AI: The Recipe Maker by Bhuvana Chandra Atche

Abstract :

Flavor Network Flavor network is a graph network of food ingredients based on flavor compounds they share.Using flavor network, will project recipes from ingredient space to flavor space, and build a dish recommender based on similar flavor profile. It is a fun way to find dishes with similar flavor to your favorite dish but from another regional cuisine.

Data and graph Flavor profile data came from Y-Y Ahn's work (see reference), including 1530 food ingredients, flavor compounds and 36,781 edges. Using networkx and cytoscape, I will be able to build food flavor network, with each node representing a food ingredient and the edge between nodes representing the number of flavor compounds they shared. The original network is too dense to visualize. After backbone extraction, should produce a more visually compelling network graph, albeit with less ingredients, as only ingredients with significant connections to others are kept after backbone extraction.

Speaking chemically molecules form the basis of flavor expressed primarily via gustatory & olfactory mechanisms undertake during consumption of food. Due to molecules that can bind olfactory receptors odors or taste is produced. Since taste, is based on chemical reactions which are limited to thousands of unique molecules possessed by hundreds of ingredients, a machine that could assign different reactions values is possible.

“We eat things we like.” - Devin Peterson has spent a significant amount of time in Minnesota, in his research on how people make eating decisions, he’s found that flavor, cost, and availability top the list of factors influencing whether they eat. He explains that humans do, however, have what’s called a “reward complex” where they associate certain foods and flavors with strong emotions and memories. “Did I have a good experience last time I ate this? Do I associate it with a family tragedy? We have very emotional food associations,” he says.

Data Description :
~9,000 recipes using Yummly's API and pickled the data frame. After cleaning up, I am able to match ~7000 recipes into the ingredient space. (Some recipes have to be discarded as their ingredients are not listed in the flavor network.)

Classifiers :
logistic regression, support vector machine, multinomial naive bayes and tuned parameters

Packages needed :
sklearn, cytoscape, networkx, Numpy, Scipy, Nltk, Matplotlib, Seaborn, Web Scraping, Pickle, EC2, S3 for backup

Dish Recommender based on flavor similarity Based on cosine similarity, it will recommend dishes based on flavor. The recommender will return top 20 dishes most similar to the query, in terms of flavor. The top matches usually come from the same region. Top 20 matches usually include dishes from other regional cuisines. This is a fun way to discover new cuisines based on flavor profile.