



Flavor-Driven Food Recommendation System

Overview

Red Buffer worked with a spin-off of a Fortune 500 food company to develop a Machine Learning system that could predict the flavour of any food item and make recommendations for food and beverage pairings. The goal was to digitize and predict flavour using the flavour profiles of ingredients, recipes, and titles.

CUSTOMER

Supplies world food throughout the UK with a particular emphasis on exotic seafood and vegetables. We thrive to build a meaningful business, encouraging curiosity for the food we eat, the people who harvest it and the environment that produces it.

Country: USA

Industry: Food

Customer Size: 10 - 20

Publish Date:

Problem Statement

Developing a system that can predict the flavour of a food item accurately and recommend suitable items based on the predicted flavour is a major challenge for food and beverage industry. The difficulty is compounded by the fact that the system must work with a limited set of pre-existing ingredients, consisting of only 3,000 items. To expand the system's capabilities and cover a broader range of food items, it is necessary to develop models that can accurately determine the flavour profiles of other ingredients by analyzing cooking methods and ingredient keywords. Furthermore, a vast amount of recipe data needs to be parsed and converted into structured information to enable the system to function efficiently. Overall, the challenge is to build a reliable system that can provide accurate and relevant recommendations for a vast range of food items while working with a limited set of pre-existing ingredients.

Technical Solution

Red Buffer developed a comprehensive solution to the problem of accurately predicting the flavour of any food item and providing recommendations based on that flavour. They created a tool called the Flavor Oracle, which utilized various sources of information, including the meal title, ingredients, and recipes, to predict the taste of a particular food item. To accomplish this, Red Buffer employed advanced Natural Language Processing (NLP) techniques, such as Named Entity Recognition (NER), to parse hundreds of thousands of recipes and convert them into structured information.

These structured recipes were then mapped to the pre-existing 'paneled' flavour profiles of about 3,000 ingredients. Red Buffer then trained advanced machine learning models, such as gradient boosting and random forests, to infer the flavour profiles of other ingredients by analyzing both cooking methods and ingredient keywords. Once all the ingredients in a recipe had been mapped, another set of machine learning models was trained to predict the final flavour profile of the recipe.

The Flavor Oracle developed by Red Buffer offered a reliable solution for predicting the taste of a vast range of food items while working with a limited set of pre-existing ingredients. It used sophisticated machine learning models to analyze recipes, ingredients, and cooking methods to provide accurate and relevant recommendations to users. Overall, the solution offered by Red Buffer was a significant step towards building a comprehensive system for predicting the flavour of any food item and making recommendations based on that flavour.

Results

The recommendation system developed by Red Buffer offered several significant benefits to the client. One of the most notable advantages was that the machine learning technology used by Red Buffer helped the client secure strategic investment from SAP and some of the most prominent food and beverage brands. This investment demonstrated the value and potential of the recommendation system, which was a testament to the robustness and accuracy of the technology used.

The system also enabled the client to create a personalized beverage creation system for Diageo based on beverage recommendation technology. This personalized system allowed Diageo to offer more tailored and relevant recommendations to their customers, leading to higher customer satisfaction and loyalty. Additionally, the use of advanced machine learning algorithms, such as KDTree and SKLearn, in the development process allowed for efficient and scalable data processing, which saved the client time and resources while improving the accuracy of the system.

Overall, the recommendation system developed by Red Buffer offered significant benefits to the client, including strategic investment, personalized recommendation capabilities, and efficient data processing. These benefits helped the client to improve their products and services while staying ahead of the competition in the food and beverage industry.

Technologies	Domain
Python, Facebook Prophet Model, LSTMs	