

Food Pairing: Data & Visualization in Cooking

Based on Ahn et al., “*Flavor network and the principles of food pairing*” (*Nature*, 2011)

Research Goal & Objectives

Goal:

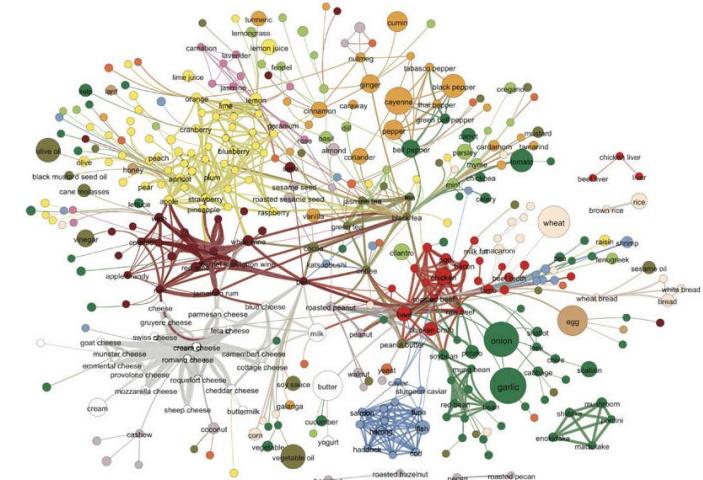
Develop a data-driven system to identify which foods and spices go well together.

Objectives:

- Collect and clean large-scale data on ingredients and flavor compounds
 - Build a computational model to map relationships between ingredients
 - Visualize ingredient networks to reveal pairing patterns
 - Compare pairing tendencies across world cuisines

Outcome:

A visual, interactive tool for exploring compatible food–spice pairings



Methodology & Data Processing

Data Sources:

- Ingredient databases (e.g., FooDB, FlavorDB)
- Online recipes across cuisines

Processing Steps:

1. Extract and standardize ingredients and their flavor compounds
2. Construct bipartite network (ingredient ↔ flavor compounds)
3. Create ingredient–ingredient network (shared compounds = edges)
4. Apply statistical analysis to measure pairing strength
5. Visualize results (network graphs, heatmaps, clustering)

Tools:

Python, NetworkX, Gephi, Tableau

Expected Results & Next Steps

Expected Results:

- Identification of “core” spices that connect multiple flavor clusters
- Data-driven insights into pairing preferences by region
- Visualization of new, unexplored flavor combinations

Next Steps:

- Validate predictions through taste tests or chef feedback
- Develop a user interface for exploring ingredient pairings
- Extend model to beverages, sauces, and regional dishes

Impact:

Enable chefs and researchers to use data visualization to design more creative, evidence-based recipes.

Team members

- Lan Vukušić
- Srećko Krečković
- Veronika Sovdat
- Matija Tomažič