**Software Requirements Specification**

for

trendAssist App

Version 1.1 approved

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Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
| SRS FM | 2/13/2018 | Initial Setup | 1.0 |
| SRS | 3/02/2018 | Updating syntax and content | 1.1 |
|  |  |  |  |

# **1. Introduction**

## **1.1 Purpose**

## The purpose of this Software Requirements Specification document is to describe, in detail, the functionalities of trendAssist, a sales trend prediction program. This document will explain the purpose, features, constraints, interfaces, and functionality of trendAssist.

## **1.2 Document Conventions**

This document was written using the IEEE template for System Requirements Specification.

## **1.3 Product Scope**

## trendAssist is a business finance and trend prediction program that allows the user to input data over sales made in a day. This data will then be submitted into a database containing financial sales data for every day of the week. It will also allow a user to input data from years past to increase the accuracy of sales predictions; the program will then use this information to generate a new estimation of revenue for that same day of the week in the future and describe requirements needed to hit specific profit margins. There will be two different authorization levels for accounts in the database: standard employee accounts that have access to basic data entry features and owner/manager accounts that have escalated privileges for access to more features about past data. An authorized user (owner/manager) will also be able to determine the optimal staffing needed on any given day to support the expected crowd and maximize profits. The most recent year’s data will be weighted higher than the previous year’s data to maintain accuracy and adjust for recent trends.

## **1.4 References**

IEEE 830

# **2. Overall Description**

## **2.1 Product Perspective**

This program is a new, self-contained product that will be convenient for small business owners to make use of after inputting financial data by predicting potential future sales data based on this data on a given day in the future. This product will exist as a personal computer application.

## **2.2 Product Functions**

The primary functions of trendAssist are as follows:

* Input/Modify sales data
* Generate prediction of sales based on user inputted data
* Create data visualizations in the form of a graph and table

## **2.3 User Classes and Characteristics**

* Admin Account: authorization level for total accessibility to view and modify all sales data, generate sales prediction, view data visualizations, view suggested employee amount, and create/delete accounts
* Employee Account: authorization level with limited access to input new sales data and generate sales prediction

## **2.4 Operating Environment**

The software will operate on Windows and Mac OS X.

This application will require the host computer to run:

* Java
* MySQL Server Database
* Windows or Mac OS X

## **2.5 Design and Implementation Constraints**

The design and implementation of the program will be limited by the memory allocation ability of the programming languages used.

## **2.6 User Documentation**

Generic readme.txt file that includes basic instructions on how to navigate the program, input new data, view past data, generate new prediction graph, etc.

## **2.7 Assumptions and Dependencies**

Constraints to the system:

* The personal computer must have a steady power source (External/Internal Power).
* The personal computer must have Input/Output capability.
* The personal computer must run at least Windows XP/Mac OS X 10.8.
* The personal computer must have enough storage space to host the MySQL database.

# **3. Interface Requirements**

## **3.1 User Interfaces**

**SCREEN 1: Login Screen**

The opening screen will be comprised of a login screen that will take the user’s Username and Password.

Text Field 1: Username

Pre-existing account username stored in account MySQL database.

Text Field 2: Password

Password associated with pre-existing account.

Button 1: Sign In

Button to verify login credentials, checked against the credentials stored in the account database.

Once credentials have been verified, the main screen will have buttons for the main functions of the program.

**SCREEN 2: Home Screen**

Button 1: Generate Sales Prediction

This button will lead to a page that will prompt the user for a specific date. A small description will remind the user to only input a date that does not predate the current date.

Button 2: Modify Sales Data (Input Sales Data for employee accounts)

This button will lead to another screen which will allow the user to select a specific date to modify (or input only for that night for employees) the sales data. This is the screen that will be used to input new data after closing each night.

Button 3: Account Settings (ADMIN ONLY)

This button will lead the user to a screen which will allow them to modify account login credentials.

Button 4: Create New Account (ADMIN ONLY)

This button will lead the user to a page where they will be able to enter details for a new account that is then submitted to the account MySQL database. This will create a new account with the authorization level the user specifies with a drop-down box.

**SCREEN 3: Data Entry Screen**

Field 1: Date of Sales

Field 2: Sales Value

Button 1: Submit Data

**SCREEN 4: Account Creation Screen**

Field 1: Username

Field 2: Password

Field 3: Confirm Password

Drop-down 1: Choose a Role (for authorization level access)

Button 1: Create My Account

## **3.2 Hardware Interfaces**

This program will be lightweight enough to store on a flash drive to maintain portability and be cross-platform with Windows and Mac OS devices alike to be as accessible as possible. It will not require the user to install on their machine but will be run locally off the flash drive.

## **3.3 Software Interfaces**

The project is split up into 3 sections: front-end, featuring the GUI and interactive part of the program written in Java; security/encryption, handling data encryption written in Java; and back-end, the user account and sales data databases written in Java to handle the data and number crunching. This section will also interface with and pass data to the front-end. The database information will be fully secured and encrypted with AES 128-bit encryption.

Databases: Excel, MySQL

Languages: Java

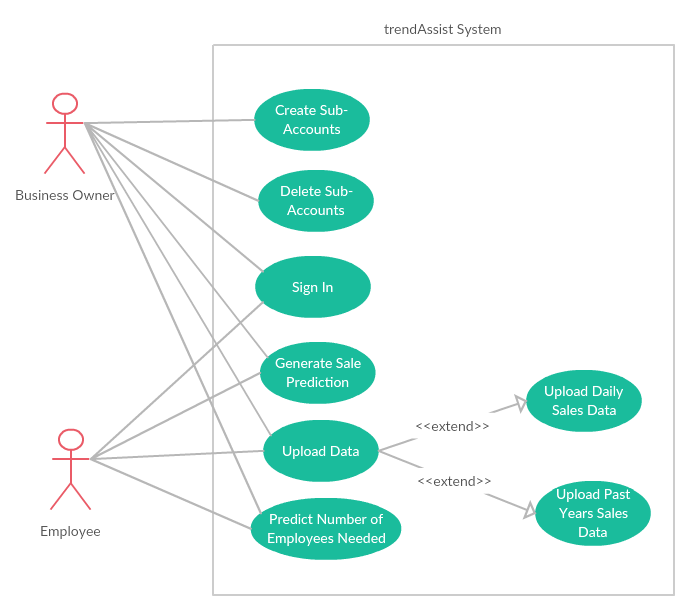
## 

## **3.4 Communications Interfaces**

The system shall have the capability to open the database using trendAssist. The system shall have the capability to modify the data within the database, given the appropriate user authorization level. The system shall be able to communicate with any hardware containing the program.

# **4. System Features**

**Overall System Use Case Diagram**



Note: Create Sub-Accounts and Delete Sub-Accounts Use Cases are not extensions of Sign In Use Case because only the business owner or manager can create or delete other accounts.

**4.1 Sign in**

|  |  |
| --- | --- |
| **Title:** | **Sign in** |
| **Description**: | Existing user tries to login in the application. |
| **Actors**: | Business owner, employee, application. |
| **Precondition**: | User is not logged in but have an existing account. |
| **STEPS**:   1. User starts application. 2. User enters username and password. 3. The system will check user information against the database for validation. 4. If valid, system will load the home page screen. | **ALTERNATIVES**:   * If user account information is invalid, then the system will prompt an error message. |
| **Postcondition:** | User successfully logged in. |

**4.2 Create Sub-Account**

|  |  |
| --- | --- |
| **Title:** | **Create Sub-Account** |
| **Description**: | Business owner user tries to create account for employee. |
| **Actors**: | Business owner, application. |
| **Precondition**: | User is the business owner and is not logged in but have an existing account. |
| **STEPS**:   1. Business owner starts application. 2. Business owner enters username and password. 3. The system will check business owner information against the database for validation. 4. If valid, business owner is able to get in the application and the system will load home page screen. 5. Business owner then selects to create an account. 6. The system will load the create account page. 7. Business owner the enters username, password, and role for the new account. 8. The system then will check if the username already exists in the database. 9. If not, the system will prompt a message of successful account creation | **ALTERNATIVES**:   * If employee username already exist in the database then the system will prompt an error message and let the user to enter a new username. |
| **Postcondition:** | Business owner successfully creates new account for employee. |

**4.3 Delete/Update Sub-Account**

|  |  |
| --- | --- |
| **Title:** | **Delete/Update Sub-Accounts** |
| **Description**: | Business owner wants to delete or update an account information of an employee. |
| **Actors**: | Business owner, application. |
| **Precondition**: | User is the business owner and has an existing account. |
| **STEPS**:   1. Business owner start application. 2. Business owner enter username and password. 3. The system will check business owner account information against the database for validation. 4. If valid, business owner is able to get in the application and the system will load home page screen. 5. Business owner then select account settings. 6. System displays all employee’ account. 7. Business owner selects an account from the list. 8. Business owner can either update information of an account or delete the account. 9. System deletes/updates selected account from the database and displays a message for successful process. | **ALTERNATIVES**:   * If user account information is invalid extend to Sign in use case. |
| **Postcondition:** | User successfully deletes/updates an account in the database. |

**4.4 Generate Sales Prediction**

|  |  |
| --- | --- |
| **Title:** | **Generate sales prediction** |
| **Description**: | Business owner or employee wants to predict amount of income for a date range to have an idea of potential revenue. |
| **Actors**: | Business owner, employee, application. |
| **Precondition**: | User has an existing account |
| **STEPS**:   1. User starts application. 2. User enters username and password. 3. The system will check user account information against the database for validation. 4. If valid, user is able to get in the application and the system will load home page screen. 5. User selects to generate sale prediction. 6. System will load the sale prediction page. 7. User selects a data range he/she would like to view. 8. System displays a predicted amount of revenue to be earned for that date range. 9. System will also display a graphical view of sales made for those days. | **ALTERNATIVES**:   * If user account information is invalid extend to Sign in use case. * If financial data for an inputted date isn’t found, system will prompt a message for data to be entered. |
| **Postcondition:** | System provides an accurate prediction to user. |

**4.5 Upload Data**

|  |  |
| --- | --- |
| **Title:** | **Upload data** |
| **Description**: | Business owner or employee wants to upload sales data in the database to improve the accuracy of the software. |
| **Actors**: | Business owner, employee, application. |
| **Following Use Cases:** | Extend to Upload Daily Sales Data and Upload Past Year Sales Data. |
| **Precondition**: | User has an existing account |
| **STEPS**:   1. User starts application. 2. User enters username and password. 3. The system will check user account information against the database for validation. 4. If valid, user is able to get in the application and the system will load home page screen. 5. User selects to modify sales data. 6. System will display modify sales data page. 7. User then either select to input sales data for the day or input sales data for past years. 8. System will prompt the user to input sales data. 9. User enters sales data. 10. System will display a message for successful process and stores/updates data in the database. | **ALTERNATIVES**:   * If user account information is invalid extend to Sign in use case. * If user selects to input sales data for the day extend to Upload daily sales use case. * If user selects to input sales data for past years extend to Upload past year sales use case. |
| **Postcondition:** | User successfully store/update sales data in the database. |

**4.6 Upload Daily Sales Data**

|  |  |
| --- | --- |
| **Title:** | **Upload daily sales data** |
| **Description**: | Business owner or employee wants to upload daily sales data in the database to improve the accuracy of the software. |
| **Actors**: | Business owner, employee, application. |
| **Following Use Cases:** | Includes Upload Data. |
| **Precondition**: | User has an existing account |
| **STEPS**:   1. User starts application. 2. User enters username and password. 3. The system will check user account information against the database for validation. 4. If valid, user is able to get in the application and the system will load home page screen. 5. User selects to modify sales data. 6. User then select to input sales data for the day. 7. System will prompt the user to pick a date and enter sales data for that day. 8. User input data manually by typing the date and gross sales for the day. 9. System will display a message for successful process and stores/updates data in the database. | **ALTERNATIVES**:   * If user account information is invalid extend to Sign in use case. |
| **Postcondition:** | User successfully store/update daily sales data in the database. |

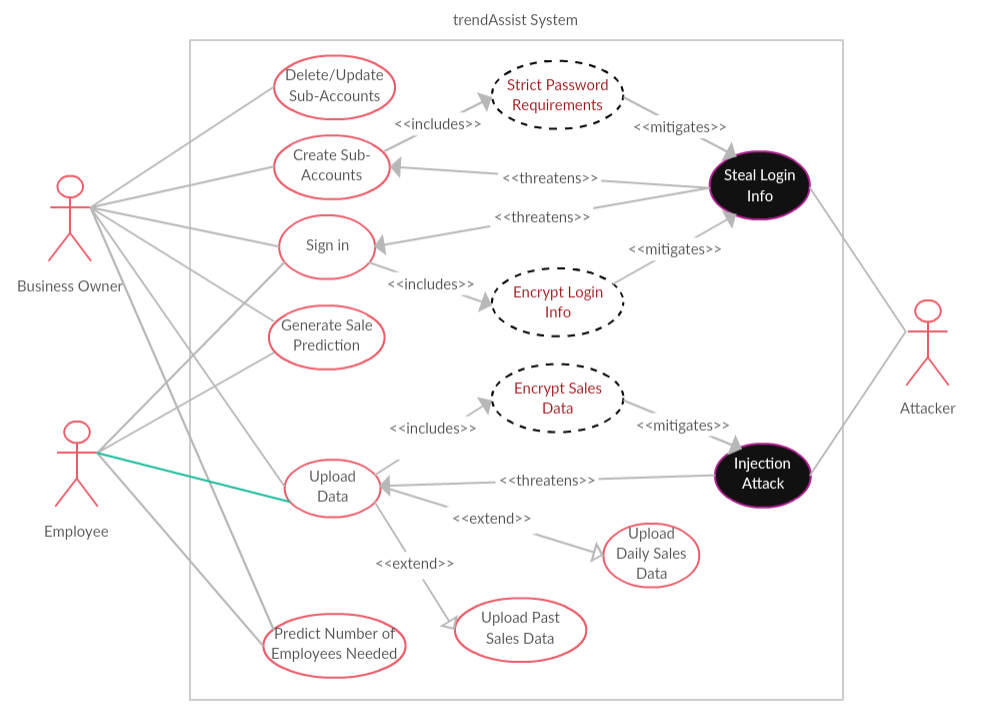
**4.7 Upload Past Years Sales Data**

|  |  |
| --- | --- |
| **Title:** | **Upload past years sales data** |
| **Description**: | Business owner or employee wants to upload past years sales data in the database to improve the accuracy of the software. |
| **Actors**: | Business owner, employee, application. |
| **Following Use Cases:** | Includes Upload Data. |
| **Precondition**: | User has an existing account |
| **STEPS**:   1. User starts application. 2. User enters username and password. 3. The system will check user account information against the database for validation. 4. If valid, user is able to get in the application and the system will load home page screen. 5. User selects to modify sales data. 6. User then select to upload past years sales data. 7. System will prompt the user to select a file from the computer he would like to upload (must be an excel file). 8. System will check if it is a valid file. 9. If valid, system will display a message for successful process and stores/updates data in the database. | **ALTERNATIVES**:   * If user account information is invalid extend to Sign in use case. * If file is not valid, system will prompt an error message for incorrect file. |
| **Postcondition:** | User successfully store/update past years sales data in the database. |

**4.8 Predict Number of Employees Needed**

|  |  |
| --- | --- |
| **Title:** | **Predict number of employees needed** |
| **Description**: | Business owner or employee wants to get an estimated number of employees needed based on sales made on previous year for any given date. |
| **Actors**: | Business owner, employee, application. |
| **Precondition**: | User has an existing account |
| **STEPS**:   1. User starts application. 2. User enters username and password. 3. The system will check user account information against the database for validation. 4. If valid, user is able to get in the application and the system will load home page screen. 5. User selects to generate sale prediction. 6. System will load the sale prediction page. 7. User selects a data range he/she would like to view. 8. System displays a predicted amount of revenue to be earned for that date range. 9. User select generate number of employees required. 10. System calculates number of employees required using an algorithm. 11. System displays number of employees needed for the given date. | **ALTERNATIVES**:   * If user account information is invalid extend to Sign in use case. |
| **Postcondition:** | System will display number of employees needed based on revenues made for those days. |

**Misuse Case Diagram**



**Misuse Case Descriptions:**

**4.9. Steal Login Info**

|  |  |
| --- | --- |
| **Name:** | Steal Login Info |
| **Summary:** | An attacker obtains and later misuse account information of a user. |
| **Author(s):** | Mayur Bhakta, Michael Wall, Aaron Turner, Xujia Wu, Aaron Riggs, Andre Manz |
| **Date:** | 5/8/2018 |
| **Basic Path:** | 1. The attacker hacks a network host computer and installs IP sniffer. All messages sent through the compromised host containing strings like ‘user’, ‘username’, ‘password’, etc. are intercepted. The attacker uses the username and password to gain illegal access to the users account. 2. The attacker uses username/password generating software. |
| **Capture Points:** | * If there are very strong password restrictions, then the attacker’s attempt will have a very low probability of working. * All username and password for the application must be encrypted. |

**4.10. Injection Attack**

|  |  |
| --- | --- |
| **Name:** | Injection Attack |
| **Summary:** | An attacker obtains access to the database with sales information through an injection attack and may spoof identity; expose, tamper, destroy, or make existing data unavailable. |
| **Author(s):** | Mayur Bhakta, Michael Wall, Aaron Turner, Xujia Wu, Aaron Riggs, Andre Manz |
| **Date:** | 5/8/2018 |
| **Basic Path:** | * + - 1. The attacker finds a parameter that the application passes through to a database. By carefully altering SQL commands into the content of the parameter, the attacker can trick the application into forwarding a malicious query to the database. |
| **Capture Points:** | If the sales data is encrypted, the information obtained by the attacker will not be decipherable by the attacker |

# **5. Other Nonfunctional Requirements**

## **5.1 Performance Requirements**

5.1.1 The system shall be able to run on devices with at least Windows XP installed

5.1.2 The system shall be able to run on devices with at least Mac OS X 10.8 installed

5.1.3 The system shall be able to run on devices that have at least 1GB of memory

5.1.4 The system shall be able to run on devices that have at least a 1GHz processor

## **5.2 Safety Requirements**

5.2.1 The system shall keep the database backed up to a server in case of catastrophic failure

5.2.2 The system shall restore a past copy of the database from the server, when necessary

5.2.3 The system shall reconstruct the database by redoing the operations of committed transactions up to the time of failure

## **5.3 Security Requirements**

5.3.1 The system shall keep customer data encrypted with AES-256-bit encryption

5.3.2 The system also uses a cipher created by the development team.

5.3.3 The system shall allow the user to access customer data when requested by an authorized user

5.3.4 The system shall feature a login screen so that a user of an existing account may log in securely

5.3.5 The system shall store user account data with encrypted keys checked against stored secure hashes

## **5.4 Software Quality Attributes**

5.4.1 The system shall be portable to increase accessibility

5.4.1 The system shall be compatible with multiple OSes to increase accessibility

## **5.5 Business Rules**

5.5.1 The system shall be secure to restrict access so only users with pre-existing accounts within the approved organization can access the program

## **5.6 Privacy Requirements**

5.6.1 The system shall not disclose any information to third parties about sales data

5.6.2 The system shall not disclose any information about usernames to any third parties

5.6.3 The system shall not disclose any information about the password

5.6.4 The system shall not disclose any personal information to third parties

**6. Functional Requirements**

**6.1 Sign In and Out**

6.1.1 The system shall require a unique personalized account to sign in

6.1.2 The system shall allow the user to log out of their account

**6.2 Sub-account Modification**

6.2.1 The system shall allow authorized users to create/edit sub-accounts

6.2.2 The system shall allow authorized users to promote sub-accounts

6.2.3 The system shall allow authorized users to demote sub-accounts

6.2.4 The system shall allow the authorized user to delete sub-accounts

**6.3 Predict Gross Sales**

6.3.1 The system shall allow the user to select the date for projection

6.3.2 The system shall generate a projection based on past sales data

6.3.3 The system shall display the sales data projection in table format

6.3.4 The system shall display the sales data projection in graphical format

**6.4 Upload Daily Sales Data**

6.4.1 The system shall allow the user to input data for the current day’s sales

**6.5 Upload Past Sales Data**

6.5.1 The system shall allow the user to pick a date range to alter a previous year’s data

6.5.2 The system shall allow the user to update selected date range sales data

6.5.3 The system shall allow the user to upload past sales data in the form of a .csv file

**6.6 Employee Prediction**

6.6.1 The system shall allow the user to select dates for prediction of employees needed

6.6.2 The system shall generate a prediction of employees needed for the user

6.6.3 The system shall display the generated prediction of employees needed

**6.7 View Past Sales Data**

6.7.1 The system shall allow the user to input a date range of data to view

6.7.2 The system shall display the sales data for the date range provided

## **6.8 Privacy Requirements**

6.8.1 The system shall not allow employees to view another employees’ username

6.8.2 The system shall not allow employees to view another employees’ password

6.8.3 The system shall not allow employees to view their employer’s past years’ sales data