SRE LAB 4 TASK:

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Software Requirements Specification (SRS)

Recycling Machine Application

1. Introduction:

1.1 Purpose

The purpose of the Recycling Machine Application is to manage the operations of a recycling machine that accepts returnable bottles and cans. The system facilitates customer returns, processes refunds, prints receipts, and provides operators with monitoring, reporting, and system management capabilities.

1.2 Scope

The system will support customer interactions for item returns and refunds, operator interactions for monitoring usage, configuring deposit values, and handling machine issues. It will recognize item types, record transactions, print receipts, generate daily reports, and trigger alarms for malfunctions.

1.3 Definitions, Acronyms, and Abbreviations

- **Refund:** Monetary return given to customers for deposited items.
- **Receipt:** Printed proof of deposit listing items and refund details.
- **Operator:** Authorized personnel managing machine configurations and maintenance.
- **Deposit Value:** Monetary value assigned to each returned item type.

1.4 References

- IEEE Standard 830-1998: IEEE Recommended Practice for Software Requirements Specifications
- User manual of similar recycling machines (if applicable)

1.5 Overview

This document describes the functional and non-functional requirements of the Recycling Machine Application, including customer and operator use cases, system features, and performance constraints.

2. Overall Description:

2.1 Product Perspective

The application operates as an embedded system managing a physical recycling machine, interfacing with sensors to detect and identify returned items, a printer for receipts, and a user interface for customers and operators.

2.2 Product Functions

- Item recognition and quantity recording.
- Receipt generation and printing.
- Refund calculation and processing.
- Daily usage monitoring and reporting.
- System configuration by operators.
- Alarm management for machine malfunctions.

2.3 User Characteristics

- **Customers:** General public who return bottles and cans; no technical expertise required.
- **Operators:** Trained personnel responsible for machine maintenance, reporting, and configuration.

2.4 Constraints

- Limited physical space for machine components.
- Hardware limitations in item recognition accuracy.
- Printer hardware constraints (e.g., receipt paper roll size).
- Real-time processing needed for smooth customer interaction.

2.5 Assumptions and Dependencies

- The system assumes correct hardware functioning for sensors and printer.
- Operator access is secured and limited to authorized personnel only.
- Daily reports are generated based on local system time.

3. Specific Requirements:

3.1 Functional Requirements

Customer Interactions:

- FR1: The system shall allow customers to return multiple bottles or cans during a single session.
- FR2: The system shall identify the type of each returned item and record the quantity.
- FR3: The system shall calculate the refund based on the deposit value for each item type.
- FR4: The system shall generate and print a receipt upon customer request containing:
    - List of deposited items.
    - Deposit value per item type.
    - Total refund amount.

Operator Interactions:

- FR5: The operator shall be able to view the total number of bottles and cans returned during the day.
- FR6: The operator shall be able to generate a daily report showing the total items deposited.
- FR7: The operator shall be able to update deposit values for item types.
- FR8: The system shall trigger alarms in case of malfunctions such as stuck cans or depleted receipt rolls.
- FR9: The operator shall be responsible for acknowledging and resolving triggered alarms.

3.2 System Features

- SF1: Item recognition via sensors.
- SF2: Transaction recording and storage.
- SF3: Receipt printing functionality.
- SF4: Daily report generation.
- SF5: Machine status monitoring and alarm triggering.

3.3 Interface Requirements

- User interface for customers to start and complete return sessions.
- Operator interface for viewing reports, updating configurations, and handling alarms.
- Printer interface for receipt output.
- Sensor interfaces for item detection and identification.

4. Non-Functional Requirements:

4.1 Performance Requirements

- The system shall identify and record each item within 2 seconds of deposit.
- Receipt printing shall complete within 5 seconds after request.
- Daily report generation shall complete within 1 minute at day-end.

4.2 Security Requirements

- Operator functions shall require authentication.
- System data shall be protected against unauthorized access or modification.

4.3 Reliability

- The system shall operate continuously during business hours without failure.
- Alarms shall reliably trigger on malfunction detection.

4.4 Maintainability

- The system shall allow easy update of deposit values through the operator interface.
- Alarm logs shall be available for troubleshooting.

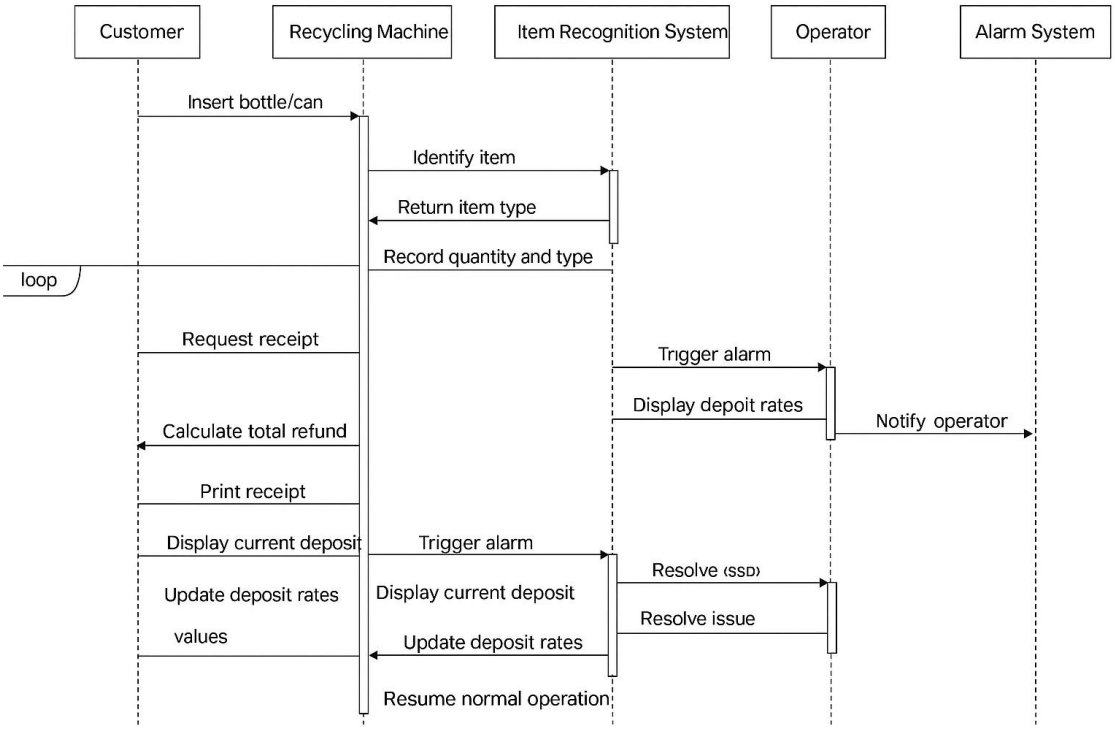
5. Other Supporting Information:

5.1 Appendices

- Sample receipt format
- Daily report template

5.2 Index

DIAGRAM:


Customer
Recycling Machine
Item Recognition System
Operator
Alarm System
Insert bottle/can
Identify item
Return item type
Record quantity and type
loop
Request receipt
Trigger alarm
Display depoit rates
Notify operator
Calculate total refund
Print receipt
Display current deposit
Trigger alarm
Resolve (SSD)
Update deposit rates
Display current deposit
Resolve issue
values
Update deposit rates
Resume normal operation