# Smartstatis Integrity/Acceptance Test Report

Is

**GenX Leaders**

*Version 1.0  20 May 2019*

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# 1.0 INTRODUCTION

This document provides integrity test about iOS application "Smartstatis" and should be used as a guide to check all the functionalities that have been implemented in the application. It also provides the completed user stories relating to our functionalities or features in the all iterations, it includes the integrity test for all functions. The use of data sources and security aspects are covered as well.

## 1.1 PROJECT DESCRIPTION

The application Smartstatis aims at reducing the food waste that is generated in the households. From the recent analysis, it shows that the food waste is a serious issue in Australia, however, it has been poorly understood and underestimated. Over thirty percent of food purchased by the households are disposed each year, which has bought both financial and environmental concerns. The insufficient purchase planning and food expired after 'best-before dates' are the two major reasons behind this issue.

The ultimate aim of the application is to raise awareness among its user for food waste and try to create a sustainable environment to live in. Tones of kilograms of food is wasted each day in Australia, the government has not yet enforced any law against this, but as citizens we are trying to spread awareness and make a practice for people that they think twice about their food to save their expenses and reduce food waste. From the previous three iterations, the application delivered features which would provide the target user, 'households' with better food management and reducing food waste.

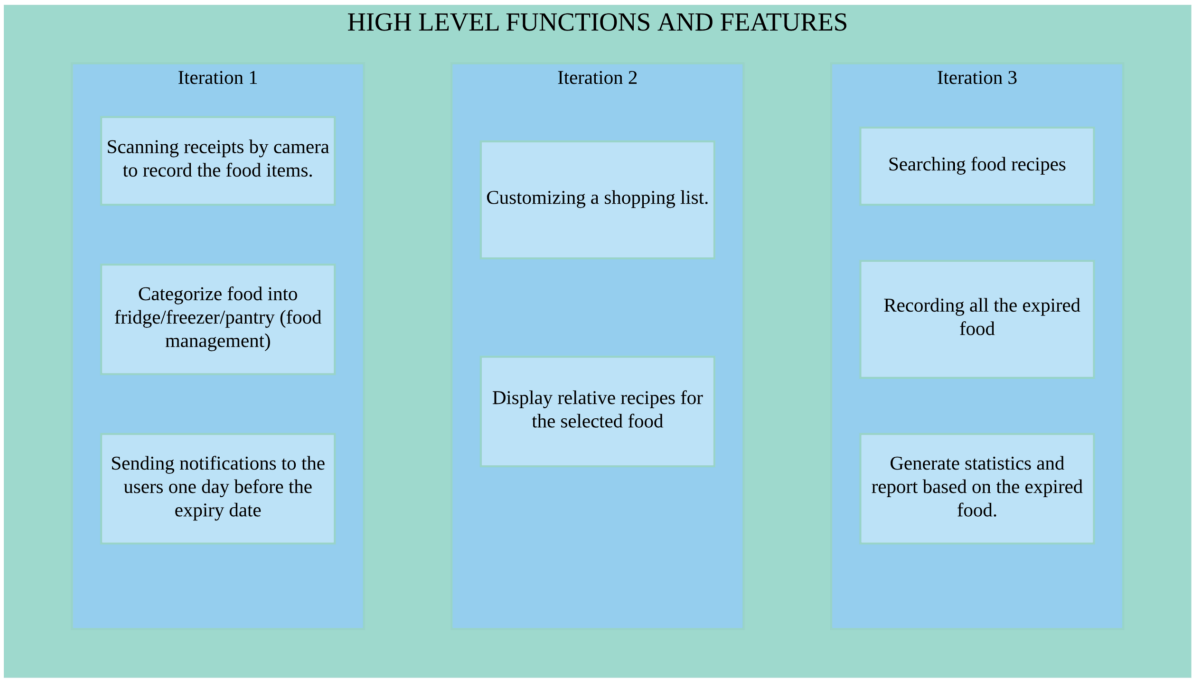
### 1.1.1 LEAN CANVAS

<table>
<tr>
<td rowspan="2">PROBLEM<br>Lack of food management often lead to food expiry<br>The consumers often buy too much food far exceeding the amount they can consume. The over-buying food is always thrown away<br>The consumers sometimes do not aware the food expiry<br><br>EXISTING ALTERNATIVES<br>Share food application</td>
<td>SOLUTION<br>A IOS application providing better food management.<br>1.Help user to avoid food expiry<br>2.Help user to manage food stocks<br>3.Help user to plan a shopping list<br>4.Help user to monitor unusual weather temperature for food storage<br>5.Help user to calculate how much money spent on food waste</td>
<td rowspan="2">UNIQUE VALUE PROPOSITION<br>1.Prevent food expiry and food corruption<br>2.Increase awareness of wasting food<br>3.Manage food stock properly<br>4.Help to manage shopping plan<br><br>HIGH-LEVEL CONCEPT<br>An application acting like a personal assistant for your grocery.</td>
<td>UNFAIR ADVANTAGE</td>
<td rowspan="2">CUSTOMER SEGMENTS<br>Households<br><br>EARLY ADOPTERS</td>
</tr>
<tr>
<td>KEY METRICS<br>Mobile app installed<br>Weather monitored<br>Expired food recorded<br>Wasted money calculated<br>Shopping list created<br>food expiry reminded<br>purchased food recorded by scanning receipts<br>Statistics generated</td>
<td>CHANNELS<br>Advertisement<br>Social network</td>
</tr>
</table>

## 1.1.2 PROJECT OVERVIEW

| Iteration | Functionality |
|---|---|
| **Iteration 1 (25/03/2019 - 07/04/2019)** | 1. Scanning receipts by camera to record the food items.<br>2. Categorize food into fridge/freezer/pantry (food management).<br>3. Sending notifications to the users one day before the expiry date. |
| **Iteration 2 (08/04/2019 - 28/04/2019)** | 4. Customizing a shopping list.<br>5. Display relative recipes for the selected food. |
| **Iteration 3 (29/04/2019 - 12/05/2019)** | 6. Search recipes for food ingredients<br>7. Recording all the expired food.<br>8. Generate statistics and report based on the expired food. |

## 1.1.3 HIGH LEVEL AND FUNCTIONS



## 1.1.4 ITERATION PLAN

| Project Overview | | | | |
|---|---|---|---|---|
| **1. Iteration 1: Food categorizing and receipt scanning** | | | | |
| **Epic description**<br>As an aware citizen of Australia, I want to lead a sustainable life where I can minimize my food waste and reduce my expenses. | | | | |
| **Priority** | | **User story** | **Features** | **Status** |
| 1.1 | Medium | Anna wants to record food so that she can remember what she has bought from supermarkets. | Scanning the receipt using optical character recognition (OCR) technology | Completed |
| 1.2 | Medium | Anna wants to categorize the food in SmartStatis so that she can remember the food is located and how long the food should be stored. | Determine Food category | Completed |
| 1.3 | Medium | Lily wants to get notifications for food expiry from SmartStatis so that she knows when the food will be expired. | Expiry notification | Completed |
| **2. Iteration 2: Provide recipes and shopping list** | | | | |
| **Epic description**<br>As an aware citizen of Australia, I want to lead a sustainable life where I can minimize my food waste and reduce my expenses. | | | | |
| **Priority** | | **User story** | **Features** | **Status** |
| 2.1 | High | Andy wants to use all of his food before it is expired and wants recipes to use all the food that is left, or which is about to expire so that he can prevent food waste. | Provide food recipes for food item | Completed |
| 2.2 | Medium | Lily wants to plan her grocery list before going to the supermarket and buy things which she actually uses rather than buying food which she hardly consumes so that she can save her expenses and reduce future food waste. | Customize shopping list for users | Completed |
| **3. Iteration 3: Record expired food and provide expenditure report** | | | | |
| **Epic description**<br>As an aware citizen of Australia, I want to lead a sustainable life where I can minimize my food waste and reduce my expenses. | | | | |
| **Priority** | | **User story** | **Features** | **Status** |

| | | | | |
|---|---|---|---|---|
| 3.1 | Medium | Andy wants to search for recipes with multiple food ingredients so that he can find a good recipe. | Search recipe videos | Completed |
| 3.2 | High | Susan wants to know how much food waste she is generating so that she can prevent over-purchasing. | Generate a monthly expenditure report with statistics | Completed |
| 3.3 | High | Kate wants to know the amount of food waste generated by average Australian households so she can know whether she contribute more or less waste compare with other Australian. | Compare with average Australian households | Completed |

## 1.2 Data Sources

| Names | Physical access | Frequency of source updates | Granularity | Copyright / licensing details | Brief Description |
|---|---|---|---|---|---|
| Australian Food Composition<br><br>http://www.foodstandards.gov.au/science/monitoringnutrients/afcd/Pages/downloadableexcelfiles.aspx | CSV file downloaded | Annually | Contains food item, food categories and food classification | Creative Commons Attribution 2.5 Australia | Determine the food categories by food items |
| Food Storage Times https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/basics-for-handling-food-safely/ct_index | PDF file downloaded | Annually | Report for food best storage time for different food categories and food items | Creative Commons Attribution-ShareAlike 4.0 Generic License. | Used to provide best food storage time based on food categories |
| Google Youtube recipe<br><br>https://developers.google.com/youtube/v3/ | Videos API | Real time data | Food recipes videos to teach people how to cook with specific food ingredient | Creative Commons Attribution 3.0 License and Apache 2.0 License. | Used to teach users to cook with the food item<br>The YouTube API is used in this iteration to search the most relevant recipe videos for food ingredient. |
| National Waste Report 2018 | PDF file downloaded | Annually | Australian food waste statistic, | Creative Commons Attribution 4.0 Australia | Used to compare the average Australian food waste with users |

| | | | | | |
|---|---|---|---|---|---|
| https://www.environment.gov.au/protection/waste-resource-recovery/national-waste-reports/national-waste-report-2018 | | | amount of money wasted | | |
| An analysis of household expenditure on food http://www.tai.org.au/node/1580 | PDF file downloaded | Annually | Household expenditure on food waste in Australia | Creative Commons Attribution 4.0 Australia | Used to provide details of food waste money for different size of households |

### 1.2.1 DATA WRANGLING AND ANALYSIS (USING PYTHON SCRIPT BOTH LOCALLY AND ON THE CLOUD)

For open data sets, python libraries including Pandas and Tabula are used to changing the data into readable formats. OCR (optical character recognition) API provided by Baidu-aip is introduced to read the receipt on the cloud server, Natural Language Toolkit, regular expression is used during data wrangling process to identify the word and numbers. This is also implemented on the cloud server, the lambda functions on Amazon Web Services (AWS). Then the analysed result will be sent to user's mobile device in JSON format. All the above techniques used are helping the users to simplify the input procedures.

Due to the current OCR technology and food related open data sets, there may be accuracy problems, hence we will use an algorithm to combine the user data and open data sets to improve the accuracy, it will compare the scanning results with both open data set and user data set, e.g. once the user edits the food details, the database will update, then the lambda function on AWS will automatically do the new calculations and selections.

## 1.3 SECURITY ASPECTS/ISSUES TO BE COVERED

- The communication from the application to the AWS is now secure by using HTTPS and SSL certificates.
- The reference ID generated at the login is random, so no need to provide personal information for the user.
- No sensitive data is being displayed anywhere in the application.
- The data is stored in the MySQL database, the data encryption is provided where the data is protected.
- Data loss will not happen as there is a backup at the database.
- Privacy breach is avoided by the means of using secured channels.
- All the outgoing and incoming requests are forwarded on HTTPS.
- The cloud service AWS is not vulnerable to attacks such as ssh connection and DDOS as we limited the number of queries from particular IP, that is blacklisting filtering is used.
- The authentication of AWS is done using username and password of a team member.
- A primary key is required in the database if there are changes to be made.
- Automatic encryption is enabled on all traffic that is generated.

The detailed risk assessment and security policies document is uploaded on Mahara:

https://mahara.infotech.monash.edu.au/mahara/view/view.php?id=29407

### 1.3.1 ASSUMPTIONS

With regard to the Record expired food and Generate a monthly expenditure report with statistics
of user stories in Iteration 3, the following assumption:

- It is assumed that user would put expiry items into Bin when they are expired, as the data for record and report food waste is based on the records in the Bin.
- It is assumed that user will input correct price of food so that the statistics generated by report could be reliable.
- It is assumed that all the users have the access to the internet when they are using the app.

### 1.3.2 RISK IDENTIFICATION

- Unexpected disruption of AWS service might affect the use of application. As the back-ends of Smartstatis is deployed on AWS, sudden disruption of AWS service will affect the communication between app and server.
- Individual privileges on RDS (relational database service) of AWS provide end-users with the probability of accessing to other users' information without their

permissions. Smartstatis is using reference number to identify each end-user instead of using pass word, which means that if someone knows the reference number of others, he can use this reference number to login without the permission from the owner of this account. This will result in invading of privacy.

- Reliability and performance of API might affect the user experience of application. As Smartstatis requires to interact with some APIs to fulfil functional requirements, the responding time and secure issues can lead to unpleasant result on the performance and functionality of application

### 1.3.3 RISK ANALYSIS

| Risk Description | | Effectiveness of Controls | | Analysis | Evaluation |
|---|---|---|---|---|---|
| Risk Source | Description | Current Control(s) | Control Rating | Risk Rating | |
| Disruption of AWS service | Unexpected disruption of AWS servers would disconnect the communication between users and application. This will cause unpleasant use of application for end-users. | Backup servers will be deployed in order to tackle with interruption of service. | high | Likelihood: low;<br><br>Consequence : High | Although the interrupted service of AWS will directly shutdown all the services provided by Smartstatis, the possibility of this situation would be relatively low. |
| Misuse of other one's account | Misuse of other one's account on purpose. The user can login with other one's account without permission as long as he knows the reference number for particular a user. | Apply RDS user management to restrict the access of end-users | high | Likelihood: low;<br><br>Consequence : Medium | Smartstatis essentially do not record personal information but the data generated by end-users should be protected as well. |

| | | | | | |
|---|---|---|---|---|---|
| Disruption of API service from YouTube | Unexpected service disruption of API service from YouTube will affect the functionality of search food recipe | Backup plan to change to EDAMAM API | high | Likelihood: low;<br><br>Consequence: Medium | Although the interrupted service of API service from YouTube will directly shutdown the services of search food recipe provided by Smartstatis, the possibility of this situation would be relatively low and backup API has been provided |

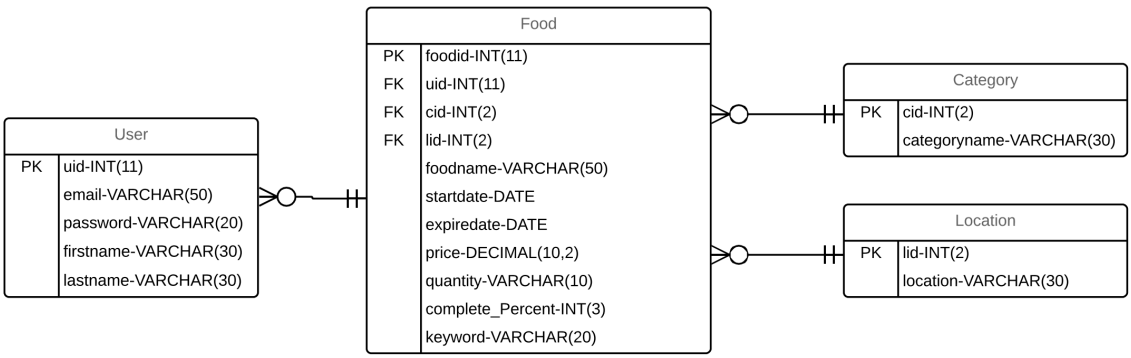
## 1.4 SYSTEM

Mobile application link:
https://github.com/ta9-genx-leader/SmartStatis

Support document:
http://bit.ly/2w8DY4A

Use case diagram:
http://bit.ly/2w7tF0M

ER diagram for saving user's purchase detail



## 2.0 INTEGRITY TEST PLAN

**Epic**
As an Australia citizen, I want to lead a sustainable life where I can minimize my food waste and reduce my expenses.

**User story 1**
Anna wants to record food so that she can remember what she has bought from supermarkets.

| **Activity (ADMIN)** | | **Pass/ Fail** | **Comments** | **Date retested P/F** |
|---|---|---|---|---|
| 1.1.1 | Log into the system successfully | Pass | Login successfully | May 18th |
| 1.1.2 | Navigate to home page | Pass | Home page display successfully | May 18th |
| 1.1.3 | Record all the food items by scanning receipts | Pass | Takes time to scan the receipts | May 18th |
| 1.1.4 | Manually add food items | Pass | Add food successfully | May 18th |
| 1.1.5 | Edit the food item details | Pass | Change food category, name expiry days successfully | May 18th |
| 1.1.6 | Delete food item | Pass | Delete food successfully | May 18th |
| 1.1.7 | Log out from the system | Pass | Log out successfully | May 18th |

**User story 2**
Anna wants to categorize the food so that she can remember the food is located and how long the food should be stored

| **Activity (ADMIN)** | | **Pass/ Fail** | **Comments** | **Date retested P/F** |
|---|---|---|---|---|
| 1.2.1 | Navigate to home page | Pass | Home page display successfully | May 18th |
| 1.2.2 | Edit the food item details | Pass | Change food category, name expiry days successfully | May 18th |
| 1.2.3 | Delete food item | Pass | Delete food successfully | May 18th |

**User story 3**
Lily wants to get notifications for food expiry so that she knows when the food will be expired

| **Activity (ADMIN)** | | **Pass/ Fail** | **Comments** | **Date retested P/F** |
|---|---|---|---|---|
| 1.3.1 | Get notification when food is going to expired | Pass | Check notification successfully | May 18th |
| 1.3.2 | Get notification when food is already expired | Pass | Check notification successfully | May 18th |
| 1.3.3 | Navigate to setting page | Pass | Setting page | May 18th |

| | | | | |
|---|---|---|---|---|
| 1.3.4 | Set notification time | Pass | Set time for notification successfully | May 18th |
| **User story 4**<br>Andy wants to use all of his food before it is expired and wants recipes to use all the food that is left, or which is about to expire so that he can prevent food waste. | | | | |
| **Activity (ADMIN)** | | **Pass/ Fail** | **Comments** | **Date retested P/F** |
| 1.4.1 | Navigate to food item details | Pass | Get food item details | May 18th |
| 1.4.2 | Search food recipe videos for food item saved in the system | Pass | Get food recipe videos successful | May 18th |
| **User story 5**<br>Lily wants to plan her grocery list before going to the supermarket and buy things which she actually uses rather than buying food which she hardly consumes so that she can save her expenses and reduce future food waste. | | | | |
| **Activity (ADMIN)** | | **Pass/ Fail** | **Comments** | **Date retested P/F** |
| 1.5.1 | Add food items into shopping list by manually type | Pass | Add food in shopping list successfully | May 18th |
| 1.5.2 | Navigate to Cart page | Pass | Cart page displayed | May 18th |
| 1.5.3 | Add food items into shopping list by manually type | Pass | Add food in shopping list successfully | May 18th |
| 1.5.4 | Record price for food item in shopping list | Pass | Add food price successfully | May 18th |
| 1.5.5 | Move food item in shopping list to home page | Pass | Save food item successfully | May 18th |
| 1.5.6 | Delete food item in shopping list | Pass | Delete food successfully | May 18th |
| **User story 6**<br>Andy wants to search for recipes with multiple food ingredients so that he can find a good recipe. | | | | |
| **Activity (ADMIN)** | | **Pass/ Fail** | **Comments** | **Date retested P/F** |
| 1.6.1 | Navigate to Recipe page | Pass | Recipe page displayed | May 18th |
| 1.6.2 | Search particular food recipe videos | Pass | View food recipe videos successfully | May 18th |
| **User story 7**<br>Susan wants to know how much food waste she is generating so that she can prevent over-purchasing. | | | | |
| **Activity (ADMIN)** | | **Pass/ Fail** | **Comments** | **Date retested P/F** |
| 1.7.1 | Navigate to Report page | Pass | Report page displayed | May 18th |
| 1.7.2 | View monthly food waste statistic | Pass | See figures for food waste and expenditure | May 18th |

| | | | | |
|---|---|---|---|---|
| 1.7.3 | View details of food expenditure including food name, category and exact money | Pass | Food expenditure bar chart and food details | May 18th |
| 1.7.4 | View details of food waste including food name, category and exact money | Pass | Food waste bar chart and food details | May 18th |

**User story 8**

Kate wants to know the amount of food waste generated by average Australian households so she can know whether she contribute more or less waste compare with other Australian.

| **Activity (ADMIN)** | | **Pass/ Fail** | **Comments** | **Date retested P/F** |
|---|---|---|---|---|
| 1.8.1 | Navigate to Report page | Pass | Report page displayed | May 18th |
| 1.8.2 | Compare waste and expenditure money compare with Australian average | Pass | See line graph for food expenditure, waste and Australian average | May 18th |
| 1.8.2 | Change number of family members | Pass | Average statistic changes successfully | May 18th |

General Comments:

All the functions could run successfully.

## 3.0 SIGN OFF STATEMENT

I, _____, have reviewed and approved the functions of entire system described in this report as fully functional, unless stated otherwise.

Hereby, I accept the final system (including all the available functions) designed by **"GenX Leaders"** Team on condition that any changes are completed. I will sign off those changes in a further document.

Development Team Member Signature: _____
Development Team Member Signature: _____
Development Team Member Signature: _____
Development Team Member Signature: _____
Date: _____

Monash Lecturer Signature: _____
Monash Lecturer Signature: _____
Date: _____