

# RecipEasy

A content-based recipe recommendation engine



Metis NLP Module Presentation

Andrei Levin • 9/17/21

# Recipe inspiration can be hard to come by

"Cooking is a philosophy;  
it's not a recipe."

~ Marco Pierre White

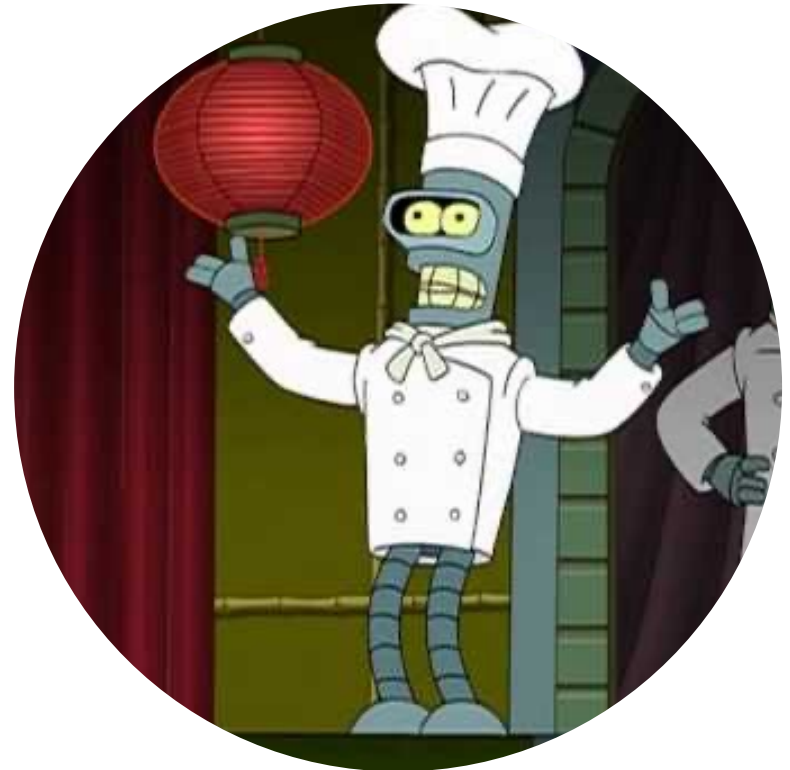


# Recipe inspiration can be hard to come by

"Cooking is a philosophy;  
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~ Marco Pierre White



"If it's chicken— chicken à la king.  
If it's fish— fish à la king.  
If it's turkey— fish à la king."  
~ Bender



**Food.**

RECIPES

POPULAR

KIDS & FAMILY

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## CHEESEBURGER CASSEROLE



★★★★☆ (14)

Recipe by **Marg CaymanDesigns**



**15** People talking  
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# CHEESEBURGER CASSEROLE

READY IN: 40mins

SERVES: 6

UNITS: [US](#)

## INGREDIENTS

[Nutrition](#)

- 1 ½      tablespoons [flour](#)
- 1-2      lb [ground beef](#)
- ¼      cup [onion](#), chopped
- 1      (8 ounce) can [tomato sauce](#)
- ½      cup [ketchup](#)
- 1      teaspoon [salt](#)
- ⅛      teaspoon [pepper](#)
- 1      (16 ounce) can refrigerated  
biscuits
- 1      cup [cheddar cheese](#),  
shredded

## DIRECTIONS

Combine ground beef and flour in skillet. Add onion and brown.

Pour off drippings.

Add tomato sauce, ketchup, salt and pepper.

Pour into 1 1/2-quart casserole dish.

Bake for 10 minutes at 425°F.

Top with cheese and biscuits.

Bake for 10-15 minutes longer.



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[Submit a Recipe Correction](#)

## MY PRIVATE NOTES

[+ Add a Note](#)



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[← RECIPES / QUICK BREADS](#)

COMMUNITY PICK

# BEST BANANA BREAD

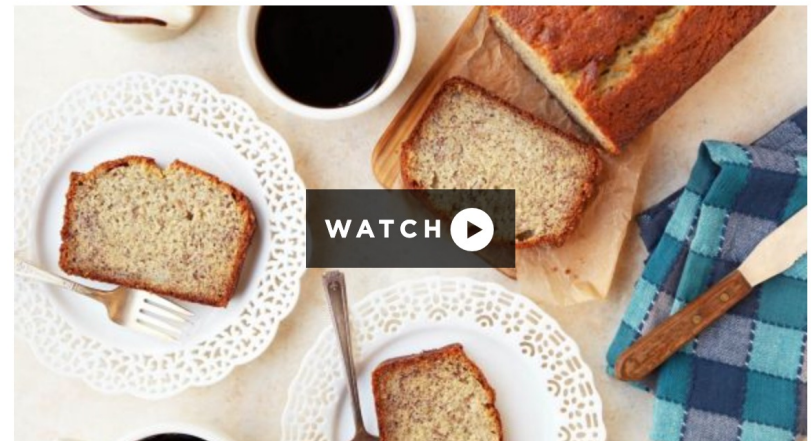


★★★★★ (2289)

Recipe by [lkadlec](#)



3077 People talking  
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[← RECIPES / CHEESE](#)

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Bake for 10-15 minutes longer.

[PRINT RECIPE](#)[Submit a Recipe Correction](#)

## MY PRIVATE NOTES

[+ Add a Note](#)[← RECIPES / QUICK BREADS](#)

COMMUNITY PICK

# BEST BANANA BREAD

READY IN: 1hr 10mins

SERVES: 10

YIELD: 1 loaf

UNITS: [US](#)

## INGREDIENTS

[Nutrition](#)

- ½ cup [butter](#), softened
- 1 cup [granulated sugar](#)
- 2 [eggs](#), beaten
- 3 [bananas](#), finely crushed (for serious and extreme moist and delicious, try 4 bananas)
- 1 ½ cups [all-purpose flour](#)
- 1 teaspoon [baking soda](#)
- ½ teaspoon [salt](#)
- ½ teaspoon [vanilla](#) (optional)

## DIRECTIONS

Remove odd pots and pans from oven.

Preheat oven to 350° / 180°.

Cream together butter and sugar.

Add eggs and crushed bananas.

Combine well.

Sift together flour, soda and salt. Add to creamed mixture. Add vanilla.

Mix just until combined. Do not overmix.

Pour into greased and floured loaf pan.

Bake at 350° / 180° for 55 minutes.

Keeps well, refrigerated.

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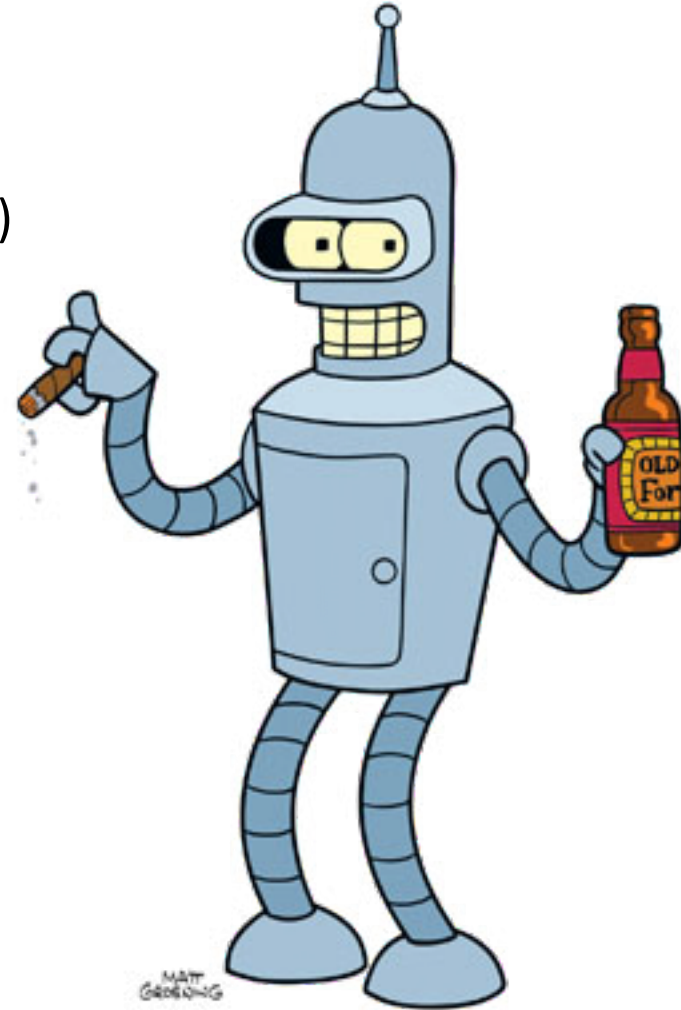
# The boring stuff

## Data

- **17k** recipe webpages scraped (title, ingredients, time, # steps, avg rating, # reviews)
- **6k** recipes used (minimum 4 stars, 4 reviews)

## Model

- NMF with 20 topics
- Noun-based tokenization
- TF-IDF vectorizer
- Cosine similarity for recs





# Ingredients → Tokens

Cranberry Butter

```
['2 1/2 lbs cranberries',  
 '2/3 cup apple juice',  
 '1 cup pure maple syrup',  
 '1/2 cup liquid honey',  
 '1/2 teaspoon ground cinnamon',  
 '1 dash ground ginger']
```



- **Stop words:** Remove measurement units
- **Lemmatization:** Turn nouns to singular form
- **Unigrams:** Nouns only!
- **Bigrams:** At least one word needs to be a noun

# Ingredients → Tokens

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- **Stop words:** Remove measurement units
- **Lemmatization:** Turn nouns to singular form
- **Unigrams:** Nouns only!
- **Bigrams:** At least one word needs to be a noun

```
['apple juice',  
 'pure maple',  
 'maple syrup',  
 'liquid honey',  
 'ground cinnamon',  
 'ground ginger',  
 'cranberry',  
 'apple',  
 'juice',  
 'maple',  
 'syrup',  
 'liquid',  
 'honey',  
 'ground',  
 'cinnamon',  
 'ground',  
 'ginger']
```

# Topics

Topic 0  
flour, baking powder, egg, allpurpose flour, baking soda, sugar, buttermilk, vegetable oil

Topic 1  
olive, olive oil, virgin olive, basil, tomato, fresh basil, oregano, wine

Topic 2  
cheese, parmesan cheese, mozzarella, mozzarella cheese, spaghetti, pasta, breadcrumb, basil

Topic 3  
chicken, breast, chicken breast, boneless skinless, chicken broth, broth, breast half, chicken stock

Topic 4  
potato, onion, carrot, celery, bacon, parsley, paprika, red potato

Topic 5  
chocolate, chocolate chip, semisweet, semisweet chocolate, walnut, cake, cake mix, condensed milk

Topic 6  
lemon, lemon juice, lemon rind, grated lemon, parsley, mayonnaise, sugar, fresh parsley

Topic 7  
butter, peanut, peanut butter, melted butter, bread, flour, sugar, creamy peanut

Topic 8  
water, yeast, dry yeast, flour, sugar, cornstarch, hot water, bread flour

Topic 9  
cream, cream cheese, sour cream, cheese, whipping cream, heavy cream, pie, chicken soup

Topic 10  
tomato, beef, ground beef, onion, bean, tomato sauce, green pepper, chili powder

Topic 11  
vinegar, mustard, wine, wine vinegar, cider, dry mustard, cider vinegar, white vinegar

Topic 12  
soup, mushroom, mushroom soup, of mushroom, cream, onion soup, soup mix, onion

Topic 13  
milk, evaporated milk, condensed milk, flour, skim milk, lowfat milk, egg, powdered milk

Topic 14  
garlic, clove, clove garlic, garlic clove, black pepper, cayenne, garlic powder, ground black

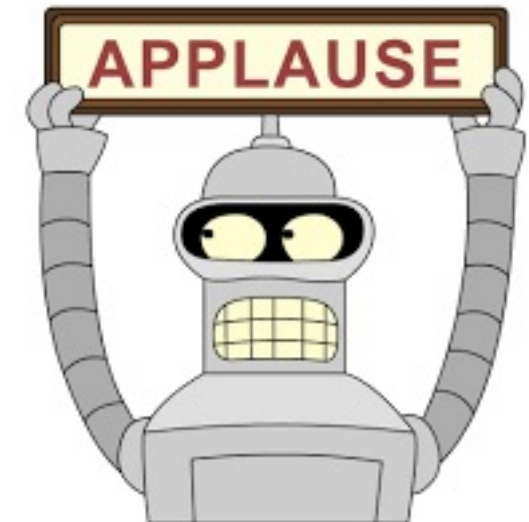
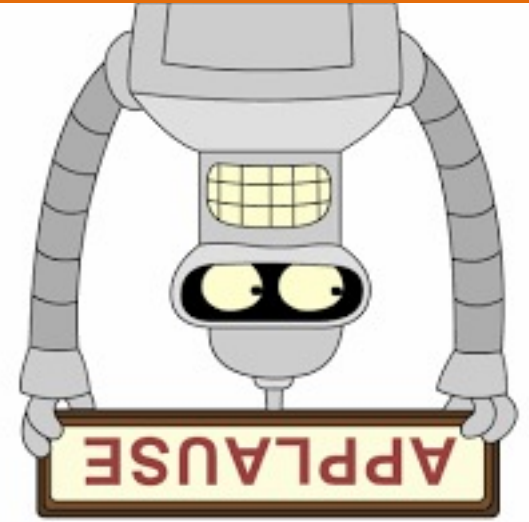
Topic 15  
cinnamon, sugar, brown sugar, nutmeg, apple, ground cinnamon, raisin, baking soda

Topic 16  
cheddar, cheddar cheese, cheese, sharp cheddar, onion, macaroni, green onion, bacon

Topic 17  
orange, orange juice, orange rind, grated orange, pineapple, mandarin, mandarin orange, ginger

Topic 18  
vanilla, sugar, vanilla extract, cocoa, powdered sugar, egg, confectioner sugar, cocoa powder

Topic 19  
corn, syrup, corn syrup, kernel, corn flake, peanut, maple, maple syrup



# Recommendation 1

User Input: broccoli, cheddar cheese, butter, breadcrumbs

Tokens Generated: cheddar cheese, broccoli, cheddar, cheese, butter, breadcrumb

## CHEDDAR BAKED BAGELS AND EGGS

['4 bagels, halved', ' 2 tablespoons butter', ' 8 eggs', ' 1-2 teaspoon salt', ' 1-2 teaspoon pepper', ' 1-2 cup shredded cheddar cheese#item']

## BROCCOLI CASSEROLE

['2 packages chopped frozen broccoli', ' 1 cup mayonnaise', ' 1 small onion, chopped', ' 2 eggs, beaten', ' 2 cups grated cheddar cheese', ' 1-4 - 1-2 cup butter, melted', ' 1 cup breadcrumbs#item']

## SUMMER SQUASH CASSEROLE

['1 1-2 lbs summer squash', ' 1-2 cup butter or 1/2 cup margarine', ' 1 egg', ' 1 medium onion, chopped', ' salt and pepper', ' 12 -15 Ritz crackers, crushed', ' 3-4 cup grated cheddar cheese or 3/4 cup longhorn cheese#item']

## CHEESE SQUARES

['1 cup butter or 1 cup margarine, softened', ' 2 (5 ounce) jars Kraft Old English cheese spread, softened', ' 1 egg', ' 1 (4 ounce) can chopped green chilies', ' 1-4 cup salsa', ' 2 cups shredded cheddar cheese', ' 2 (1 1/2 lb) thinly sliced loaves white bread#item']

## TRADITIONAL MIGAS

['2 teaspoons butter', ' 4 eggs, lightly beaten', ' 2 dashes Tabasco sauce', ' 2 teaspoons onions, chopped', ' 1-2 cup cheddar cheese, grated', ' 2 teaspoons green peppers, chopped', ' tostados, crumbled#item']



[illegible]

Tokens Generated: maple syrup, chocolate chip, maple, syrup, pecan, butter, chocolate, chip

```
[ '1-8 - 1-4 cup Butter Flavor Crisco', ' 1-2 cup light corn syrup', ' 1 tablespoon brown sugar', ' 1-2 teaspoon vanil  
la', ' 1-2 cup all-purpose flour', ' 1-4 teaspoon salt', ' 1-3 cup semi-sweet chocolate chips', ' 1-3 cup coarsely ch  
opped pecans#item']
```

```
[ '1 1/2 lbs quality white chocolate', ' 2 teaspoons vegetable shortening', ' 3 cups Cheerios toasted oat cereal', ' 3 cups corn or 3 cups Rice Chex', ' 3 cups small pretzels', ' 2 cups nuts (I use mixed nuts)#item']
```

```
['Cake', ' 1 cup unsalted butter', ' 8 ounces semisweet chocolate, chopped', ' 5 large eggs', ' 1-4 cup sugar', ' 1-3 cup dark corn syrup', ' Glaze', ' 3-4 cup whipping cream', ' 8 ounces semisweet chocolate, chopped', ' 1 1-2 tablespo ons unsalted butter, room temperature', ' 1 1-2 tablespoons light corn syrup#item']
```

```
['12 cups popped popcorn', ' 2 1-2 cups salted peanuts', ' 1 3-4 cups milk chocolate chips', ' 1 cup corn syrup', ' 1-4 cup butter#item']
```

```
['1 cup sugar', ' 1 cup white corn syrup', ' 1 cup peanut butter', ' 6 cups Rice Krispies', ' 6 ounces chocolate chips', ' 6 ounces butterscotch chips#item']
```



# Thank You!

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## Rejected App Names...

- Recipe Rustler
- Chef's Kiss
- Ratatouille.io
- Recipe Tayyip Erdogan
- Ma, the Meatloaf!

