

NUTRISORT

Matthew Juranek/Keith Kamer

Administrative

Team Name: Nutrisort Team

Team Members: Matthew Juranek (matthewjuranek) and Keith Kamer (keithf40)

Link to GitHub repo: <https://github.com/mattjuranek/NutriSort>

Link to Video Demo: <https://youtu.be/9r4V63jQ2sQ>

Extended and Refined Proposal

Problem:

Individuals are often unaware that they consume food products with low nutritional value.

Nutrition labels are available but can be difficult for the average person to understand.

Motivation:

Consumers often struggle to distinguish healthy food options due to misleading packaging.

Additionally, many individuals either overlook or do not know how to properly read nutrition labels when selecting food options. To address this issue, our solution is to provide the user with an accessible platform where they can search for their desired food product by keyword and receive a list of the healthiest options, depending on their dietary preferences.

Features:

We know that we solved the problem when we can provide a list of food options that fit the dietary restrictions of the user in order to help them make better health decisions.

Description of data:

The data for our project came from Open Food Facts. Open Food Facts is a database of over three million food products. The purpose of the database is to help inform visitors of the health quality of the foods they eat.

Each food has a Barcode and basic information including name, size of product, country of origin for ingredients, etc. Also included is a large table of nutrition facts (fat, carbohydrates, proteins, etc.). The real purpose of this database though is to analyze the confusing nutrition facts and give recommendations to users. For that information the site displays “Nutrient levels” which give levels for fat, saturated fat, sugars and salt. Also included is a “NUTRI-SCORE” that assesses overall nutritional quality.

Outside of just nutrition, Open Food Facts also gives a grade on how processed the foods and how eco-friendly the production of the food was. For eco-score carbon footprint (with an assigned rating), information about packaging (also with an assigned rating), and packaging parts (again with an assigned rating) are given. Packaging materials are also listed in a table.

Tools/Languages/APIs/Libraries used:

For the coding part of this project, we used the C++ language and Clion as the IDE. APIs used were Open Food Facts for the data, “JSON for Modern C++”, which was used to parse the data, “CRP”, which was used to fetch the data from Open Food Facts, and “SFML”, which was used to create the GUI.

Algorithms Implemented:

Since we had to sort our results from low to high, or high to low, for different nutrients, we had to use the standard sort algorithm but had to implement custom comparators.

Additional Data Structures/Algorithms used:

The two data structures that we decided to analyze were ordered maps and unordered maps.

Distribution of Responsibility and Roles:

Matthew was in charge of the front-end GUI coding and creating a GitHub repository. Keith was in charge of the back-end coding, specifically for the unordered map, and the documentation and video creation.

Analysis

Changes:

Since one of your members had to drop the class, we decided to use a standard version of the map data structure. We did code the unordered map by hand as well as the interface. We were contemplating using a CLI but decided that the interface was too important to the overall project to sacrifice.

Time Complexity:

The time complexity for the compare functions were $O(1)$. The time complexity for the sort functions were $O(n \log n)$, where n is the size of the vector. The load results window functions were $O(n \log n)$, where n is the number of products.

Reflection

Experience:

This project was one of the first group projects that we each had to work on. With both of us being health minded people, we enjoyed working on a project that we could actually use. Working with a teammate, and being able to collaborate on ideas and help each other implement our ideas was a new and rewarding experience.

Challenges:

Using a new tool like GitHub produced some new challenges. Working on a project individually doesn't require the type of coordination that working on a project with a team does.

Changes:

The creation of our project went quite smoothly, so no major changes would be made.

Comments:

Matthew and Keith both learned how to use a few new APIs. Although Matthew was already familiar with handling large data sets, this process was entirely new to Keith.

References

API Documentation:

<https://openfoodfacts.github.io/openfoodfacts-server/api/>

Data Set:

<https://www.kaggle.com/datasets/openfoodfacts/world-food-facts/data>

SFML:

<https://www.sfml-dev.org/>

JSON:

<https://github.com/nlohmann/json>