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*Vending Machine* System

Supplementary Requirements Specification

Group/Team: *16*

*Ana Das 2541425*

*Abiola Medahunsi 2541425*

*Akinbola Faniran 2563098*

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# Requirements conformance statement

The following keywords are used to differentiate between different levels of requirements and optionality, as defined in IEEE Std 100-1992 [RD11].

**Shall**: indicates a mandatory requirement. To ensure interoperability with other products conforming to this standard, all mandatory requirements must be followed strictly with no deviation.

**Should:** indicates a recommended but not mandatory requirement. Allows flexibility of choice between several possible alternatives while indicating a strongly preferred alternative. Indicates that a certain course of action is desirable but not mandatory or indicates that a certain course of action is deprecated but not prohibited.

**May:** indicates a suggested course of action without implying preference over any other possible course of action.

# SUPPLEMENTARY REQUIREMENTS

# *Performance and Reliability*

1. Response Time for Vending Transactions in Customized Vending Machines

The system shall do smooth vending transaction of maximum up to 5 seconds under user selections.

*Rationale: Customers often get annoyed with lengthy wait times between orders and be (!!! Namely, active!) rather than prone to fall.*

1. System Uptime

The availability of the vending machine, shall be no less than 99% in the period of 30 days’ guarantee.

*Rationale: Since very high availabilities are achieved, year-round access for consumers lie within range, so that disruptions in services are kept on a minimum level.*

1. Transaction Logging

The machine shall be configured to record all vending transactions with details including purchase data, timestamps, and the vending machine ID and store the transactions in a securely and tamper-resistance transaction log file that will be stored on the vending machine's hard disk.

*Rationale: In addition, audit trail is an element that logs transactions to monitor and troubleshoot problems in the vending operations for accountability and integrity*.

# *Security*

1. Data Encryption

The use of cryptographic protocols on all communications channels between the very good Vending Machine and external servers, including the Very Good Vending Payment Server shall be required.

*Rationale: Encryption keeps the net secure with confidential transactions involving delivery of personalized information like credit card data or details of the transaction.*

1. Access Control

The system shall be characterized by user role-based access control (RBAC). It will limit access to the sensitive functionalities for maintenance operators, service operators, and other users' roles.

*Rationale: RBAC improves security situation by granting just the access to the personnel who are authorized for doing the job and exclude unauthorized users from doing maintenance, changing settings or otherwise interfering.*

1. Intrusion Detection

The system may have an intrusion detection system to monitor any attempts of unauthorized accesses, or tampering with the machines' hardware units by issuing alarms to responsible personnel in real-time mode.

*Rationale: Intrusion detection systems have the ability to prevent attacks by detecting and responding to suspicious activity or even physical damage to the vending machine.*

1. Multilingual Support

The user interface of the vending machine should be multilingual and shall allow for multiple languages choice, this will include Spanish, English, as well as Mandarin.

*Rationale: In fact, multilingual support provides access to various groups of users, like non-native readers and international visitors, thus enhancing usability and users' satisfaction.*

# *Usability*

1. User Interface Accessibility

The user interface of the vending machine shall be following the accessibility standards. In the user interface, I will be providing the options for text-to-speech output and large-font displays for the users that have visual impairments.

*Rationale: Availability, on the other hand, should cater to the needs of users with varying abilities, if it will then lead to products that are simple to use and more universal in their application.*

1. Intuitive Navigation

The UI's design shall have intuitiveness backed by user-friendly instructions to navigate it conveniently with no tech proficiency barriers.

*Rationale: Combatting the introduction of the conveningity of the interface promotes easy navigation that eliminates user’s errors and confusion as they interact with the vending machine, thus enhancing users experience.*

# *Scalability*

1. Expandable Scale File Size

The configuration file, which is the file representing the product information for the vending machine, storing product information on the hard disk of vending machine, shall not exceed 1 MB, even with the addition of new products and updates.

*Rationale: The size of the configuration storage and its performance are both made more efficient by limiting the size of the configuration file; the latter also resolves memory issues on machines with lower capacity.*

1. Vending machine monitoring

The system design shall need to allow the updated product inventory details and synchronization of multiple vending machines on the premises of an organization.

*Rationale: Companies with numerous vending machines often need a centralized distribution and control of the inventory for the products to keep the consistency also accuracy*.

1. Remote Configuration Management

The system shall allow for remote management of product info, software release, and maintenance tasks performed for vending machines in far-flung areas through secure remote access protocols.

*Rationale: The remote manipulation of configuration settings simplifies operations and decreases the burden on administration, as a consequence, when it comes to managing scattered vending equipment systems.*

# *Enhancements*

1. Predictive Maintenance

The system shall have predictive maintenance capabilities built in through the application of machine learning algorithms to collect usage data and component health diagnostic information in anticipation of faults which will then trigger the system to organize preventive maintenance before a failure occurs.

*Rationale: With the predictive maintenance, eliminates delays and save money by fixing the problems before they transform into urgently of equipment failures.*

1. Personalized Recommendations

This platform may utilize individual purchase history and preferences in creating personalized product recommendations on the vending machine display. This will significantly improve the shopping experience and strengthen customer engagement.

*Rationale: Personalized recommendations not only increase the chances of customers being satisfied and purchasing again, but also lead to more revenue, thus benefiting the income of the vending business.*

1. Sustainability Features

Sustainability features shall represent the part of the system, this involves energy efficient components, recyclable materials in construction and power saving modes and these features help to reduce environmental footprint of the vending machine and promote eco-friendly operation.

*Rationale: Sustainability projects hand-in-hand with corporate social responsibility goals thereby bolster the image of the vending machine provider as environmentally responsible.*