

# Intelligent Recipe Suggestion System For Zero-Waste Summary

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## 1 Objective

It is recorded that the world wastes approximately 2.5 billion tons of food each and every year. In the United States alone, it is estimated that nearly 60 million tons of waste is produced each year which is more than any other country. This equates to roughly 40 percent of the entire food supply and is the single largest component taking up space inside of landfills. This equates to a loss of approximately 218 billion dollars per year. Additionally, the water and energy it takes to produce food globally contributes to 11 percent of greenhouse gas emissions. This project seeks to mitigate these issues by posing the following objective:

**Objective.** *In an individual household, our primary objective is to identify recipes that prioritize ingredients with approaching expiration dates and considers the users' cuisine preference.*

## 2 Stakeholders

Since we are seeking to provide various recipes to our consumers, our primary stakeholder would be for individual households. By implementing our intelligent zero waste recipes, we will help achieve the following performance indicators:

- Reduce overall waste production and greenhouse gas emission by prioritizing ingredients by their expiration date.
- Minimize consumer spending by increasing the utilization of at home ingredients.

Additionally, our program is capable of grouping together regions with similar cuisines. This would be useful information for grocery stores where ingredients involved in similar cuisines can be located together. This would improve the sale of all of the items since it would increase the likelihood of the ingredients being purchased together.

## 3 Dataset

Our dataset consists of the over 230,000 recipes from the recipe aggregate Food.com. The initial dataset required cleaning to be used for our purposes. For example, there were many ingredient duplicates since ingredients could either be listed in the singular or plural form. Additionally, we wanted to filter the recipes based on their cuisine type which required further data processing.

## 4 Final Product

We managed to achieve our goal by creating a program which takes in ingredients and their expiration dates as inputs. The program will then predict which types of cuisines can be made with those ingredients, and it will filter the corresponding recipes. The program will lastly suggest a recipe which prioritizes ingredients with approaching expiration dates.

## 5 Future Directions

Because our product is heavily focused on the users' experience, we consider implementing the following features in our future work:

- Weighting the recipe matrix according to likes or dislikes of the user.
- An optimization algorithm to maximize the total shelf life of the ingredients.
- An estimate of how much the user saved by using an ingredient with an approaching expiration date.