Daham<br>Gunasekara                                   | 45/A              |           | Darshana Mw | Badulla         | Near Bus Stand | 76483799V  | 0556647338 | 0552347876 | daham_d@gmail.com        |

- “users” table

+ Options

|                          | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | user_id | full_name                | username  | password   | acc_type      | created_date        |
|--------------------------|-------------------------------------|-------------------------------------|---------------------------------------|---------|--------------------------|-----------|--|---------------|---------------------|
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 1       | Hiroon Imaalsha Wijekoon | hiroon123 | \$2y\$10\$dVa27pTjFlKomuxSsoBtdOJRTJoA4T58AcbEm8Ycaqp... | Administrator | 2020-11-07 07:09:20 |

- “brands” table

+ Options

|                          | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | item_id | brand_name |
|--------------------------|-------------------------------------|-------------------------------------|---------------------------------------|---------|------------|
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 1       | CEAT       |
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 2       | GT Radial  |
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 3       | Nankang    |

- “categories” table

+ Options

|                          | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | item_id | category           |
|--------------------------|-------------------------------------|-------------------------------------|---------------------------------------|---------|--------------------|
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 1       | Passenger Vehicles |
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 2       | Heavy Vehicles     |

- “sizes” table

+ Options

|                          | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | item_id | size      |
|--------------------------|-------------------------------------|-------------------------------------|---------------------------------------|---------|-----------|
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 1       | 195x40x13 |
| <input type="checkbox"/> | <input type="button" value="Edit"/> | <input type="button" value="Copy"/> | <input type="button" value="Delete"/> | 2       | 195x45x13 |

### 3. Changes in risks that have materialized

#### 3.1 Changes in initial risks.

| <b>Risk</b>  | <b>Management Strategy</b>  |
|--|---|
| Difficulty using development technologies                      | More easier parts were developed in the initial stage of development such as login screen and home screen.  |
| Difficulty hosting web application                             | Trial version or a limited version free hosting service will be used at the development stage and application will be finally moved to a paid server. |
| In-App Security Issues (such as Passwords)                     | User passwords were first encrypted and then saved as a hash value in the database.   |
| Customer requirement may change during the project development | Sample prototype of the project was developed and confirmed by owners of the company.   |

#### 3.2 New Risks

| <b>Risk</b>   | <b>Management Strategy</b>   |
|---|--|
| Difficulty restoring previous transaction data in the company to the new system | Previous POS system has a file backup feature. Output MS Access file data can be stripped using a software and load it to the new system |
| Network security issues   | Use a well secured host for web hosting  |
| Backup and Restore issues   | Give users option to either backup to the cloud or to the local machine.   |

## 4. Schedule

| Stage   | Deadline   | Products/Deliverables/Outcome         |
|---|------------|---------------------------------------|
| 1. Initiation   | 5/11/2020  | PID                                   |
| 2. Initial stage development – Prototype (Web App)          | 30/11/2020 | Sample Prototype                      |
| 3. Initial stage development – Actual Application (Web App) | 3/1/2020   | Initial stage components              |
| 4. Increment 1  | 11/1/2021  | Interim Report 1 and Progress Video 1 |
| 3. Finish Web App development                               | 15/2/2021  | POS Web App                           |
| 4. Increment 2  | 15/2/2021  | Interim Report 2                      |
| 5. Study Flutter  | 20/2/2021  | Research Abstract Submission          |
| 6. Finish Mobile App development                            | 15/3/2021  | Mobile App                            |
| 7. System testing   | 25/03/2021 | Final System                          |
| 8. Complete final report                                    | 01/04/2021 | PRO303SL Report                       |

## 5. Resources

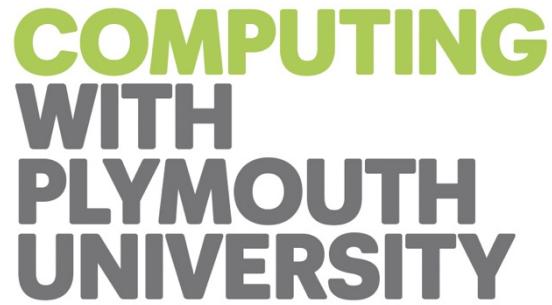
*Required resources:*

- 2 new computers per shop with touch screen monitors. (2 x 5 shops = 10 computers)
- 1 computer per factories. (1 x 3 factories = 3 computers)
- 1 smartphone per manager (1 x 5 managers = 5 smartphones)

These resources will be required after completion of the web and mobile application in order to implement in the system

## 6. Student learning undertaken and required

- Currently following React JS tutorials to use it in the next step of development stage.
- Tutorials about new technologies and ways to optimize the code and speed of the web application and database are always followed parallel to the software development process.
- Should follow Android and Flutter tutorials after the completion of the web application development.



School of Computing and Mathematics

Interim Report 2

PRCO303SL  
Final Stage Computing Project

BSc (Hons) in Software Engineering

Hiroon Imalsha Wijekoon

Web and Mobile Point of Sales System

2020/2021

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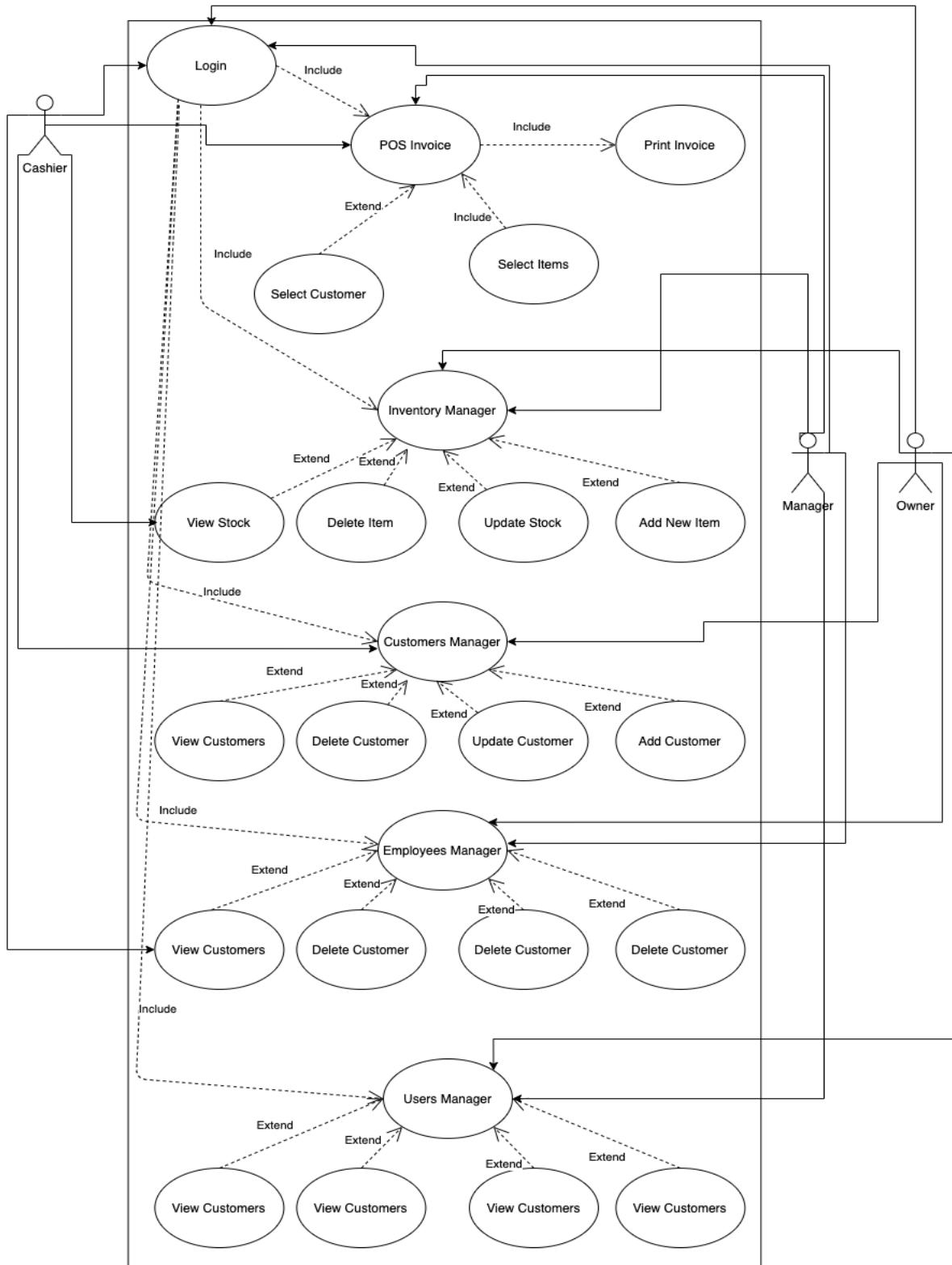
## 1. Tasks undertaken and outcomes

| Tasks undertaken  | Outcomes   |
|---|--|
| Gather their history of strategic decisions taken using the previous POS System               | Gathered all strategic decisions they have taken by discussing with company owners.  |
| Gather more operational data of their factories   | Gathered operational data of their factories by going on a field visit to their factory  |
| Gather more inventory handling operations data  | Gathered inventory data by analyzing day-to-day inventory data   |
| Analyze backup and restore functions of the current stand-alone POS system                    | Contacted the developer of their previous POS system and got a copy of their currently running POS system to analyze the business needs. |
| Design the complete web application according to the initial template approved by the owners. | Designed 75% of the Web POS Application.   |
| Develop the web application   | Developed 70% of the Web POS Application.  |

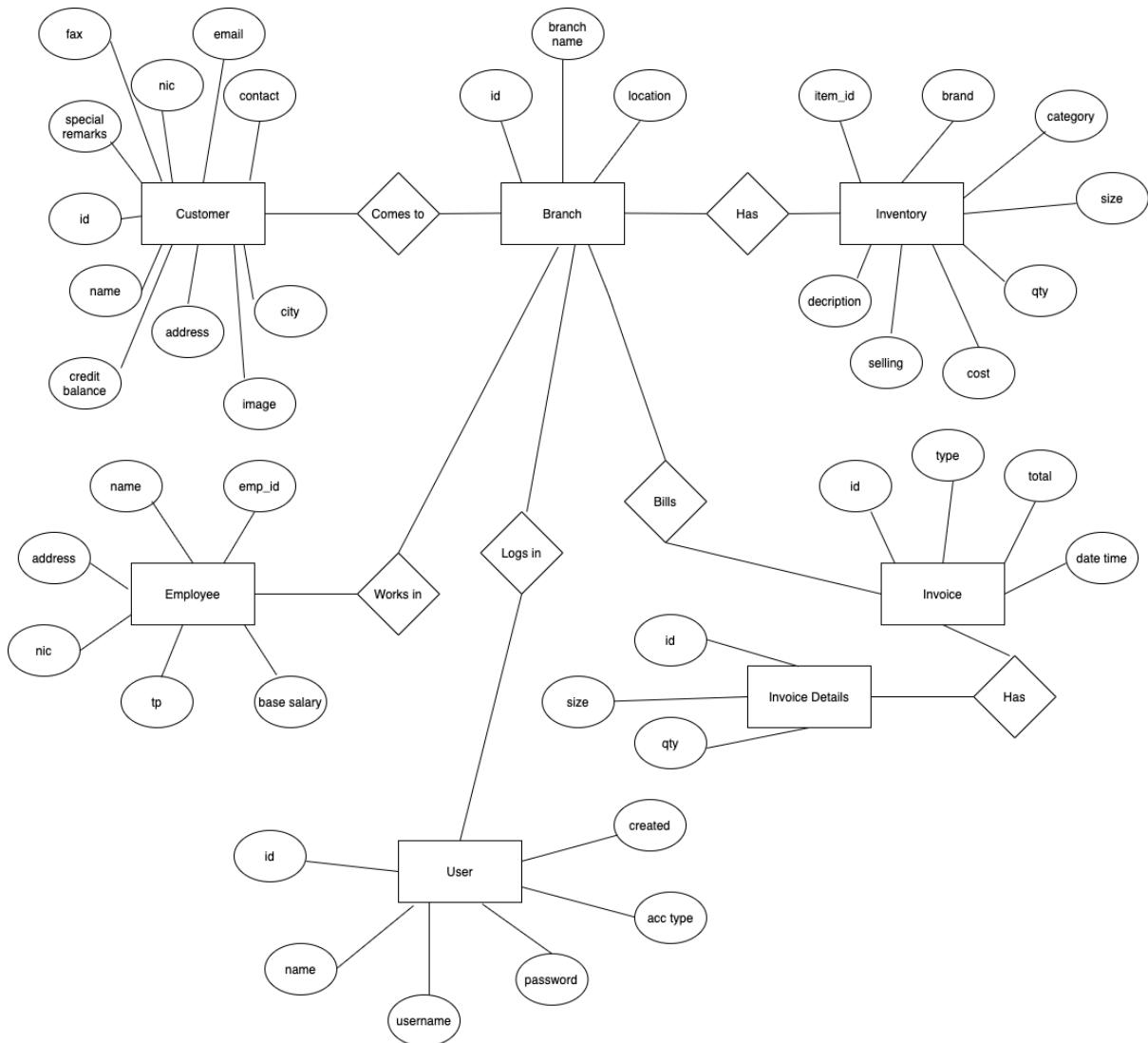
## 2. Products produced and product quality

### 2.1 Diagrams

#### ➤ Use Case Diagram



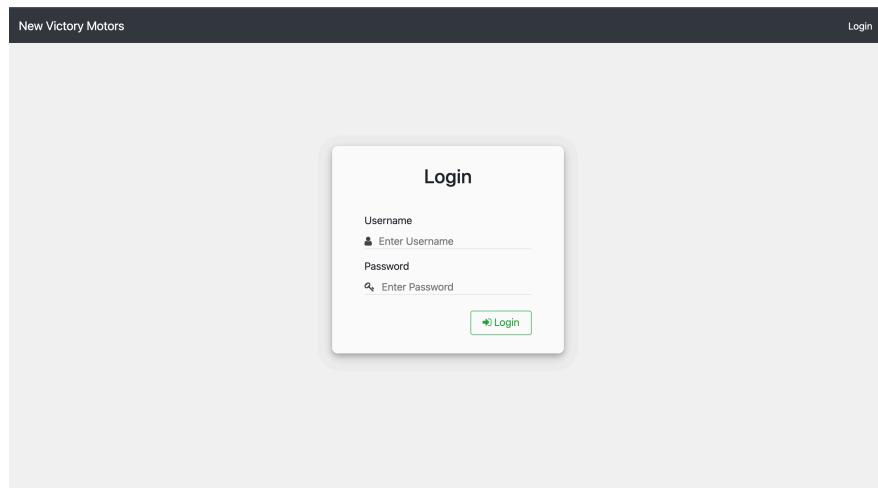
➤ ER Diagram



## 2.2 GUI Design

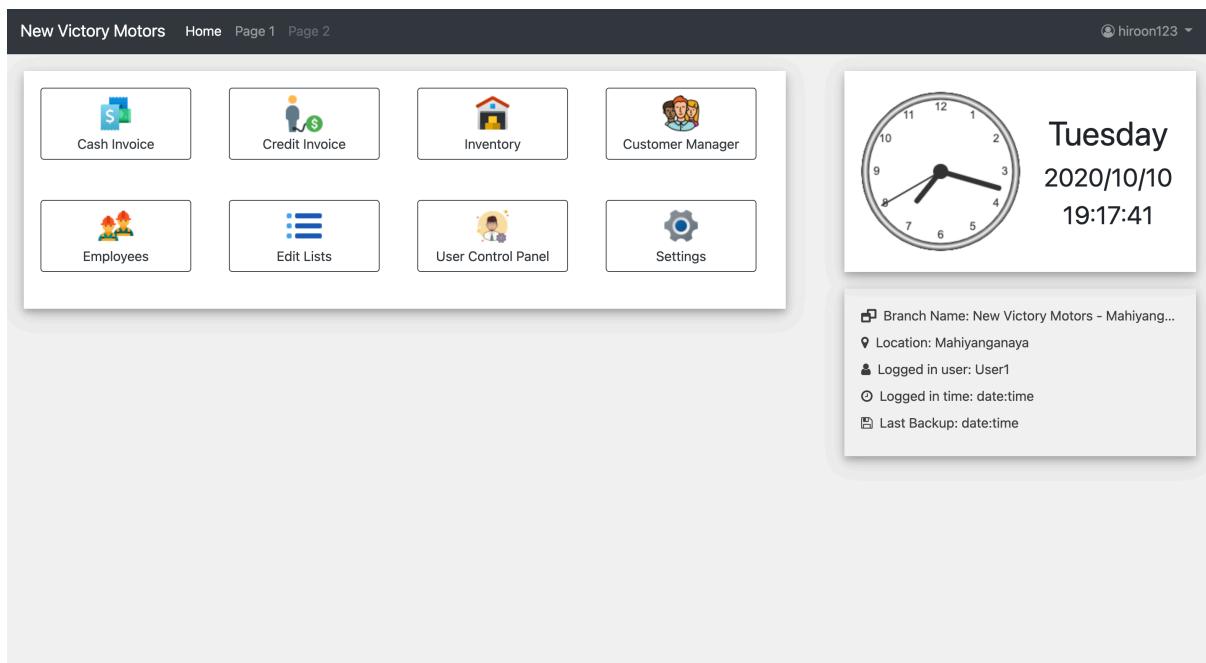
In the initial stage a sample template was developed and confirmed the design by owners. After that, development of the Web POS application was started and 75% of the work is completed. Screenshots of currently developed pages are as follows.

### ○ Login Screen

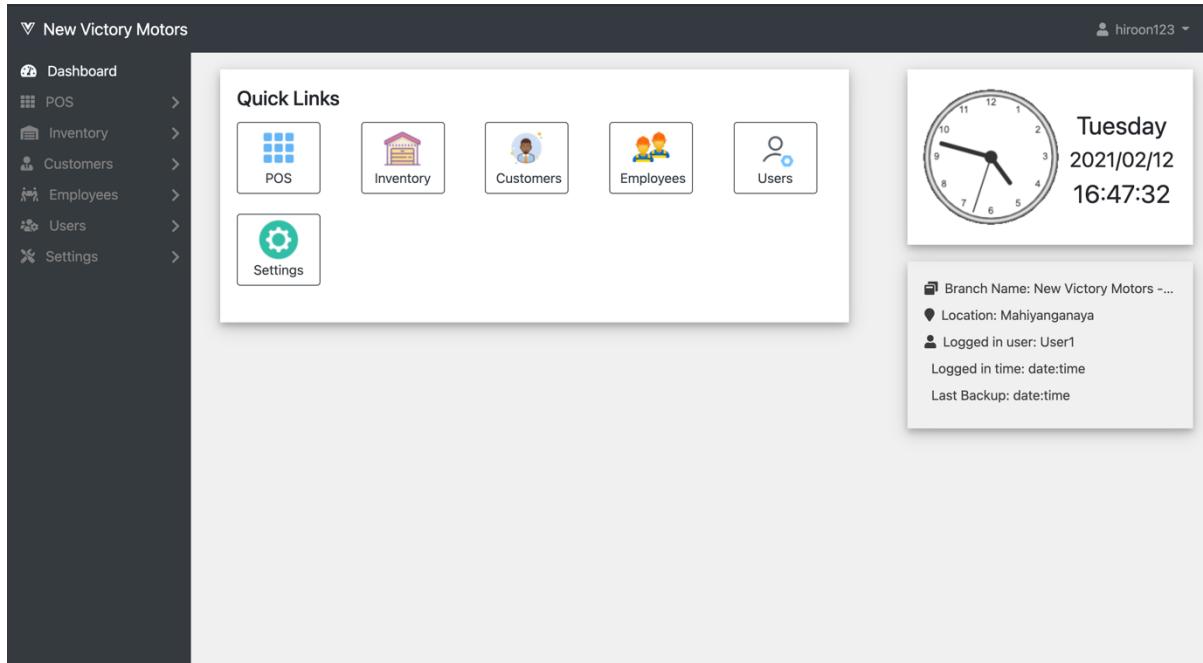


Passwords are encrypted and stored in the database as a hash value.

### ○ Home Screen



Initial design of the home page was as above, but after discussing more with the owners they agreed for making it more user friendly and modern-looking as below.



Home page is developed to be very user friendly. All the functionalities of the application are displayed as tiles. Clocks are displayed in both analogue and digital style. Analogue clock was developed by using JavaScript drawings. Branch details are shown in a separate tile. Complete UI is developed to be touch screen friendly.

- **POS**

The screenshot shows the POS interface for 'New Victory Motors'. On the left is a dark sidebar with navigation links: Dashboard, POS (selected), Inventory, Customers, Employees, Users, and Settings. The main area has a header 'Home \ POS' and a title 'POS'. It features a search bar ('Search Item: -- Select Item --'), a unit price input ('Unit Price: 0.00'), a quantity input ('Qty: 0'), and buttons for '+ Add' and 'Delete'. Below these are tables for 'Item Name', 'Unit Price', 'Qty', and 'Sub Total'. To the right is a summary section titled 'Select Customer' with dropdowns for 'Walk-In Customer'. It displays financial metrics: 'Total Items' (0), 'Total' (0.00), 'Discount' (0.00), and 'Total Payable' (0.00). At the bottom are buttons for 'Print Bill' and 'Payment'.

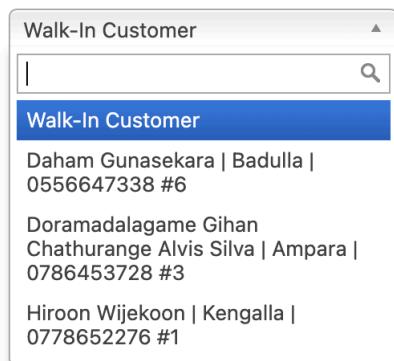
POS system page is designed to be very user-friendly and touch screen friendly. User can easily search and select the item. After selecting an item, it automatically loads the unit price into the “Unit Price” field. After entering the quantity, user can click “Add” button add item to the cart.

- Search function inside the dropdown

This screenshot shows a dropdown menu for selecting an item. It includes a search bar labeled 'Search Item: -- Select Item --' and a list of items under 'Item Name'. The list contains: 'Nankang | 195x45x15 | Passenger Vehicles #4' (highlighted in blue), 'GT Radial | 195x50x15 | Passenger Vehicles #1', 'CEAT | 195x55x14 | Passenger Vehicles #2', and 'CEAT | 1000x20 | Heavy Vehicles #3'.

User can also select the customer by searching inside the customer dropdown menu.

## Select Customer



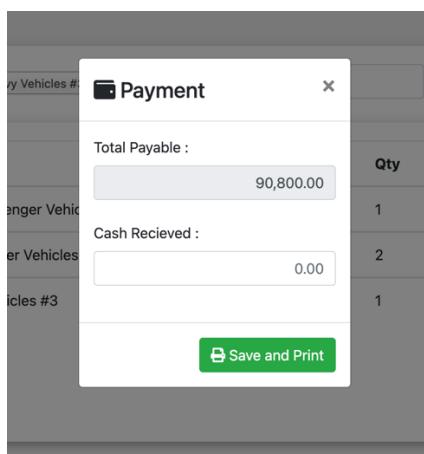
After entering some data, cart will look like below,

| Item Name                                   | Unit Price | Qty | Sub Total |
|---|------------|-----|-----------|
| Nankang   195x45x15   Passenger Vehicles #4 | 14,500.00  | 1   | 14,500.00 |
| CEAT   195x55x14   Passenger Vehicles #2    | 11,950.00  | 2   | 23,900.00 |
| CEAT   1000x20   Heavy Vehicles #3          | 52,400.00  | 1   | 52,400.00 |

Total Items: 3  
 Total: 91,800.00  
 Discount: 1,000.00  
 Total Payable: 90,800.00

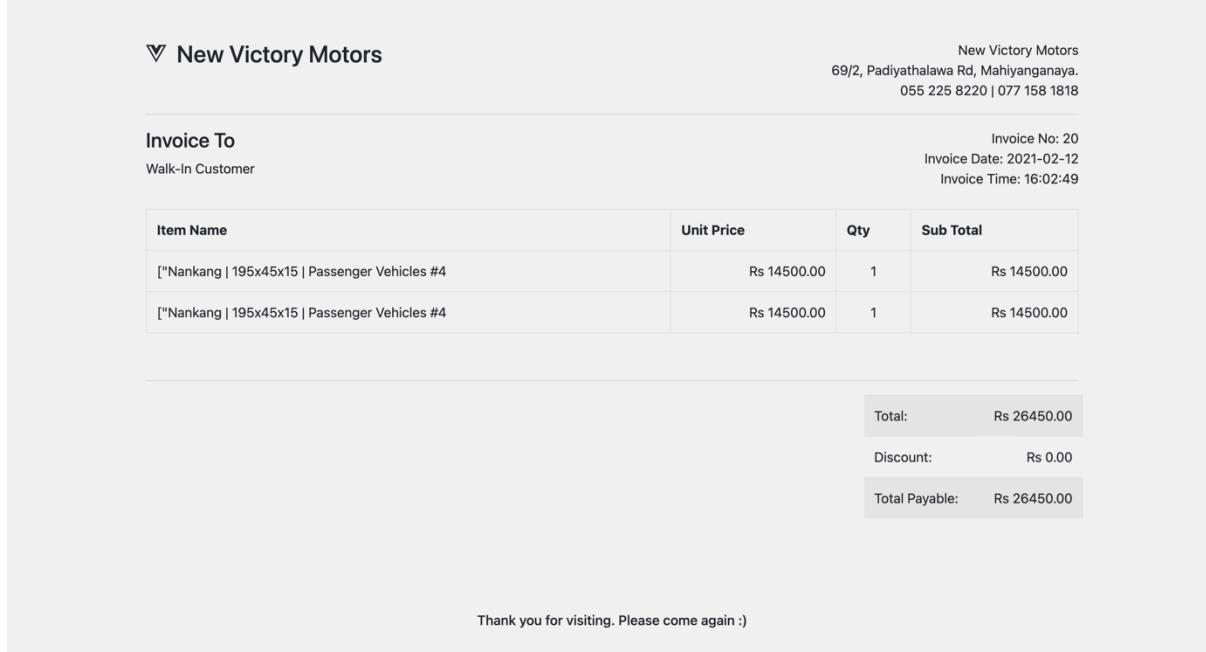
[Print Bill](#) [Payment](#)

### ○ Payment Button



User can enter the received cash amount here and balance will be displayed as a dialog box. This part is still under development.

- Bill design template



Above is the design template of the invoice which will be printed by the POS system.  
This part is still under development.

## ○ Inventory Manager

New Victory Motors hiroon123 ▾

Dashboard >

POS >

Inventory > Home \ Inventory

Customers >

Employees >

Users >

Settings >

**Inventory**

Type to search... Search Clear + Add Item

| Size      | Brand     | Category           | Quantity | Cost  | Selling Price | Refresh |
|-----------|-----------|--------------------|----------|-------|---------------|---------|
| 195x55x14 | CEAT      | Passenger Vehicles | 14       | 8770  | 11950         |         |
| 195x50x15 | GT Radial | Passenger Vehicles | 5        | 9870  | 13500         |         |
| 195x45x15 | Nankang   | Passenger Vehicles | 3        | 11400 | 14500         |         |
| 1000x20   | CEAT      | Heavy Vehicles     | 32       | 45600 | 53400         |         |

User can search an item using size, brand or category. Advanced searching algorithms are used in here in order to optimize performance. Add Item, Edit Item and Update functions are still the same as in the interim report 1. These parts are to be completed in the final stage.

## ○ Customer Manager

New Victory Motors Home Page 1 Page 2 hiroon123 ▾

Home \ Customer Manager

Customer Manager

Type to search... Search Clear + Add New

| Full Name                 | Address Line 1    | Address Line 2 | City     | Special Remarks | Contact Number | Fax Number | Refresh |
|---------------------------|-------------------|----------------|----------|-----------------|----------------|------------|---------|
| Daham Gunasekara          | 45/A              | Darshana Mw    | Badulla  | Near Bus Stand  | 0556647338     | 0552347876 |         |
| Doramadalagama Gihan C... | No 12/A           | Main Rd        | Ampara   |                 | 0786453728     | 0257686543 |         |
| Hiroon Wijekoon           | 50,Regent Village | Balagolla      | Kengalla | Near BOI        | 0778652276     |            |         |

## search function-

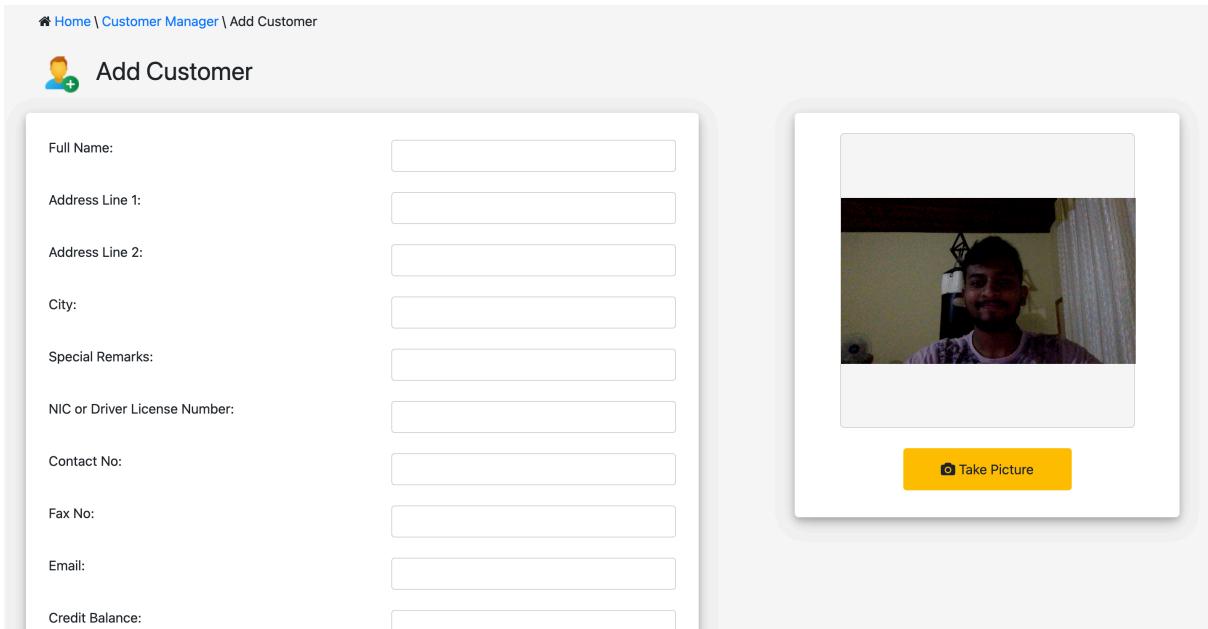
The screenshot shows a search interface for a customer management system. At the top, there is a search bar with the text "Daham", a green "Search" button, and a "Clear" button. To the right of the search bar is a "Add New" button. Below the search bar is a table with columns: Full Name, Address Line 1, Address Line 2, City, Special Remarks, Contact Number, Fax Number, and Refresh. A single row of data is shown: Daham Gunasekara, 45/A, Darshana Mw, Badulla, Near Bus Stand, 0556647338, 0552347876, and a refresh icon. To the right of the table are two small icons: a yellow eye icon and a red trash icon.

User can search using customer's Full Name, Address or City. Advanced searching algorithms are used in here in order to optimize performance.

## Add new customer –

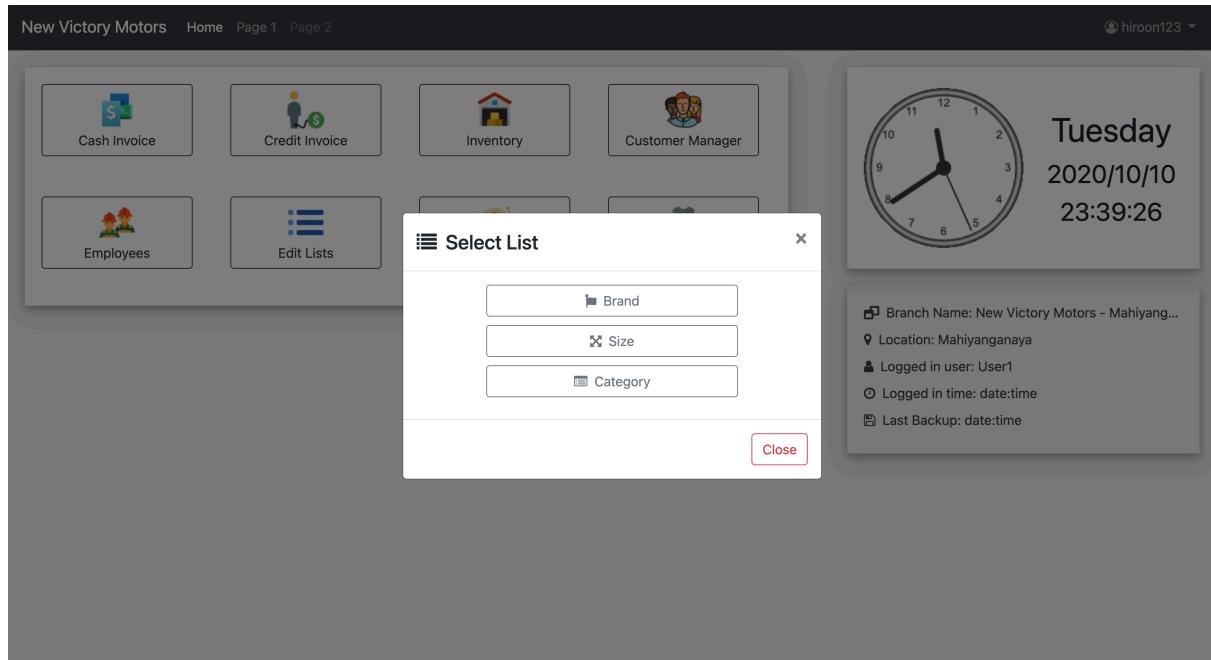
The screenshot shows an "Add Customer" form. At the top left is a breadcrumb navigation: "Home \ Customer Manager \ Add Customer". Below it is a title "Add Customer" with a user icon. The form contains several input fields: "Full Name" (text input), "Address Line 1" (text input), "Address Line 2" (text input), "City" (text input), "Special Remarks" (text input), "NIC or Driver License Number" (text input), "Contact No:" (text input), "Fax No:" (text input), "Email:" (text input), and "Credit Balance:" (text input). To the right of the form is a large, empty rectangular area representing a camera preview, with a "Turn on Camera" button at the bottom right.

Camera to take pictures of customers –

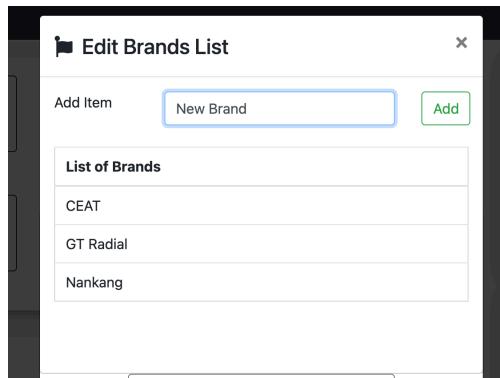


Camera is developed using webcam function in JavaScript. No additional libraries are used. User can first click the button under the camera to turn the camera on. Then user can click button again to take a snapshot.

○ **Edit Lists –**



User can edit all the lists used in other pages such as inventory manager and customer manager here by clicking on the relevant list name. Then user can add or delete items from those lists as below image.



#### ○ User Control Panel –

A screenshot of the "User Control Panel" page. The header shows "New Victory Motors" and navigation links "Home", "Page 1", "Page 2", and a user profile "hiroon123". The main area has a title "User Control Panel" with a user icon. It features a search bar with a magnifying glass icon, a "Search" button, and a "Clear" button. To the right is a "Add New" button. Below is a table with columns "Name", "Username", "Account Type", and "Created Date and Time". A single row is shown for "Hiroon Imalsha Wijekoon" with "hiroon123" as the username, "Administrator" as the account type, and "2020-11-07 07:09:20" as the creation date. To the right of the table are "Refresh", "Edit", and "Delete" buttons.

All the users in the system are managed in this page. All the passwords are first encrypted and then saved as a hash value.

## Add new user -

The screenshot shows a modal window titled "Add New User" over a dark background. The modal contains fields for Name, Username, Password, Verify Password, and Account Type. The Account Type dropdown is set to "Administrator". At the bottom are "Submit" and "Close" buttons.

New Victory Motors Home Page 1 Page 2

User Control Panel

Type to search...

Name

Hiroon Imaalsha Wijekoon

**Add New User**

Name:

Username:

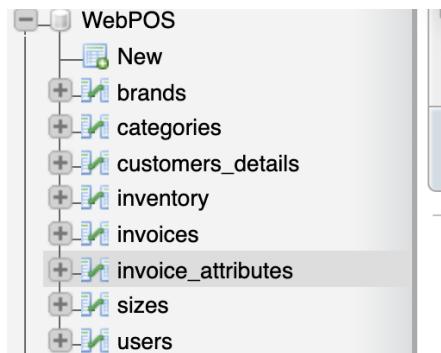
Password:

Verify Password:

Account Type:

## 2.3 Database

A MySQL database is used in this web application. Currently there are 6 fully developed tables and other tables are still under development. There are some tables like brand, sizes and categories. They hold list information and they are not having any relationship with each other.



- “inventory” table

| + Options                |         |           |                    |           |     |       |               |             |  |  |
|--------------------------|---------|-----------|--------------------|-----------|-----|-------|---------------|-------------|--|--|
|                          | item_id | brand     | category           | size      | qty | cost  | selling_price | description |  |  |
| <input type="checkbox"/> | 1       | GT Radial | Passenger Vehicles | 195x50x15 | 7   | 9870  | 13500         | Thaiwan     |  |  |
| <input type="checkbox"/> | 2       | CEAT      | Passenger Vehicles | 195x55x14 | 12  | 8770  | 11950         | Sri Lanka   |  |  |
| <input type="checkbox"/> | 3       | CEAT      | Heavy Vehicles     | 1000x20   | 32  | 45600 | 53400         | Sri Lanka   |  |  |
| <input type="checkbox"/> | 4       | Nankang   | Passenger Vehicles | 195x45x15 | 3   | 11400 | 14500         |             |  |  |

- “customer\_details” table

| + Options                |        |   |                   |             |          |                 |            |            |            |                          |      |
|--------------------------|--------|---|-------------------|-------------|----------|-----------------|------------|------------|------------|--------------------------|------|
|                          | cus_id | cus_name  | address_1         | address_2   | city     | special_remarks | nic        | contact_no | fax        | email                    | cred |
| <input type="checkbox"/> | 1      | Hiroon Wijekoon                                       | 50,Regent Village | Balagolla   | Kengalla | Near BOI        | 981802144v | 0778652276 |            | hiroon.victory@gmail.com |      |
| <input type="checkbox"/> | 3      | Doramadalagama<br>Gihan<br>Chathuranga<br>Alvis Silva | No 12/A           | Main Rd     | Ampara   |                 | 867654298v | 0786453728 | 0257686543 |                          |      |
| <input type="checkbox"/> | 6      | Daham<br>Gunasekara                                   | 45/A              | Darshana Mw | Badulla  | Near Bus Stand  | 76483799V  | 0556647338 | 0552347876 | daham_d@gmail.com        |      |

- “users” table

| + Options                |         |                         |           |  |               |                     |
|--------------------------|---------|-------------------------|-----------|--|---------------|---------------------|
|                          | user_id | full_name               | username  | password   | acc_type      | created_date        |
| <input type="checkbox"/> | 1       | Hiroon Imlasha Wijekoon | hiroon123 | \$2y\$10\$dVa27pTjFlKomuxSsoBldOJRTJoA4T58AcbEm8Ycaqp... | Administrator | 2020-11-07 07:09:20 |

- “brands” table

| + Options                |         |            |  |
|--------------------------|---------|------------|--|
|                          | item_id | brand_name |  |
| <input type="checkbox"/> | 1       | CEAT       |  |
| <input type="checkbox"/> | 2       | GT Radial  |  |
| <input type="checkbox"/> | 3       | Nankang    |  |

- “categories” table

|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | item_id | category           |
|--|--------------------------|-------------------------------|-------------------------------|---------------------------------|---------|--------------------|
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 1       | Passenger Vehicles |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 2       | Heavy Vehicles     |

- “sizes” table

|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | item_id | size      |
|--|--------------------------|-------------------------------|-------------------------------|---------------------------------|---------|-----------|
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 1       | 195x40x13 |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 2       | 195x45x13 |

- “invoice\_attributes” table

|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | record_id | item_name                                     | unit_price | qty | sub_total | invoice_id |
|--|--------------------------|-------------------------------|-------------------------------|---------------------------------|-----------|---|------------|-----|-----------|------------|
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 38        | ["Nankang   195x45x15   Passenger Vehicles #4 | 14500      | 1   | 14500     | 20         |
|  | <input type="checkbox"/> | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | 39        | ["Nankang   195x45x15   Passenger Vehicles #4 | 14500      | 1   | 14500     | 20         |

### 3. Changes in risks that have materialized

#### 3.1 Changes in initial risks.

| Risk   | Management Strategy  |
|--|--|
| Difficulty using development technologies                      | More easier parts were developed at first and then harder parts are developed to manage time.                        |
| Difficulty hosting web application                             | 000webhostapp platform will be used at the development stage and application will be finally moved to a paid server. |
| In-App Security Issues (such as Passwords)                     | User passwords were first encrypted and then saved as a hash value in the database.                                  |
| Customer requirement may change during the project development | Development done according to the Sample prototype of the project that was confirmed by owners of the company.       |

## 3.2 New Risks

| Risk  | Management Strategy   |
|---|---|
| Difficulty restoring previous transaction data in the company to the new system | Previous POS system has a file backup feature. Output MS Access file data can be stripped using a software and load it to the new system                                      |
| Network security issues   | Use a well secured host for web hosting   |
| Backup and Restore issues   | Give users option to either backup to the cloud or to the local machine.  |
| Web browser issues  | Some computers that are used in company are very old and they use very old browsers. Those computers need to be updated with the latest windows OS and google chrome browser. |
| Screen resolution issues  | Responsive design is used throughout the web application.   |
| Camera issues   | New cameras will be installed to all the computers to take pictures of their customers.   |

## 4. Schedule

| Stage   | Deadline   | Products/Deliverables/Outcome         |
|---|------------|---------------------------------------|
| 1. Initiation   | 5/11/2020  | PID                                   |
| 2. Initial stage development – Prototype (Web App)          | 30/11/2020 | Sample Prototype                      |
| 3. Initial stage development – Actual Application (Web App) | 3/1/2020   | Initial stage components              |
| 4. Increment 1  | 11/1/2021  | Interim Report 1 and Progress Video 1 |
| 5. Increment 2  | 15/2/2021  | Interim Report 2 and Progress Video 2 |
| 6. Increment 2 - b  | 20/2/2021  | Research Abstract Submission          |
| 7. Finish Web App development                               | 10/3/2021  | POS Web App                           |
| 6. Finish Mobile App development                            | 25/3/2021  | Mobile App                            |
| 7. System testing   | 25/03/2021 | Final System                          |
| 8. Complete final report                                    | 01/04/2021 | PRO303SL Report                       |

## 5. Resources

### Required resources:

- 2 new computers per shop with touch screen monitors. (2 x 5 shops = 10 computers)
- 1 computer per factories. (1 x 3 factories = 3 computers)
- 1 smartphone per manager (1 x 5 managers = 5 smartphones)
- 1 web camera per computer ( 1 x 2 x 5 Shops = 10 cameras)

These resources will be required after completion of the web and mobile application in order to implement in the system

## 6. Student learning undertaken and required

- Currently following React JS tutorials to use it in the next step of development stage.
- Currently following Ajax tutorials to learn how to handle back-end with front-end.
- Tutorials about new technologies and ways to optimize the code and speed of the web application and database are always followed parallel to the software development process.
- Should follow Android and Flutter tutorials after the completion of the web application development.