The Home Cooks Guide to Ingredients and Spices

Final Project: Data and Analytics Bootcamp - Team 8
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Selected Topic

Charlie had an idea for the average at home chef to be able to have way to know which herbs and spices go well together. We went in a more generalized direction, looking at the overall ingredients within recipes within certain cuisines.

Which ingredients occur in recipes of the same cuisine most frequently and can we use them as a predictor of cuisine?

Spoonacular

Our knowledge engineers spent years crafting our **complex food ontology**, which allows us to understand the relationships between ingredients, recipes, nutrition, allergens, and more.

The Spoonacular API is an online resource containing:

- Ingredients
- Recipes
- Product Information
- Menu Items (restaurants)

Questions we hope to answer with the data:

We hope to be able to see which ingredients most commonly occur within different cuisine types and can those ingredients predict a cuisine type when it is unknown.

Possibly put together recipes based on available ingredients?

Cook certain cuisines based on common ingredients?

Data Exploration

Initial Data Processing:

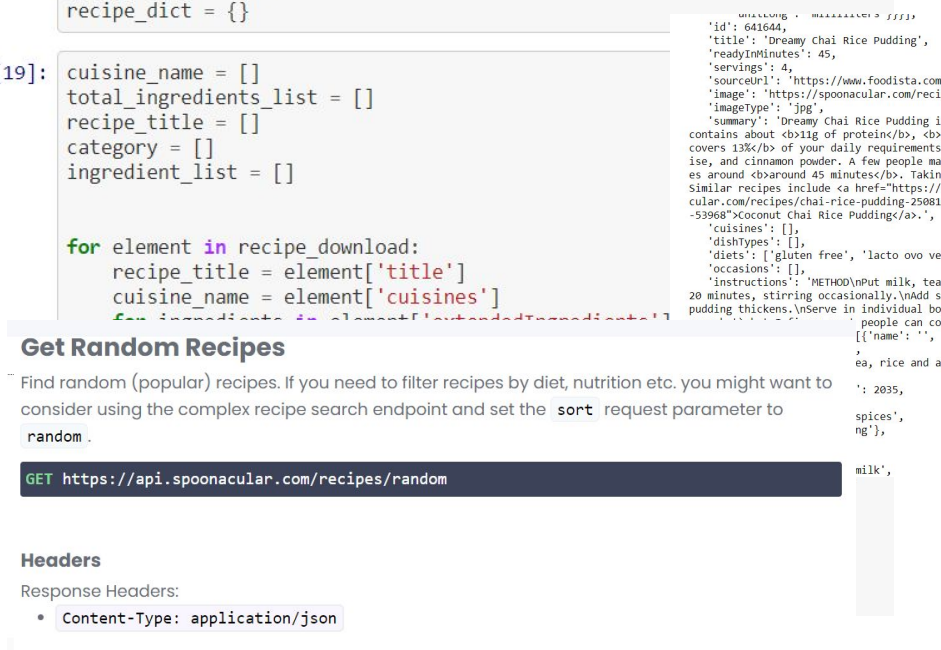
- Data downloaded via Spoonacular API
- Performing a random recipe search, 100 random recipes were downloaded in each call.
- Data cleaned in JSON to limit to recipe, cuisine, ingredient names
- For loop to pull 10k recipes, merged into single dataframe.

```
In [16]: recipe_download = recipe_download['recipes']

In [17]: ingredients_dict = {}
         category_dict = {}
         recipe_dict = {}

In [19]: cuisine_name = []
         total_ingredients_list = []
         recipe_title = []
         category = []
         ingredient_list = []


         for element in recipe_download:
             recipe_title = element['title']
             cuisine_name = element['cuisines']
```



Data Exploration

- Create single list of ingredients and their counts
- Use Regex to create a consistent, clean list of ingredients
- Drop overly common items like salt and pepper, oil

```
    elif re.search('(?:(?:^)|(?:\s))[Tt]omato(?:\ssauce|\spaste|\sjuice)', element):
        corrected_ingredient_list.append('tomato sauce')
    elif re.search('(?:(?:^)|(?:\s))[Cc]oconut(?:\smeat|\sextract|\sflake|$)', element):
        corrected_ingredient_list.append('coconut')
    elif re.search('(?:(?:^)|(?:\s))[Mm]ustard(?!\spowder|\sseed)', element):
        corrected_ingredient_list.append('prepared mustard')
    elif re.search('(?:(?:^)|(?:\s))[Mm]ushroom|mushrooms(?!\ssoup)', element):
        corrected_ingredient_list.append('mushrooms')
    elif re.search('(?:(?:^)|(?:\s))[Cc]umin(?:\sseeds|$)', element):
        corrected_ingredient_list.append('mushrooms')
    elif re.search('(?:(?:^)|(?:\s))[Ss]ugar(?:\s|$)', element):
        corrected_ingredient_list.append('sugar')
    elif re.search('(?:(?:^)|(?:\s))[Gg]arlic(?!\ssauce|\schili)', element):
        corrected_ingredient_list.append('garlic')
    elif re.findall('dried.*?chile',element):
        corrected_ingredient_list.append('dried chile')
    elif re.search('(?:(?:^)|(?:dried\s))[Cc]ilantro(?:\s|$)', element):
        corrected_ingredient_list.append('cilantro')
    elif re.search('(?:(?:^)|(?:dried\s))[Dd]ill(?:\s|weed|$)', element):
        corrected_ingredient_list.append('dill')
    elif re.search('(?:(?:^)|(?:\s))[Ff]enugreek(?:\s|$)', element):
        corrected_ingredient_list.append('fenugreek')
    elif re.search('(?:(?:^)|(?:dried\s))[Mm]int(?:\s|$)', element):
        corrected_ingredient_list.append('mint')
    elif re.search('(?:(?:^)|(?:dried\s))[Pp]arsley(?:\s|$)', element):
        corrected_ingredient_list.append('parsley')
```

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andom Forest

	cuisine_SP	onion	garlic	vanilla	lemon	bell pepper	tomato	chocolate	mushrooms	italian cheese
0	[]	0	0	0	0	0	0	0	0	0
1	[]	0	0	0	0	0	0	0	0	0
2	[]	0	1	0	0	0	0	0	0	0
3	[]	0	0	0	0	0	0	0	0	0
4	[]	1	1	0	0	0	1			
...	...	...	...	...	...	...	...			
9995	[]	0	0	0	0	0	0			
9996	[]	0	1	0	0	0	0			

	Predicted 0	Predicted 1	Predic 2
Actual 0	4	0	0
Actual 1	0	180	0
Actual 2	0	0	65
Actual 3	0	0	0
Actual 4	0	0	0
Actual 5	0	0	0
Actual 6	0	0	0

sis Phase I:

ɔm Forest was the machine learning model we chose to classify known ingredients by cuisine and ther
es in the data. About 7000 recipes had a null value for cuisine, 3000 had a populated value

Ingredients turned into columns, with one column for cuisine
Recipes become the index
Ingredients are given 1 or 0 if they occur in a recipe
Cuisine names normalized
Cuisines encoded
Confusion Matrix

PCA Analysis: Spices

KMeans: Spices

Market Basket Analysis: by Cuisines

Another way to understand the relationship between ingredients and cuisines.