



‘YOUR PERSONAL COOKBOOK’

FINDING NEW MEALS THAT
FIT YOUR TASTES

Prepared by Misha Berrien

THE PROBLEM

The average American cooks around nine meals on rotation. One reason for this is the fear of trying something new and ultimately disliking it throwing it out.

OUR SOLUTION - 'YOUR PERSONAL COOKBOOK'

An application that recommends new menu items based on foods you already love as well as items similar to them.



ABOUT ‘YOUR PERSONAL COOKBOOK’

Our aim is to help you diversify your weekly menu helping you discover new meals that incorporate flavors that you already love.

HOW IT WORKS

01

User inputs three foods they like as well as any dietary restrictions.

02

From the initial three inputs 12 additional similar foods are found.

03

A recipe in our database is found using at least 3 of the foods from our list.

DATASETS

32M SHOPPING BASKETS

Shopping Baskets

- 32M shopping carts from over 200k Instacart users

1K DIVERSE RECIPES

Recipes

- Over 1K Recipes scraped from
simplyrecipes.com

20K PRICED GROCERIES

Grocery Prices

- Priced products from over 20k products scraped from marianos.com

THE APPROACH

BEFORE BUILDING RECOMMENDER FIRST NEED NLP

Conditional Random Field (CRF) Models

- Used for pattern recognition and structured prediction / tagging

Example:

	BEFORE	AFTER
CRF Model: Recipes	8 Slices Sourdough Bread	8 (quantity) Slices (unit) Sourdough bread (food item)
CRF Model: Products	Organic kale bunch	Organic (comment) Kale (food item) Bunch (unit)

CRF MODEL EVALUATION

	precision	recall	f1-score	support
0	0.95	0.99	0.97	19749
1	1.00	1.00	1.00	35747
2	1.00	1.00	1.00	35842
3	1.00	1.00	1.00	24504
micro avg	0.99	1.00	0.99	115842
macro avg	0.99	1.00	0.99	115842
weighted avg	0.99	1.00	0.99	115842
samples avg	0.99	1.00	0.99	115842

RECOMMENDATION SYSTEM: COLLECTIVE CLASSIFICATION

- Method: Item-Item based collaborative filtering using implicit feedback
- Calculate cosine similarity between different food items based on what foods users purchase together.



ITEM-ITEM SIMILARITY EXAMPLE OUTPUT

INPUT - ITEMS USER LIKES

- Cheese
- Chicken
- Pasta

OUTPUT- SIMILAR ITEMS

◆	1 ◆	2 ◆	3 ◆	4 ◆	5 ◆	6 ◆	7 ◆	8 ◆	9 ◆	10 ◆
cheese	cheese	milk	bread	yogurt	chicken	banana	strawberries	eggs	avocado	apple
chicken	chicken	cheese	milk	banana	bread	avocado	yogurt	strawberries	turkey	eggs
pasta	pasta	cheese	pasta sauce	bread	chicken	milk	banana	tomatoes	eggs	parmesan



LIVE DEMO

LINK TO FLASK APP REPO

<https://github.com/mishaberrien/your-personal-cookbook-webapp>

LIMITATIONS, CONCLUSION & NEXT STEPS

LIMITATIONS & CONCLUSIONS

- Milk, eggs and bread appear in the majority of item similarity searches (these items are purchased often and so are lumped in together).
- item-to-item collaborative filtering recommends items that are similar to an input item (i.e., input basil, and output mint, thyme, fennel) instead of items that go with the item (i.e., pasta, cheese, bacon).

NEXT STEPS

- Build user-user based recommendation system in order to get more ingredients that go together
- Weight common ingredients lower (i.e., milk, eggs and bread)
- Deploy Application via Heroku
- Expand database of recipes and allowing more dietary inputs.

THANK YOU!

*For inquiries and partnerships,
reach me at:
misha.berrien@gmail.com*

*Check out all my projects at my
personal website or on github:
<https://mishaberrien.com/>
<https://github.com/mishaberrien>*

ABOUT ME



*Data Scientist &
Policy Analyst
MPP, Harris School of Public Policy*