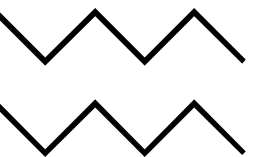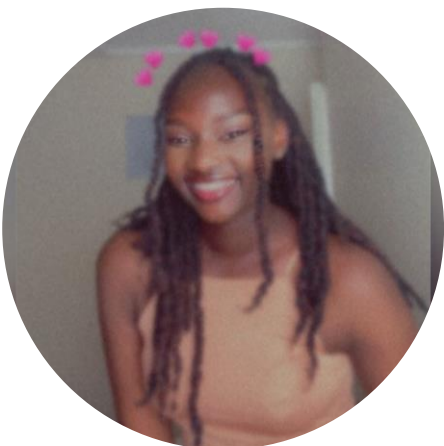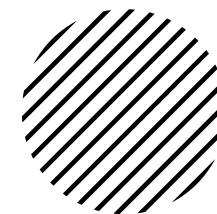# Recipe Recommender System.

Thursday, 21st August 2024.

Meet the Team.

Silvia
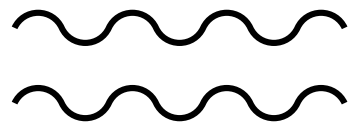Gworit

Denis
Mwenda

Myra
Kadenge

Paul
Muniu

Ian
Nzangi

Overview.

Tech to Tech Hub is partnering with **Flavor Fields Restaurant Int.** to revolutionize the culinary experience with a cutting-edge recipe recommendation system. Our goal is to develop **Data Crunch**, an advanced web application designed to deliver personalized recipe suggestions based on the ingredients users have on hand. By leveraging a rich and diverse dataset, Data Crunch will cater to a wide array of dietary preferences and meal categories. This innovative platform aims to simplify meal planning and inspire users with intuitive, customized cooking solutions that enhance their culinary journey.
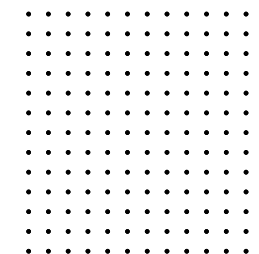
Spicing it up!

✕ *Problem Statement.*

- People often have a variety of ingredients in their kitchens but struggle with deciding what to cook. This leads to time-consuming meal preparation or the need to purchase additional ingredients. The overwhelming number of recipe options can make meal planning daunting. Data Crunch Application addresses these challenges by providing personalized recipe suggestions based on the ingredients users already have, reducing food waste and simplifying meal planning.

✕ <u>OBJECTIVES</u>.

1. **Main Objective**: To develop an interactive, user-friendly recommender system that provides personalized recipe suggestions based on user-input ingredients.

2. Recipe Matching: Implement an algorithm that matches user-input ingredients with a comprehensive recipe database to offer tailored recipe suggestions.

3. User Interface and Experience Design: Create an intuitive and user-friendly interface that allows users to easily browse recipes, read reviews, and receive personalized suggestions.

CRISP-DM Process.

DATA UNDERSTANDING
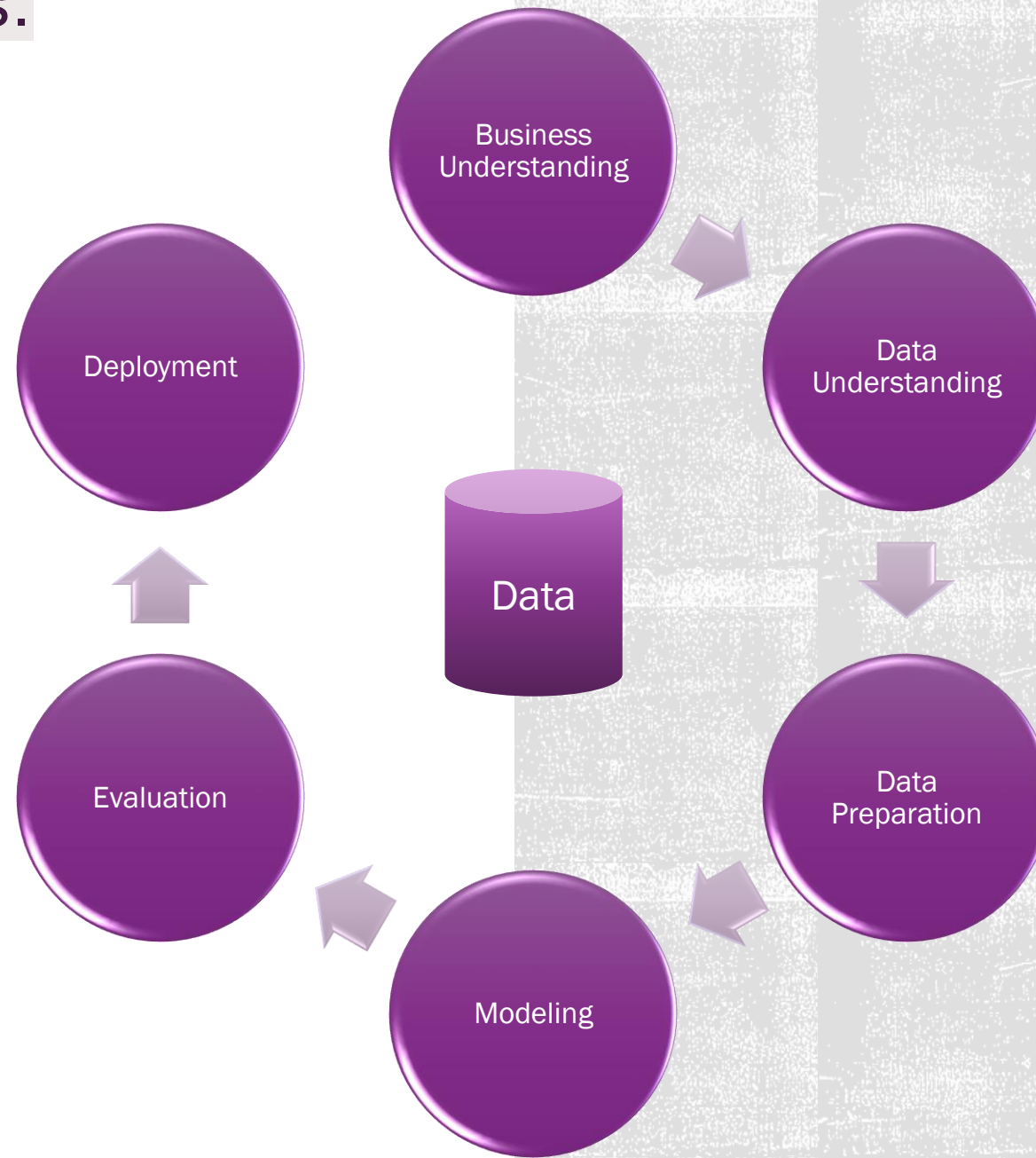
We utilized two datasets for this project:

1. **Recipe Review and User Feedback Dataset** (from UC Irvine Machine Learning Repository)

2. **Ingredients Dataset** (from **Kaggle**):

DATA UNDERSTANDING

- **Recipe Review Data:**
  - Recipe Number, Recipe Name
  - User Information: ID, Name, Reputation
  - Review Details: Created At, Reply Count, Thumbs Up/Down, Stars, Best Score
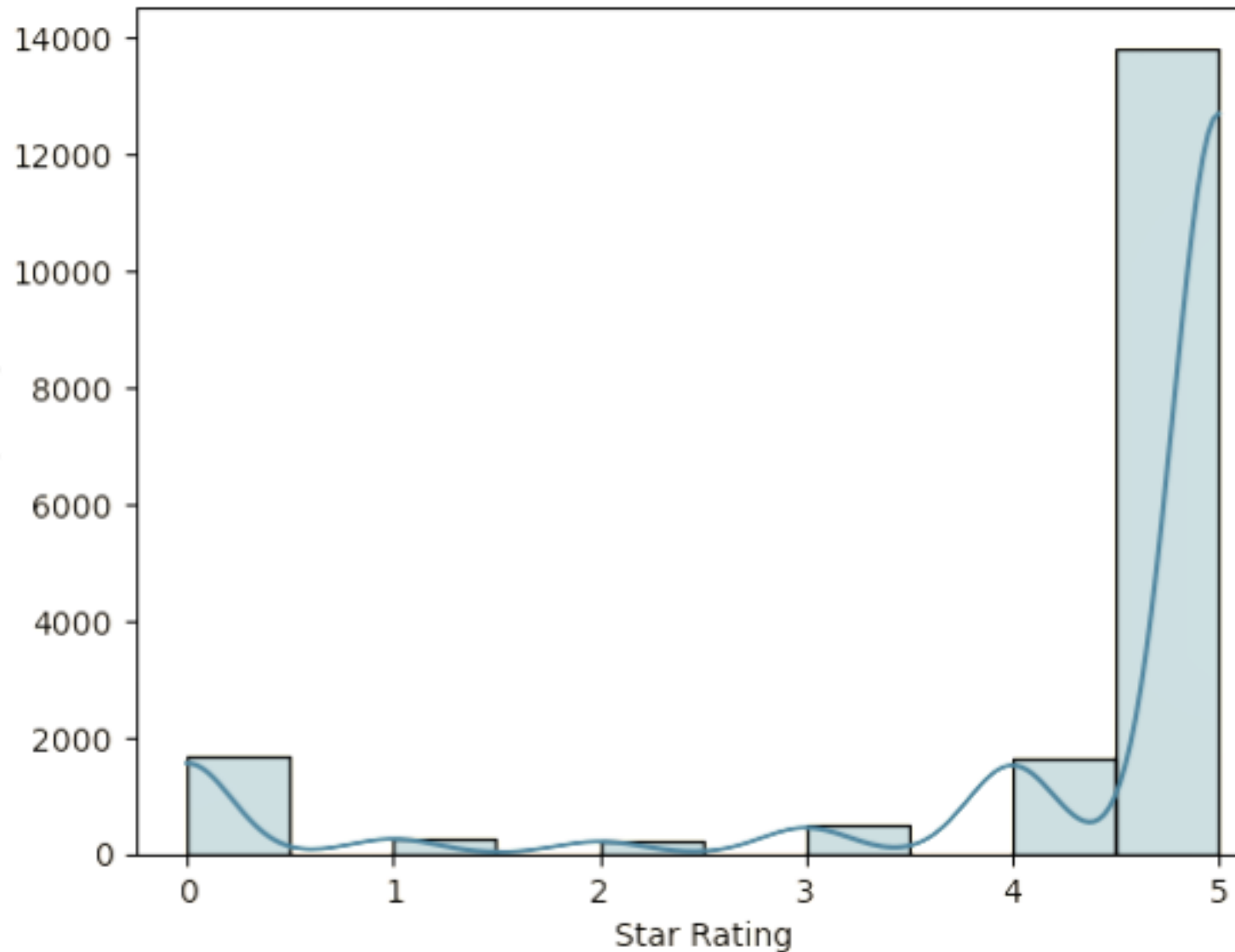 - Comment Text

- **Ingredients Data:**
  - Recipe Name
  - Ingredients List
  - Cooking Instructions

OUR TOP INGREDIENTS.

The analysis revealed that
ingredients associated
with savory recipes occur
more frequently,
indicating a preference for
such dishes among users.

Top 10 Most Common Ingredients
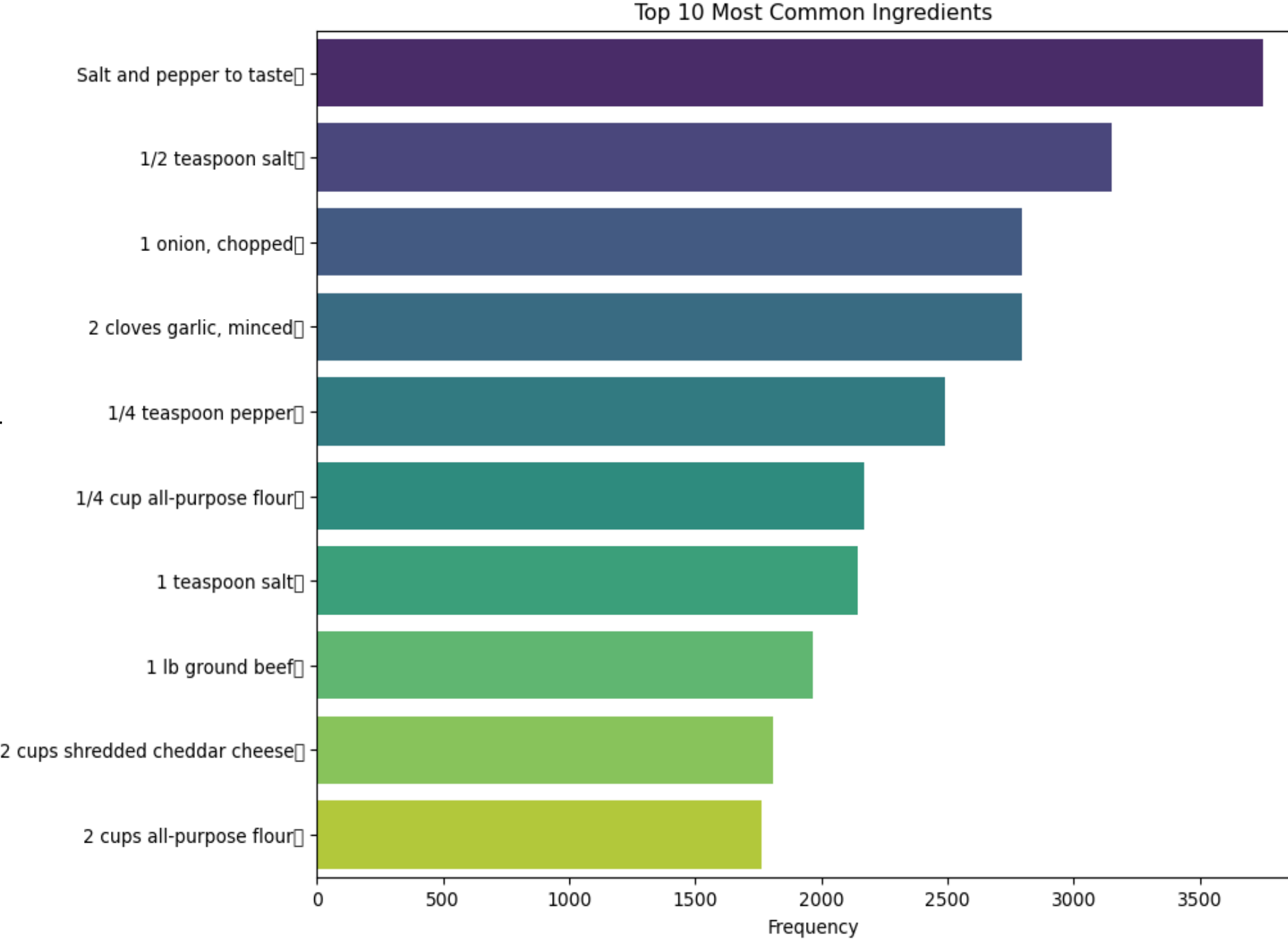
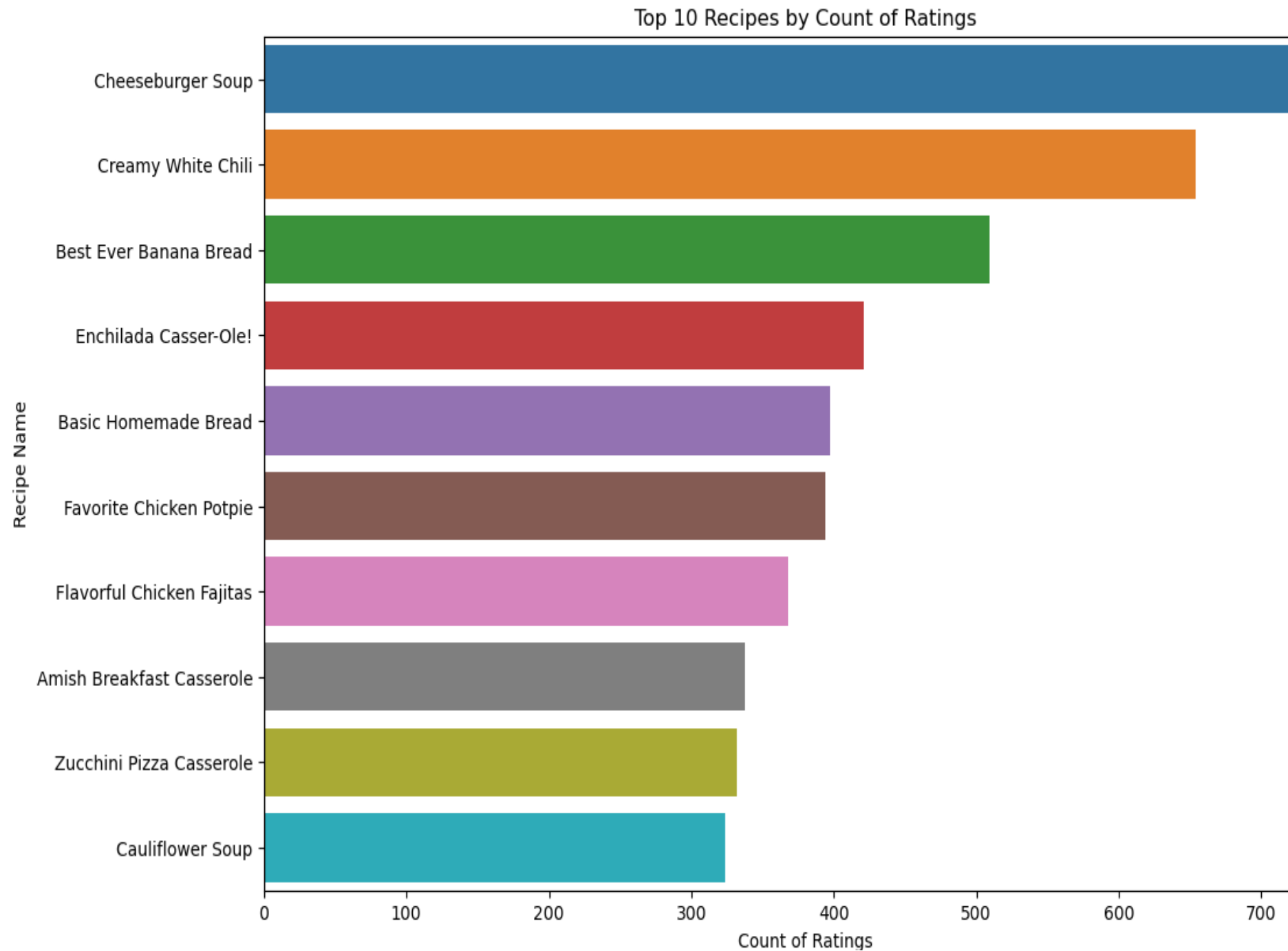Distribution of Star Ratings

DISTRIBUTION OF THE RATINGS

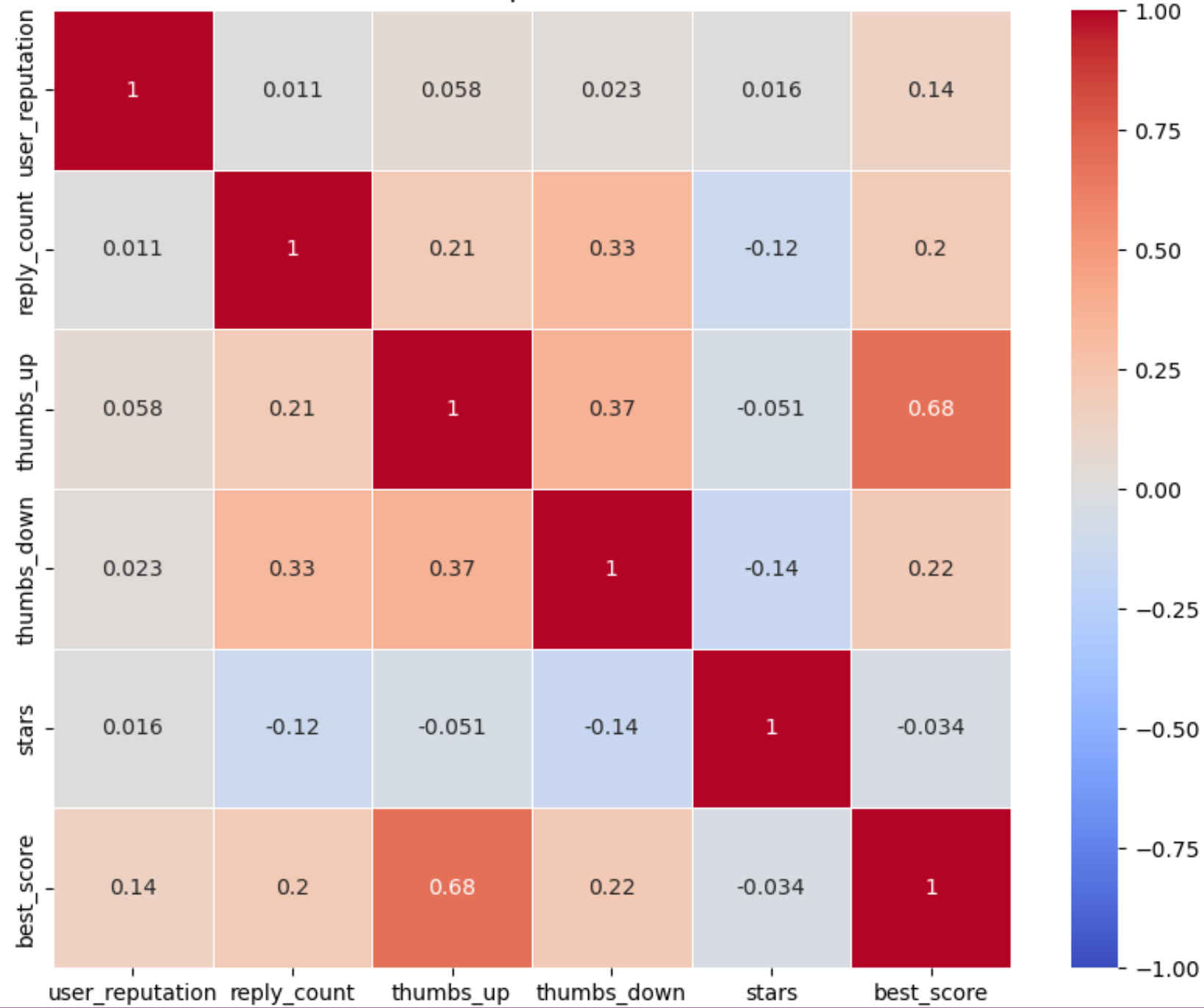High satisfaction was observed from 5 stars.

Notable 'total dissatisfaction' and equal 'almost satisfaction' observed by 0 stars and 4 stars.

OUR TOP RECIPES.

These are the most popular recipes among users.

Top 10 Recipes by Count of Ratings

Correlation Heatmap for Numeric Features

CORRELATION MATRIX

The correlation matrix provides valuable insights into the relationships between different features.

Modeling.

We experimented with several models to identify the best-performing recipe recommender system:

1. **K-Nearest Neighbors (KNN Basic)**

2. **KNN Baseline & KNN With Means**

3. **Singular Value Decomposition (SVD)** - *Our best-performing model, fine-tuned for optimal results.*

Conclusions.

▪ The best performing model was the Tuned SVD Model with a Root Mean Squared Error(RMSE) of 1.5374 and a Mean Squared Error(MAE) of 1.0629

▪ By leveraging the SVD model's predicted ratings, the system suggests recipes the user will likely enjoy based on their input ingredients.

▪ The recommendations are presented to the user then allowing the user to choose the recipe that interests them the most.

▪ The system then presents them with the cooking instructions based on their preferred recipe and the user can start preparing their meal.

UI and Deployment.

We used **Streamlit** to create a user-friendly web application for Data Crunch. Streamlit allowed us to quickly build and deploy the app, offering an interactive interface for users to input ingredients and receive recipe recommendations.

Deployment: Streamlit Community Cloud allows seamless deployment from GitHub, making it easy to collaborate and share the app.

DAZZLE !

✖ *Recommendations.*

- **Recipe Categorization**: Develop a robust categorization system that classifies recipes based on cuisines, ingredients, cooking methods, and dietary preferences. The system should be dynamic, allowing the addition of new categories over time.

- **Automated Sentiment Analysis**: Enhance user feedback analysis. Implement natural language processing (NLP) techniques to perform real-time sentiment analysis on user reviews. This will help identify trends in user satisfaction and areas for improvement. This feature will enable the system to make timely adjustments based on user sentiment, improving user satisfaction and engagement.

Future Work.

✓ **Incorporation of Local Ingredients**: Adapt the recommender system to prioritize local ingredients, promoting sustainability and supporting local economies.

✓ **Expansion of Recipe Database**: Continuously enrich the recipe database to offer users a wider variety of options. Ensure that new recipes are seamlessly categorized within the existing system.

✓ **Integration with Smart Kitchen Devices**: Enhance the user experience by integrating the recommender system with smart kitchen devices. Hence offering tailored cooking instructions and real-time ingredient tracking.

THANK YOU.

Any Questions?

Made
With
Love
💜

The End.