



MINIMIZING FOOD WASTE: RECIPE RECOMMENDATION APP

AGENDA

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Overview

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Strategy

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Data & Models

4

Recommendation App

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Limitations & Next Steps

FOOD WASTE



40% of
produced food
goes uneaten



1/3 of food
obtained by
households is
wasted



Major
contributor to
greenhouse gas
emissions

*Sources: Harvard School of Public Health; The Economist;
The American Journal of Agricultural Economics*

CONSUMER FOOD WASTE REDUCTION STRATEGY

- 1 Target at the household level
- 2 Data-based approach
- 3 User-to-user collaborative filtering
- 4 Recommendation App



DATA & METHODS

DATA OVERVIEW



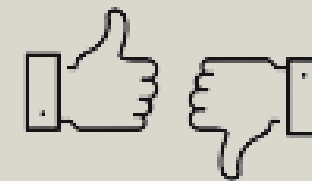
537, 267 Reviews



17,096 Users

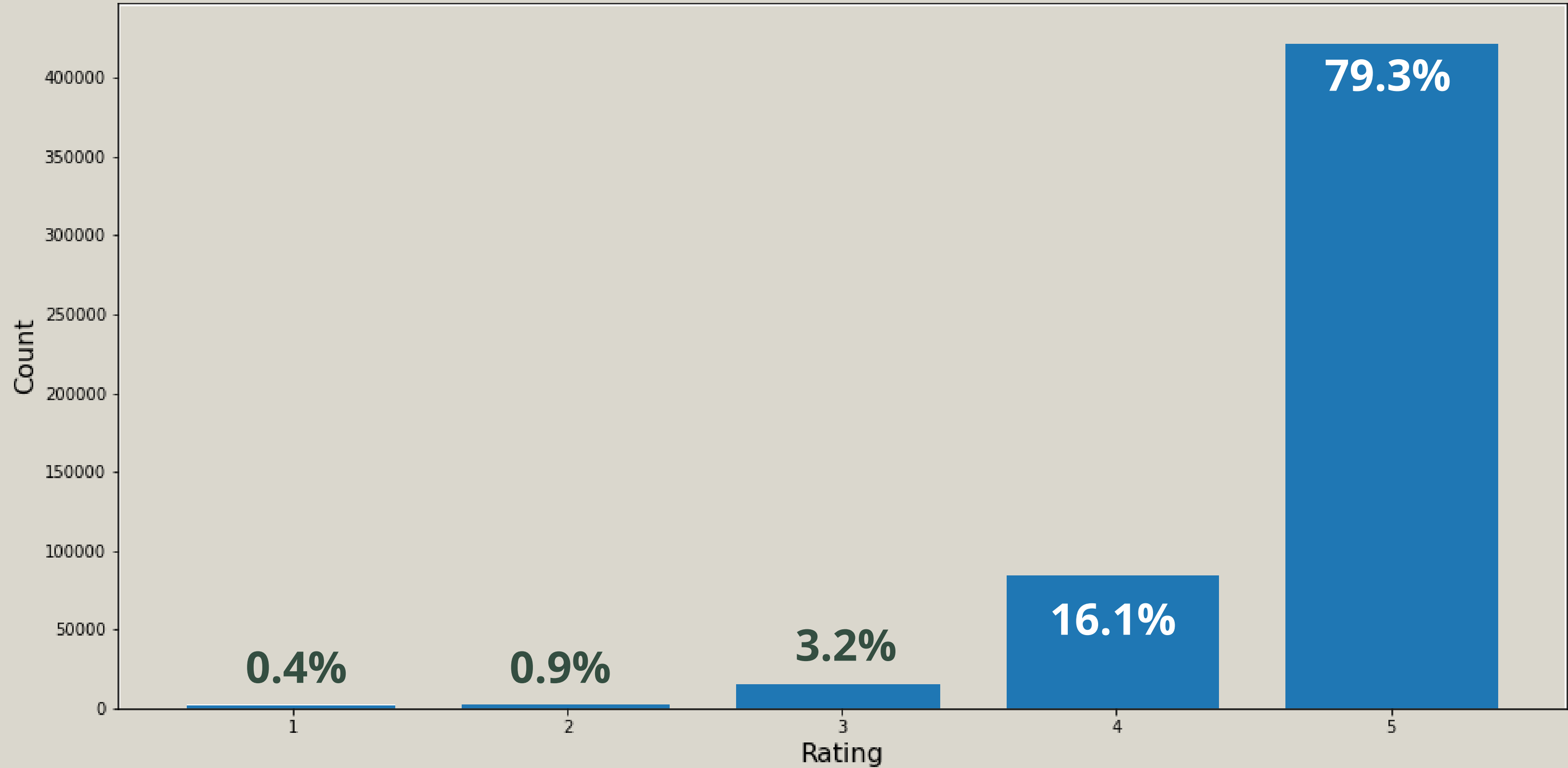


40,526 Recipes



1-5 Review Scale

Distribution of Ratings



Data & Modeling Process

Collaborative Filtering



User A Prior Reviews



Users X Prior Reviews

Ingredient & Subfilter

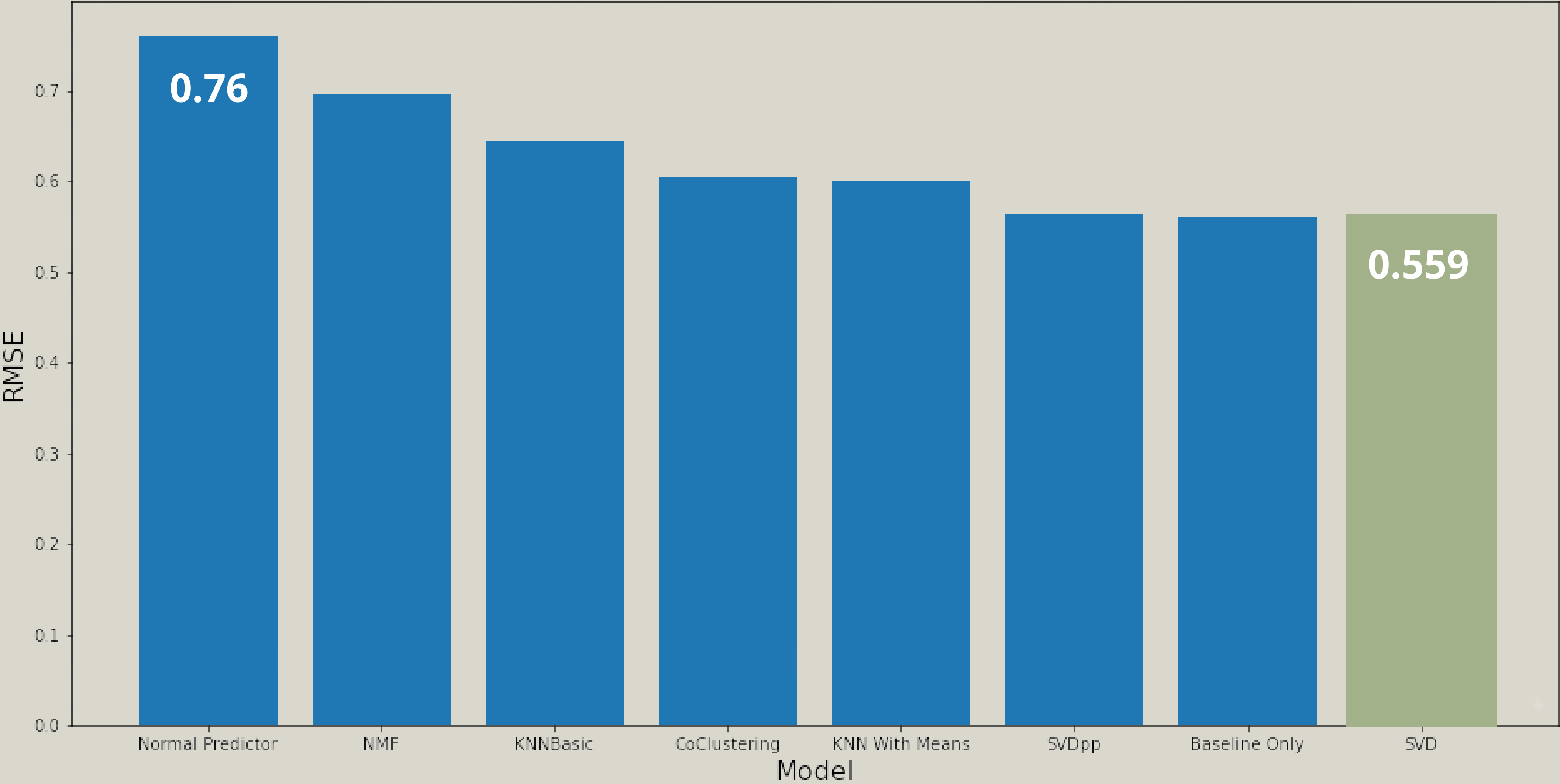
Any
Vegetarian
Not Vegetarian
Low Cal
Low Carb
Sugar Free
Dessert
Beverage

Output

Recipes



Model Performance Based On RMSE



RECIPE RECOMMENDATION TOOL

Recommendation Tool Walkthrough

```
In [*]: recommended_recipes()  
        user_id:   
  
In [ ]:   
  
In [ ]:   
  
In [ ]:   
  
In [ ]:   
  
In [ ]:   
  
In [ ]:   
  
In [ ]: 
```

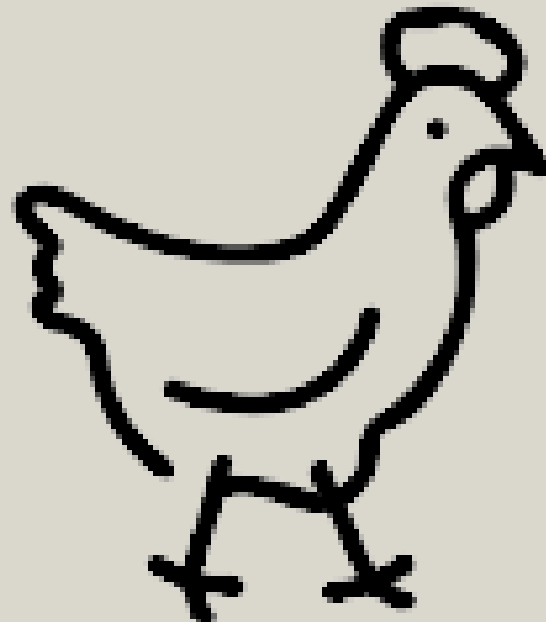
user_id: 462571

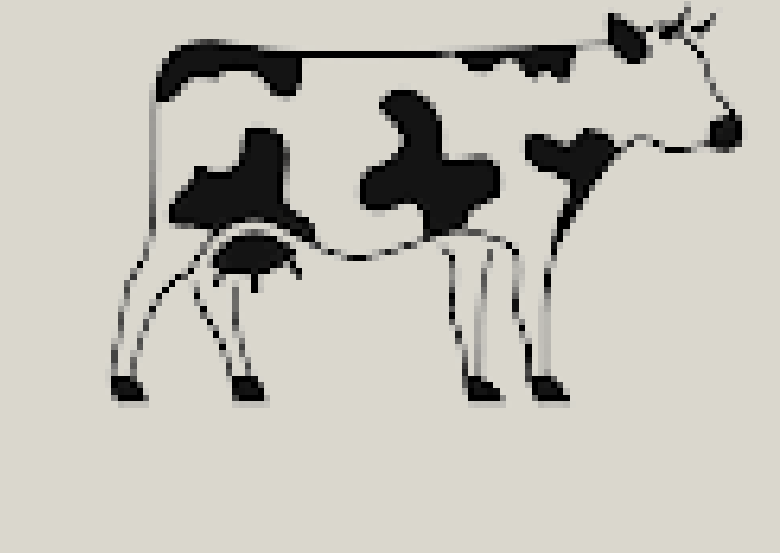
What ingredients do you need to use? chicken

Recipe type? any

How many recipes would you like to see? 4

	name	minutes	ingredients	recipe_type	predicted_rating
399	chicken and cheese french bread pizza	30	[butter, cheddar cheese, parmesan cheese, garlic, dried italian seasoning, french bread, chicken, salt, pepper, mozzarella cheese, red bell pepper, green onion]	[any, not vegetarian]	4.566741
976	couscous jambalaya	40	[raw shrimp, chicken breast, creole seasoning, olive oil, andouille sausages, onion, green bell pepper, celery, garlic, italian plum tomato, bay leaves, worcestershire sauce, hot pepper sauce, chicken stock, salt, fresh ground black pepper, couscous, paprika, garlic powder, black pepper, onion powder, cayenne pepper, dried oregano leaves, dried leaf thyme]	[any, low cal, not vegetarian]	4.549372
96	autumn chicken salad	20	[chicken, red seedless grapes, celery ribs, red delicious apple, pecan halves, mayonnaise, honey mustard, salt, pepper, lettuce leaf]	[any, low cal, low carb, not vegetarian]	4.528772
107	b stilla	130	[butter, chicken, parsley, onion, saffron thread, whole almond, icing sugar, eggs, pepper, cinnamon, phyllo pastry]	[any, not vegetarian]	4.518940





user_id: 462571

What ingredients do you need to use? beef

Recipe type? any

How many recipes would you like to see? 4

	name	minutes	ingredients	recipe_type	predicted_rating
316	homemade stock	125	[water, bay leaf, peppercorns, oregano, thyme, basil, dill, salt, onion, carrot, broccoli stem, spinach leaves, fresh parsley, celery, green beans, tomatoes, mushroom, garlic cloves, shallot, leek, turnip, chicken piece, beef]	[any, low cal, low carb, not vegetarian]	4.529465
88	beef ramen stir fry	20	[beef, red bell pepper, green bell pepper, ramen noodles, snow peas, broccoli, teriyaki sauce, vegetable oil, garlic powder, ginger powder]	[any, low carb, not vegetarian]	4.527217
458	quesadillas for one or two	15	[oil, flour tortillas, cheddar cheese, chopped tomato, green chili, guacamole, green onion, green bell pepper, black olives, sour cream, salsa, refried beans, chicken, turkey, ham, beef, crabmeat, shrimp]	[any, low cal, low carb, not vegetarian]	4.502716
304	hash	20	[potatoes, onion, beef, salt and pepper, vegetable oil, butter]	[any, not vegetarian]	4.494467

user_id: 462571
What ingredients do you need to use? tomato
Recipe type? vegetarian ←
How many recipes would you like to see? 4

	name	minutes	ingredients	recipe_type	predicted_rating
286	three cheese enchiladas	40	[monterey jack cheese, cheddar cheese, cream cheese, pace picante sauce, red bell pepper, green onion, cumin, flour tortillas, lettuce, chopped tomato]	[vegetarian]	4.526545
57	chili cheese omelette burritos	15	[chili, cheddar cheese, eggs, water, salt and pepper, butter, flour tortillas, onion, diced tomato, sour cream, salsa]	[vegetarian, low carb]	4.490707
150	layered hummus dip	15	[hummus, cumin, chopped tomato, garlic salt, cucumber, fresh ground pepper, feta cheese, kalamata olives, parsley]	[vegetarian, low cal, low carb]	4.483711
139	hummus and veggie wrap	5	[tortillas, hummus, cucumber, diced tomato, bell pepper, shoestring carrots, red onions, alfalfa sprout, lettuce]	[vegetarian]	4.461277

user_id: 462571
What ingredients do you need to use? tomato
Recipe type? not vegetarian ←
How many recipes would you like to see? 4

	name	minutes	ingredients	recipe_type	predicted_rating
151	dorito taco salad	20	[ground beef, lettuce, chopped tomato, cheddar cheese, red onion, taco seasoning, ranch style beans, catalina dressing, doritos]	[not vegetarian]	4.500552
362	quesadillas for one or two	15	[oil, flour tortillas, cheddar cheese, chopped tomato, green chili, guacamole, green onion, green bell pepper, black olives, sour cream, salsa, refried beans, chicken, turkey, ham, beef, crabmeat, shrimp]	[low cal, low carb, not vegetarian]	4.489851
251	italian nachos	25	[wonton wrappers, egg white, olive oil, oregano, italian sausage, four cheese pasta sauce, chopped tomato, green onion, sliced ripe olives, pickled jalapeno peppers, mozzarella cheese, red pepper flakes]	[low cal, low carb, not vegetarian]	4.487431
214	great white chili supposed to be by willie nelson	270	[white beans, chicken broth, chicken base, onions, oil, garlic, diced green chilies, ground cumin, dried oregano leaves, cayenne pepper, cilantro, cooked chicken, sour cream, monterey jack cheese, green onion, chopped tomato]	[not vegetarian]	4.485513

Evaluation



Ratings off by
0.56 pts



Recipe Discovery



Relevant



Personalized



Household
Food Waste

Limitations & Next Steps

- 1 Skews to higher ratings
- 2 Indiscriminate Reviewers
- 3 Cold Start Problem
- 4 User Error

THANK YOU!

QUESTIONS?



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