What even is an IPA?

Using Homebrewer Recipes Scraped from Brewer's Friend to Determine Beer Style Classification

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METIS

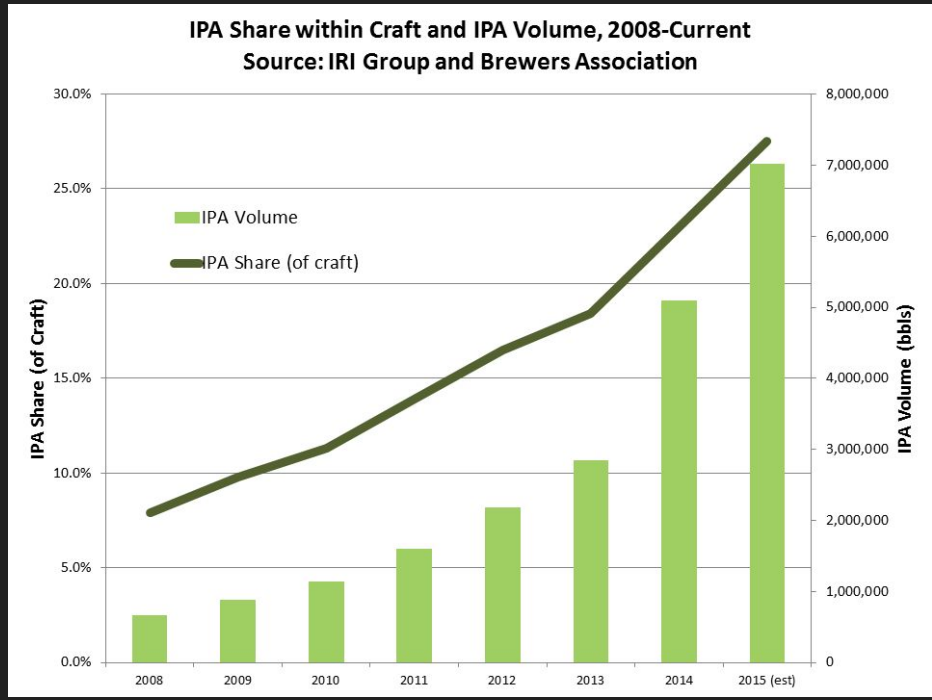
The Craft Beer Industry

India Pale Ales are ubiquitous

Account for over ¼ beers produced

- Brewer's Association

But in the scramble to corner this market we ought to ask what is an IPA?



Founders
Founders Brewing Company
Dark Penance

BREWING CO

Dogfish Head
60 Minute
IPA
INDIA PALE ALE

Methodology

Collection

Requests/BeautifulSoup

Homebrewer Recipes

from BrewersFriend.com

A video of my scraper in action

Modeling

Classification Model Stack (XGBoost, RandomForest, SVC,
Logistic Regression, K Nearest Neighbors)

Methodology: Feature Engineering

Data comes from user provided recipes: *messy*!

Dummy encoded for hop and yeast contents from recipes

le Citra, Columbus, Nugget, Noble, etc. (40+ hops)

Vermont Yeast, Wyeast London, etc.

Dummy encoded major flavor profile descriptors from user notes/reviews

Calculated hop complexity and ratio of bitter to sweet

Is this an IPA?

Can we classify your beer based only on its ingredients?

Machine learning models will evaluate the hops in your beer and guess if you have an IPA!

Select all hops in your beer!

Azacca × Challenger ×

☑ Dry Hopped?

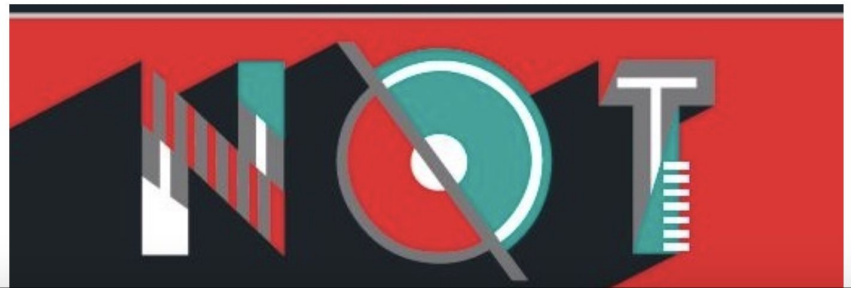
Are any of these yeasts in your beer?

us4 ×

GUESS!

Based on those ingredients, it seems like you're drinking:

Not IPA



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Can we classify your beer based only on its ingredients?

Machine learning models will evaluate the hops in your beer and guess if you have an IPA!

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Citra × Columbus ×

☐ Dry Hopped?

Are any of these yeasts in your beer?

vermont ×

GUESS!

Based on those ingredients, it seems like you're drinking:

IPA/Pale Ale

ROC AUC Scores, IPA x Hops Model

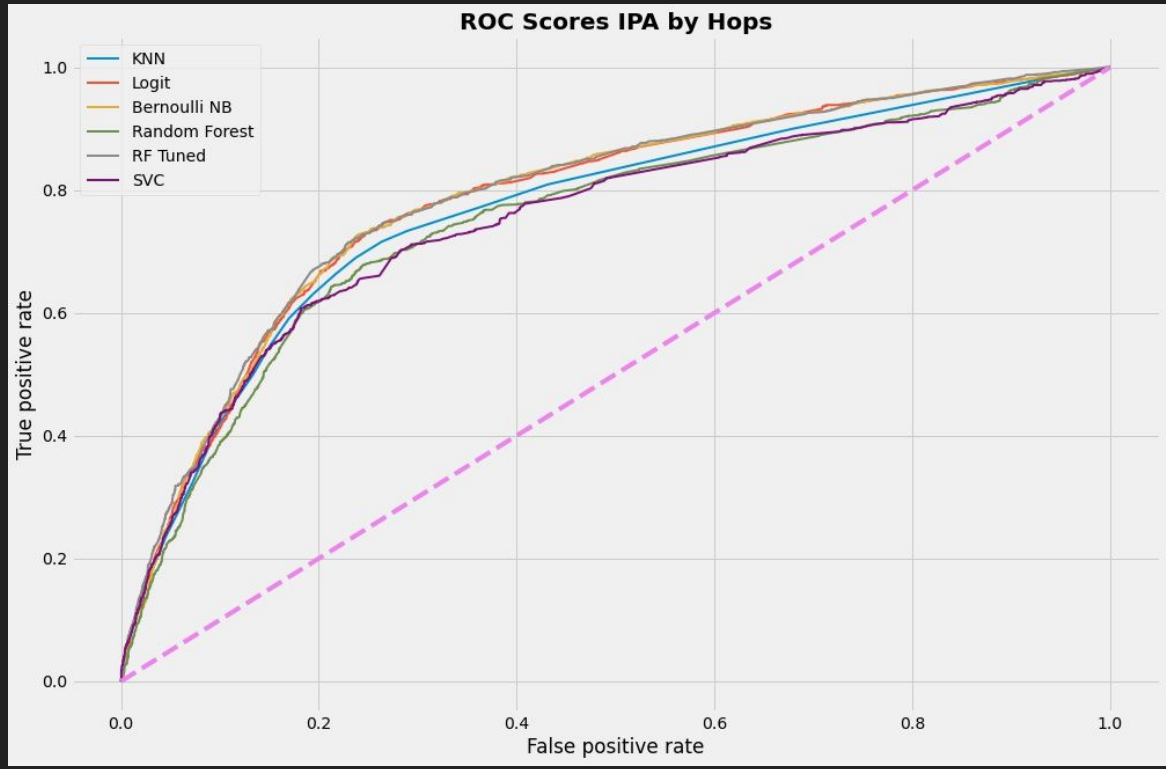
KNN : 0.77

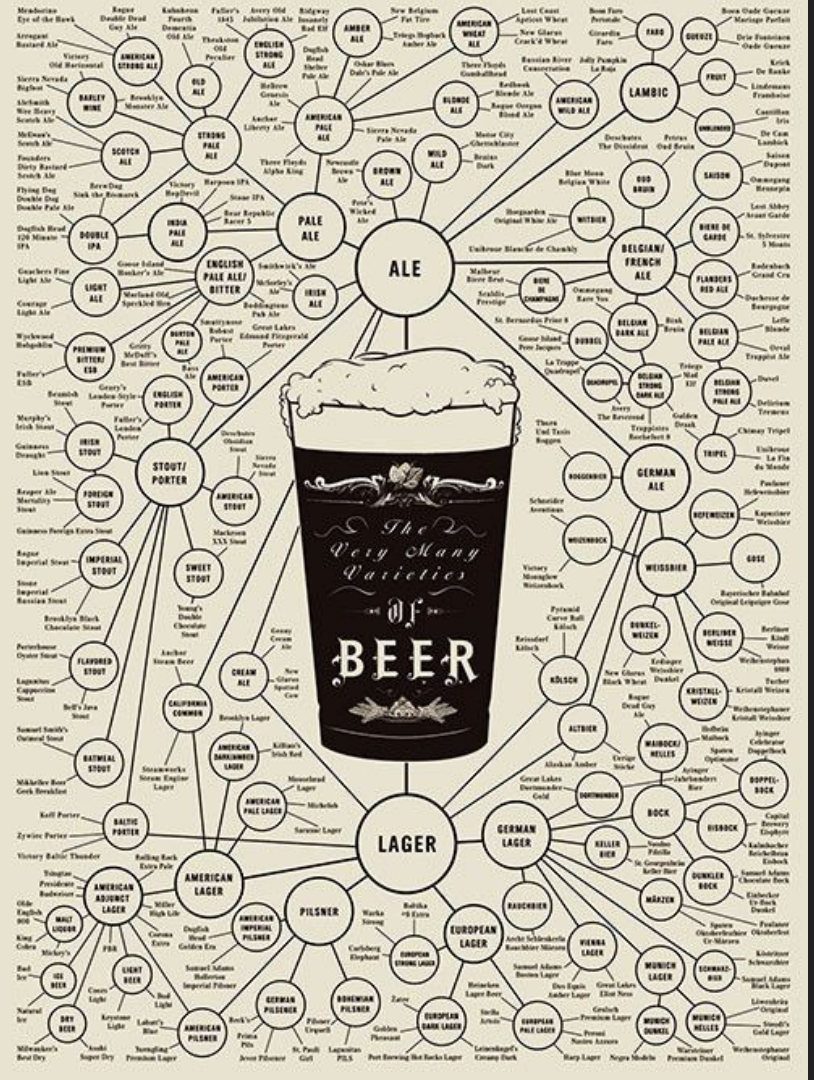
Logit : 0.78

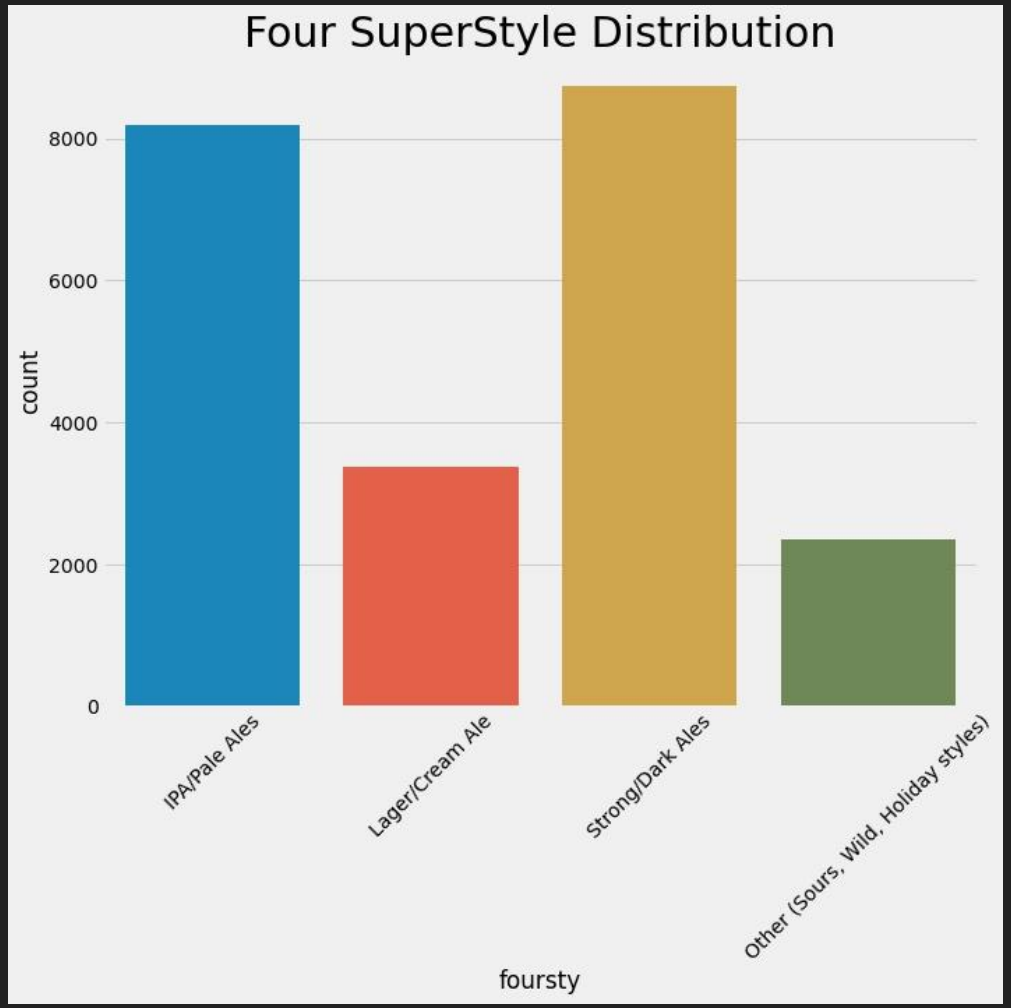
Naive Bayes: 0.79

Random Forest : 0.79

SVC : 0.75




ALE
LAGER
STOUT/ PORTER
PALE ALE
BELGIAN/ FRENCH ALE
GERMAN ALE
LAMBIC
WEISSBIER
GERMAN LAGER
EUROPEAN LAGER
PILSNER
AMERICAN LAGER
The Very Many Varieties OF BEER


Four SuperStyle Distribution
count
8000
6000
4000
2000
0
IPA/Pale Ales
Lager/Cream Ale
Strong/Dark Ales
Other (Sours, Wild, Holiday styles)
foursty

Results:

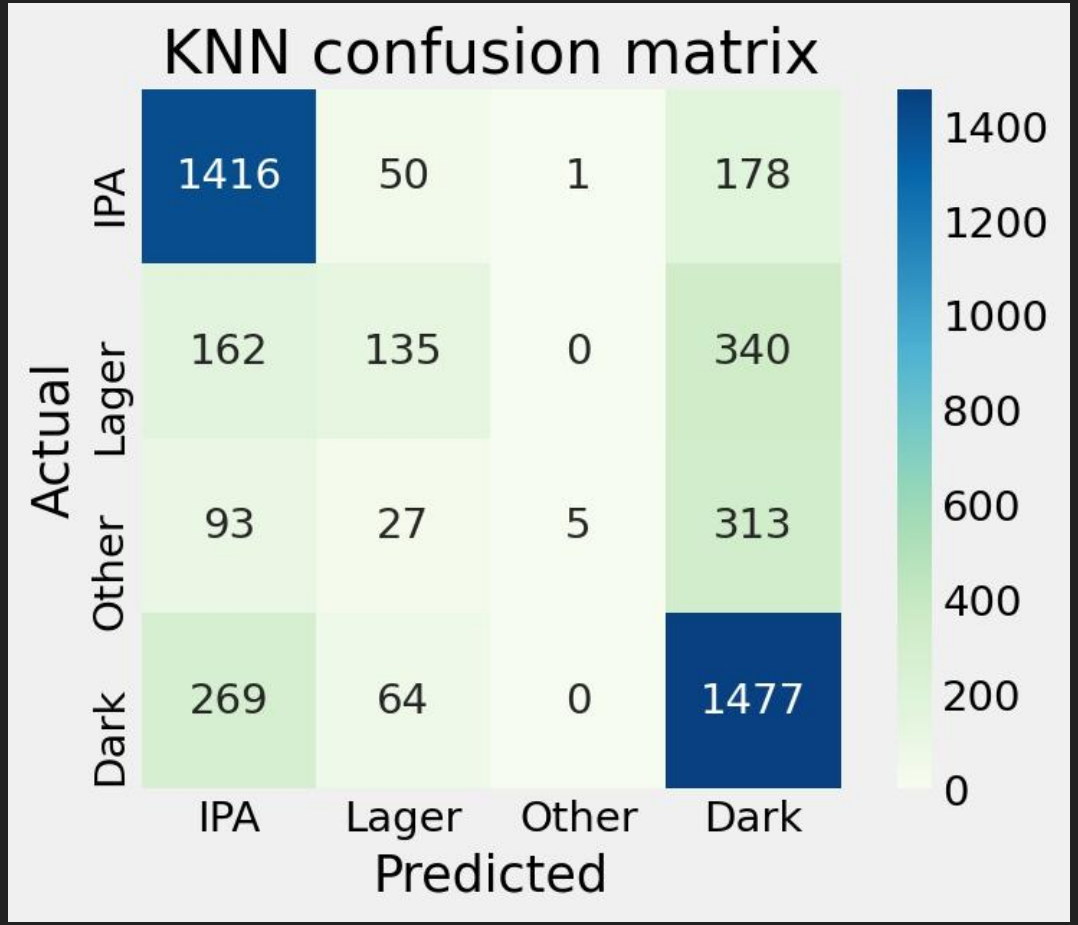
Precision: 67%

Recall: 67%

Accuracy : 67%

F1 Scores:
XGB: 0.71
to
LogReg: 0.64

For a 4 class
Target Label



What Next, BRO?

The Beer Review Organizer, or Beer BRO is an attempt at modeling beer classification on user input descriptions and reviews

Forest F1: 0.69
KNN F1: 0.64
SVC F1: 0.64
XGB F1: 0.65

Problem: Smaller set with notes in row

Magical Beer BRO

Beer Review Organizer

Type a stereotypical description of your beer and see if the machine learning models can predict your beer!

Write a description or review of your beer. Be descriptive!

That piney, juicy goodness. Great bitterness with a citrusy/tropical aroma that is incredibly inviting. Get some mango, orange, a bit of malt sweetness to it helping cut that bitterness a bit. That dank/resinous hop aroma from the west coast IPAs I grew up with making an appearance.

Guess!

Oh I know that beer! It's a:

Pale Ales and Lagers

Magical Beer BRO

Beer Review Organizer

Type a stereotypical description of your beer and see if the machine learning models can predict your beer!

Write a description or review of your beer. Be descriptive!

Tasting it, I was immediately hit with a rich cocoa powder bitterness, then mellowing out to a dark chocolate and some Sumatra dark coffee (coffee with earthy and herbal notes) towards the middle. Then towards the back of the throat, I picked up some of the roasted malt characteristics that I got from the aroma while also getting a bit of lingering cocoa

Guess!

Oh I know that beer! It's a:

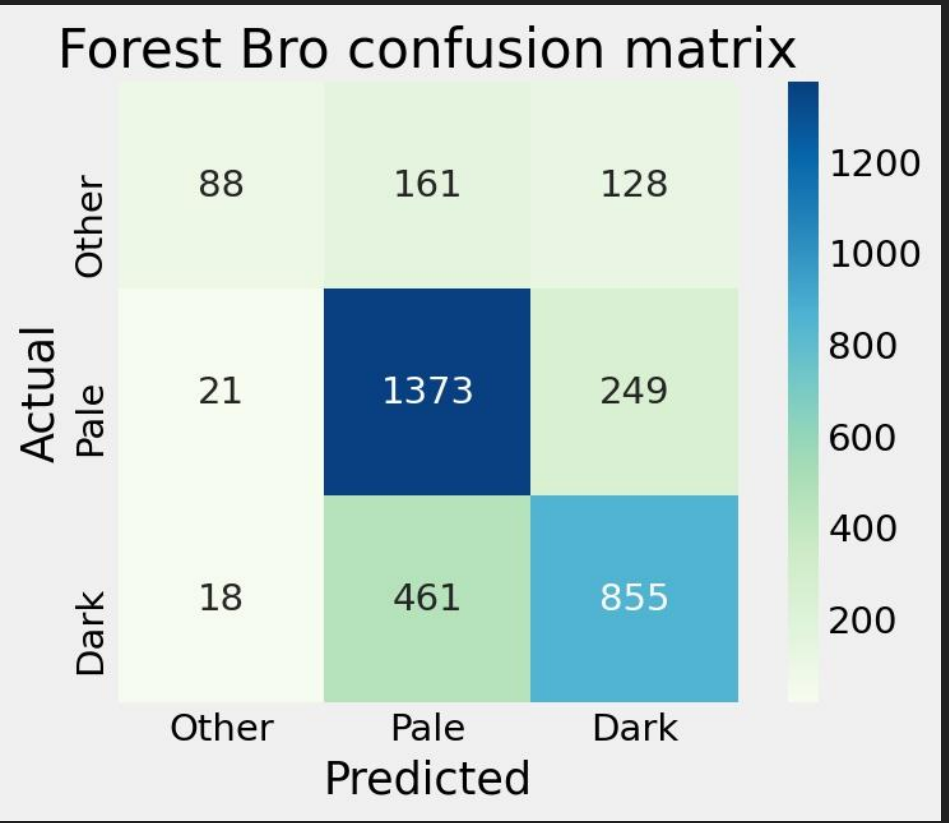
Strong/Dark Ales

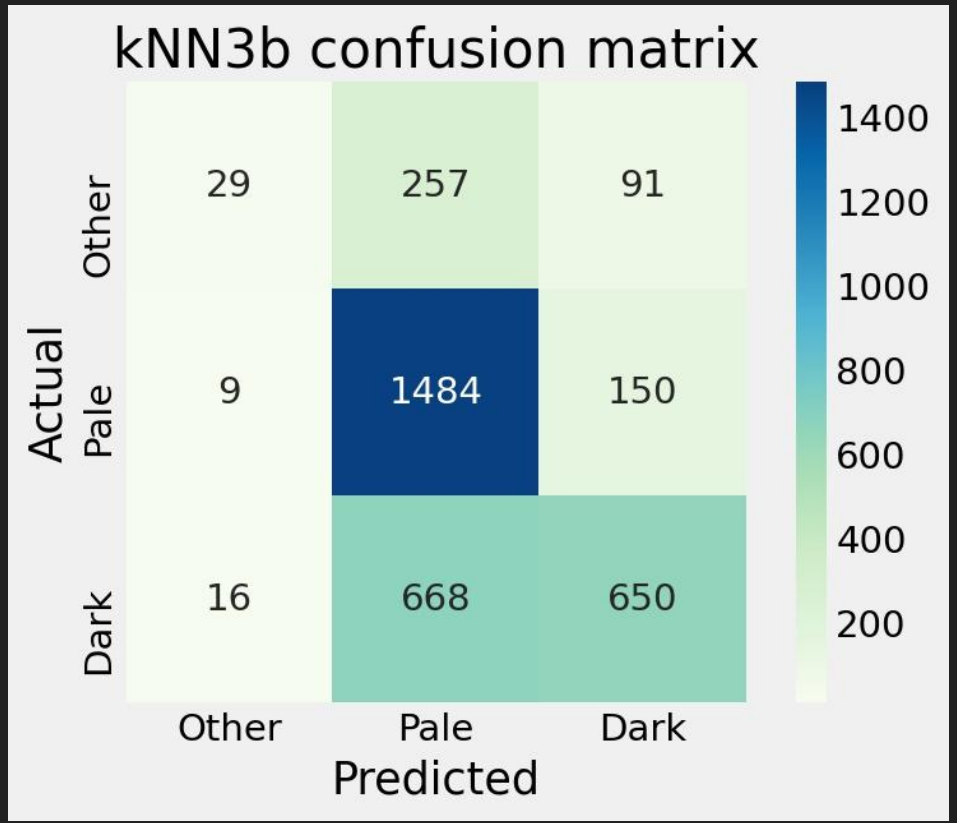
Common Beer Descriptors

'whiskey', 'tropical', 'pineapple', 'mango', 'papaya', 'dry hopped', 'lactose', 'clone', 'juicy', 'dank', 'cannabis', 'marijuana', 'wedding', 'marriage', 'award', 'best', 'smoke', 'roast', 'thick', 'heavy', 'stone fruit', 'apricot', 'orange', 'lemon', 'citrus', 'hazy', 'phenolic', 'banana', 'clove', 'bitter','puree', 'lovehop', 'strong', 'dry', 'sweet', 'sour', 'pucker', 'dark', 'pine', 'sticky', 'foam', 'hoppy', 'biscuit', 'ester', 'straw', 'chocolate', 'coffee' 'malt', 'aggressive', 'balance', 'complex', 'crisp', 'smooth', 'diacetyl', 'apple', 'floral', 'fruity', 'robust', 'wood','vanilla', 'cherry', 'funk', 'grapefruit','solvent', 'astringent'

Dark Beers

IPA and Pale Ales


Forest Bro confusion matrix
Actual
Other
Pale
Dark
88
161
128
21
1373
249
18
461
855
Other
Pale
Dark
Predicted
1200
1000
800
600
400
200


kNN3b confusion matrix
Actual
Other
Pale
Dark
29
257
91
9
1484
150
16
668
650
Other
Pale
Dark
Predicted
1400
1200
1000
800
600
400
200

Thank You