

**Smart POS (Point of Sales) application  
Software Requirements Specification**

**Version 1.0**

**Prepared by Group 11**

**Mentor - Dr. Sapumal Ahangama**

**Group Members**

**Kobinarth Panchalingam - 200307C**

**R. A. T. C. Kumara - 200321M**

**Sanjula Kumarasinghe - 200323V**

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

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Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

# Table of Contents

<b>1. Introduction</b>	<b>5</b>
1.1 Purpose	5
1.2 Scope	5
1.3 Definitions, Acronyms, and Abbreviations	5
1.4 References	6
1.5 Overview	6
<b>2. Overall Description</b>	<b>6</b>
2.1 Product perspective	6
2.2 Product functions	7
2.3 User characteristics	7
2.4 Constraints	8
2.5 Assumptions and dependencies	8
2.5.1 Assumptions	8
2.5.2 Dependencies	9
<b>3. Specific Requirements</b>	<b>10</b>
<b>3.1 Functionality</b>	<b>10</b>
3.1.1 Sales processing and transaction management	10
3.1.2 Inventory Management	11
3.1.3 Employee Management	12
3.1.4 Customer Management	13
3.1.5 Report and Analytics	14
3.1.6 E-commerce Integration	14
3.1.7 Multi-Store Support	15
<b>3.2 Usability</b>	<b>16</b>
3.2.1 Required Training Time	16
3.2.2 Ease of Use	17
3.2.3 Responsive Design	17
3.2.4 User-Friendly Navigation	17
<b>3.3 Reliability</b>	<b>17</b>
3.3.1 Availability	17
3.3.2 Mean Time Between Failures (MTBF)	18
3.3.3 Mean Time To Repair (MTTR)	18
3.3.4 Accuracy	18
3.3.5 Maximum Bugs or Defect Rate	18
3.3.6 Bugs or Defect Rate	18
<b>3.4 Performance and Security</b>	<b>19</b>
3.4.1 Response Time for a Transaction	19
3.4.2 Throughput	19
3.4.3 Capacity	19
3.4.4 Degradation Modes	20
3.4.5 Resource Utilization	20
3.4.6 Data Encryption	20
3.4.7 User Authentication and Authorization	20
3.4.8 Data Backup and Recovery	21
<b>3.5 Supportability</b>	<b>21</b>
3.5.1 Coding Standards and Naming Conventions	21

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

3.5.2	Code Reusability	21
3.5.3	Maintenance Access	21
3.5.4	Version Control:	21
<b>3.6</b>	<b>Design Constraints</b>	<b>22</b>
3.6.1	Software Languages and Frameworks	22
3.6.2	Development Process	22
3.6.3	Software Languages and Frameworks	22
3.6.4	Development Tools	22
3.6.5	Hardware and Platform Limitations	22
<b>3.7</b>	<b>On-line User Documentation and Help System Requirements</b>	<b>23</b>
<b>3.8</b>	<b>Purchased Components</b>	<b>23</b>
<b>3.9</b>	<b>Interfaces</b>	<b>23</b>
3.9.1	User Interfaces	23
3.9.2	Hardware Interfaces	29
3.9.3	Software Interfaces	29
3.9.4	Communications Interfaces	29
<b>3.10</b>	<b>Database Requirements</b>	<b>30</b>
<b>3.11</b>	<b>Licensing, Legal, Copyright, and Other Notices</b>	<b>30</b>
<b>3.12</b>	<b>Applicable Standards</b>	<b>30</b>
<b>4.</b>	<b>Supporting Information</b>	<b>31</b>
<b>4.1</b>	<b>References</b>	<b>31</b>

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Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

# Software Requirements Specification

## 1. Introduction

### 1.1 Purpose

This document's goal is to outline all the proposed system's functional and nonfunctional requirements. The document also offers a thorough explanation of the POS system, its objectives, and goals as well as how external users perceive the product and its features. System designers, testers, and system users are the document's intended audience.

### 1.2 Scope

The system that is described in this document consists of a web application and a mobile application. This system aims to revolutionize the way supermarkets operate by streamlining sales transactions, enhancing inventory management, and optimizing customer interactions. Further, the proposed system consists of backend API. The system consists of main subsystems: sales transaction management system, employee management system, customer management system, inventory management system, report and analytics subsystem and ecommerce integration subsystem. System Use case model will be used to describe the requirements and functionalities of the system.

### 1.3 Definitions, Acronyms, and Abbreviations

- POS - Point of Sale
- API - Application Programming interface.
- IDE - Integrated Development Environment
- MVC - Model-View-Controller
- SSL/TLS - Secure Sockets Layer/Transport Layer Security
- MIT - Massachusetts Institute of Technology
- URL - Uniform Resource Locator
- IEEE - Institute of Electrical and Electronics Engineers

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

## 1.4 References

None

## 1.5 Overview

The foundation and necessary information for the system's development will be provided for the development team in this document. The text is divided into four main sections. The document's goal, scope, definitions, acronyms, abbreviations, and references are all included in the first section's summary. The second section will give a general overview of Smart POS and discuss the main elements influencing the product and its specifications. To help the reader comprehend the system requirements, which are established and detailed in section three, it will provide background information. The software specifications will give programmers enough information so they can create the system and test it to make sure it adheres to the specifications. Section 3 also outlines other non-functional requirements, design limitations, and interfaces that the system must support.

## 2. Overall Description

### 2.1 Product perspective

The Smart POS application serves as an integrated software solution that facilitates efficient and modern point-of-sale operations for supermarkets. It introduces a system consisting of web and mobile applications seamlessly integrated with backend APIs. This system empowers staff members, administrators, and customers with intuitive interfaces and functionalities. By efficiently managing sales transactions, inventory, and customer interactions, the Smart POS application enhances business efficiency and data-driven decision-making. The inclusion of analytical tools offers real-time insights into sales trends, inventory performance, employee productivity, and customer behaviors. This comprehensive viewpoint ensures a better user experience and promotes growth and adaptability in the ever-changing market.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

## 2.2 Product functions

The Smart POS system offers seamless sales processing, streamlined inventory control, efficient employee management, personalized customer interactions, robust reporting, integrated e-commerce capabilities, and versatile multi-store support for comprehensive business optimization.

- Sales processing and transaction management
- Inventory management
- Employee management
- Customer management
- Report and analytics
- E-commerce integration
- Multi-Store support

## 2.3 User characteristics

This system contains a web application and a mobile application, and it will be mainly used by the following users.

- **Cashier**

Cashiers, vital users of the Smart POS system, are expected to possess basic computer skills and require an intuitive interface for smooth transaction processing. They engage in frequent customer interactions, necessitating real-time product information and swift loyalty program updates, ensuring a seamless and efficient checkout process.

- **Staff members**

Staff members utilizing the mobile application for inventory and employee management are characterized by their familiarity with smartphones and mobile apps. They require an easily navigable interface for efficient inventory tracking, product updating, and employee task scheduling. These users often multitask and need quick access to real-time data, emphasizing the importance of streamlined information retrieval and task assignment. Additionally, their roles involve responsibility for

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

accurate data entry and employee performance monitoring, making data integrity and user-friendly input mechanisms essential aspects of the application's design.

- **Managers and administrators**

Administrators and managers, key users of the Smart POS system, possess strong technical skills and strategic insight. They need a comprehensive web interface for sales oversight, inventory management, and data analysis. Robust reporting, secure authentication, and adaptable features are essential for informed decision-making and efficient employee management.

- **Online customers**

Online customers vary in technical familiarity, but all look for an easy-to-use website. They want to browse and select products effortlessly, use simple payment methods, and track their orders. Personalized features like order history and loyalty programs are important. The website should work well on different devices for a smooth shopping experience.

## 2.4 Constraints

- The system is limited to English language only.
- The project should be completed within a defined timeline.
- The system must be compatible with a range of devices and platforms, ensuring accessibility for users.
- The backend server should be active for 24 hours and should serve multiple users concurrently.
- An active data connection is needed for mobile applications to work.
- A clear guideline for mobile applications should be included.
- Stringent security measures must be implemented to safeguard sensitive customer and business data.

## 2.5 Assumptions and dependencies

### 2.5.1 Assumptions

- It is assumed that the required hardware, such as servers, computers, barcode scanners,



Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

receipt printer and mobile devices, along with stable internet connectivity, will be available for system deployment and usage.

- The assumption is that suppliers will cooperate to provide accurate product details, pricing, and availability, enabling real-time inventory updates.
- The assumption is made that stable and high-speed internet connectivity will be available to ensure uninterrupted communication between the application components and external services.
- The application assumes the availability and compatibility of third-party services, such as payment gateways and barcode scanning tools, for seamless integration. Successful integration is essential for secure payment processing and efficient inventory management.

### **2.5.2 Dependencies**

- The system's functionality is dependent on successful integration with third-party payment gateways to facilitate secure and efficient payment processing.
- The project depends on implementing robust data security measures and protocols to safeguard customer and business data from breaches and unauthorized access.
- Successful integration with external services, such as barcode scanning and payment gateways, depends on the availability and support of their APIs.
- The project's success relies on adhering to relevant industry regulations and compliance standards to ensure legal and ethical operations.
- The project depends on successful implementation of scalable architecture to accommodate future business growth and increased user activity.
- The mobile application's success relies on compatibility with various mobile devices and operating systems.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

### **3. Specific Requirements**

#### **3.1 Functionality**

##### **3.1.1 Sales processing and transaction management**

###### **3.1.1.1 Transaction Processing**

This feature involves initiating and processing sales transactions, capturing essential details such as product selection, quantity, pricing, and customer information. The system receives input from the cashier or user regarding the chosen items and their quantities. The output includes a finalized order with a unique transaction ID. The system should efficiently process transactions, ensuring accuracy, real-time updates, and secure handling of sensitive customer and payment information.

###### **3.1.1.2 Payment Handling**

Encompassing various payment methods such as cash, credit/debit cards, mobile payments, and gift cards, this feature securely manages transaction payments. Inputs include payment details provided by the customer, while the output is a confirmation of successful payment and an associated payment record.

###### **3.1.1.3 Receipt Generation**

After successful payment, the system generates itemized receipts as an output, including transaction details, purchased items, quantities, prices, applicable taxes, and the total amount paid. Inputs are the finalized transaction and payment data.

###### **3.1.1.4 Refunds and Returns**

Handling customer returns or requests for refunds, this feature requires input from the customer (such as the reason for return) and generates outputs like return authorizations, updated inventory quantities, and refunded payment records. The system also manages the return process, ensuring proper stock adjustment and financial reconciliation.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

### **3.1.2 Inventory Management**

#### **3.1.2.1 Real-Time Inventory Tracking**

This functionality ensures that the system maintains an up-to-date record of available products in the supermarket's inventory. Input includes sales transactions, returns, new stock arrivals and stock returns. Output provides real-time inventory levels for each product, aiding accurate order fulfillment and preventing stockouts.

#### **3.1.2.2 Automated Reordering for Super Markets**

By setting reorder points and triggers, this feature automatically generates purchase orders when inventory falls below predefined thresholds. Input includes current inventory levels and reorder criteria. The output is an auto-generated purchase order sent to suppliers.

#### **3.1.2.3 Product Ordering and Tracking**

Supermarket staff can initiate orders for new products or replenishments based on customer demand or seasonal changes. Input consists of order details and quantities. Output includes order confirmations, expected delivery dates, and integration with inventory tracking.

#### **3.1.2.4 Products transferring to the supermarkets.**

Facilitating the transfer of products between different store locations or warehouses, this functionality ensures accurate stock movement. Input includes source and destination locations, quantities, and product details. Output involves updated inventory levels at both locations.

#### **3.1.2.5 Adding New Product Details**

Supermarket administrators or authorized personnel can input new product details, including names, descriptions, categories, and pricing. Input encompasses product attributes and details. Output is the inclusion of the new product in the inventory catalog.

#### **3.1.2.6 Updating Inventory**

Regular updates, such as stock adjustments due to sales, returns, or transfers, are recorded. Input includes transaction data or inventory count adjustments. Output involves accurate inventory levels.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

### **3.1.2.7 Product Information Management**

Centralizing product information, this feature allows management of comprehensive details like names, descriptions, images, and supplier information. Input includes product data and supplier details. Output provides organized and easily accessible product information.

### **3.1.2.8 Handling Expiry Date Tracking**

For products with expiration dates, the system tracks these dates and generates alerts as expiration approaches. Input includes product details and expiration dates. Output includes notifications and inventory adjustments.

### **3.1.2.9 Supplier Management**

Managing supplier information, this functionality records details such as contacts, products supplied, and order history. Input includes supplier details and order data. Output involves a centralized supplier database and streamlines ordering processes.

## **3.1.3 Employee Management**

### **3.1.3.1 Employee Profile Creation and Management (Salary)**

This functionality involves creating and maintaining individual employee profiles, including personal information, job roles, and salary details. Inputs encompass employee data and salary information. Outputs include updated profiles and salary records.

### **3.1.3.2 User Roles and Permissions, Access Control**

Establishing different user roles and permissions ensures controlled access to the system's features. Inputs involve defining role-specific permissions. Outputs result in restricted access levels based on defined roles.

### **3.1.3.3 Attendance Tracking**

The system records employee attendance, capturing clock-in and clock-out times. Inputs include employee check-in data. Outputs encompass attendance records for payroll and performance evaluation.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

#### **3.1.3.4 Leave Management**

Managing employee leave requests and approvals, this feature involves inputting leave requests and processing them for approval. Outputs include approved leave status and updated attendance records.

#### **3.1.3.5 Performance Monitoring**

Tracking and assessing employee performance against predefined metrics and goals. Inputs involve performance metrics and targets. Outputs consist of performance reports and insights.

#### **3.1.3.6 Employee Task Scheduling**

Assigning and managing tasks and shifts for employees based on their roles and availability. Inputs encompass task assignments and schedules. Outputs include assigned tasks and schedules.

### **3.1.4 Customer Management**

#### **3.1.4.1 Customer Profile Creation**

This functionality involves creating and maintaining individual customer profiles, including personal information and contact details. Inputs encompass customer data. Outputs result in updated customer profiles in the database.

#### **3.1.4.2 Purchase History**

Tracking and recording customers' past purchases, including products bought and transaction dates. Inputs involve sales data. Outputs provide historical purchase records for analysis and personalized marketing.

#### **3.1.4.3 Loyalty Program Integration**

Integrating with a loyalty program to track and manage customer participation, points earned, and rewards redeemed. Inputs encompass customer loyalty activity. Outputs result in updated loyalty program records and rewards status.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

### **3.1.5 Report and Analytics**

#### **3.1.5.1 Sales Performance Analysis**

This functionality involves analyzing sales data to gain insights into trends, revenue, and profitability. Inputs encompass sales transactions and revenue data. Outputs provide sales reports, graphs, and key performance indicators for informed decision-making.

#### **3.1.5.2 Inventory Analysis**

Analyzing inventory data to optimize stock levels, turnover rates, and order fulfillment efficiency. Inputs include inventory data and stock movement. Outputs deliver inventory reports, stock turnover metrics, and recommendations for inventory management.

#### **3.1.5.3 Employee Performance Metrics**

Monitoring and assessing employee performance based on sales, customer interactions, and other metrics. Inputs include employee data and performance criteria. Outputs provide performance reports, comparisons, and feedback for performance evaluation.

### **3.1.6 E-commerce Integration**

#### **3.1.6.1 Order Placement and Processing**

Enabling customers to place orders through the online platform and seamlessly process them. Inputs encompass customer orders and product details. Outputs provide processed orders for fulfillment.

#### **3.1.6.2 Real-Time Availability**

Displaying accurate product availability on the website based on current stock levels. Inputs involve inventory data. Outputs provide real-time availability status for each product.

#### **3.1.6.3 Delivery Options**

Offering customers various delivery options, including local delivery, scheduled slots, and express delivery. Inputs include delivery preferences and addresses. Outputs provide delivery options during order placement.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

#### **3.1.6.4 Payment Integration**

Integrating with online payment gateways to securely process payments for online orders. Inputs involve payment details. Outputs include confirmation of successful payment and associated payment records.

#### **3.1.6.5 Promotions and Discounts**

Applying online-specific promotions, discounts, and coupons to encourage online sales. Inputs encompass discount codes and eligible products. Outputs result in applied discounts and updated order totals.

#### **3.1.6.6 Order Tracking and Notifications**

Providing order tracking and notifications to keep customers informed about order status. Inputs include order details. Outputs involve order status updates and notifications.

#### **3.1.6.7 Returns and Refunds**

Handling customer returns or requests for refunds for online purchases. Inputs involve return requests and reasons. Outputs include return authorizations, updated inventory, and refunded payment records.

#### **3.1.6.8 Integration with Loyalty Programs**

Integrating online purchases with the loyalty program to track and reward customer loyalty. Inputs involve loyalty account details and online purchases. Outputs include loyalty points earned and program rewards.

### **3.1.7 Multi-Store Support**

#### **3.1.7.1 Centralized Dashboard**

Providing a centralized view of key performance indicators and metrics across all store locations. Inputs involve data from each store. Outputs deliver a consolidated dashboard for comprehensive monitoring.

#### **3.1.7.2 Multi-Location Inventory Management**

Ensuring seamless tracking and management of inventory across all store locations. Inputs

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

encompass inventory data from each location. Outputs provide real-time inventory levels and stock movements.

### **3.1.7.3 Unified Product Catalog**

Maintaining a consistent product catalog accessible from all store locations. Inputs involve product details and updates. Outputs provide a standardized catalog view for all stores.

### **3.1.7.4 Price and Promotion Consistency**

Ensuring consistent pricing and promotional offers across all store locations. Inputs involve pricing and promotion details. Output results in uniform pricing and promotions.

### **3.1.7.5 Centralized Customer Database**

Maintaining a centralized database of customer profiles and information from all store locations. Inputs involve customer data from each store. Outputs deliver a unified customer database.

### **3.1.7.6 Employee Management and Communication**

Managing employee profiles, schedules, and communication across multiple store locations. Inputs encompass employee data and schedules. Outputs provide coordinated employee management.

### **3.1.7.7 Multi-Location Alerts and Notifications**

Sending alerts and notifications to store managers or administrators about important updates, low stock levels, and operational issues. Inputs involve triggers and alerts. Outputs deliver notifications to relevant parties.

## **3.2 Usability**

This section outlines the requirements related to the usability of the Smart POS application. It encompasses factors that influence the user experience and the ease of interaction with the system.

### **3.2.1 Required Training Time**

The application must be designed in such a way that a normal user, with basic computer



Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

skills, can become proficient in using essential operations within a maximum of two hours of training. Similarly, a power user, possessing more advanced skills, should be able to become productive within one hour of training.

### **3.2.2 Ease of Use**

Usability requirements ensure that the Smart POS application is user-friendly, efficient, and intuitive for its intended users. These requirements enhance the overall user experience and contribute to successful adoption and utilization of the system.

### **3.2.3 Responsive Design**

The application's user interface should be responsive and adaptable to various screen sizes, resolutions, and devices, including desktop computers, tablets, and smartphones, to ensure consistent usability across platforms.

### **3.2.4 User-Friendly Navigation**

The application's menu structure, navigation buttons, and links should be logically organized and labeled, enabling users to access various functionalities and features with minimal effort.

## **3.3 Reliability**

Reliability requirements ensure that the Smart POS application operates consistently and reliably under various conditions, minimizing downtime and errors. The following reliability aspects are defined.

### **3.3.1 Availability**

- The system should strive for high availability, aiming to be operational 99.9% of the time.
- Planned maintenance and updates will be scheduled during non-peak hours (between 1:00 AM and 5:00 AM) to minimize disruption to users. During maintenance windows, the system may experience temporary unavailability.
- In the event of system maintenance or hardware failure, the POS system will enter a degraded mode. During this mode, basic transaction processing functionality will

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

remain available, ensuring minimal disruption to ongoing operations.

### 3.3.2 Mean Time Between Failures (MTBF)

The system should have an MTBF of at least 10,000 hours. This indicates the average time between failures that require system intervention.

### 3.3.3 Mean Time To Repair (MTTR)

In case of a failure, the system should be restored to operational status within a maximum of 4 hours. This includes the identification of the issue, troubleshooting, repair, and verification.

### 3.3.4 Accuracy

The system's output should have a precision of at least four decimal places for numerical values. Accuracy requirements should align with industry standards for financial transactions to ensure accurate handling of payments and inventory records.

### 3.3.5 Maximum Bugs or Defect Rate

The application should have a maximum bug or defect rate of 5 minor bugs per 1000 lines of code (bugs/KLOC) and 1 significant or critical bug per 1000 lines of code. Minor bugs are those that have a limited impact on functionality, while significant bugs affect critical operations, and critical bugs lead to substantial system failures.

### 3.3.6 Bugs or Defect Rate

	Minor Bugs	Significant Bugs	Critical Bugs
<b>Definition</b>	Minor bugs are issues that have a limited impact on system functionality and can be addressed without significant disruption to operations	Significant bugs are issues that impact certain functionalities or processes but do not cause a complete loss of usability	Critical bugs are issues that cause a complete loss of specific functionality or render the system unusable for a significant portion of users

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

<b>Possible bugs</b>	Display glitches, typos, minor formatting issues	Inaccurate inventory calculations, occasional payment processing delays.	System crashes, inability to process transactions, loss of customer data
<b>Allowable Rate</b>	The system shall have a minor bug rate of no more than 2% of total reported issues	The system shall have a significant bug rate of no more than 1% of total reported issues	The system shall have a critical bug rate of no more than 0.1% of total reported issues.

### 3.4 Performance and Security

#### Performance Requirements

##### 3.4.1 Response Time for a Transaction

The system shall ensure an average response time of no more than 2 seconds for processing a transaction, including payment and receipt generation.

The system shall maintain a maximum response time of 5 seconds for any individual transaction processing.

##### 3.4.2 Throughput

The system shall support a minimum throughput of 30 transactions per second during peak usage periods.

The system shall support concurrent usage by at least 100 users without significantly affecting transaction processing speed.

##### 3.4.3 Capacity

The system shall be capable of accommodating a minimum of 500 concurrent users across all subsystems without performance degradation.

The system shall have the ability to handle a minimum of 50,000 transactions per day without system slowdown.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

#### **3.4.4 Degradation Modes**

In the event of high traffic or server load, the system shall gracefully degrade by prioritizing core transaction processing over secondary functionalities (e.g., advanced analytics).

If system resources become constrained, the system shall continue to process transactions while suspending non-essential features such as real-time reports.

#### **3.4.5 Resource Utilization**

##### **3.4.5.1 Memory Utilization**

The system shall maintain memory utilization below 70% of available system memory, ensuring efficient performance and minimizing the risk of crashes due to memory exhaustion.

##### **3.4.5.2 Disk Space Utilization**

The system shall ensure that database storage and log files do not exceed 80% of available disk space to prevent data corruption and ensure system stability.

##### **3.4.5.3 Network Communications**

The system shall optimize network communications to ensure that data transfers between the client, server, and external services are accomplished within 500 milliseconds for a typical data packet.

### **Security Requirements**

#### **3.4.6 Data Encryption**

All sensitive data transmitted between the client and server shall be encrypted using industry-standard encryption protocols (e.g., SSL/TLS) to ensure data confidentiality and prevent eavesdropping.

Sensitive customer data such as payment information shall be securely encrypted when stored in the system's database to prevent unauthorized access.

#### **3.4.7 User Authentication and Authorization**

The system shall require user authentication for all interactions, and user roles shall determine access to specific functionalities and data.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

The system shall enforce strong password policies, including a minimum character length, combination of letters, numbers, and special characters, and regular password expiration.

### **3.4.8 Data Backup and Recovery**

The system shall perform regular backups of critical data to ensure data integrity and provide a means for recovery in case of data loss or corruption.

## **3.5 Supportability**

### **3.5.1 Coding Standards and Naming Conventions**

The system's development shall adhere to industry-recognized coding standards, promoting code, consistency, readability, and maintainability.

Clear and consistent naming conventions shall be followed for variables, functions, classes, and other code elements to facilitate code comprehension and maintenance.

### **3.5.2 Code Reusability**

The system shall prioritize the development of reusable code components, such as libraries, modules, and APIs, to maximize code reusability across different parts of the application and future projects.

Reusable components shall adhere to standardized interfaces and APIs, enabling seamless integration and reducing the effort required for modifications and updates.

### **3.5.3 Maintenance Access**

The system shall provide remote access to authorized maintenance personnel for diagnosing and resolving issues, enabling timely support without requiring physical presence.

### **3.5.4 Version Control:**

Source Code Repository - The system's source code shall be stored in a version control repository (e.g., Git), enabling version tracking, collaboration, and rollback capabilities.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

### 3.6 Design Constraints

#### 3.6.1 Software Languages and Frameworks

Backend: The system shall be developed using Spring Boot framework with Java for backend functionalities.

Frontend: The system shall utilize ReactJS for web interfaces and React-Native for mobile app development.

Database: PostgreSQL shall be used as the primary database management system for data storage.

#### 3.6.2 Development Process

Software Process: The project development shall follow an Agile methodology to ensure iterative development, adaptability, and continuous improvement.

Design Pattern: The system architecture shall adhere to the Model-View-Controller (MVC) design pattern for clear separation of concerns and maintainability.

#### 3.6.3 Software Languages and Frameworks

Backend: The system shall be developed using Spring Boot framework with Java for backend functionalities.

Frontend: The system shall utilize ReactJS for web interfaces and React-Native for mobile app development.

Database: PostgreSQL shall be used as the primary database management system for data storage.

#### 3.6.4 Development Tools

Integrated Development Environments (IDEs): Development teams are encouraged to use tools such as VS Code, IntelliJ IDEA, and Android Studio for efficient coding, debugging, and collaboration.

#### 3.6.5 Hardware and Platform Limitations

The hardware constraints for the web applications are not highly critical, and they are independent of the operating systems. A computer with normal performance capabilities is sufficient for accessing and using the web applications. On the other hand, for the mobile

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

application, hardware constraints play a critical role. A mobile phone equipped with a camera is necessary to fully utilize the mobile application's features. These hardware considerations ensure compatibility and optimal performance across different devices and platforms, enhancing user experience and usability.

### 3.7 On-line User Documentation and Help System Requirements

The user will be provided with a user manual including all the tasks.

### 3.8 Purchased Components

The purchasing of components is unnecessary since all the intended software and technologies for the system are readily accessible without any cost.

### 3.9 Interfaces

#### 3.9.1 User Interfaces

- **Sales Processing and Transaction Management:**

Login Interface: Cahier can login through the pin provided by the admin.

Checkout Interface: Allows cashiers to scan products, calculate totals, select payment methods, and generate receipts.

Payment Interface: Enables cashiers to process different payment methods such as cash, credit/debit cards, and gift cards.

Receipt Interface: Displays generated receipts to cashiers for verification and printing.

- **Inventory Management:**

Inventory Tracking Interface: Displays real-time inventory levels and provides options for adding, updating, and tracking products.

Reorder Interface: Enables authorized personnel to set reorder points, trigger automatic purchase orders, and manage stock replenishment.

Product Management Interface: Allows staff to add new products, update details, and manage product information centrally.

- **Employee Management:**

Employee Profile Interface: Provides a platform for creating and maintaining employee profiles, managing roles, and tracking attendance.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

User Roles and Permissions Interface: Allows administrators to define user roles and permissions for controlled system access.

Performance Monitoring Interface: Displays employee performance metrics, comparing them against predefined targets.

- **Customer Management:**

Customer Profile Interface: Allows staff to create and manage customer profiles, capturing personal and contact details.

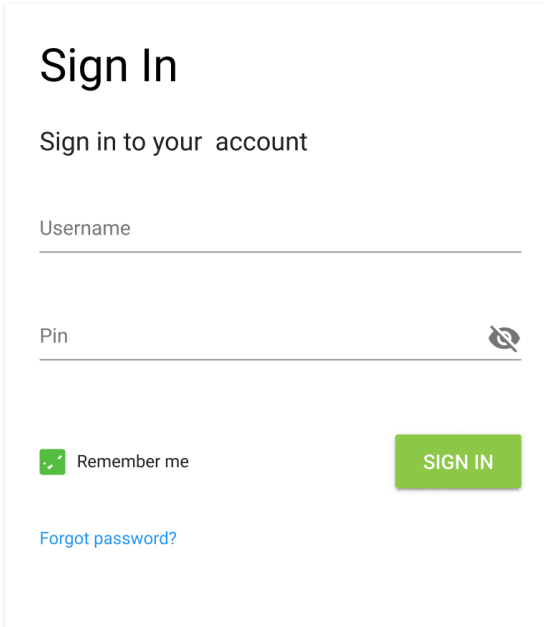
Loyalty Program Interface: Integrates with a loyalty program to track customer participation, points, and rewards.

- **Report and Analytics:**

Sales Analysis Interface: Generates sales reports, graphs, and indicators to assist in decision-making.

Inventory Analysis Interface: Provides insights into inventory turnover rates, stock levels, and recommendations.

Employee Performance Interface: Monitors and evaluates employee performance based on various metrics.



The image shows a login interface with the following elements:

- Title:** Sign In
- Instruction:** Sign in to your account
- Username Field:** A text input field labeled "Username".
- Pin Field:** A text input field labeled "Pin" with a toggle icon (an eye with a slash) to the right.
- Remember me:** A checkbox with a green checkmark icon and the text "Remember me".
- SIGN IN Button:** A green rectangular button with the text "SIGN IN" in white.
- Forgot password?:** A blue text link.

*Figure 3.9-1 Login*



Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

The screenshot shows the checkout interface for a 'CR-Book Rs200.00'. The top bar includes a menu icon, 'All items', a close icon, the item name 'CR-Book Rs200.00', a 'SAVE' button, and user icons. The main area is divided into sections: 'Variants' with two options (100 / 300 for Rs200.00 and 200 / 300 for Rs400.00), 'Quantity' with a numeric input set to 1 and minus/plus buttons, 'Comment' with a text field labeled 'Enter comment', and 'Discounts' with a toggle for 'season, 5%'. A 'CHARGE' button is at the bottom right. A sidebar on the left shows 'AtBook' and 'CR-Book' with a 'Page 1' indicator at the bottom.

Figure 3.9-2 Checkout

The screenshot shows the payment interface. On the left, a 'Ticket' summary lists 'CR-Book x 2' at Rs400.00 and a 'Total' of Rs400.00. The main area has a green top bar with a back arrow and a 'SPLIT' button. The total amount due is 'Rs400.00'. Below this, the 'Cash received' section shows 'Rs400.00' with a 'CHARGE' button. There are four buttons for cash amounts: 'RS410.00', 'RS500.00', 'RS1,000.00', and 'RS2,000.00'. At the bottom, there is a 'CARD' payment option with a card icon.

Figure 3.9-3 Payment

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

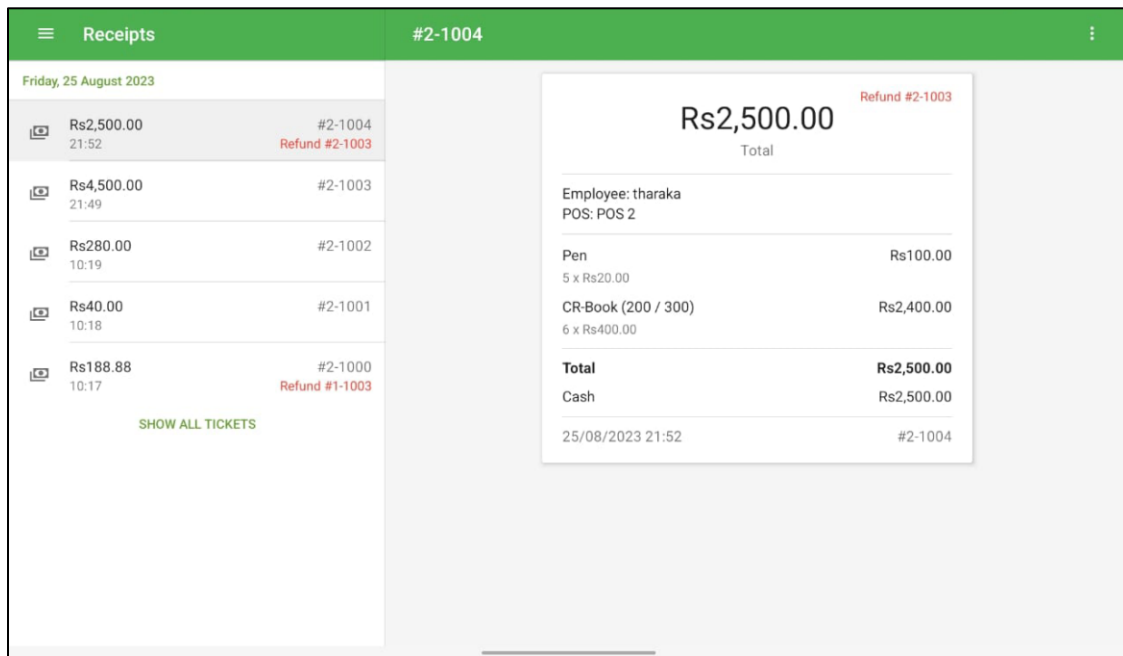


Figure 3.9-4 Receipt

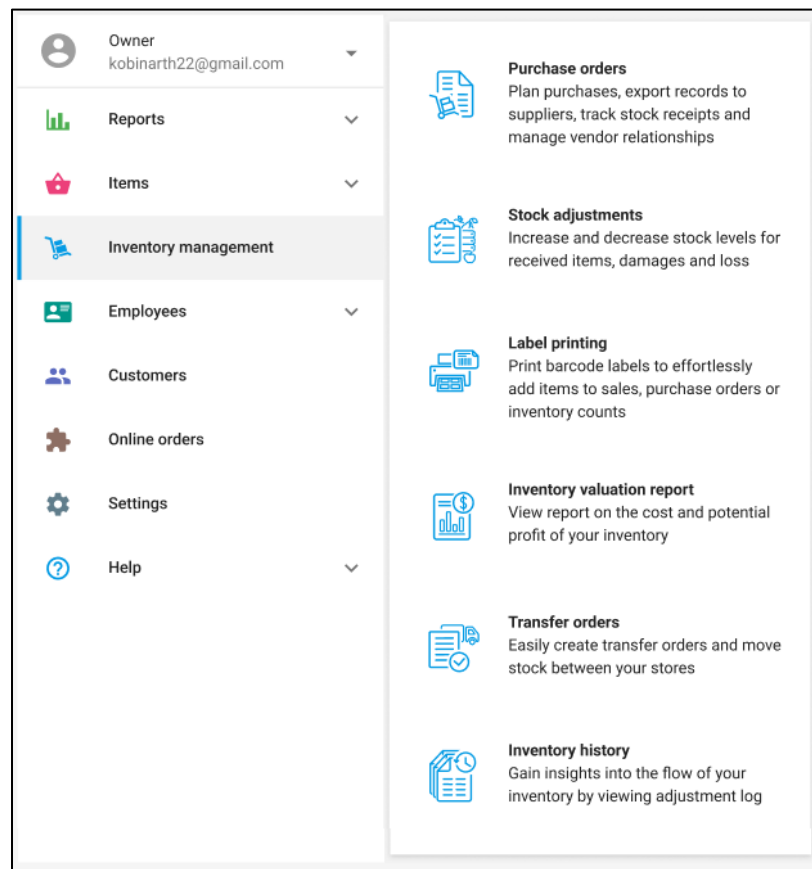


Figure 3.9-5 Inventory Management

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

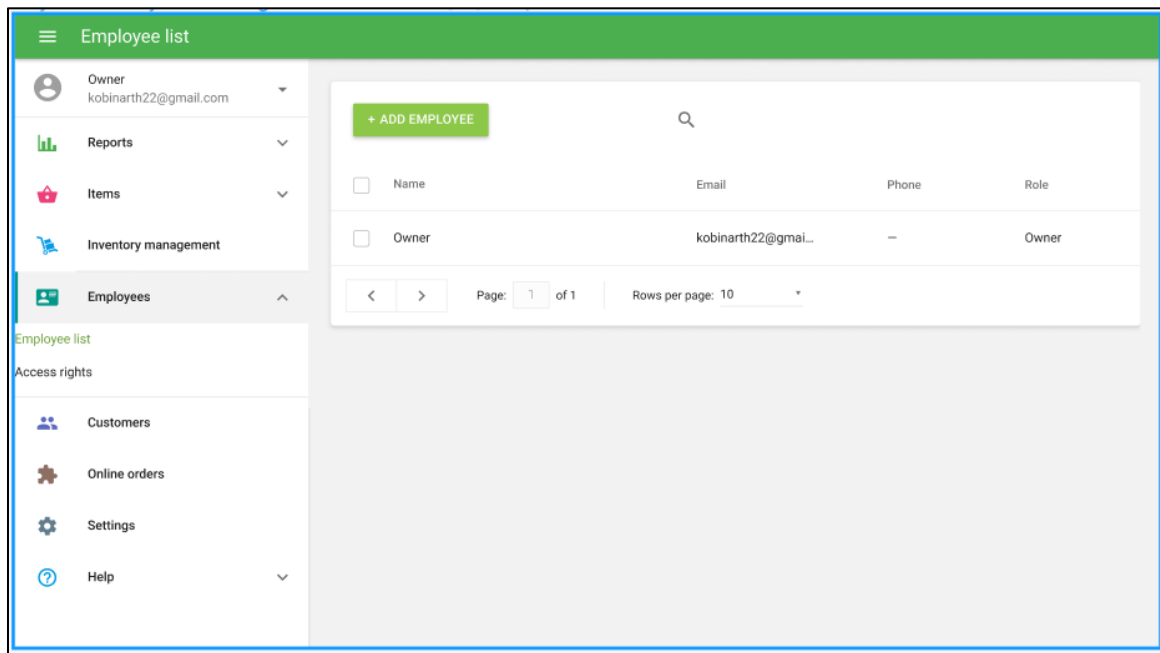


Figure 3.9-6 Employee Management

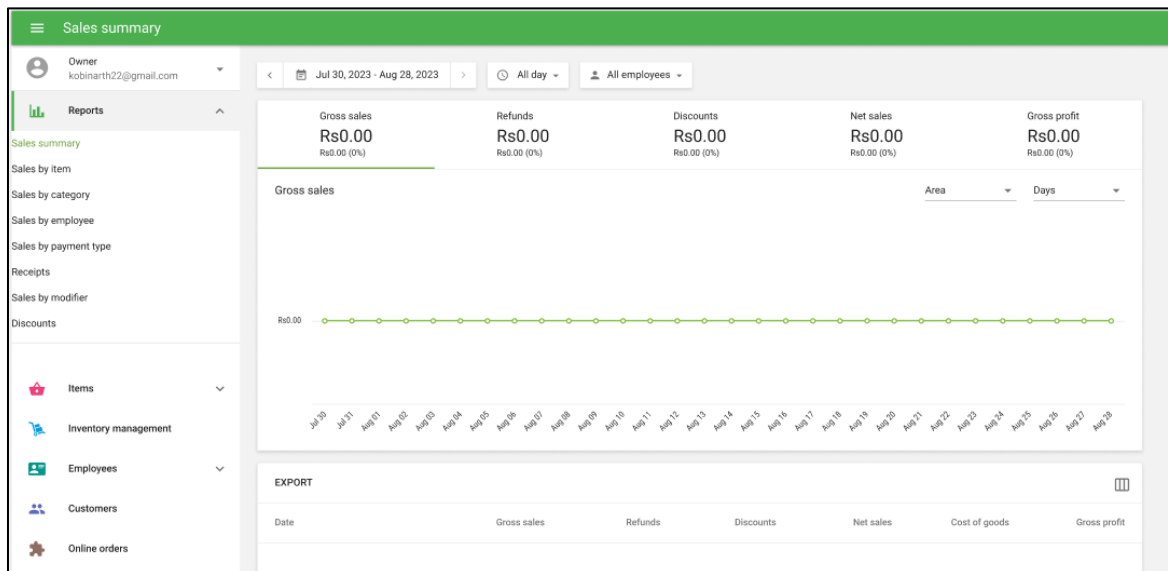
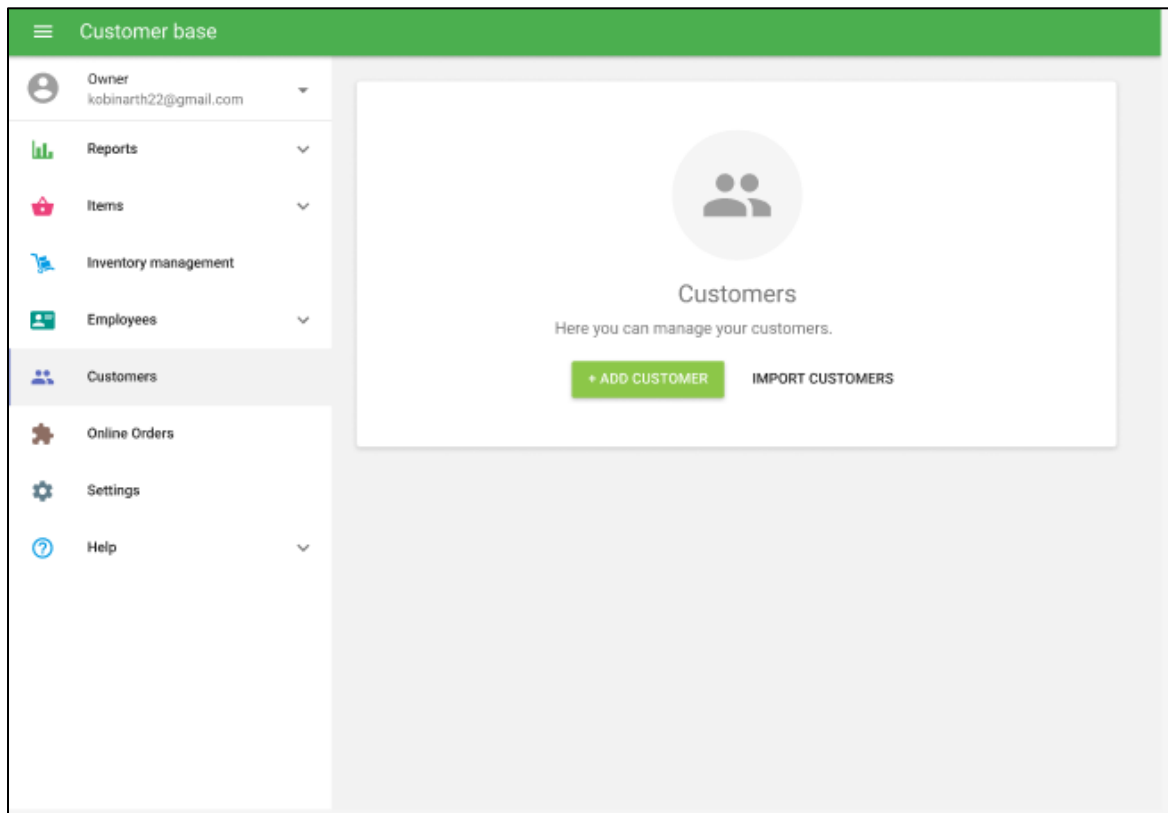


Figure 3.9-7 Reports and Analytics

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	



*Figure 3.9-8 Customer Management*

*Note : All the above UI interfaces are based on the Loyverse pos system [1]*

- **E-commerce Integration:**

Online Ordering Interface: Enables customers to place orders, choose delivery options, and apply promotions.

Payment Integration Interface: Integrates with online payment gateways for secure processing of online orders.

Order Tracking Interface: Provides order tracking and notifications to customers.

For this system bootstrap ecommerce template [2] has been completely resused.

- **Multi-Store Support:**

Multi-Store Dashboard Interface: Offers a centralized view of key metrics, performance indicators, and alerts across store locations.

Multi-Location Inventory Interface: Facilitates inventory management and tracking across multiple store locations.

Product Catalog Interface: Maintains a consistent product catalog accessible from all store locations.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

### 3.9.2 Hardware Interfaces

**Barcode Scanners:** Barcode scanners are essential tools used by cashiers to swiftly scan product barcodes during checkout. They transmit barcode data to the software, enabling accurate product identification and pricing.

**Card Readers:** Card readers facilitate secure credit/debit card payments. They read payment card information and transmit it to the software for processing, ensuring swift and reliable payment handling.

**Devices for Accessing Interfaces:** Computers, tablets, and other devices are utilized by cashiers and managers to access the software interfaces. Cashiers use these devices for product scanning, payment processing, and receipt generation. Managers employ them for inventory management, employee oversight, and reporting tasks.

### 3.9.3 Software Interfaces

The software interfaces with payment gateways to facilitate secure online payment processing. This integration allows customers to make payments using various methods such as credit/debit cards, digital wallets, or other online payment options. When a customer initiates a payment, the software communicates with the selected payment gateway to transmit payment details securely. The payment gateway then processes the payment, verifying the information provided and handling the transaction securely.

### 3.9.4 Communications Interfaces

The communication interfaces within the supermarket software system involve protocols that enable smooth data exchange between different system components. Asynchronous HTTP protocols are employed for efficient web-based interactions, allowing data transmission without immediate responses. This is particularly useful for managing real-time updates and ensuring uninterrupted processes. Additionally, FTP (File Transfer Protocol) is utilized for transferring files between the software system and external servers. This ensures the seamless sharing of essential files such as product data updates and reports, facilitating effective communication with external services and platforms.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

### 3.10 Database Requirements

The database should ensure low and predictable response times, prioritizing efficient data retrieval and manipulation. Scalability with high availability is a key requirement, allowing the system to handle increased user activity without compromising performance. The implementation of indexing will be crucial to enhance query performance and optimize data access. To minimize data redundancy and maintain data consistency, the database design will adhere to normalization principles. This approach aims to eliminate data anomalies and ensure efficient storage and retrieval. By fulfilling these database requirements, the system will establish a solid foundation for seamless and reliable point-of-sale operations.

### 3.11 Licensing, Legal, Copyright, and Other Notices

The Smart POS system will be released under the MIT License, making the source code accessible on GitHub. Users are granted the freedom to use, modify, distribute, and sublicense the software, both for commercial and non-commercial purposes, while retaining the original copyright and license notice. The software is provided without any warranties or guarantees, and the developers shall not be liable for any damages or liabilities arising from its use. By accessing, using, or contributing to the software, users acknowledge and agree to abide by the terms and conditions outlined in the MIT License, ensuring transparency, collaboration, and adherence to open-source principles.

### 3.12 Applicable Standards

- IEEE 830: Software Requirements Specification  
This is the IEEE standard for documenting software requirements specifications, and it provides guidelines for structuring and formatting SRS documents.
- PCI DSS: Payment Card Industry Data Security Standard  
If the system handles credit card payments, compliance with PCI DSS is essential to ensure the security of cardholder data during transmission, processing, and storage.

Smart POS (Point of Sales) application	Version: 1.0
Software Requirements Specification	Date: 28/08/2023
SRS document	

## 4. Supporting Information

### 4.1 References

[1] Download Loyverse POS (no date) Loyverse. Available at: <https://loyverse.com/download-loyverse> (Accessed: 28 August 2023).

[2] Website *layout sample*. Available at: <https://bootstrap-ecommerce-web.netlify.app/p-market-index> (Accessed: 28 August 2023).