Predicting NY Times Cooking Recipe Popularity

Joe Serigano - DSIR 523

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The New York Times

Cooking

NYT Cooking is a digital source for 20,000+ of the best recipes from The New York Times along with how-to guides for home cooks of every level.

NYT Cooking recipes posted per year
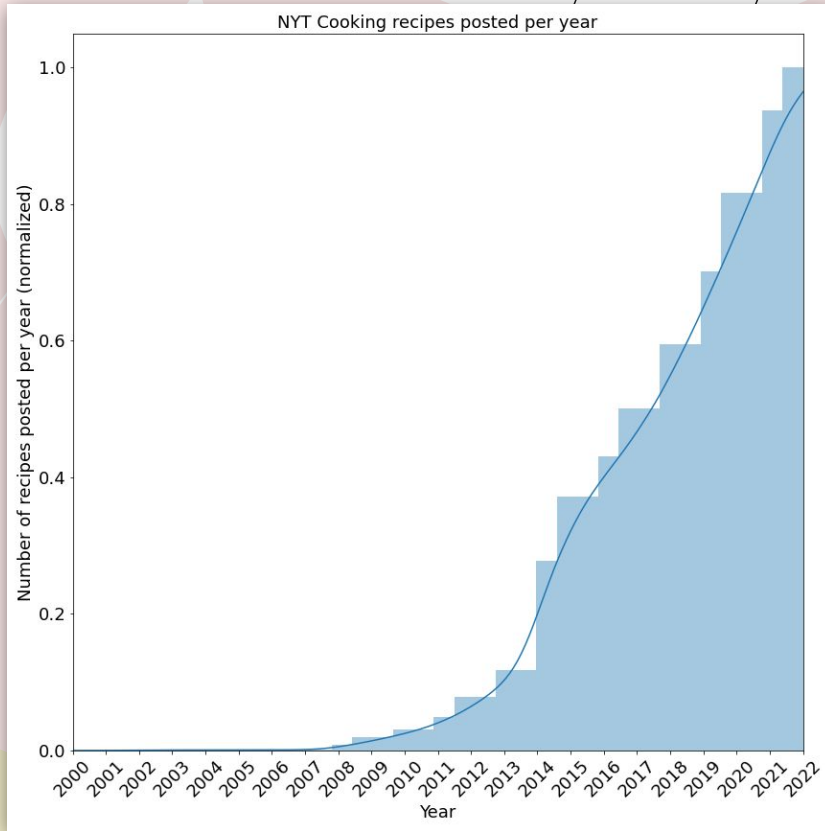
Number of recipes posted per year (normalized)

Year

The New York Times

Cooking

NYT Cooking is a digital source for 20,000+ of the best recipes from The New York Times along with how-to guides for home cooks of every level.

NYT Cooking has grown significantly since 2014.

Number of recipe ratings per year

The New York Times

Cooking

In the digital age, online traffic and engagement are huge metrics of success. This can be monitored via total number of recipe ratings.

- NYT Cooking requires a paid subscription.

- Retention of existing, loyal subscribers and acquisition of new subscribers is key.

- This can only be accomplished by creating engaging content for users.
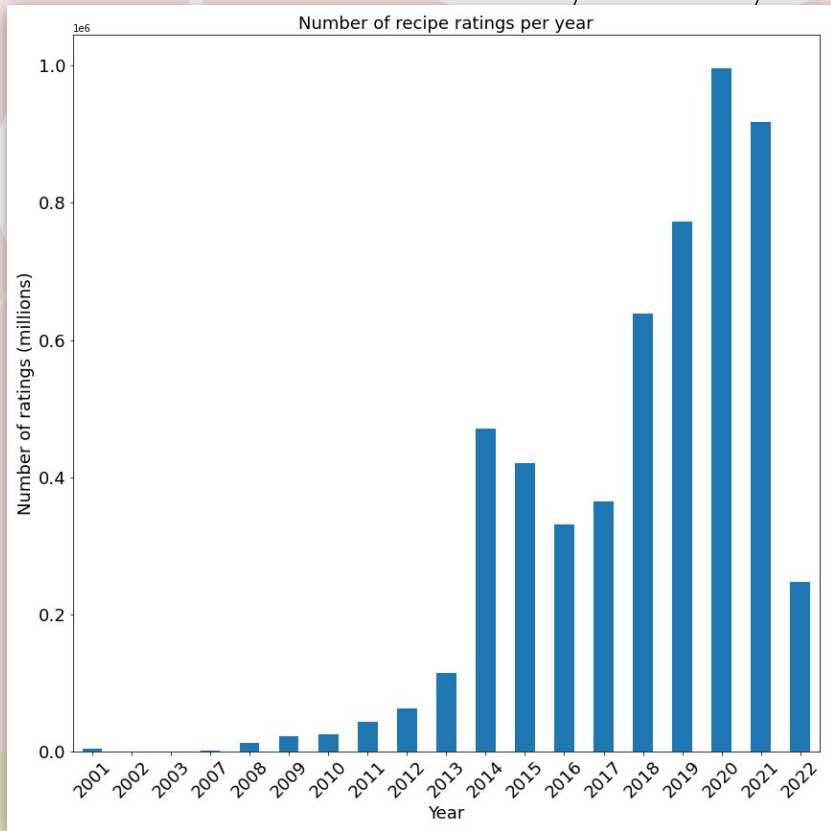
Objective:

- How can NYT Cooking improve their recipe popularity and overall site traffic?
    - Determine what characteristics of a recipe are most likely to increase the overall popularity.
    - Recommend changes that can be made to recipe before posting.

Method:

- Generate 10,000 NYT Cooking URLs using XML-Sitemaps.
- Scrape NYT Cooking recipe data using recipe_scrapers tool from Github user hhursev.
- Create classification models to predict whether a recipe will create higher than average site traffic based on several features.

Recipe rating count will be used as a proxy for recipe popularity and overall site traffic.

- A popular recipe will be a recipe with a rating count greater than the median numbers of ratings.

- Goal: Predict if a recipe has greater than 336 ratings.

- Baseline model:

  - 50.01% of recipes have a rating count less than the median.

Number of ratings per recipe (median = 336)
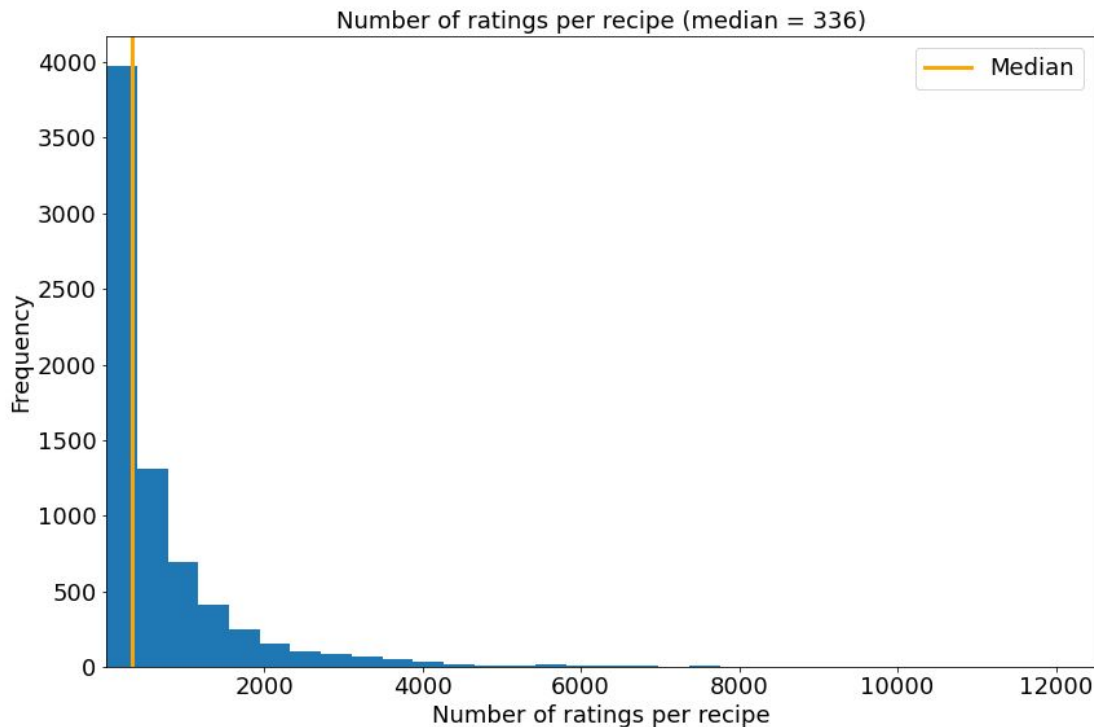
Recipe overview:

What features impact a recipe's overall popularity?

- Title
- Author
- Yield
- Time
- Description word count
- Tags
- Cuisine
- Number of ingredients
- Rating
- Number of steps
- Steps word count
- Date posted

Creamy Macaroni and Cheese

By Julia Moskin

YIELD   6 to 8 servings

TIME   1 hour 40 minutes

Save to Recipe Box

There are two schools of thought about macaroni and cheese: Some like it crusty and extra-cheesy (here's our recipe), while others prefer it smooth and creamy. But most people are delighted by any homemade macaroni and cheese. It is light years ahead of the boxed versions. This creamy version has one powerful advantage for the cook: There's no need to preboil the pasta. It cooks in the oven, absorbing the liquid from the dairy products.

Featured in: The Winter Cook; Macaroni And Lots Of Cheese.

▶ **LEARN:** How to Make Mac and Cheese

Con Poulos for The New York Times. Food Styling: Simon Andrews.

American, Casseroles, Cottage Cheese, Macaroni, Macaroni, Sharp Cheddar Cheese, Brunch, Dinner, Lunch, Weekday, Weeknight, Main Course, Side Dish, Winter, Christmas, New Year's Day, Thanksgiving

Mark as **Cooked**   13,116 ratings ★★★★★

INGREDIENTS

2 tablespoons unsalted butter

1 cup cottage cheese (not low-fat)

2 cups milk (not skim)

PREPARATION

Step 1

Heat oven to 375 degrees and position an oven rack in upper third of oven. Use 1 tablespoon butter to grease a 9-inch round or square baking pan.

# Rating and number of ratings per recipe are highly correlated.

People are more likely to interact with a recipe they deem to be 5 stars! Overall rating is a strong predictor of site traffic and recipe popularity.

But what makes a good recipe?

Average number of reviews per recipe rating
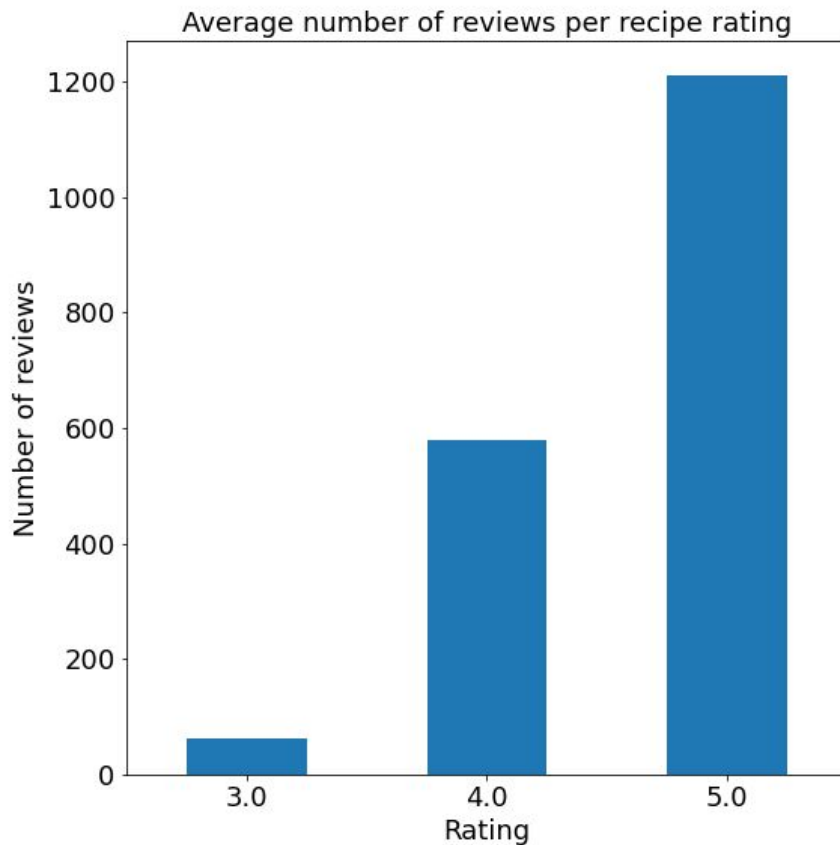
Strong indicators of a popular recipe: Author

- 8% of authors have published 66% of NYT recipes.

- Authors with more published recipes also tend to have a higher amount of ratings per recipe.

Top 15: Author
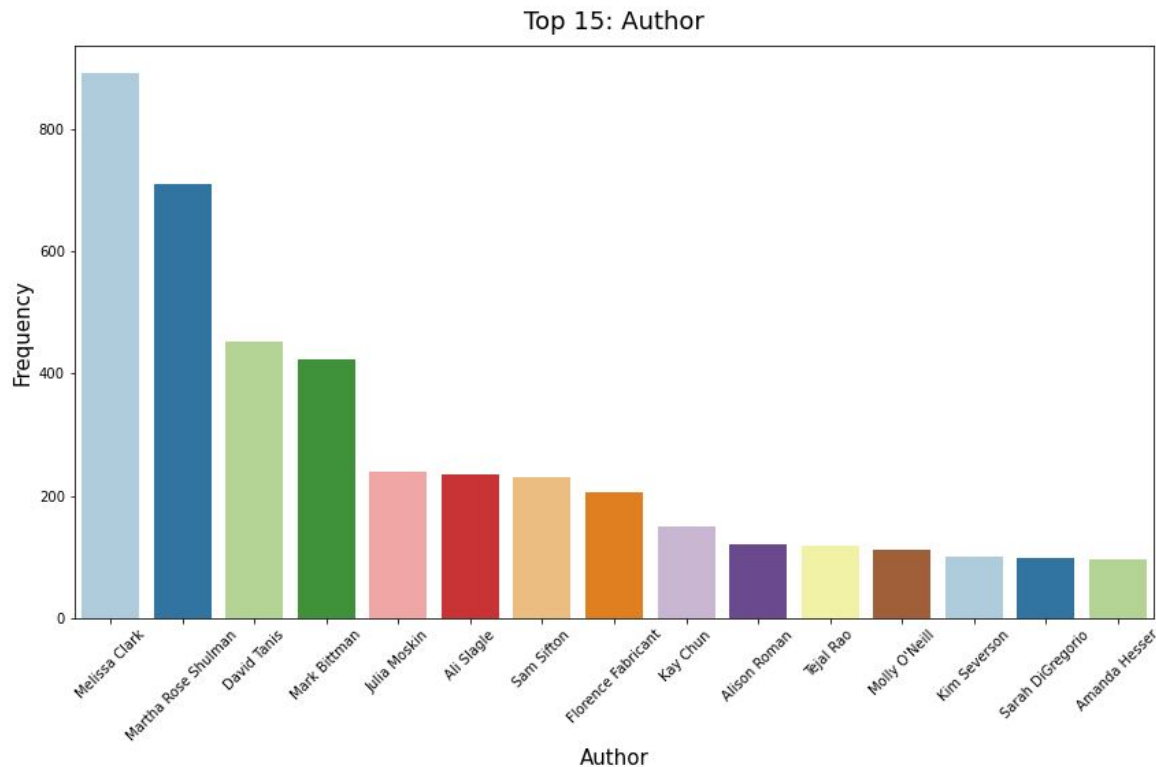
Strong indicators of a popular recipe: Cuisine

- Cuisine types that Americans would consider exotic tend to underperform on NYT Cooking.

Top 15: Cuisine
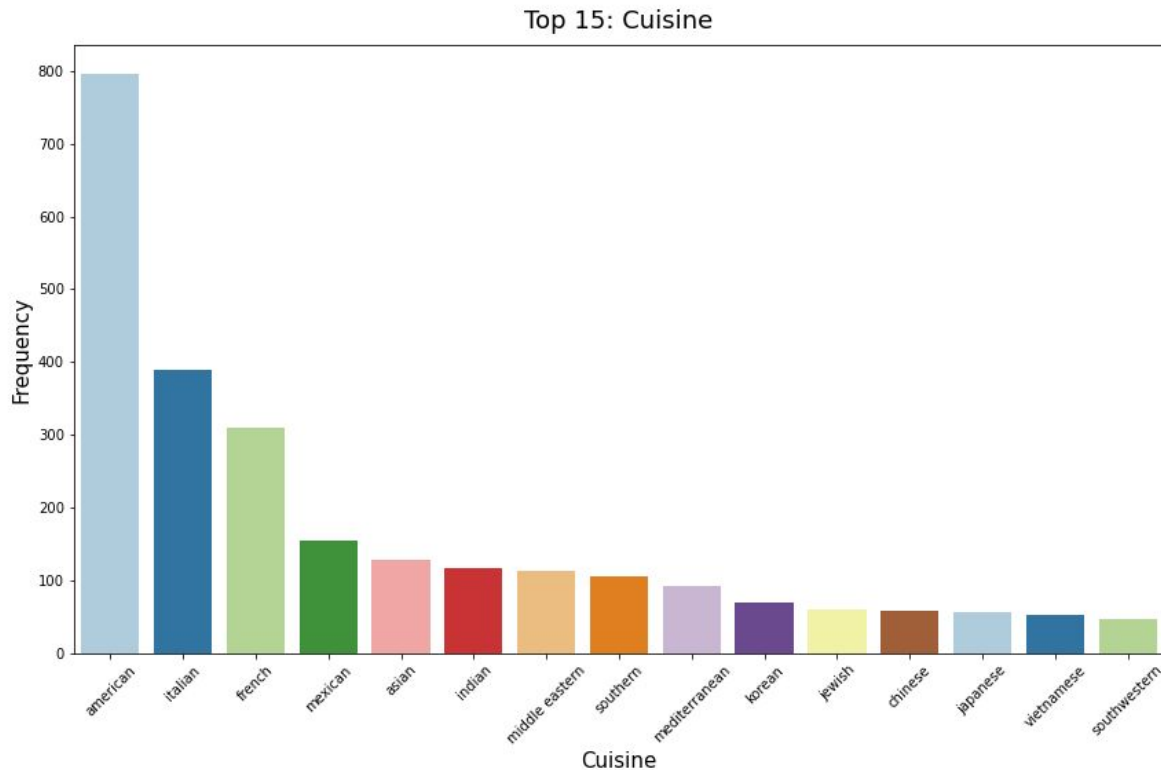
Feature engineering:

- NYT tags include the key ingredients for each recipe.

- All tags appearing in more than 15 recipes are used for modeling.

- 109 tags in total were used in model.

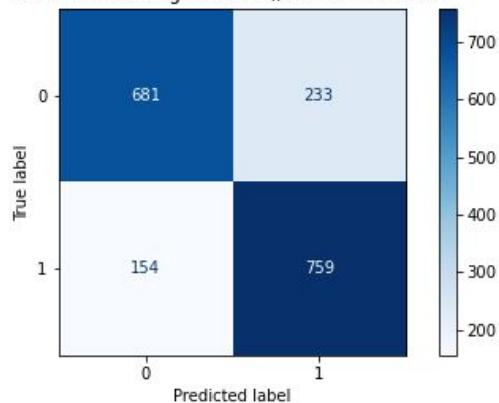- Categorical features such as *dinner, pasta, easy*, were also included.

Top 25 frequently used tags
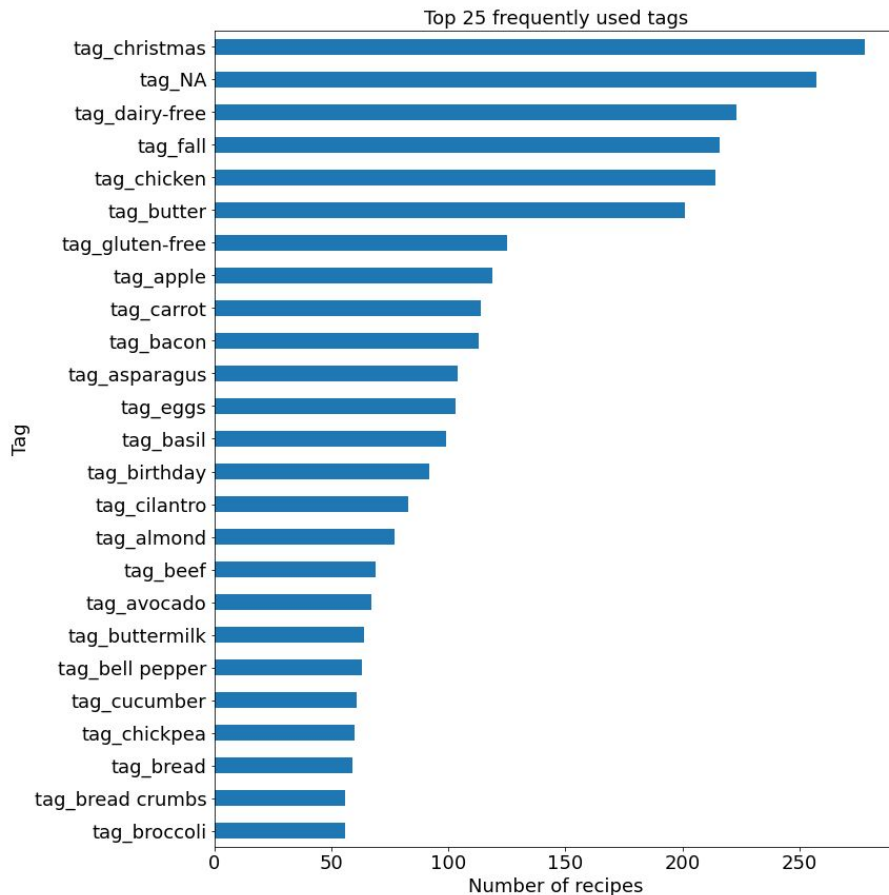
Modeling:

- After hyperparameter tuning and creating a stacked model, GradientBoostClassifier() performed the best.

| Model	Accuracy
GradientBoost	**0.79**
Stacked model	0.78
RandomForest	0.77
XGBoost	0.77
Adaboost	0.76
Baseline	0.50

GradientBoostingClassifier() Confusion Matrix

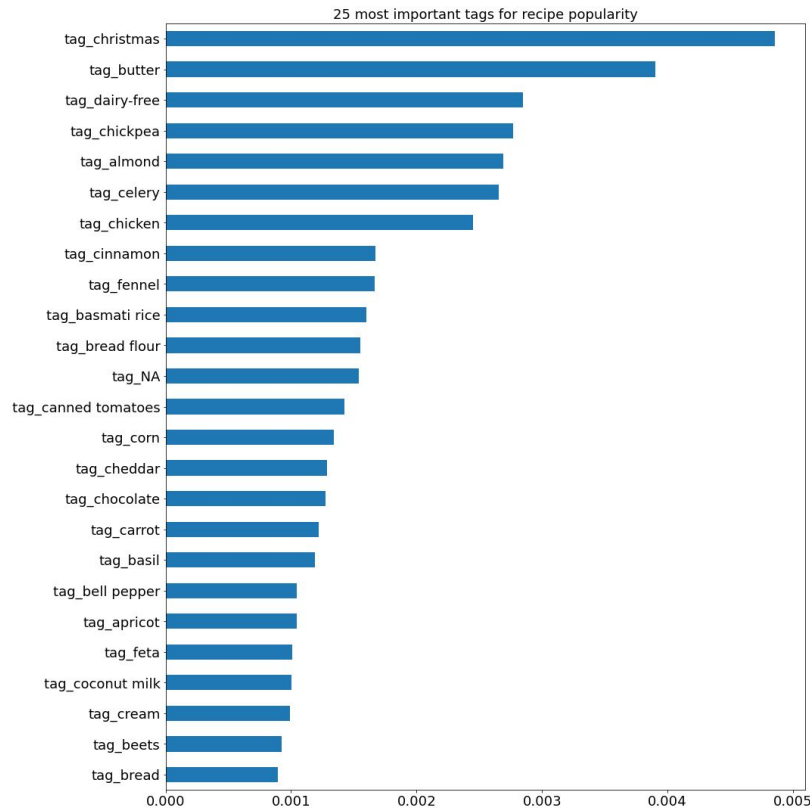GradientBoostingClassifier() ROC-AUC Curve
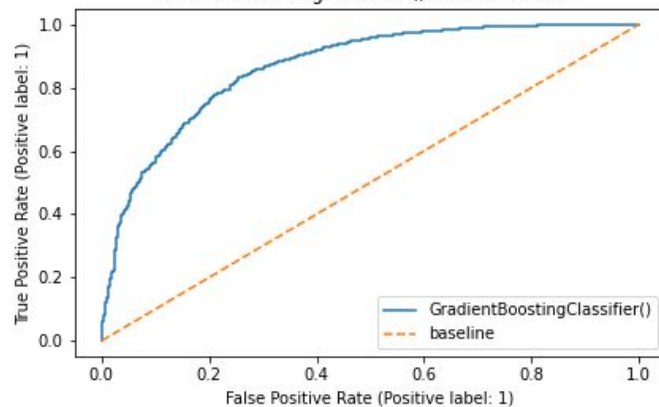
Modeling insights & recommendations

- Wordier recipes tend to have more reviews and be more popular, perhaps because they include more information and lead to better results.

- Comfort foods such as desserts and pasta perform better than others.

- Posting a recipe on Wednesday leads to more online interaction.

- Melissa Clark, David Tanis, and Alison Roman publish the most popular recipes.

25 most important features for recipe popularity
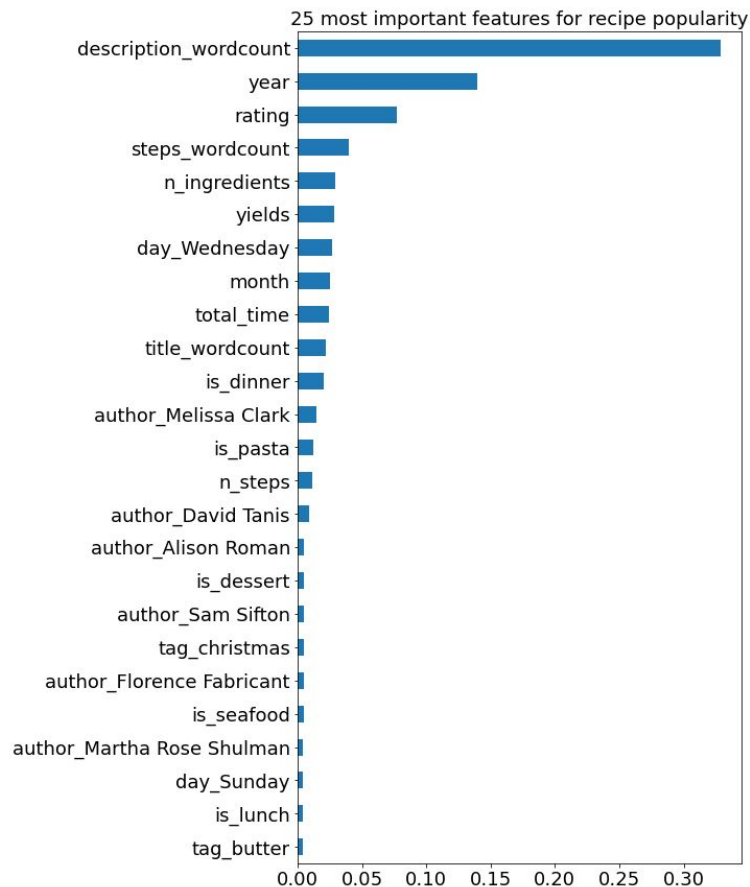
Tags that lead to the most popular recipes:

- People love christmas recipes! (NYT is known for their christmas cookies)

- Recipes including butter, chickpeas, almonds, and chicken produce a lot of site traffic.

- Dairy-free recipes or recipes including celery, cinnamon, and fennel do not typically perform well (negative correlation to rating count).

25 most important tags for recipe popularity

Thank you!

Questions?

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