Design Process

Initially, we chose to use Java and Android Studio to create an Android Application in detecting an uploaded image and displaying information based on the keywords produced from the detected image. For instance, if an image of a banana was uploaded onto the application, the application would identify the banana and produce a string such as “This is a banana on a table”. From there, Java would be used to detect the name “Banana” and display information about the sustainably sourced product and any fairtrades information. The overall problem of this plan was to connect it to all team member’s different use of programming languages. Thus, we used Python in connection to Javascript/HTML using Flask Framework to create a web application that would prompt the user for a product and describe how sustainably sourced it is. This application would then display information about the product and compare it to another fairtrades product using multiple text files opened in Python. These test files were obtained from the Excel file provided in http://guide.fairtrade.ca/. Thus, the Excel file was provided, however, we would still need to format the overall columns of different products in Excel and copy it to the text files to upload to Python.

Team Member	Tasks/Accomplishments
Tahmid Sajin	-Worked on Python to upload text files obtained from the excel file provided in http://guide.fairtrade.ca/ -Connected Python and Javascript using Flask framework to visualize and create a GUI for the user to use and input product values
Nicolas Louie	-Worked in Android Studio to develop a GUI for the user to navigate through the features of the app, intention to develop “What is trade free” page and RSS feed, developed design submission and report
Jaowad Shah	-Worked in Android Studio and using Azure to develop a framework to use computer vision to detect product type and provide information on similar products
Faraz Jamil	-Worked in Android Studio and using Azure to develop a framework to use computer vision to detect product type and provide information on similar products

The overall problem that was assigned was clear to all team members working on the programming application. However, the planning of the solutions was coordinated moderately well as most of us had different specialties in different programming languages. Originally, none of us had

experience in creating a GUI and thus we chose to use Java or Python. Overall, all team members contributed equally towards their own tasks that they chose to be assigned with. As we were working together in a room, all team members we're communicating their own problems and what they were working on at all times. The communication was most likely the strongest aspect of this team's work. Thus, if one team member was facing a problem, one other team member would take some time to communicate with them and together they will tackle the problem. To visualize what each member was responsible for, we wrote out the overall process of our application and different components of the application on a whiteboard.

Design Justification

Our team ultimately decided to use Android Studio to implement our proposed solution because of our intent to have the user use the phone camera or photo in storage to be uploaded to the application to provide information of similar products. It was initially thought that it would be unique and more useful of an application because of our feature utilizing computer vision.

Code Explanation

In our code, Java was used with Android Studio to upload an image and detect the image and produce a string. This was done by first uploading an image onto the application and obtaining a string. The prefered word in the string such as "banana" or "fruit" of the produced string would then be taken for the overall program. As this problem could not be associated with all our different tasks, Python was then used to upload text files obtained from the excel file provided by http://guide.fairtrade.ca/. The code for this section would first open the different text files that had information manually stored from the excel file in http://guide.fairtrade.ca/. The following code for this section is provided below:

```python
from flask import Flask, render_template, jsonify, request, redirect, Response
import random, json

app = Flask(__name__)

agriculture_prods = [""] * 20
fairtrades_products = [""] * 220
fairtrades_companies = [""] * 220
fairtrades_brands = [""] * 220
fairtrades_status = [""] * 220
fairtrades_cities = [""] * 220

@app.route('/')
def index():
    agriculture_products_file = open('agriculture_products.txt', 'r')

    fairtrades_products_file = open('fairtrades_products.txt', 'r')
    fairtrades_companies_file = open('fairtrades_companies.txt', 'r')
    fairtrades_brands_file = open('fairtrades_brands.txt', 'r')
    fairtrades_status_file = open('fairtrades_status.txt', 'r')
    fairtrades_cities_file = open('fairtrades_cities.txt', 'r')
```

```
    for n in range(20):
        agriculture_prods[n] = agriculture_products_file.readline()

    for a in range(220):
        fairtrades_products[a] = fairtrades_products_file.readline()

    for b in range(220):
        fairtrades_companies[b] = fairtrades_companies_file.readline()

    for c in range(220):
        fairtrades_brands[c] = fairtrades_brands_file.readline()

    for d in range(220):
        fairtrades_status[d] = fairtrades_status_file.readline()

    for e in range(220):
        fairtrades_cities[e] = fairtrades_cities_file.readline()

    agriculture_products_file.close()
    fairtrades_products_file.close()
    fairtrades_companies_file.close()
    fairtrades_brands_file.close()
    fairtrades_status_file.close()
    fairtrades_cities_file.close()
```

After the files were placed in their respective array of strings, the arrays were sent to Javascript to be used in the GUI using Flask Framework. In Javascript, we used vis.js to visualize the GUI and include a text input where the user can enter a product name to find information about it. The information was displayed from the array of strings that were sent to Javascript using Flask framework. As shown below, different loops were used to display the information about the product.

```
network.on("click", function (params) {
  params.event = "[original event]";
  nodeAt = this.getNodeAt(params.pointer.DOM);
  document.getElementById("message").innerHTML = "The product clicked: " + agriculture_prods[this.getNodeAt(params.pointer.DOM)] + "    -   ";

  if (nodeAt == 0)  {
      document.getElementById("message2").innerHTML = "Sustainable food is food that is produced within a short distance of where it is consumed, often accompani
  }   else if (nodeAt == 1)    {
      document.getElementById("message2").innerHTML = "Millions of people worldwide depend on the production, processing, and sale of produce for their livelihoo
  }   else if (nodeAt == 2)    {
      document.getElementById("message2").innerHTML = "One of the best ways to ensure your fruit and vegetables are organic, pesticide-free is to grow them yours
  }   else if (nodeAt == 3)    {
      document.getElementById("message2").innerHTML = "Sustainable chocolate has become a core concept in the cacao value chain. It's aims to preserve and ensure
  }   else if (nodeAt == 4)    {
      document.getElementById("message2").innerHTML = "The production of cocoa begins in the tropical regions around the Equator, where the hot and humid climate
  }   else if (nodeAt == 5)    {
      document.getElementById("message2").innerHTML = "Sustainable coffee is coffee that is grown and marketed for its sustainability. This includes coffee certi
  }   else if (nodeAt == 6)    {
      document.getElementById("message2").innerHTML = "Tea is one of the healthiest, most versatile drinks on the planet -- whether hot or iced, black or green,
  }   else if (nodeAt == 7)    {
      document.getElementById("message2").innerHTML = "Approximately 80% of the world's sugar is produced from sugarcane in tropical and subtropical climates wi
  }   else if (nodeAt == 8)    {
      document.getElementById("message2").innerHTML = "What is Sustainable Floristry? You could also call it Environmentally Friendly Floristry, or Eco Friendly
```

The overall GUI can be seen below where the user can select a bubble with the product name or enter a product name in the text input. Afterwards, the user can click on the button to display information about the product. This product will then be compared to a fairtrades product and relevant information about the fairtrades product will also be shown.