SFWR 4G06A - Development Process

Group 9
Gundeep Kanwal 400015267
Ivan Bauer 001418765
Yousaf Shaheen 400026476
Scott Williams 400031554
Lucas Shanks 40002994

November 18 2019

Contents

1 Overall Process Workflow and Steps to Be Done

1.1 Proof of Concept

Create an Image Classification model

- Create a model to accurately classify food images

- CNN with Food-101 Dataset that utilizes pretrained Resnet-50 model

- API calls to Nutritionix to obtain corresponding food nutritional information

1.2 Develop front-end interfaces/UI

Flutter

- Google's open source SDK for Android applications

- DART programming language

- Used for front-end user interface development

Create User profile and fitness tracker

- Login/registration page to save user account information

- Show meal consumption log and fitness progression (nutrition timeline)

- Nutrition Timeline: Page for graph to show history of nutrition data

- Fitness Timeline: Page for graph to show history of weight and pictures of yourself (select a point on the graph to see picture taken from that day, if available)

Create interface for uploading images

- Allow the user to upload an image within the application

- Make calls to food recognition model and return nutritional data for the food item(s)

- Allow the user to set meals under corresponding dates on a calendar

Create interface for "GainRivals"

- GainRivals is a competitive fitness game where you create a group and set parameters for the competition (ie. length of competition, fitness parameters [most calories, least fat, least sodium, etc...]

- Design a chart to show who is leading in the specified competition

1.3 Develop Back-end

Database for storing user information

- Non-relational database MongoDB

- User authentication using Django Authentication

- Develop API endpoints hosted on AWS

1.4   Improvements on Food Detection Model and/or Food Dataset

Improve the accuracy of the prediction made by the model. This is obviously a desirable aspect, as it would increase usability and will improve the speed at which users can use the application. We will have to modify our model in order for it to work best for our use case by changing different hyperparameters.

We also wish to add the number of classifications that are included in our dataset. This will cover a broader spectrum and will be more inclusive of multiple cuisines. Possibly include feature to dynamically update and expand the database based on user feedback.

1.5   Enable Image Processing (Volume/Food Segmentation) - Stretch Goal

Implement image pre-processing before feeding it to the image recognition AI. This is to improve the reliability and the classification abilities of the model. Image pre-processing would include image filters that overall get rid of image noise to make the image more easily identifiable. This is a stretch goal and may not be entirely necessary to implement depending on the reliability of our model without image pre-processing.

Include feature that allows users to take a picture that may include multiple different foods. Food segmentation would improve the usability and make the application faster to use. This will eliminate the need to take multiple pictures for the same meal and/or plate of food. This is a stretch goal that may be more feasible to implement.

Include feature to predict the volume and/or quantity of food from the picture. This is to automate the process of determining the macros without having the need for the user to input the serving size. This is a stretch goal that might prove too difficult to implement and may be out of the scope for this project.

2   Version Control

We will be using Git for our version control system through GitHub, and will be incorporating branching strategies that allow us to develop features and fixes based off our master branch.

The naming convention for our feature branches will be feature_NameOfFeature, and the fix branches will be named similar to fix_moduleToFix_reasonForFix. For either type of branch, we will require two approvals from repository contributors in order to successfully complete a merge request to the master branch. This is to encourage shared knowledge of the code base among group members.

Group members will also be using a gitignore file as part of the version control to ensure that no confidential information for our product is pushed to any branches, such as Application and API Keys.

3   Changes to Development Artifacts

In order to track changes to our development artifacts, we will be using the Jira Software. We will be using it's bug tracking and change request functionality. This is how we will be able to document change requests and bugs. Jira has various classificiations for tasks that we will be using to classify any of our changes. Jira has an issue and project tracking functionality that we will use in order to disposition tasks among the team and track their progress of completion.

There is also a git integration for Jira that we will be using as we will be using Github for our version control.

We will have bi-weekly sprints for our Jira board, and it shall be the responsibility of the individual to take care of their own tasks, while being mindful of the progress of others. Besides the sprint reviews, we will have quick overviews of our Jira board whenever we meet as a group, in order for us to be mindful of the tasks at hand, and to discuss high priority bugs.

4 Roles and Responsiblities

For each of our steps, all 5 members of the group will be working on each task in order to optimize our teams efficiency and maximize our progress. We will have technical leads for each step, who will be taking the initiative and will be holding themselves, and the rest of the team most accountable.

Technical Leads	Step
Lucas Shanks, Ivan Bauer	Develop Front-end Interfaces/UI
Scott Williams, Yousaf Shaheen	Develop Back-end
Gundeep Kanwal	Improvements on Food Detection Model and/or Food Dataset
No Lead	Enable Image Processing (Volume/Food Segmentation) - Stretch Goal