



RECIPE RECOMMENDER

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MOTIVATION

- There are too many recipes, hard to choose!
- Goal: Help users find relevant recipes based on preferences & past interactions

DATASET

- Based on data from food.com
- Original data contains more than 230k recipes & 1M ratings
- Rich features (ingredients, nutrition, text) → heavy memory & long training
- Need to down-sample the data to train the model and serve live recommendations in reasonable time.

DATASET SUB-SAMPLING

- Goal: shrink the dataset while preserving recipe diversity
- Tried 3 sampling methods: random, bucketing, k-medoids
- k-medoids Features: TF-IDF(name + desc), ingredients BoW, nutrition
- Keeping only 30% of the recipes gave us good results



DEMO

SCREENSHOTS

My Recipes



oriental style salmon fillets

this is out of the "everyday cooking" cook book. cooking time does not include marinating time.

🕒 13 min 🥄 9 ingredients 📖 9 steps

15-minutes-or-less time-to-make +8 more

♥ Favorited

2012-07-29 00:00:00



hawaiian coffee

here is a coffee to inspire tropical dreams.

🕒 10 min 🥄 4 ingredients 📖 6 steps

15-minutes-or-less time-to-make +15 more

♥ Favorited

2011-05-14 00:00:00



disappearing apple cake

every time i make this super-moist yummy cake it disappears in record time! the phrase that i usually hear when someone tries some for the first time is, "oh my goodness, what is this stuff?!!" ...as they reach for anoth...

🕒 45 min 🥄 11 ingredients 📖 9 steps

60-minutes-or-less time-to-make +24 more

♥ Favorited

2007-07-04 00:00:00



winner winner ranch chicken dinner rsc

ready, set, cook! hidden valley contest entry. i love crispy breaded



island baked chicken

from a friend at ww



spicy wheatberry salad

the inspiration for this concoction came from a wonderful little soup and

SCREENSHOTS



Your Profile

Customize your recipe recommendations

Allergens

Select any allergens you want to avoid in recipes

- | | | | |
|------------------------------------|------------------------------------|---------------------------------|-------------------------------|
| ☐ Peanuts | ☐ Tree Nuts | ☐ Dairy | ☐ Eggs |
| ☐ Shellfish | ☐ Soy | ☐ Gluten | ☐ Fish |

Maximum Cooking Time

How much time do you typically have for cooking?

10 min 120 min

55 minutes

Dietary Restrictions

Select any dietary preferences you follow

- | | | |
|-------------------------------------|---|--------------------------------------|
| ☐ Vegetarian | ☒ Vegan | ☐ Gluten-Free |
| ☐ Dairy-Free | ☐ Keto | ☐ Paleo |

SCREENSHOTS

1 ingredient ice cream

⌚ 5 min 🥄 2 ingredients 📖 6 steps



Description

this ice cream recipe is almost too good to be believed - so rich, creamy and luscious, you'd never know it's fat-free, dairy-free, and with no added sugar or preservatives, is even good for you! from www.instructables.com

Categories

15 minutes or less time to make course preparation low protein healthy 5 ingredients or less
desserts easy low fat frozen desserts dietary low sodium low cholesterol low saturated fat
low calorie healthy 2 low in something

Ingredients

• bananas

• nuts

Instructions

- 1 peel your bananas first
- 2 cut them into small pieces
- 3 freeze for just 1-2 hours on a plate
- 4 blend , blend , blend - scraping down the bowl when they stick
- 5 enjoy the magic moment when they turn into ice cream !
- 6 if you'd like to add additional flavors do so at the end

Nutrition Information +

Recipe Details

Recipe ID: 418500

Date Added: 2010-03-30 00:00:00

Contributor ID: 725179

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Close

ARCHITECTURE

- Frontend: React.js with TypeScript
- Backend: Python- scikit-learn, pandas
- Flask: gives the predictions via API

RECOMMENDATION LOGIC

INITIAL CHALLENGE

TensorFlow Approach - The Problem

- Advanced Neural Collaborative Filtering
- Great accuracy but required GPUs
- Long response times
- Too slow for production

Solution: Move to CPU-optimized approach

RECOMMENDATION LOGIC

OUR ARCHITECTURE

Hybrid ML Solution

- 5 data sources → Feature engineering:
- Multi-modal fusion: text, ingredients, nutrition, sentiment
- 4-model ensemble:
 - Matrix Factorization (collaborative filtering)
 - Content-Based (recipe similarity matching)
 - Sentiment-Aware (review intelligence + bias correction)
 - Meta-Learner (ensemble fusion with optimal weighting)

RECOMMENDATION LOGIC

OUR ARCHITECTURE

Context-aware enhancement boost.

- Time of day, seasonal adjustments (breakfast, winter recipes)
- MMR diversity algorithm (45% variety improvement)
- Prevents echo chambers while maintaining relevance

RECOMMENDATION LOGIC

PRODUCTION RESULTS

Performance Achieved

- <200ms response time
- 100% user coverage (cold start)
- <2GB memory usage
- Ready for millions of users
- 0.62 MAE



Q&A

