



CULINARY *Connect*

A Smart Recipe Recommendation and
Nutrition Analysis Platform

Meet The Team

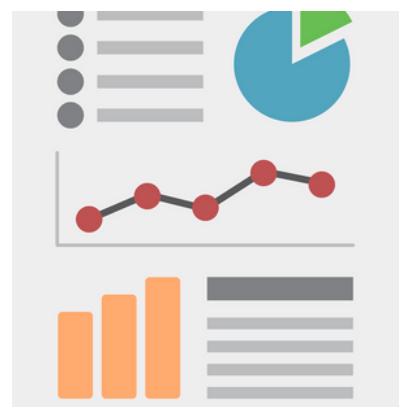
- Dennis Muuo
- Caroline Kimani
- Fiona Amugune
- Adrianna Ndubi
- Daniel Karue



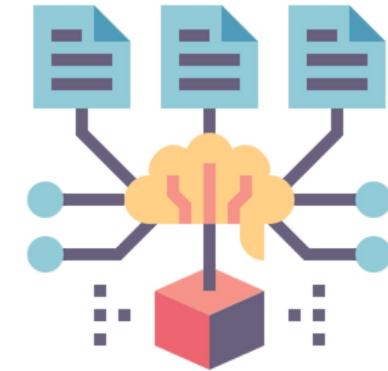
OVERVIEW



BUSINESS
PROBLEM



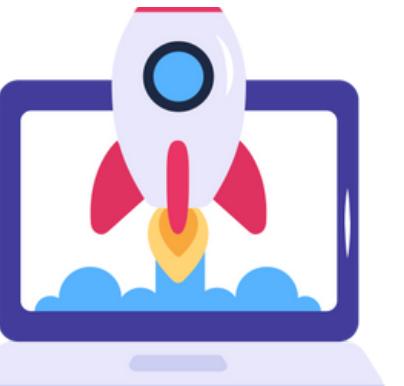
DATA
UNDERSTANDING



MODELLING



EVALUATION



DEPLOYMENT



CONCLUSION



Data Source

We scraped our data from websites using Selenium and Beautiful Soup Libraries

International Recipes: Scrapped food.com

African Recipes: Scrapped from Cookpad

International Reviews: Food.com

Nutrition: Scrapped from BetterMe

■ INTRODUCTION

Food is central to culture. African and International cuisine offers rich diversity and flavors. This project develops an AI-powered Recipe Recommendation System and Sentiment Analysis Model to help users discover authentic African and International recipes tailored to their preferences.





■ BUSINESS PROBLEM

African and International cuisine platforms struggle with low engagement due to generic recommendations and limited sentiment analysis. We propose a personalized recipe recommendation system with sentiment analysis to enhance user experience, retention, and platform authority.

■ BUSINESS OBJECTIVES

The goal is to develop a recipe recommendation system and sentiment analysis model to enhance user satisfaction through personalized suggestions. It will improve decision-making with data-driven insights, optimize recipes based on feedback, and drive revenue by boosting traffic to food blogs, e-commerce, and cooking classes.



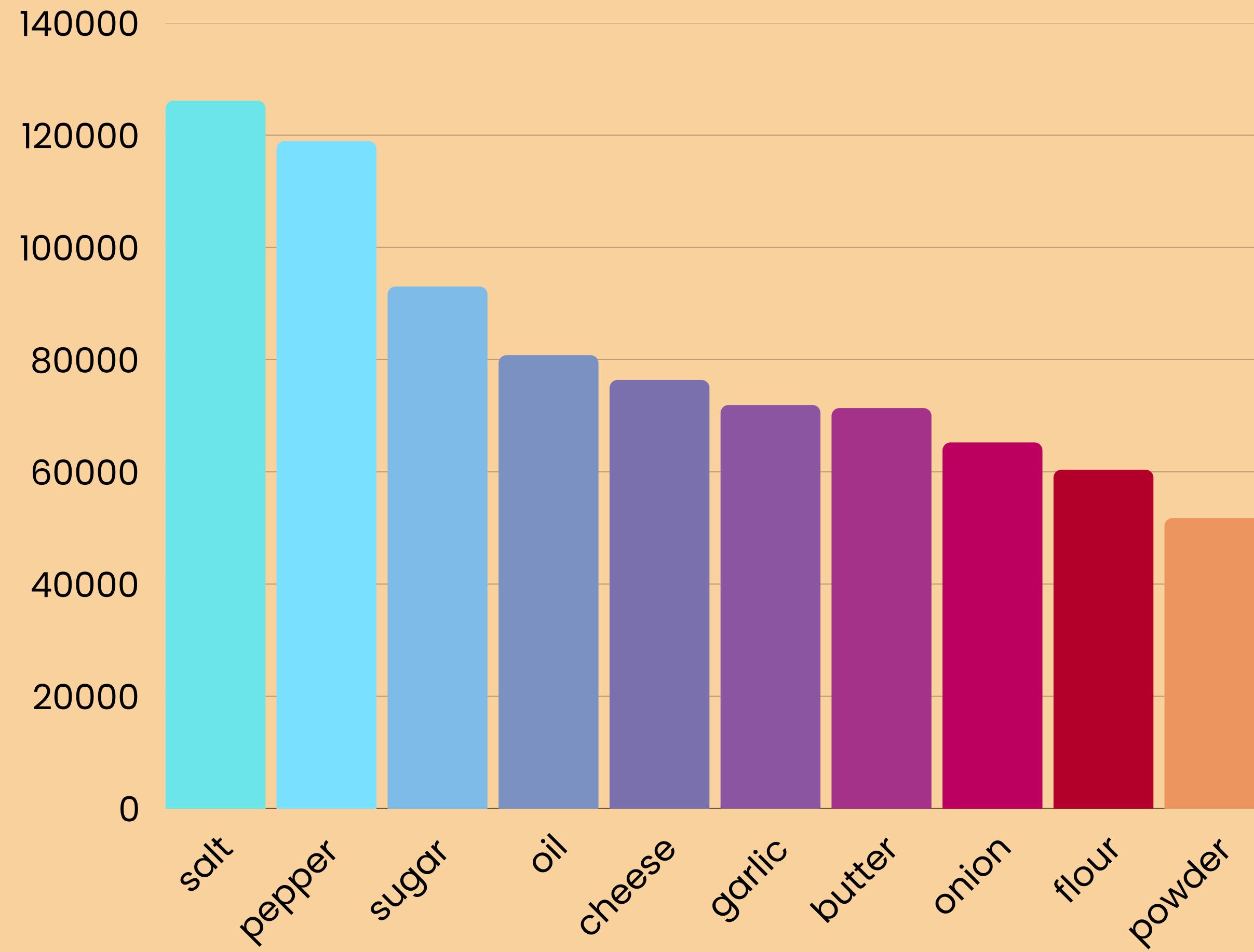


Correlation of Features to Nutrients

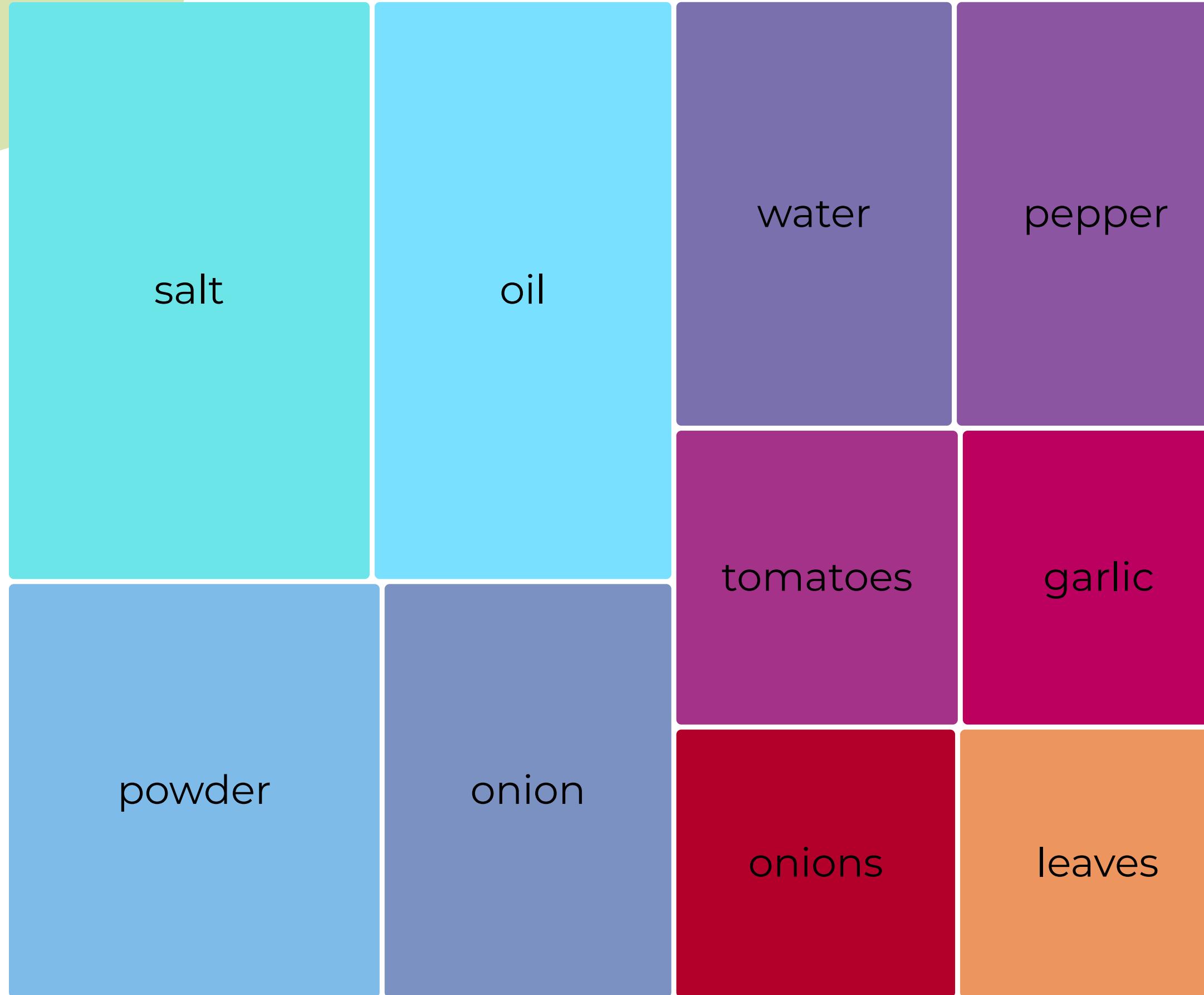
- Calories, total fat, and saturated fat are closely related—foods higher in fat tend to be higher in calories.
- Sodium and potassium show little to no correlation with fat and calorie content.
- Sodium and saturated fat are mostly independent, meaning a food high in one does not necessarily have high amounts of the other.

Visualization for the most common ingredient in African Dishes

Salt is the most common ingredient in African Cuisine

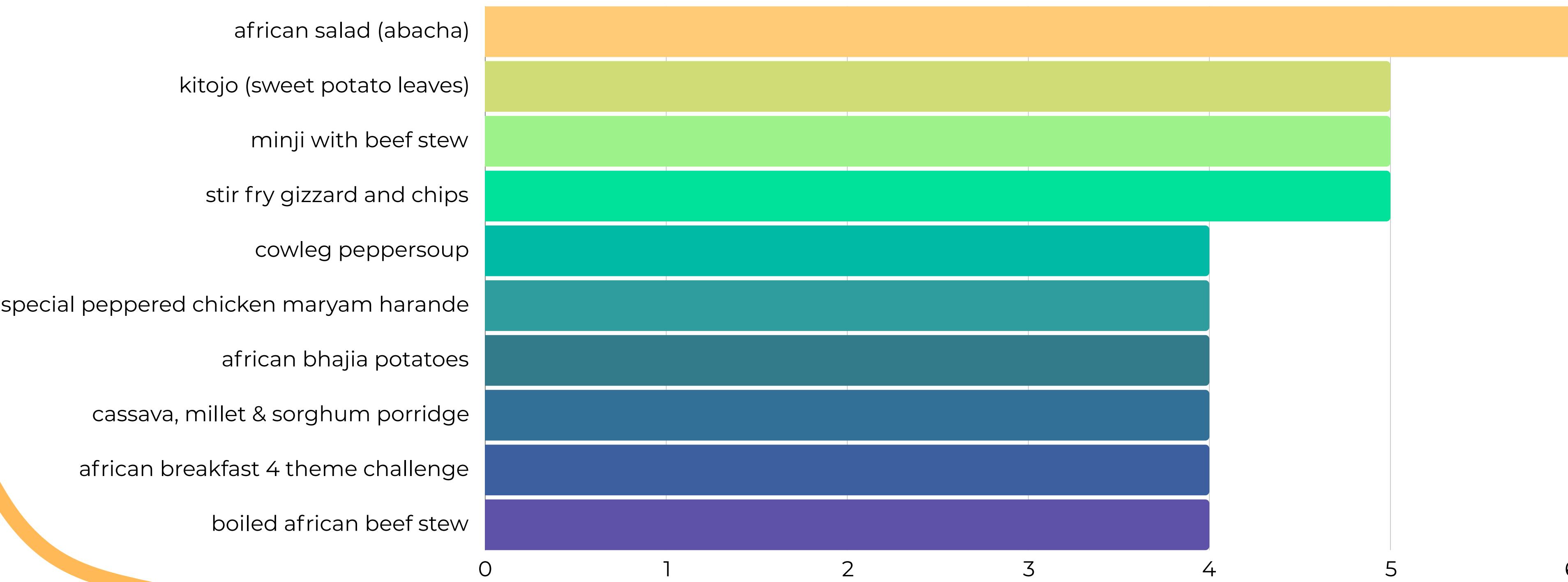


Top 10 Most common Ingredients on African Dishes

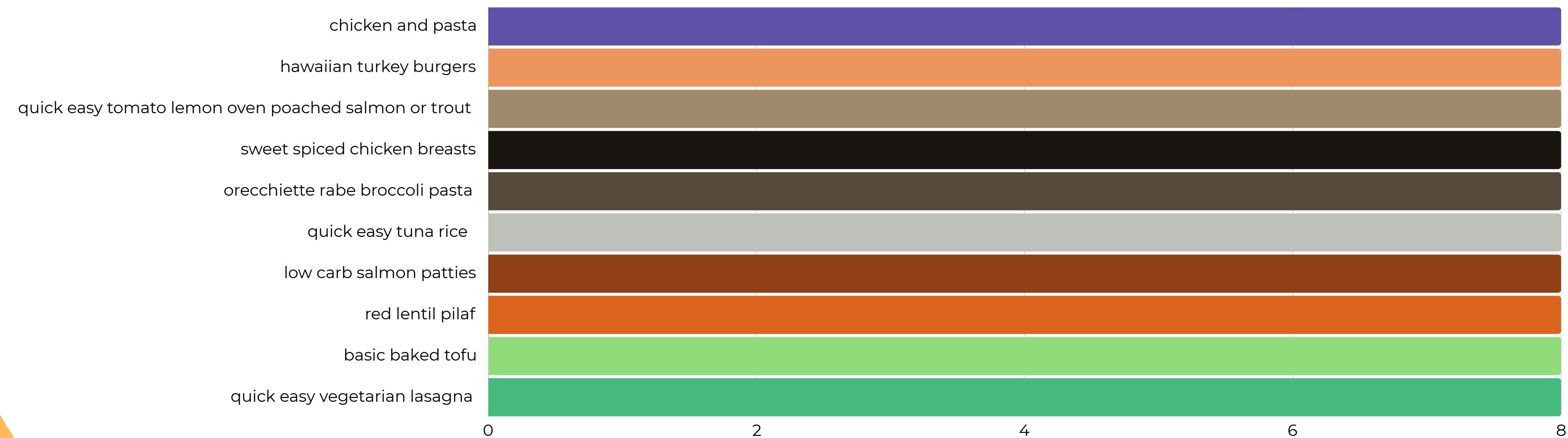


Salt is the most common ingredient on any African dish

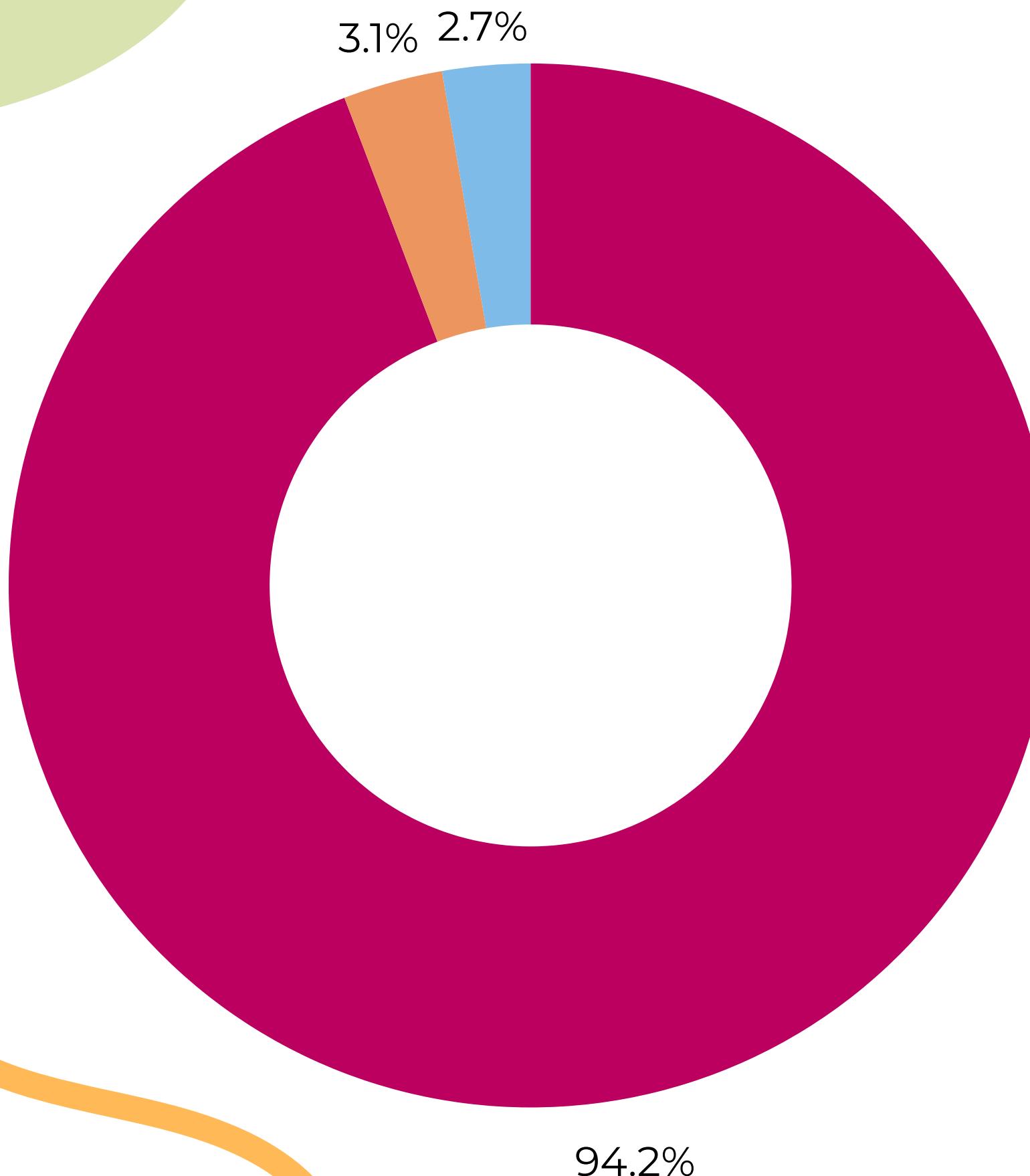
Visualization for the healthiest African Recipes



Visualization for the healthiest International

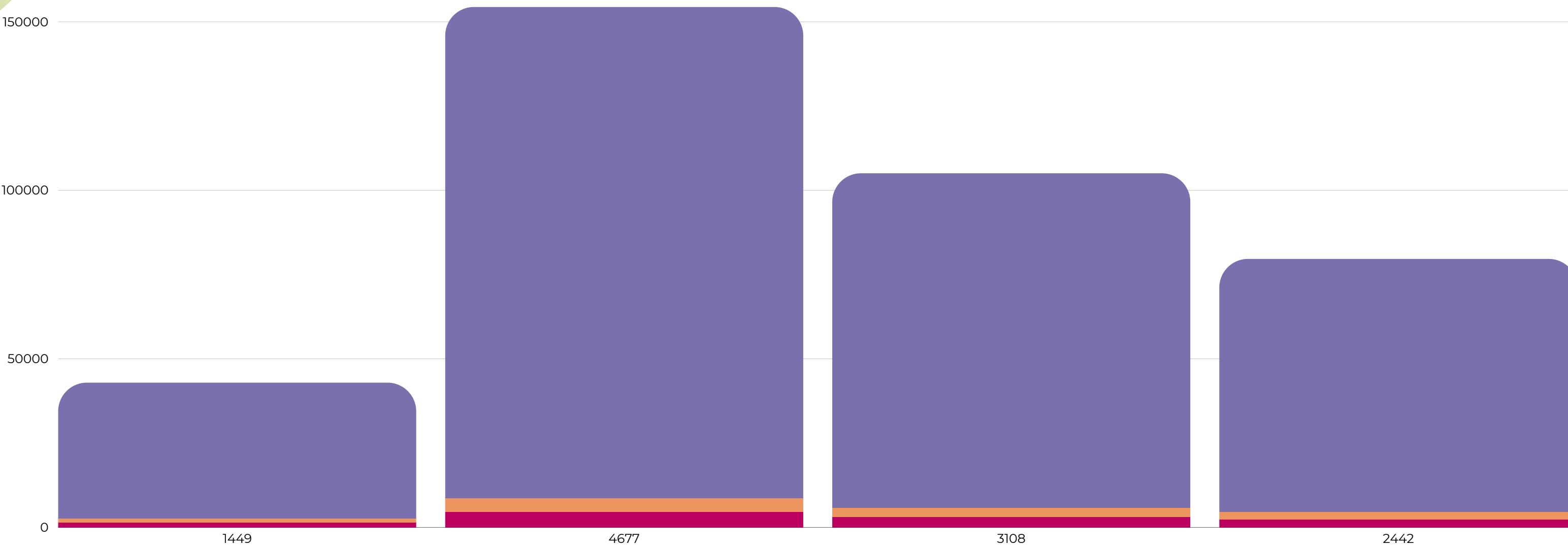


Sentiment Distribution



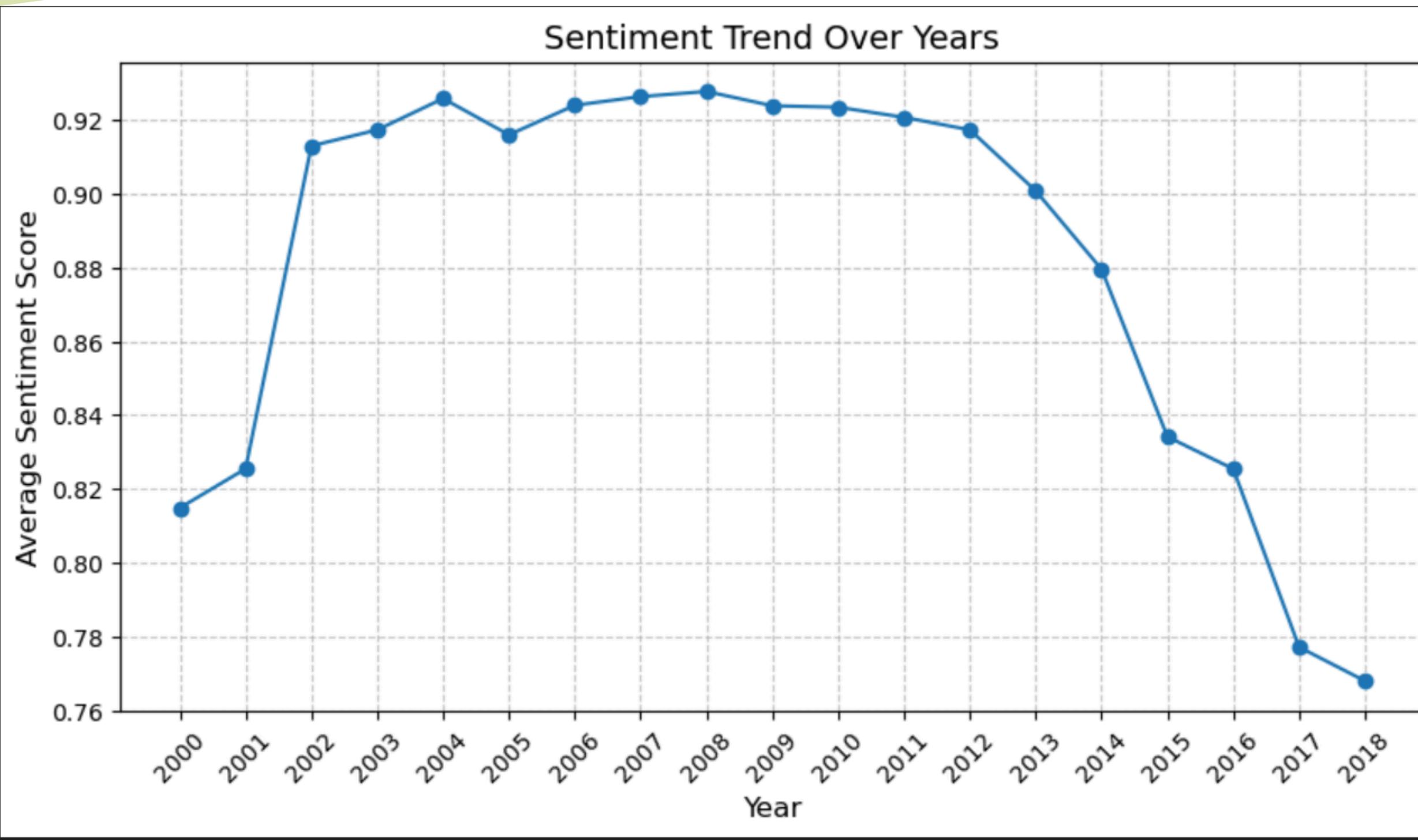
There are most positive
Sentiments. This means high
customer satisfaction

Sentiment vs Recipe Attribute



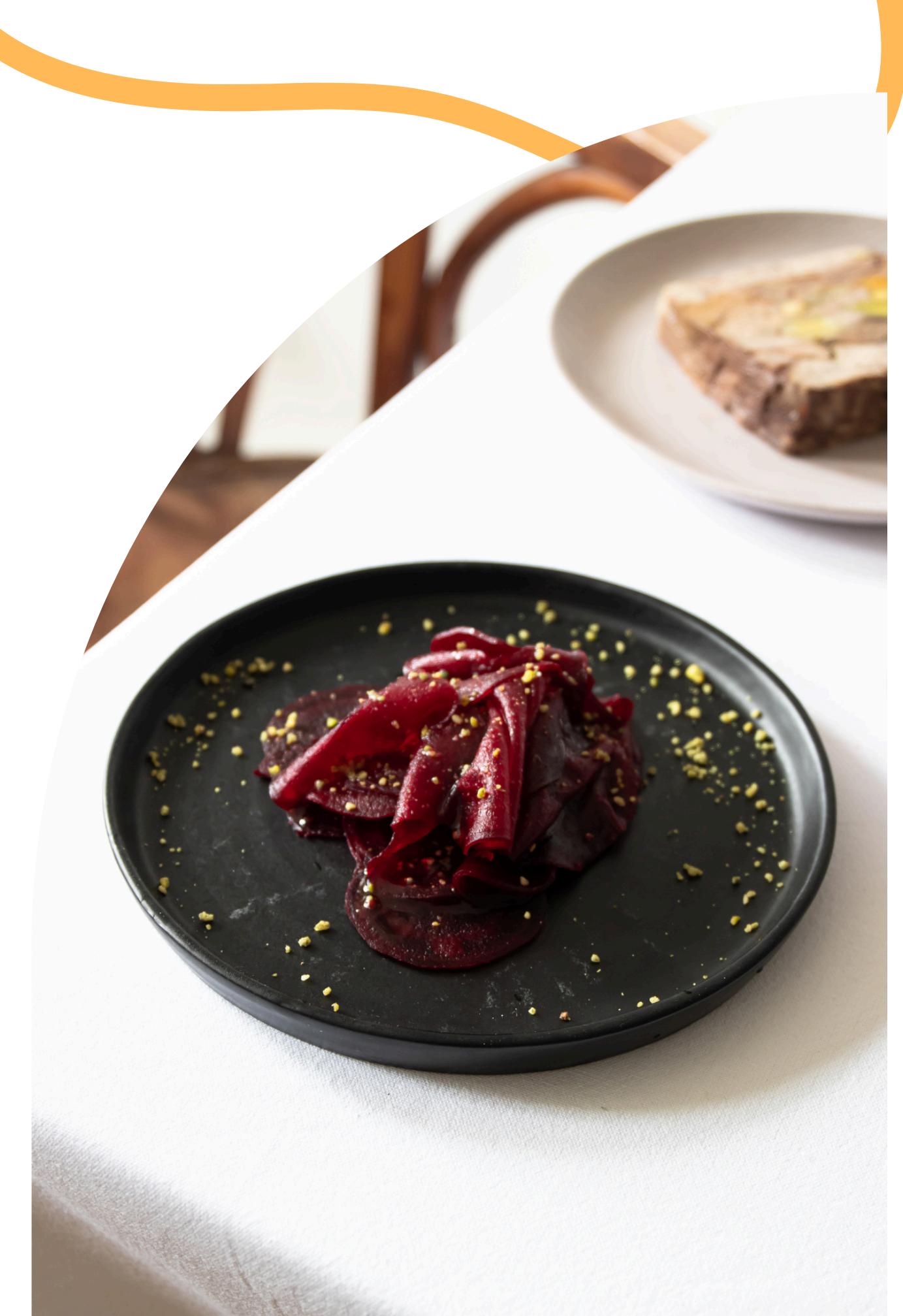
- 1. Higher-Calorie Recipes (101-1000 calories)** receive the most positive feedback, suggesting consumer preference for richer meals.
- 2. Low-Calorie Recipes (0-100 calories)** also have strong positive sentiment but fewer total reviews.
- 3. Negative and Neutral reviews** are consistently lower across all calorie ranges, indicating overall customer

Sentiment Trend Over Time



- **2000-2008:** Sentiment remained high and stable (~0.92), indicating strong customer satisfaction.
- **2009-2012:** Gradual decline (~0.91), suggesting shifting customer expectations or mild dissatisfaction.
- **2013-2018:** Significant drop from **0.90** to **0.76**, highlighting a decline in satisfaction.

MODELLING



How Recommendation & Sentiment Analysis Work Together

Recommendation System → Suggests recipes based on calories, ingredients, cooking time

- ◆ Sentiment Analysis → Analyzes user reviews to understand satisfaction & improve recommendations

↻ Feedback Loop:

✓ Positive reviews → Boost recipe ranking

✗ Negative reviews → Lower ranking or adjustments

📊 Continuous Improvement → Enhances user satisfaction & engagement

Recommendation System

Objective:

- Provide personalized recipe suggestions to users based on preference, past interactions or similarities.

Modelling Techniques used:

Content-Based Filtering:

- It utilizes TF-IDF or cosine similarity to recommend recipes based on ingredient overlap.

Collaborative Filtering:

- Leverages user item interaction matrix for personalized suggestions.

Evaluation Metrics:

Content-Based Model Results:

- MSE: 0.1214
- RMSE: 0.3484

Key Insights:

- The model shows low prediction error, indicating good accuracy.
- Predictions deviate by ~0.35 units on average.
- Content-based filtering performs well for personalized recipe recommendations.

Sentimental Analysis Modelling

Objective:

Classify user reviews into positive, neutral or negative sentiments, to understand user preferences and improve engagement

Modelling Techniques Used:

Data Preprocessing:

- Cleaning text data by removing stopwords, punctuation and special characters.
- Tokenization and vectorization using TF-IDF or Word Embeddings for feature extraction.

Model Selection and Training:

- **Logistics Regression:** It's used to predict the sentiment category.

Evaluation Metrics

- Accuracy - 96 %

Recommendation

Marketing Focus

- Promote highly rated and calorie-dense recipes to attract food enthusiasts.
- Highlight these recipes in advertisements, social media, and promotional campaigns.

User Insights & Review Analysis

- Analyze negative reviews across different rating ranges to identify recurring issues.
- Focus on reviews from 2013-2018 to detect significant shifts in sentiment and trends.

Health-Conscious Options

- Introduce low-calorie and nutrient-rich alternatives to cater to health-conscious consumers.
- Provide detailed nutritional breakdowns and healthy ingredient swaps.

Customer Satisfaction & Quality Improvement

- Address customer complaints to enhance both service and product quality.
- Implement feedback-driven improvements in recipe offerings and user experience.

Challenges

Data Sampling Approach

Our reviews dataset initially contained 1,000,000 rows, making it challenging to clean and train efficiently. To streamline the process while maintaining representativeness, we opted to use 40% of the data, selecting 400,000 rows randomly from the full dataset. This approach ensured a manageable dataset size while preserving diversity and key insights from the original data.

CONCLUSION

- The Sentiment Analysis Model provides valuable insights into customer opinions, allowing businesses to improve their offerings. However, refining text cleaning and model tuning can improve accuracy.
- The Recommendation System successfully suggests recipes but can be enhanced with personalized filtering and user feedback loops.
- Implementing these models in a real-world food app can boost user engagement, improve satisfaction, and increase retention rates.

NEXT STEPS

Build a Chatbot for User Engagement

Chatbot Features:

- Provide recipe suggestions based on user mood (using sentiment analysis results).
- Answer nutrition-related questions (calories, ingredients, dietary preferences).
- Support voice commands for an interactive experience.

Tools & Technologies:

- Use Rasa, Dialogflow, or GPT-based models for chatbot development.
- Deploy on Telegram, WhatsApp, or a web app for user access.

Q & A

ANY QUESTIONS?

Thank You