Know Your Bite: Smarter Food Choices

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Capstone Project, DSB 826

Problem Statement:

- Consumers struggle to identify harmful ingredients in food products.

- Complex labels and alternative ingredient names make it difficult to evaluate ingredients impacts.

- **Objective:**
Create a system to
  - Classify products as "Healthy" or "Unhealthy".
  - Recommend healthier alternatives for "Unhealthy" products.

- **Impact**
  - Simplify food evaluations for consumers.
  - Promote healthier lifestyles and transparency.
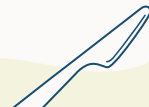
Data Collection

1. **Harmful Ingredients Data**

- Source: Center for Science for Public Interest (CSPI).
- Details:
  - Harmful ingredients and associated health concerns.
  - This included online research for E-codes and alternative ingredient names.

2. **Food Product Data**

- Source: Open Foods Fact API.
- Details:
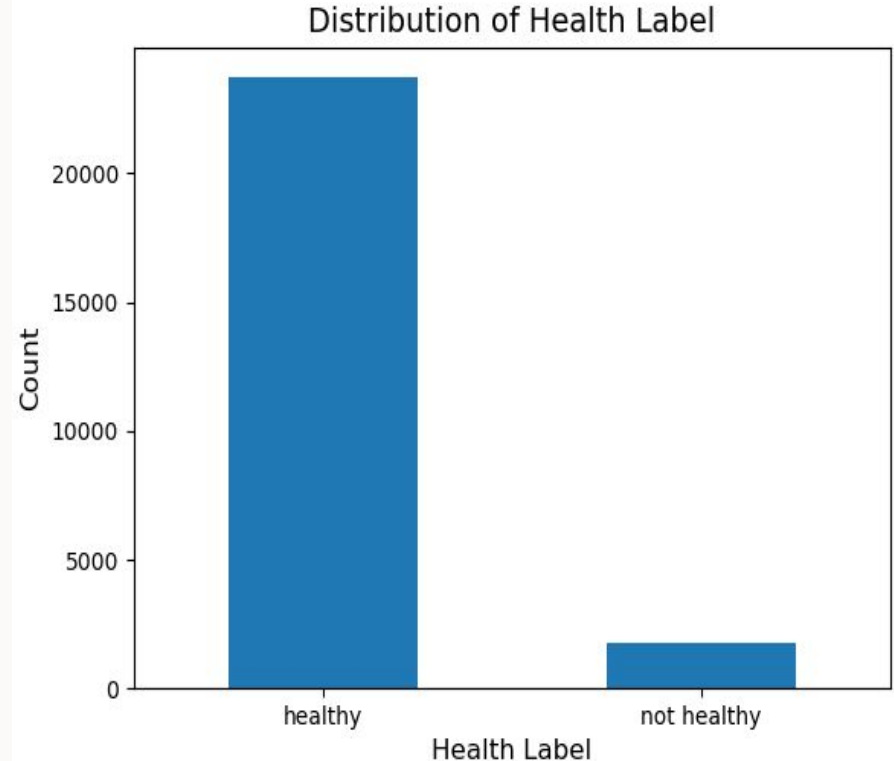 - Ingredients lists and food groups for Canada and America.
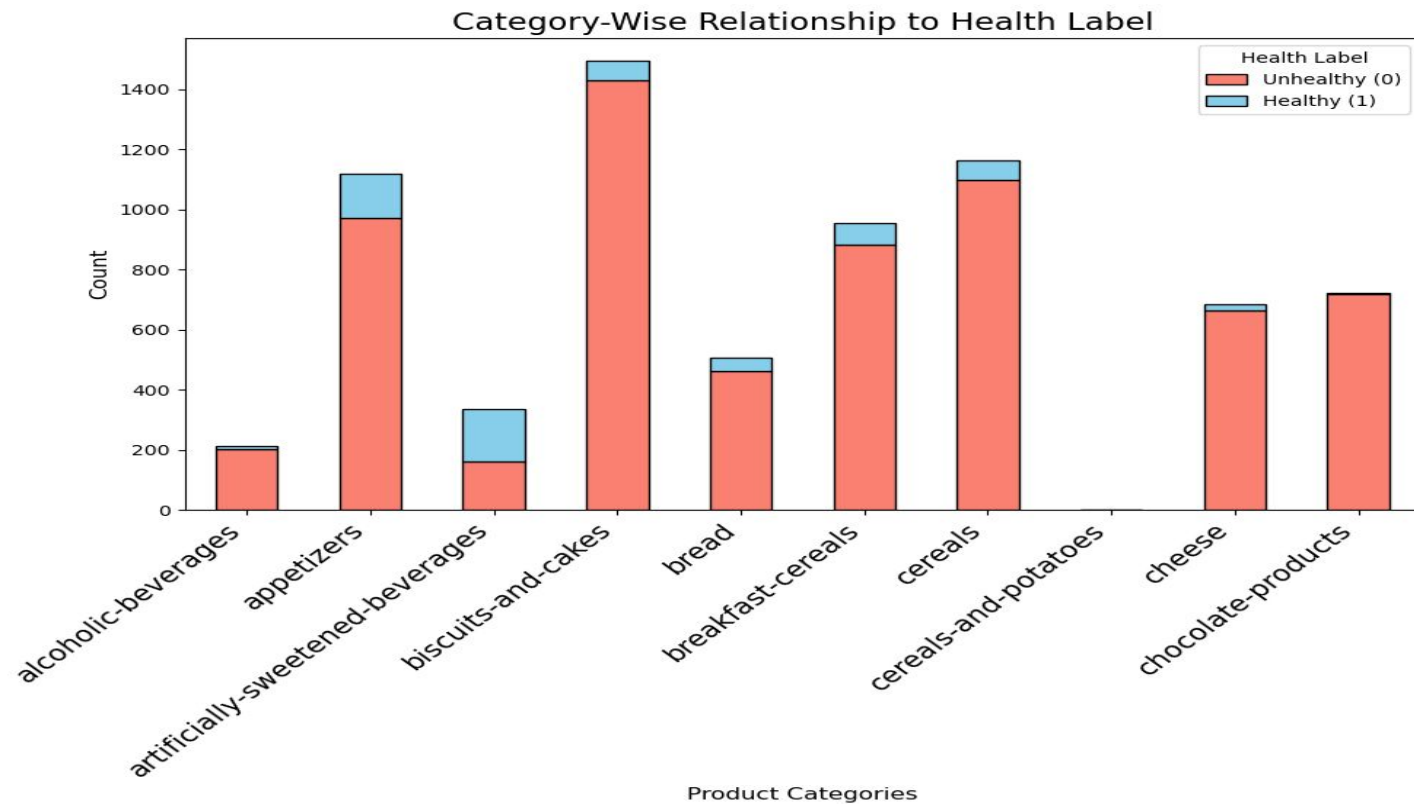
Labeling Food Products

Approach:

● Products were labeled 'Healthy' or 'Unhealthy' depending on the presence of harmful ingredients.
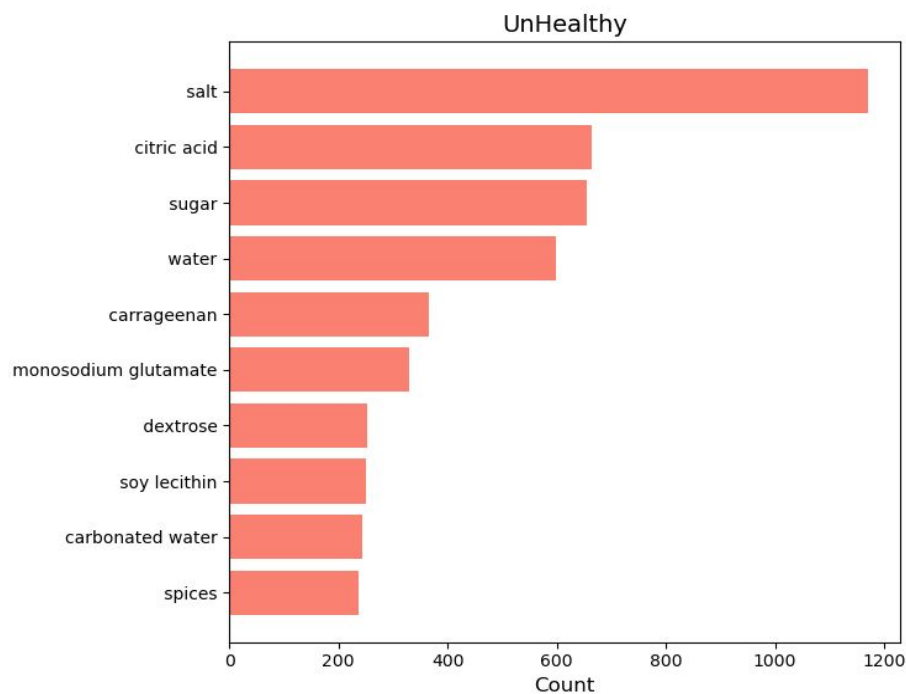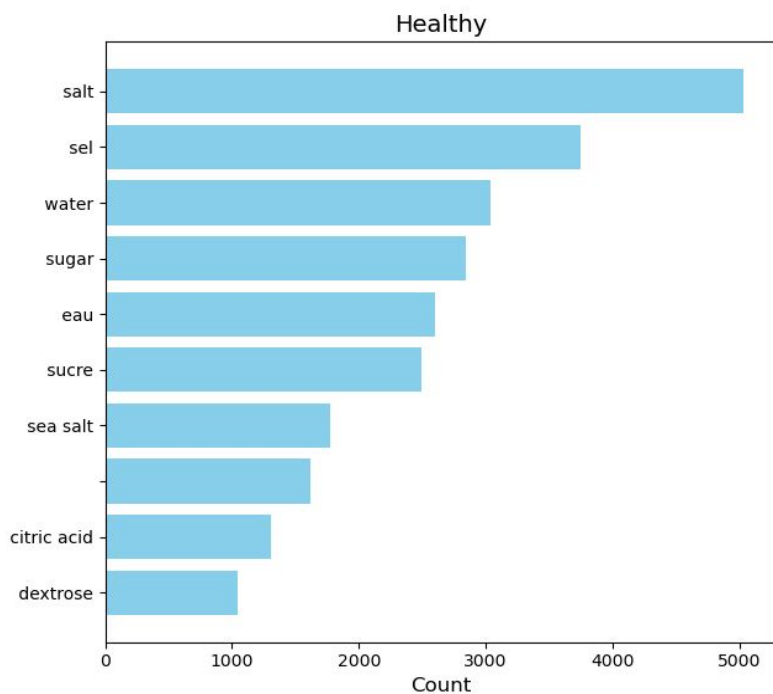
Challenge:

● Imbalanced data.

Category-Wise Relationship to Health Labels

Category-Wise Relationship to Health Label

Top 10 Ingredients in Healthy vs. Unhealthy Products

Logistic Regression & Naive Bayes

Logistic Regression with Count Vectorizer

- Training Accuracy: 99%
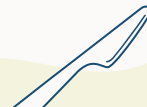- Testing Accuracy: 98%
- F1 Score(unhealthy):0.99

Naive Bayes with TF-IDF

- Training Accuracy: 83%
- Testing Accuracy: 83%
- F1 Score(unhealthy):0.42

Gradient Boosting

- **Performance Metrics:**
  - Testing Accuracy: 99%.
  - Specificity: 100%, Recall: 93%.
  - F1-scores: 0.95 (UnHealthy), 1.0 (Healthy).

- **Outcome**: Best performance, addressing imbalance effectively.

Recommender System

- Suggest healthy alternatives for unhealthy products.

- Cosine similarity based on ingredient lists within the same food group.

- Robust recommendations tailored to food categories.
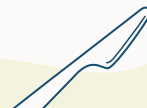
Stream lit App

🍎 **Know Your Bite**

🌟 **Discover whether your food is healthy or not!**

Enter product name:

Or upload an image of the food ingredients:

Drag and drop file here
Limit 200MB per file • JPG, PNG, JPEG

Browse files

Enter product name:

coca cola

Or upload an image of the food ingredients:

Drag and drop file here
Limit 200MB per file • JPG, PNG, JPEG

Browse files

Analysis complete!

🥗 **Ingredients List:**

- carbonated water
- caramel color
- phosphoric acid
- aspartame
- potassium benzoate
- natural flavors
- potassium citrate
- acesulfame potassium
- caffeine

Prediction

Prediction: Not Healthy

Streamlit App

🍎 **Know Your Bite**

🌟 **Discover whether your food is healthy or not!**

Enter product name:

Or upload an image of the food ingredients:

Drag and drop file here
Limit 200MB per file • JPG, PNG, JPEG

Browse files

📄 Ingredients-list.jpg 41.3KB ✕

LOW FAT VANILLA FLAVOURED YOGHURT
INGREDIENTS: Skim Milk, Concentrated Skim Milk, Water, Sugar, Cream (From Milk), Thickeners (1422 (From Maize), 1442 (From Maize)), Milk Solids, Gelatine, Flavours, Acidity Regulators (331, 332, 270, 330), Enzyme (Lactase), Live Cultures. Contains Milk and Milk Products.

Uploaded Image of Ingredients

Analysis complete!

🥗 **Ingredients List:**

- Skim Milk
- Concentrated Skim Milk
- Water
- Sugar
- Cream (From Milk)
- Thickeners (1422 (From Maize)
- 1442 (From Maize))
- Milk Solids
- Gelatine
- Flavours
- Acidity Regulators (331
- 332
- 270
- 330.
- Enzyme (Lactase)
- Live Cultures. Contains Milk and Milk Products.

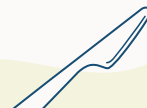## Prediction

Prediction: Healthy

Conclusion

- Gradient Boosting effectively classifies products with high accuracy.

- The Recommender System bridges the gap between classification and actionable dietary choices.

- The system empowers consumers to make informed decisions.
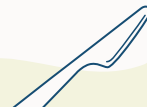
Future Work

- Expand dataset to cover more countries and cuisines.

- Integrate dietary filters for:Vegan, Halal, Kosher, and Allergy-friendly options.

- Personalize recommendations based on user history and feedback.

- Improve the text extraction system for better analysis.

Thank You