Recipe Ad Targeting

Problem

The Facts

- Total U.S. spending on food advertising was $151 billion dollars in 2018. This was a 4.1% increase from 2017.
- According to the New York Times, a person living in a city today sees over 5,000 ads per day.

Big Question

How can we target successful ad placement in a world where food related ads are everywhere?

Scenario

Scenario

- We work as an ads strategy consultant to businesses selling products and services related to the food industry (Williams-Sonoma, KitchenAid, Blue Apron, Hello Fresh, etc...)
- These companies want to place their ads only on webpages that they know people will visit a lot.
- “Likes” is our proxy for web-traffic, without knowing how many people visited the page.

Business Question

Can we predict if a recipe will be "liked" a lot, to understand where to run our ads?

Data

Data Source

- Our data source and target website for advertising is **https://spoonacular.com** - an aggregating website and app for people to collect and store all of their favorite recipes all in one place.

Description

- The Spoonacular Nutrition, Recipe, and Food API allows us to access over 365,000 recipes and 86,000 food products.
- We obtained the 1000 most popular recipes on Spoonacular.
- Each recipe provides number of “likes”, calories, prep time, price per serving, full ingredients list, full nutritional breakdown, and confirms if it is compliant with a particular diet.

Predictors

Best Predictors For “Liked” Recipes

- Number Of Ingredients
- Prep Time
- Saturated Fat
- Sodium
- Vitamin K
- Fiber

Target

- “Likes”
  - The median for a recipe’s “Likes” is 1300.
  - **If “Likes” > 1300,** then it’s a **winner.**
  - **If “Likes” < 1300,** then it’s a **loser.**

Model Results

Performance

We want to **maximize** the potential to **predict correctly** and make money.

We want to **minimize** the potential to **predict wrong** and waste money.

So, the **“precision”** of our model is the most important metric to consider.

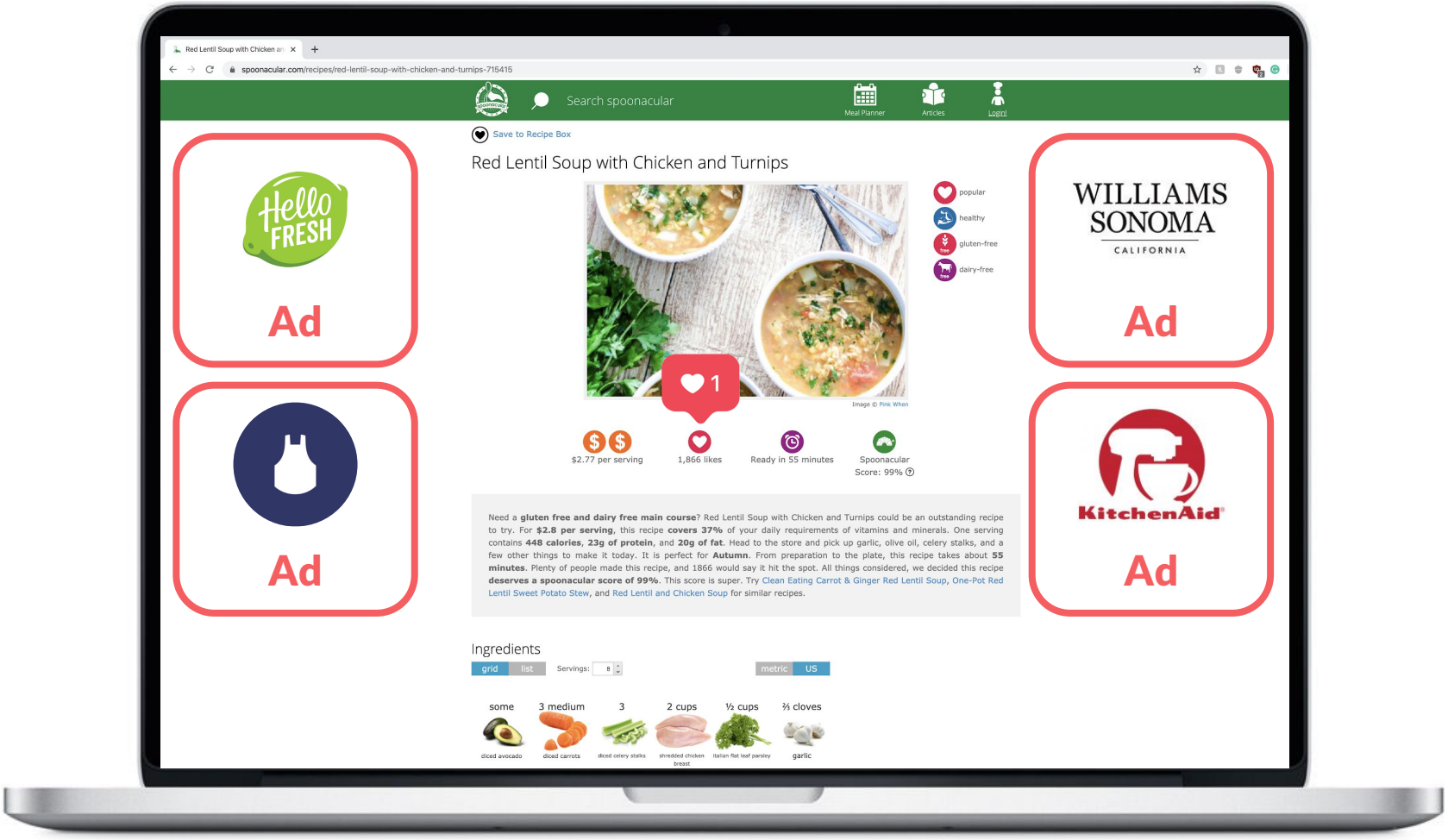
$$\text{Precision} = \frac{\text{Number Of Good Investments}}{\text{Total Number Of Investments}}$$

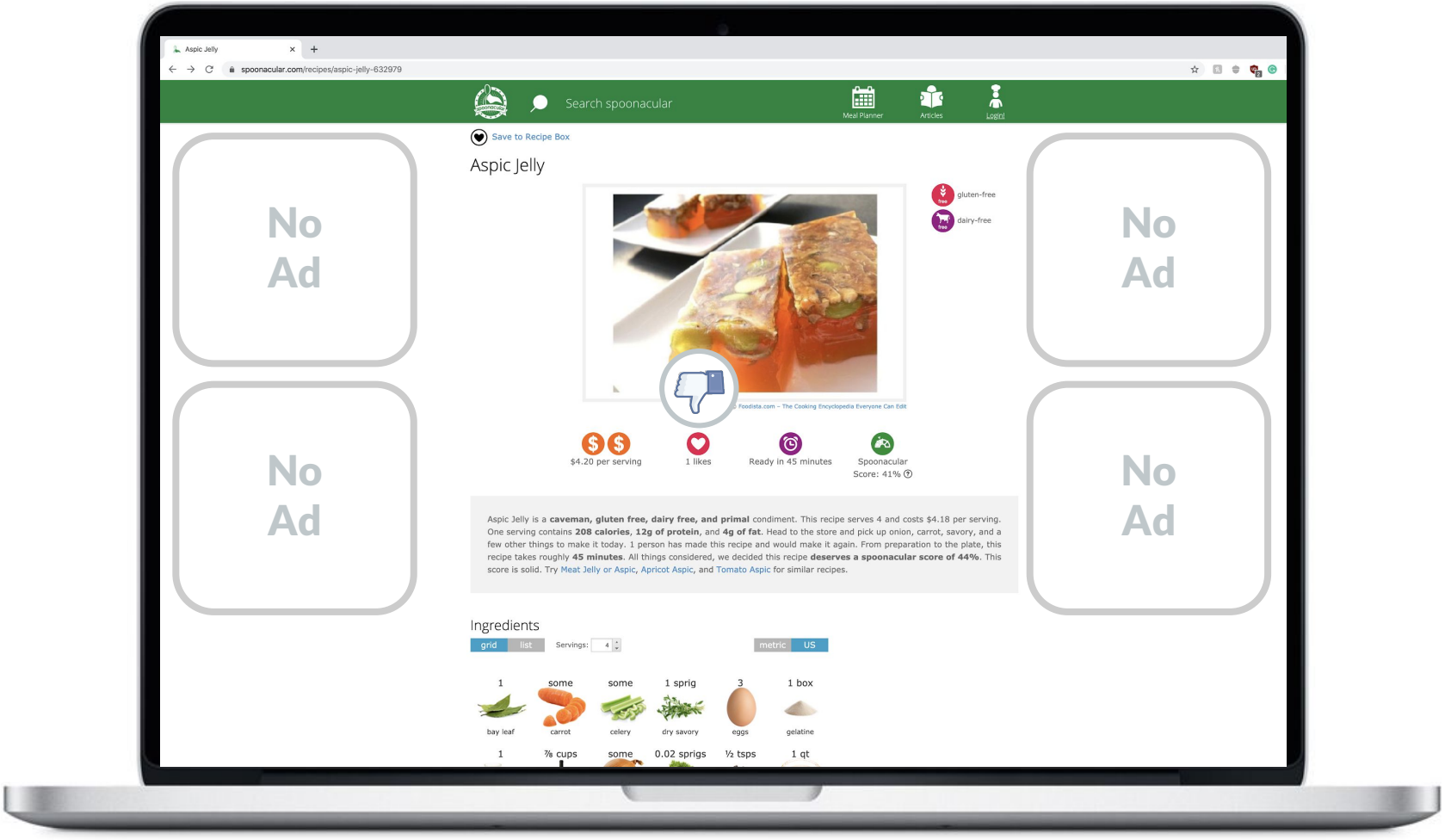
$$\text{Precision} = 68.1\,\%$$

Recommendation:

Follow the model to invest in ads!

For every 3 ads, 2 ads will be a good investment and 1 ad may be a loss.


Red Lentil Soup with Chicken and
spoonacular.com/recipes/red-lentil-soup-with-chicken-and-turnips-715415
Search spoonacular
Meal Planner
Articles
Login
Save to Recipe Box
Red Lentil Soup with Chicken and Turnips
popular
healthy
gluten-free
dairy-free
Image © Pink When
1
$2.77 per serving
1,866 likes
Ready in 55 minutes
Spoonacular Score: 99%
Need a gluten free and dairy free main course? Red Lentil Soup with Chicken and Turnips could be an outstanding recipe to try. For $2.8 per serving, this recipe covers 37% of your daily requirements of vitamins and minerals. One serving contains 448 calories, 23g of protein, and 20g of fat. Head to the store and pick up garlic, olive oil, celery stalks, and a few other things to make it today. It is perfect for Autumn. From preparation to the plate, this recipe takes about 55 minutes. Plenty of people made this recipe, and 1866 would say it hit the spot. All things considered, we decided this recipe deserves a spoonacular score of 99%. This score is super. Try Clean Eating Carrot & Ginger Red Lentil Soup, One-Pot Red Lentil Sweet Potato Stew, and Red Lentil and Chicken Soup for similar recipes.
Ingredients
grid
list
Servings:
metric
US
some
diced avocado
3 medium
diced carrots
3
diced celery stalks
2 cups
shredded chicken breast
½ cups
Italian flat leaf parsley
⅔ cloves
garlic
HelloFRESH
Ad
Ad
WILLIAMS SONOMA
CALIFORNIA
Ad
KitchenAid
Ad


Aspic Jelly
spoonacular.com/recipes/aspic-jelly-632979
Search spoonacular
Meal Planner
Articles
Login!
No Ad
No Ad
No Ad
No Ad
Save to Recipe Box
Aspic Jelly
gluten-free
dairy-free
Foodista.com – The Cooking Encyclopedia Everyone Can Edit
$4.20 per serving
1 likes
Ready in 45 minutes
Spoonacular Score: 41%
Aspic Jelly is a caveman, gluten free, dairy free, and primal condiment. This recipe serves 4 and costs $4.18 per serving. One serving contains 208 calories, 12g of protein, and 4g of fat. Head to the store and pick up onion, carrot, savory, and a few other things to make it today. 1 person has made this recipe and would make it again. From preparation to the plate, this recipe takes roughly 45 minutes. All things considered, we decided this recipe deserves a spoonacular score of 44%. This score is solid. Try Meat Jelly or Aspic, Apricot Aspic, and Tomato Aspic for similar recipes.
Ingredients
grid
list
Servings: 4
metric
US
1 bay leaf
some carrot
some celery
1 sprig dry savory
3 eggs
1 box gelatine
1
⅞ cups
some
0.02 sprigs
½ tsps
1 qt

Improvements

- Obtain **web-traffic metrics** instead of using “Likes.”
- **Pull more data** from the Spoonacular database.
- Use **Natural Language Processing (NLP)** to have better predictors.

Questions?

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Nimu Sidhu
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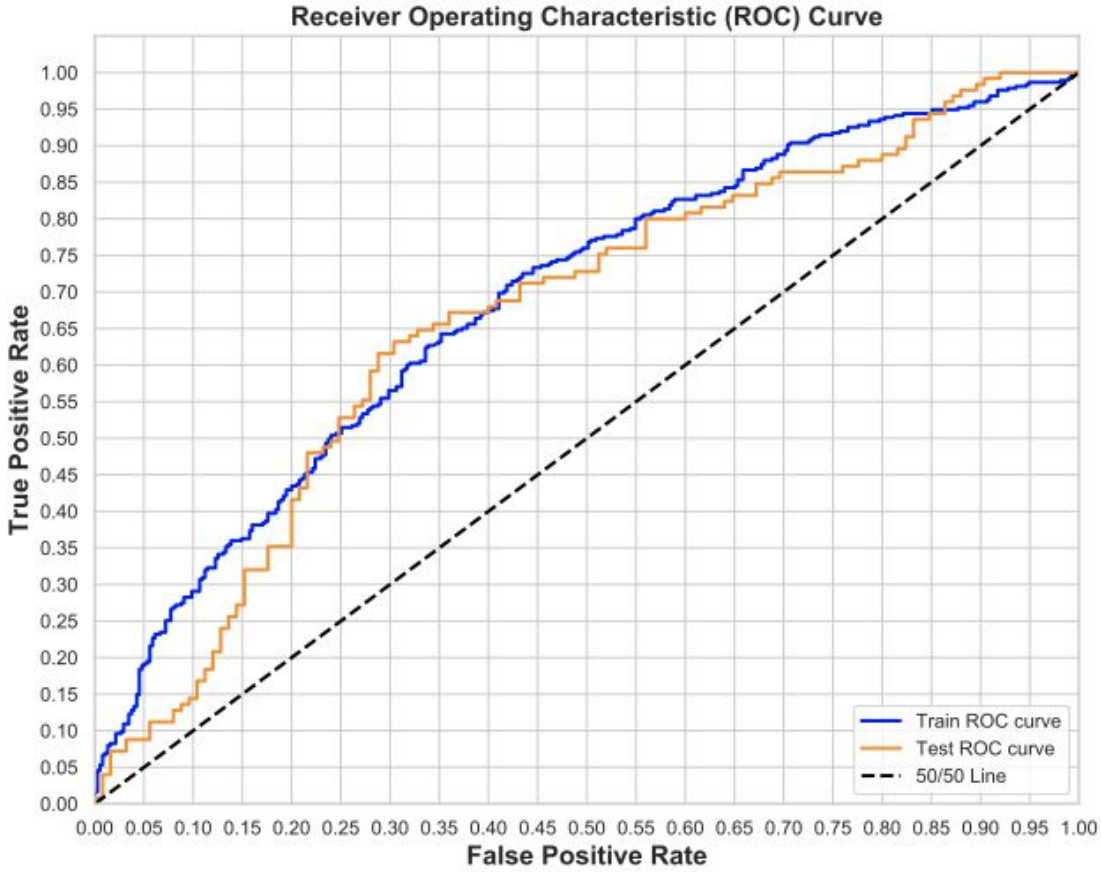
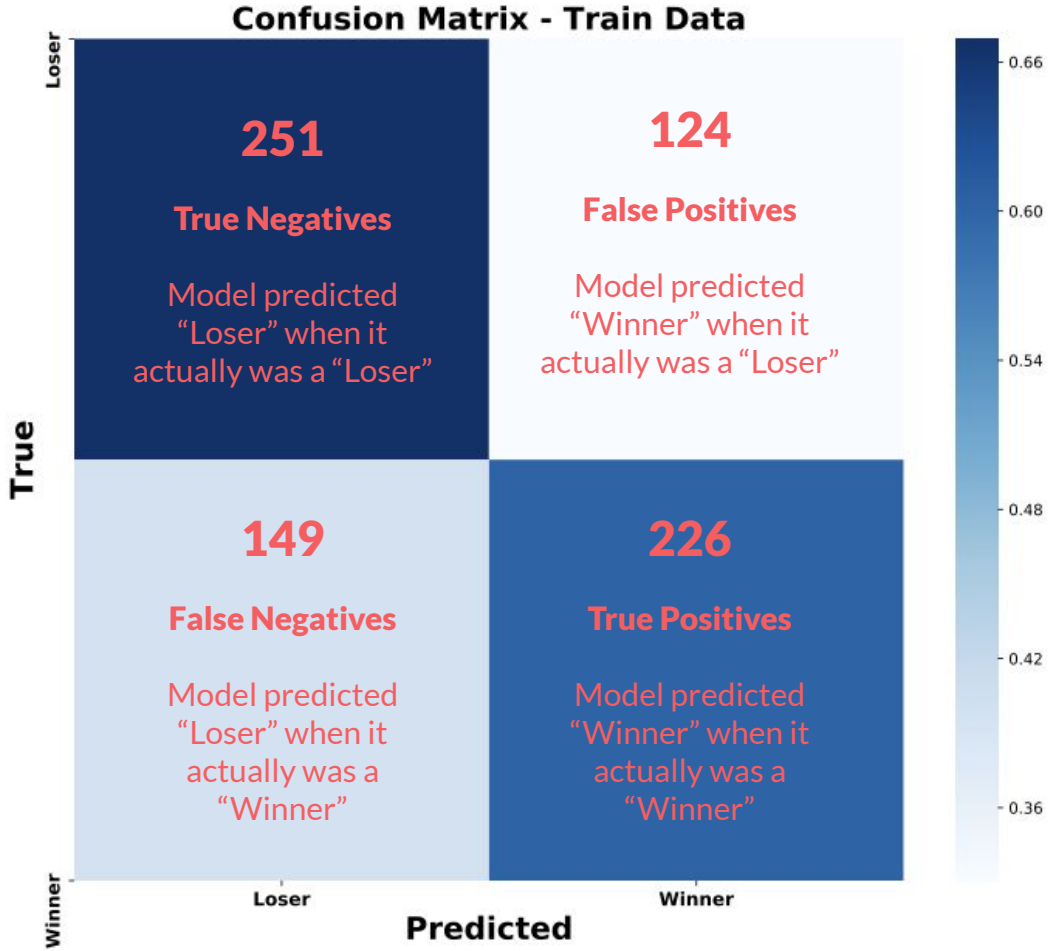
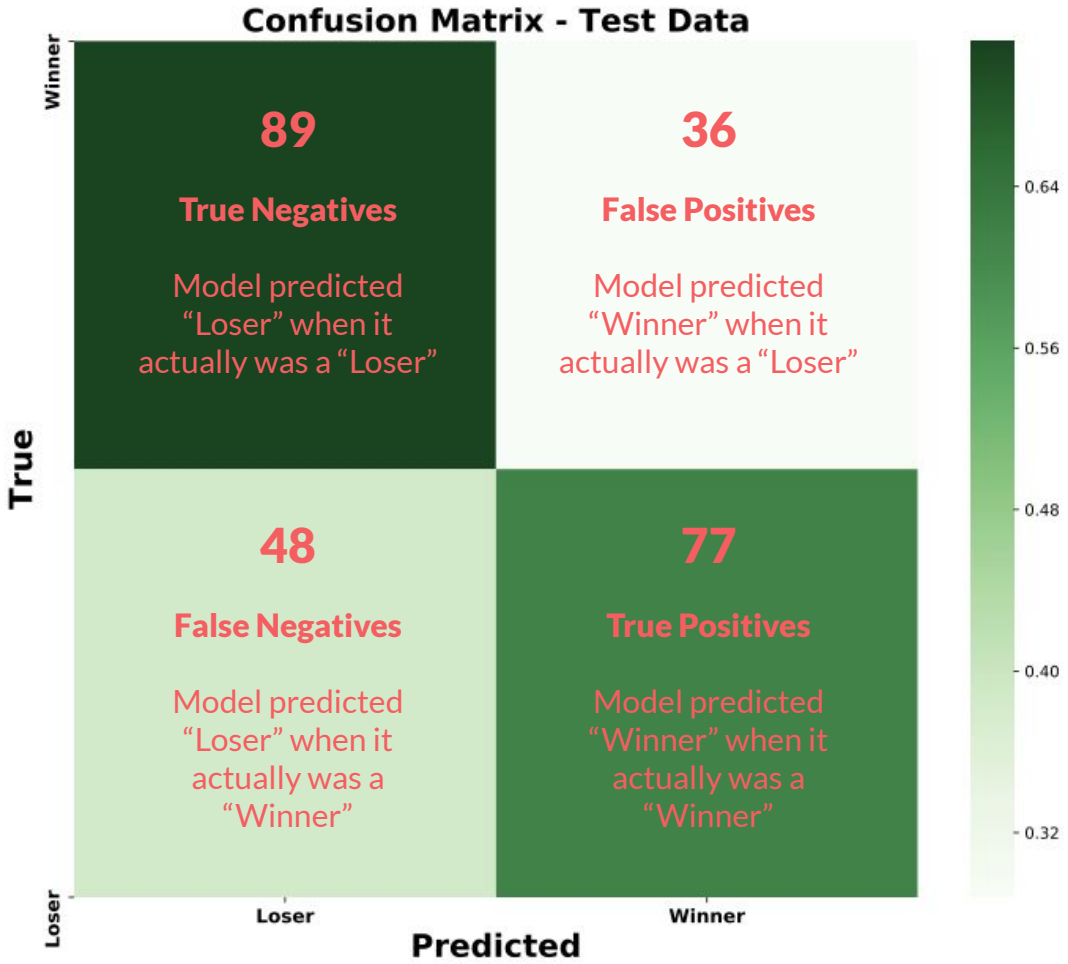
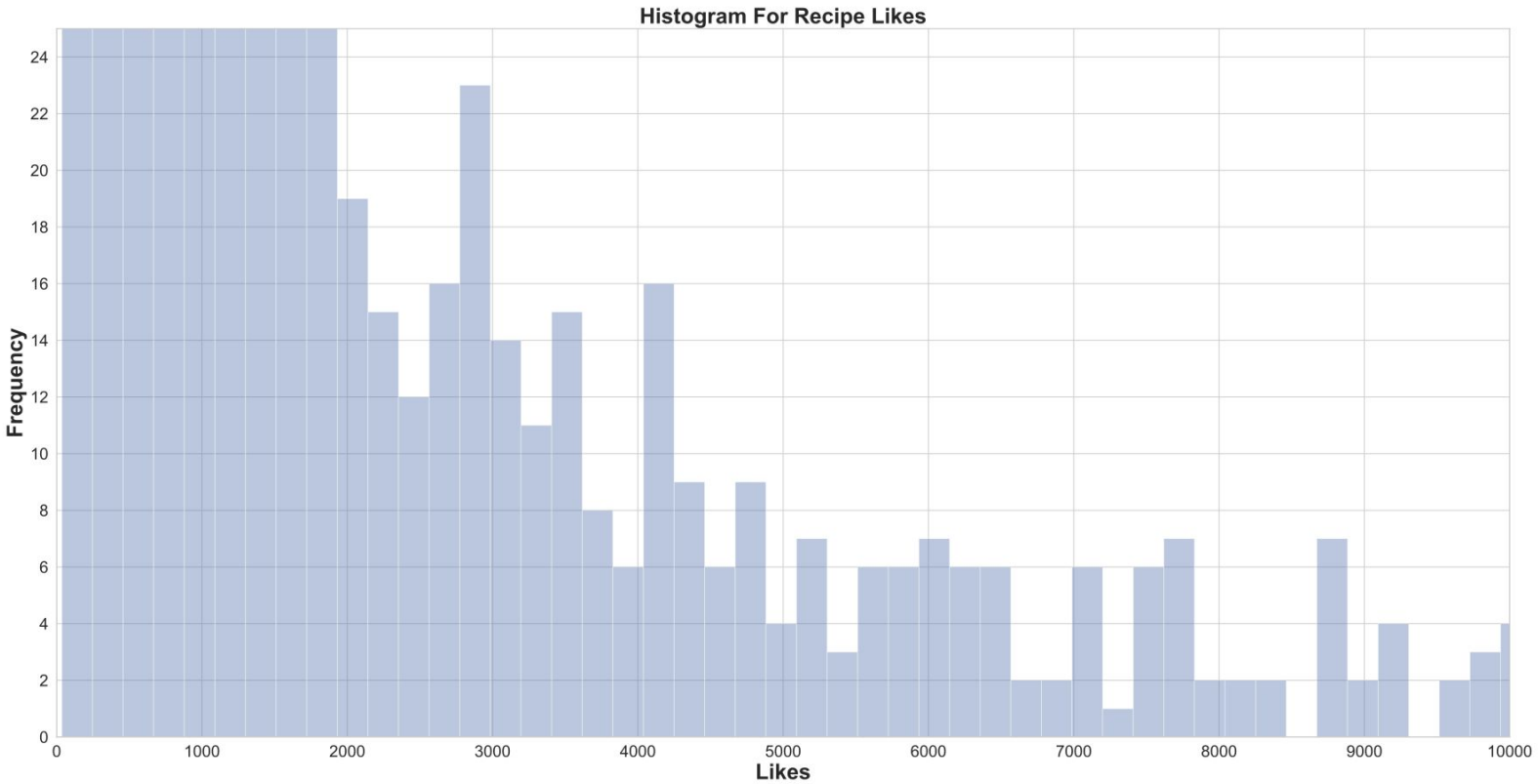
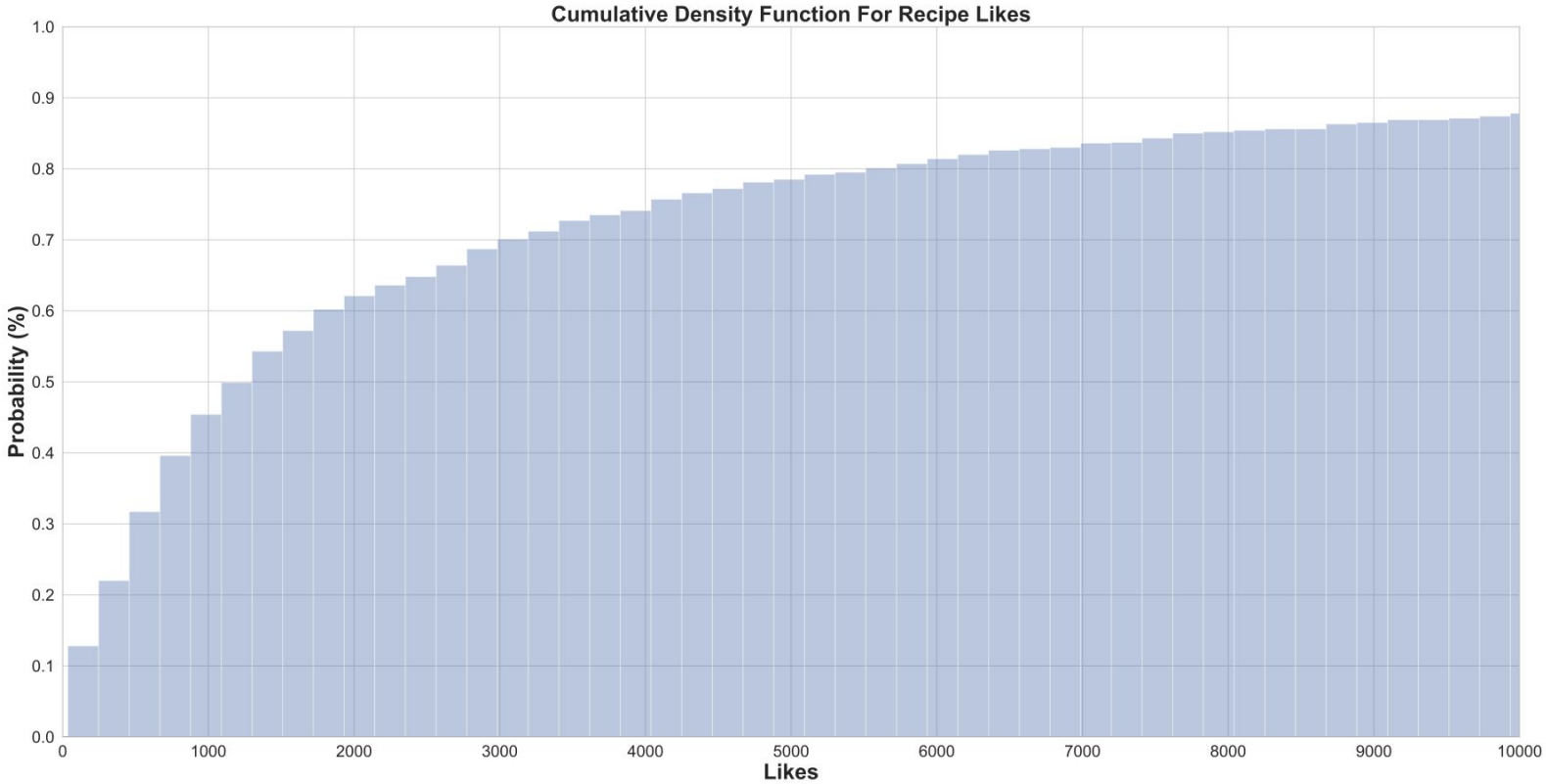
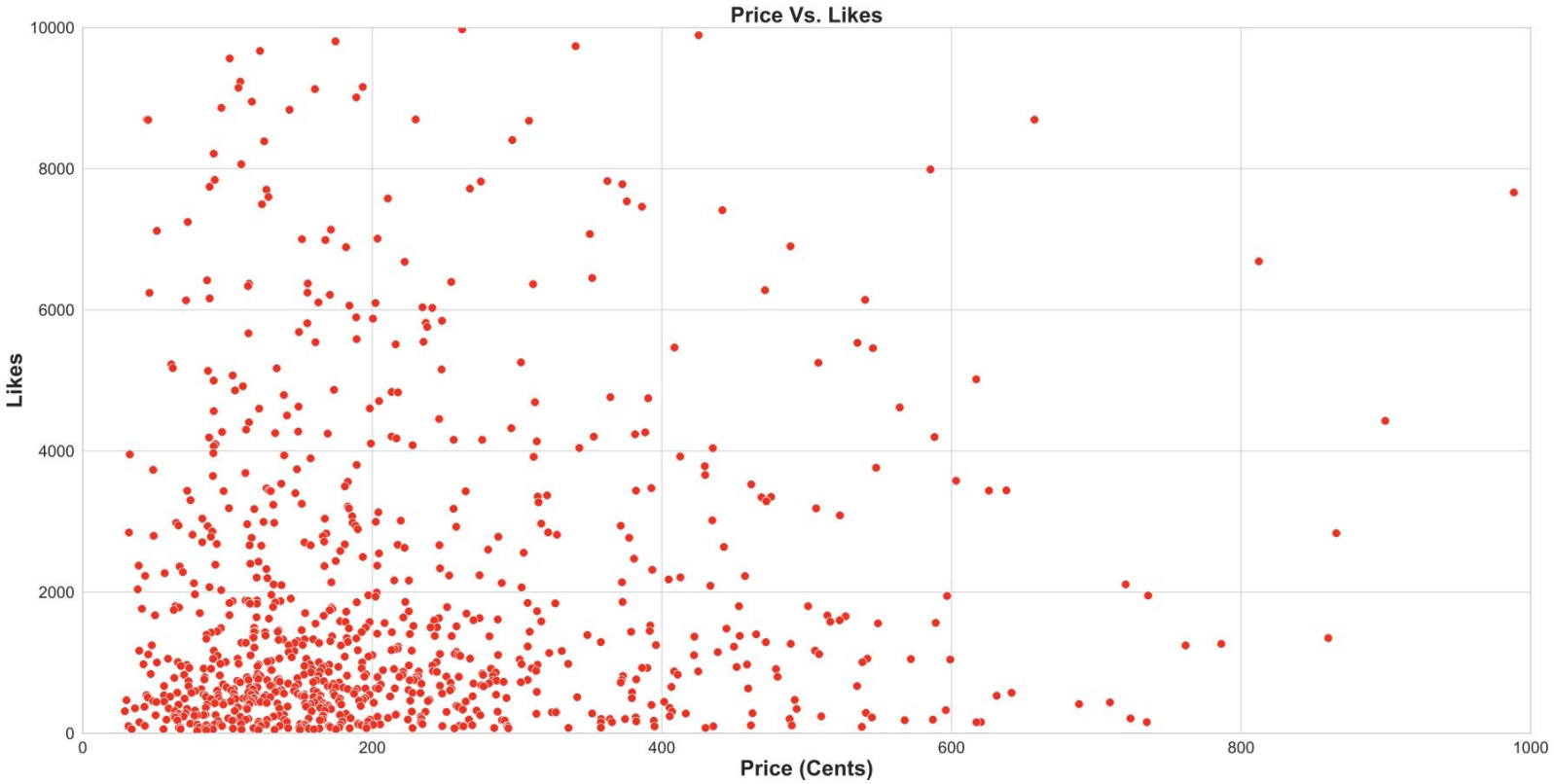

Receiver Operating Characteristic (ROC) Curve
True Positive Rate
False Positive Rate
0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50 0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90 0.95 1.00
Train ROC curve
Test ROC curve
50/50 Line

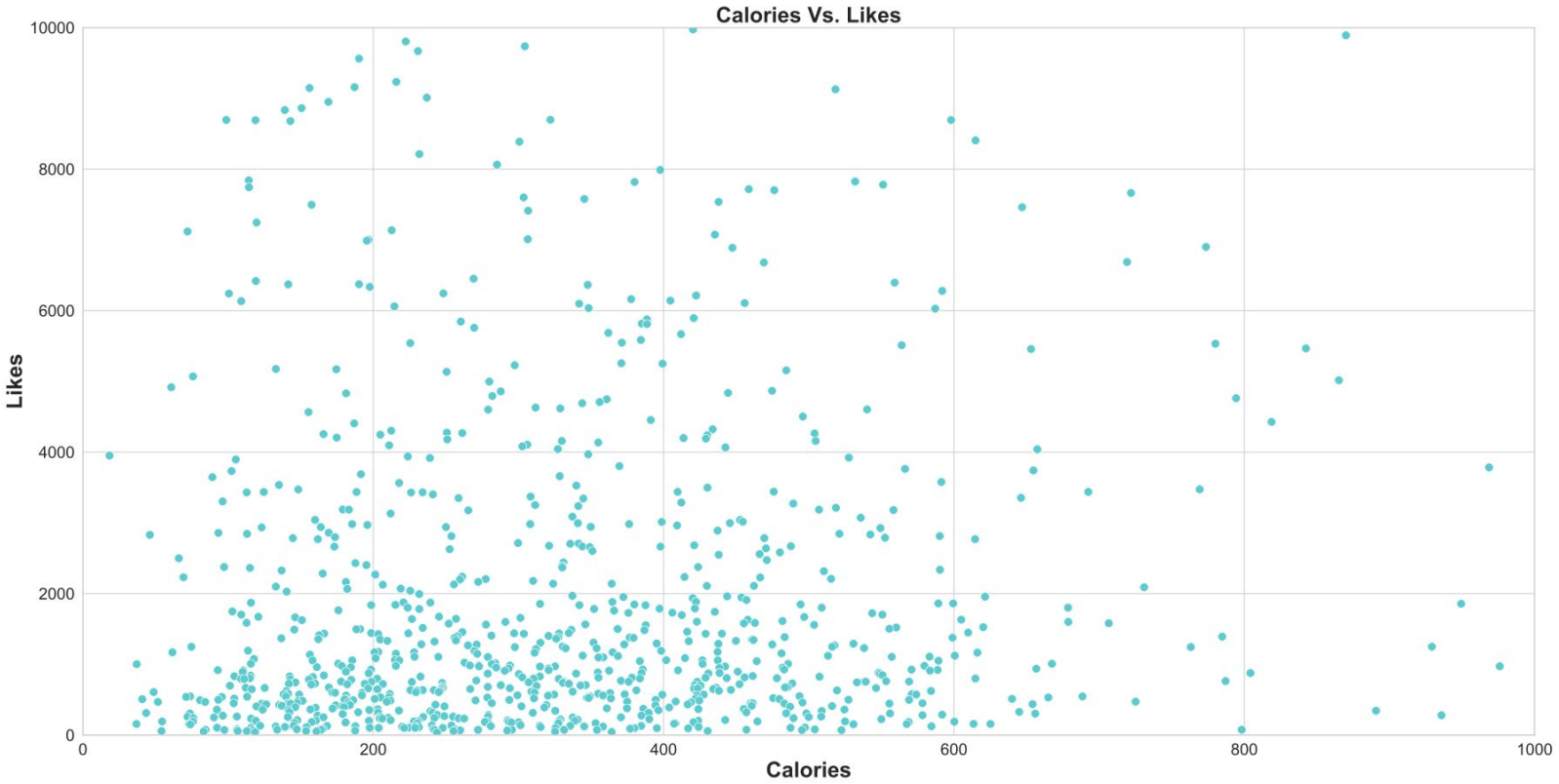

Confusion Matrix - Train Data
Loser
Winner
True
251
True Negatives
Model predicted "Loser" when it actually was a "Loser"
124
False Positives
Model predicted "Winner" when it actually was a "Loser"
149
False Negatives
Model predicted "Loser" when it actually was a "Winner"
226
True Positives
Model predicted "Winner" when it actually was a "Winner"
Loser
Winner
Predicted
0.66
0.60
0.54
0.48
0.42
0.36

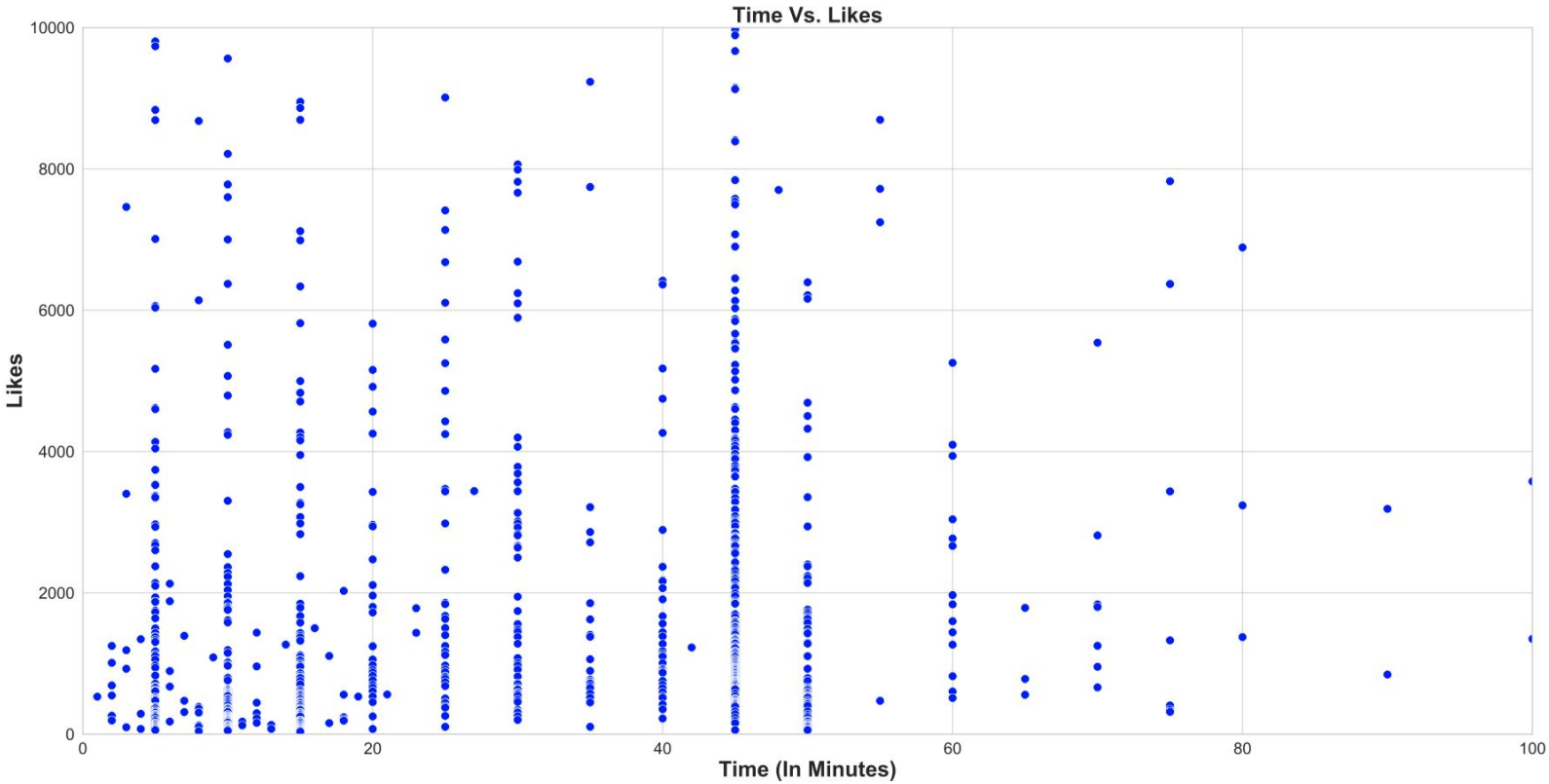

Confusion Matrix - Test Data
Winner
Loser
True
89
True Negatives
Model predicted "Loser" when it actually was a "Loser"
36
False Positives
Model predicted "Winner" when it actually was a "Loser"
48
False Negatives
Model predicted "Loser" when it actually was a "Winner"
77
True Positives
Model predicted "Winner" when it actually was a "Winner"
Loser
Winner
Predicted
0.64
0.56
0.48
0.40
0.32

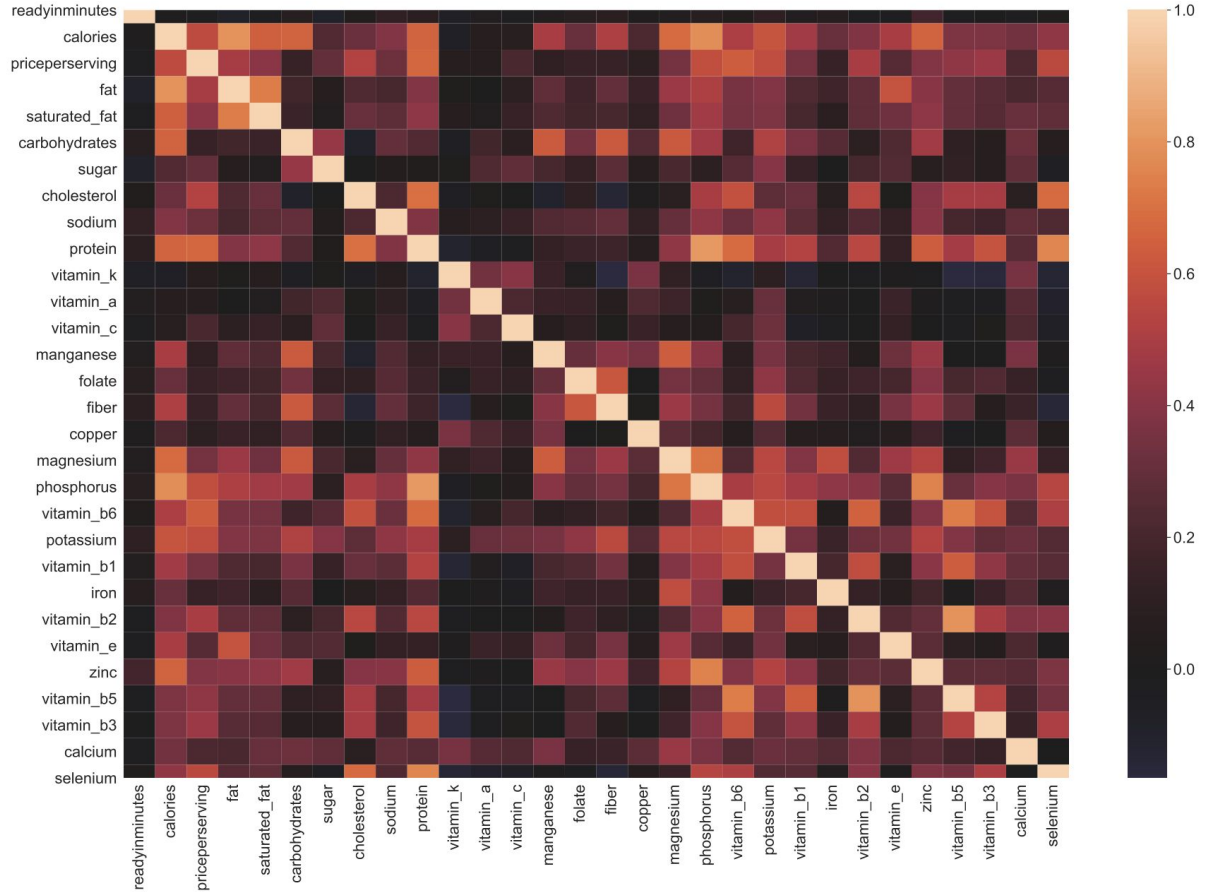

Histogram For Recipe Likes
Frequency
Likes
0
2
4
6
8
10
12
14
16
18
20
22
24
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000

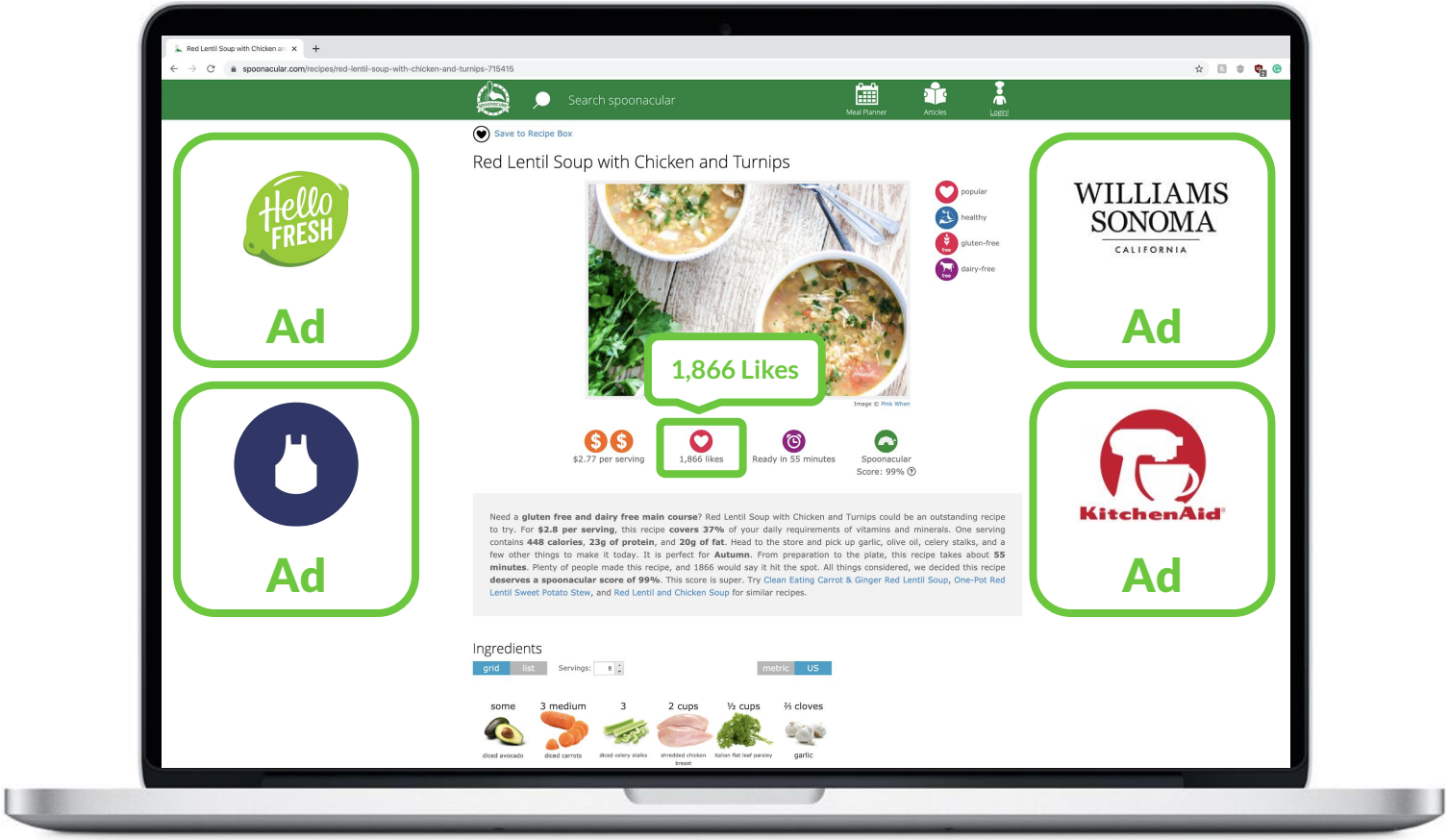

Cumulative Density Function For Recipe Likes
Probability (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Likes


Price Vs. Likes
Likes
Price (Cents)
0
2000
4000
6000
8000
10000
0
200
400
600
800
1000

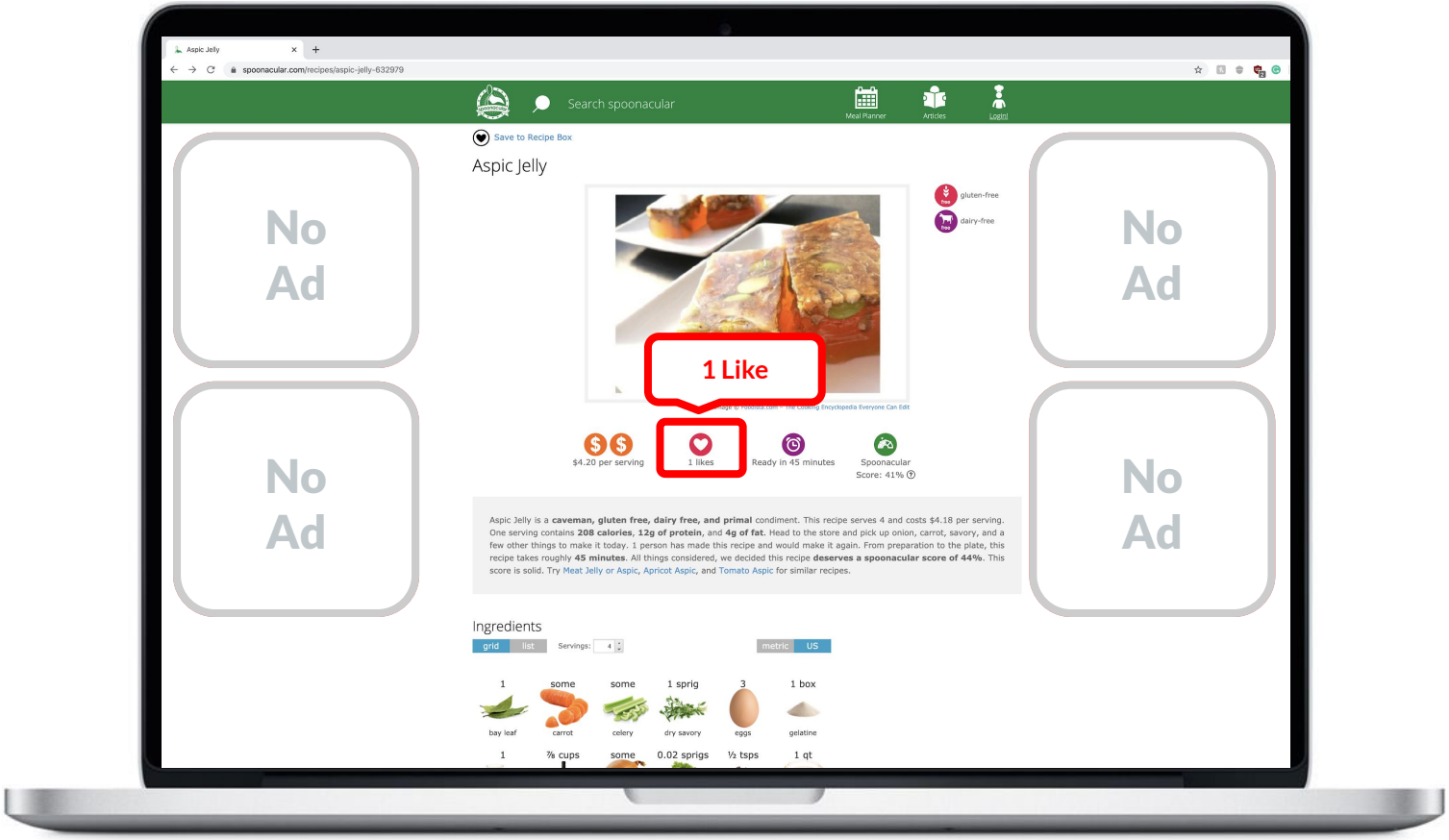

Calories Vs. Likes
Likes
Calories
10000
8000
6000
4000
2000
0
0
200
400
600
800
1000


Time Vs. Likes
Likes
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
Time (In Minutes)


readyinminutes
calories
priceperserving
fat
saturated_fat
carbohydrates
sugar
cholesterol
sodium
protein
vitamin_k
vitamin_a
vitamin_c
manganese
folate
fiber
copper
magnesium
phosphorus
vitamin_b6
potassium
vitamin_b1
iron
vitamin_b2
vitamin_e
zinc
vitamin_b5
vitamin_b3
calcium
selenium
1.0
0.8
0.6
0.4
0.2
0.0



Invest In Ads Here!



Do Not Invest In Ads Here