



Beers and Breweries Analysis

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Non-beer Styles

Several styles were not beers, so they were removed

Non-beer styles include: American Malt Liquor, Braggot, Cider, Mead, Low Alcohol Beer, Radler, Shandy

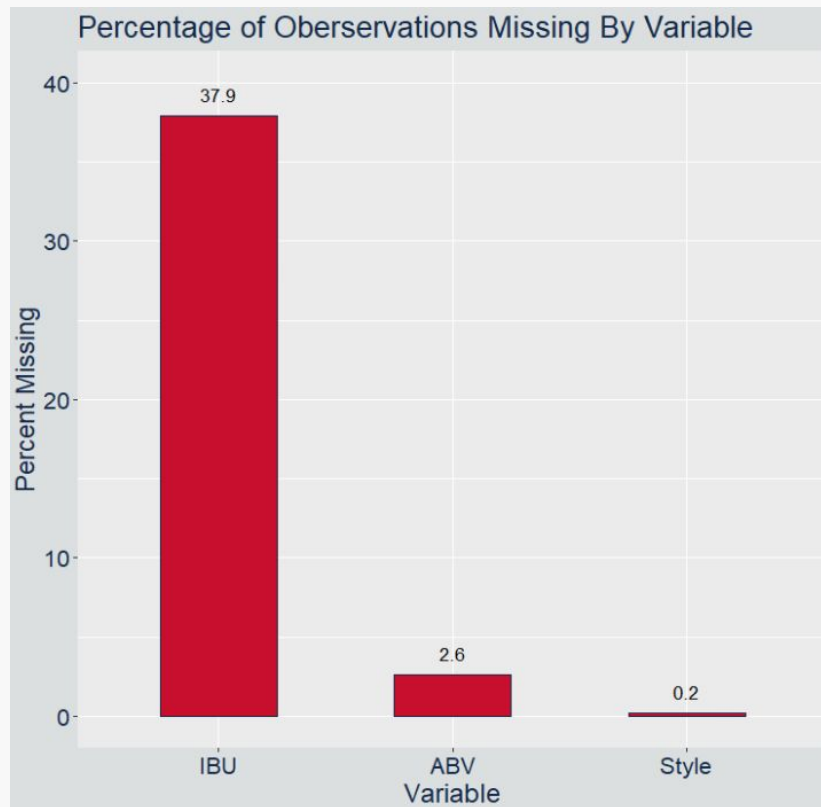
Style	Count
American Malt Liquor	1
Braggot	1
Cider	37
Low Alcohol Beer	1
Mead	5
Radler	3
Shandy	3

Missing Values

5 Missing Styles

62 Missing ABV values

895 Missing IBU Values



Address Missing Style

Only 5 missing, so could investigate each

Removed 3 “beers” because they were not beers

Beer_Name	Brewery_Name
Special Release	Cedar Creek Brewery
The CROWLER™	Oskar Blues Brewery
CAN'D AID Foundation	Oskar Blues Brewery

Address Missing ABV

Investigated how ABV was missing among Style, State, and Brewery and there appeared to be no pattern

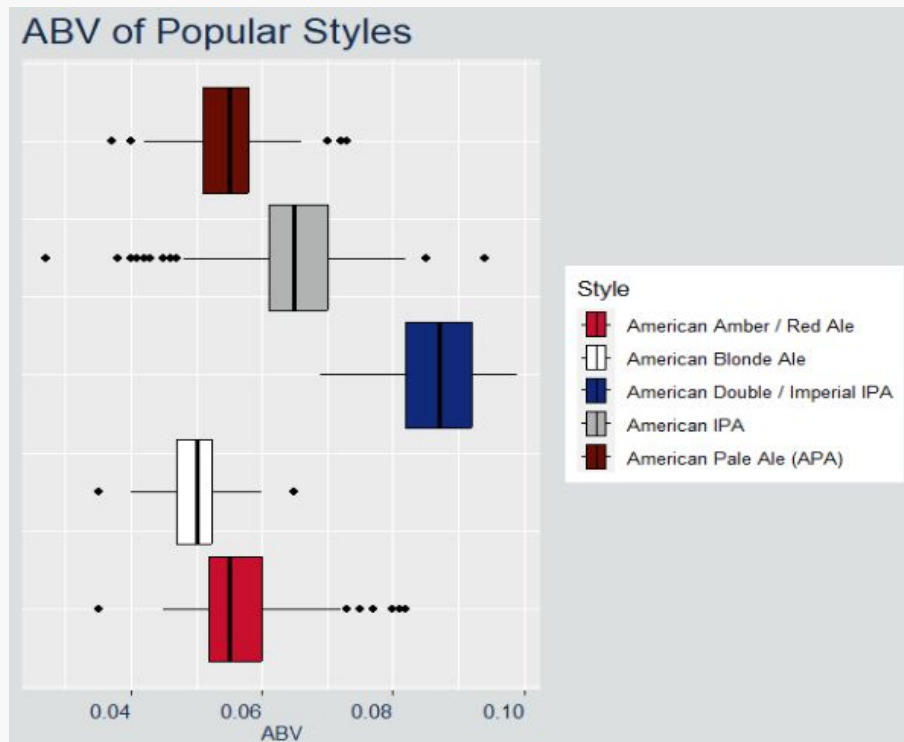
Missing ABV is MCAR (Missing Completely at Random) and can be removed or imputed



Address Missing ABV

Looking at all styles with more than 100 beers, there is a clear difference of ABV ranges by style

Imputed by using the Median ABV value by Style

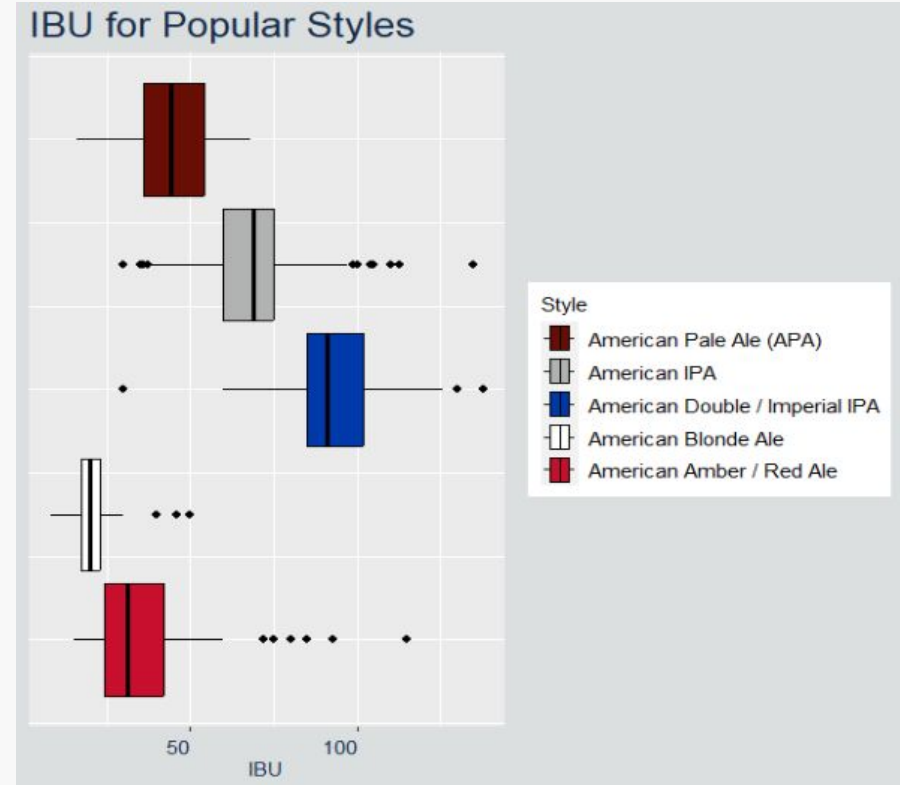


Address Missing IBU

Certain Breweries were missing all IBU values, and certain breweries were missing no IBU values

Missing IBU is MAR (Missing at Random) because it was missing more often for some Breweries, and can be removed or imputed

As shown in the plot, IBU is dependent on style

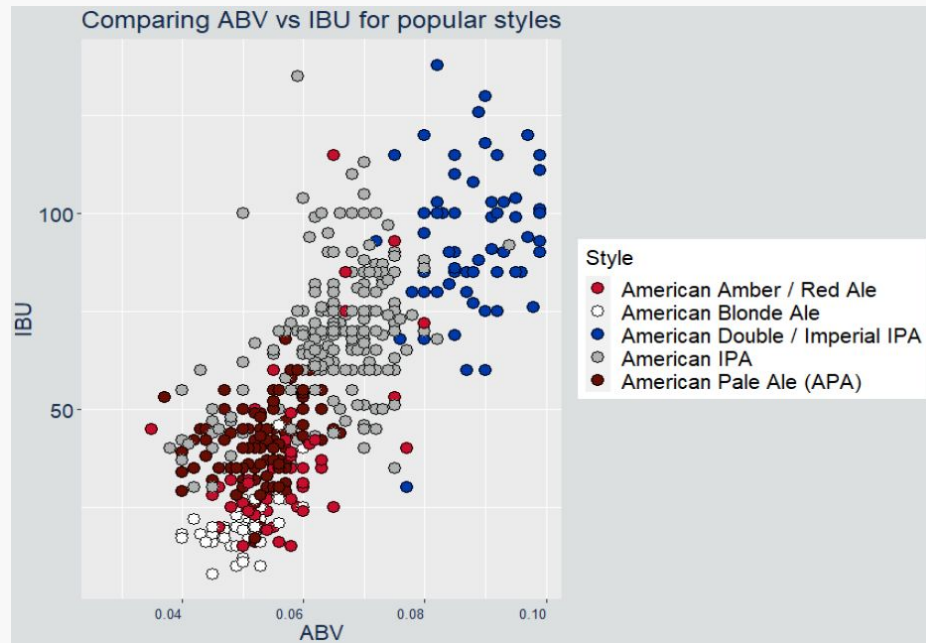


Address Missing IBU

As shown in the plot, IBUs are not correlated to ABVs within in the style

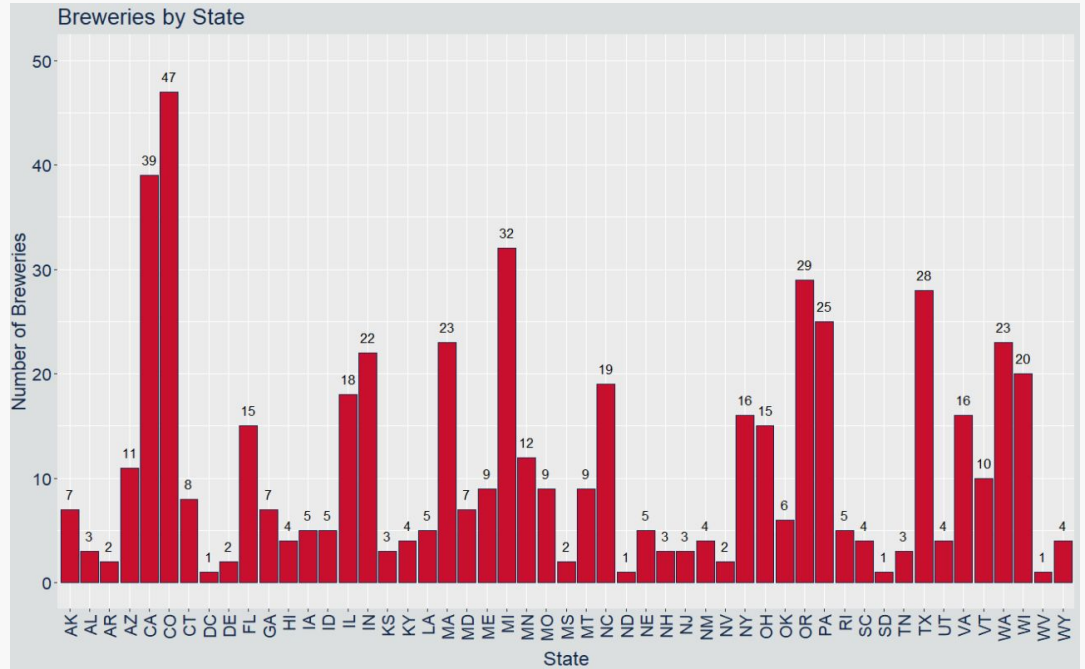
It is reasonable to impute IBU using median values per style, but not include ABV in the calculation

Certain styles were missing IBU values, so those were given a value based on a Beer Style Guide

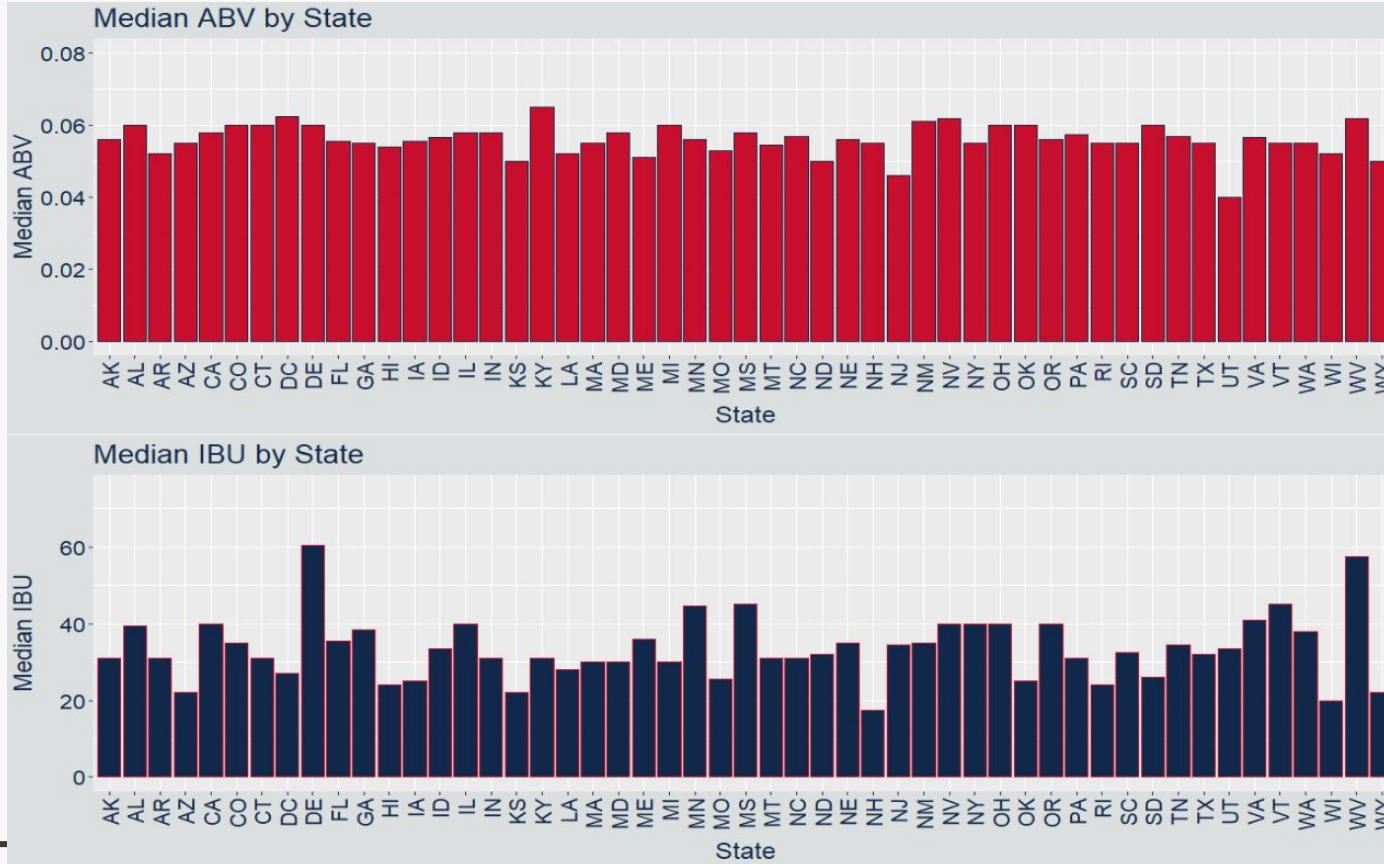


Breweries by State

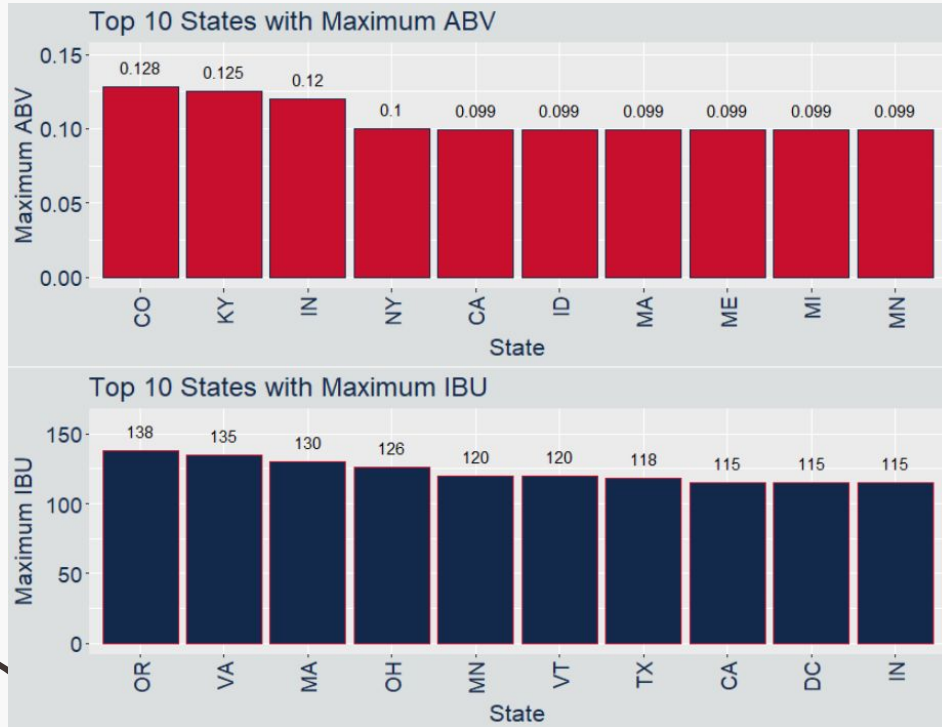
Colorado has the most with 47
Breweries



Median ABV and IBU by State



Highest ABV and IBU by State



State with Highest ABV: Colorado 0.128

Beer: Lee Hill Series Vol. 5 - Belgian Style
Quadrupel Ale

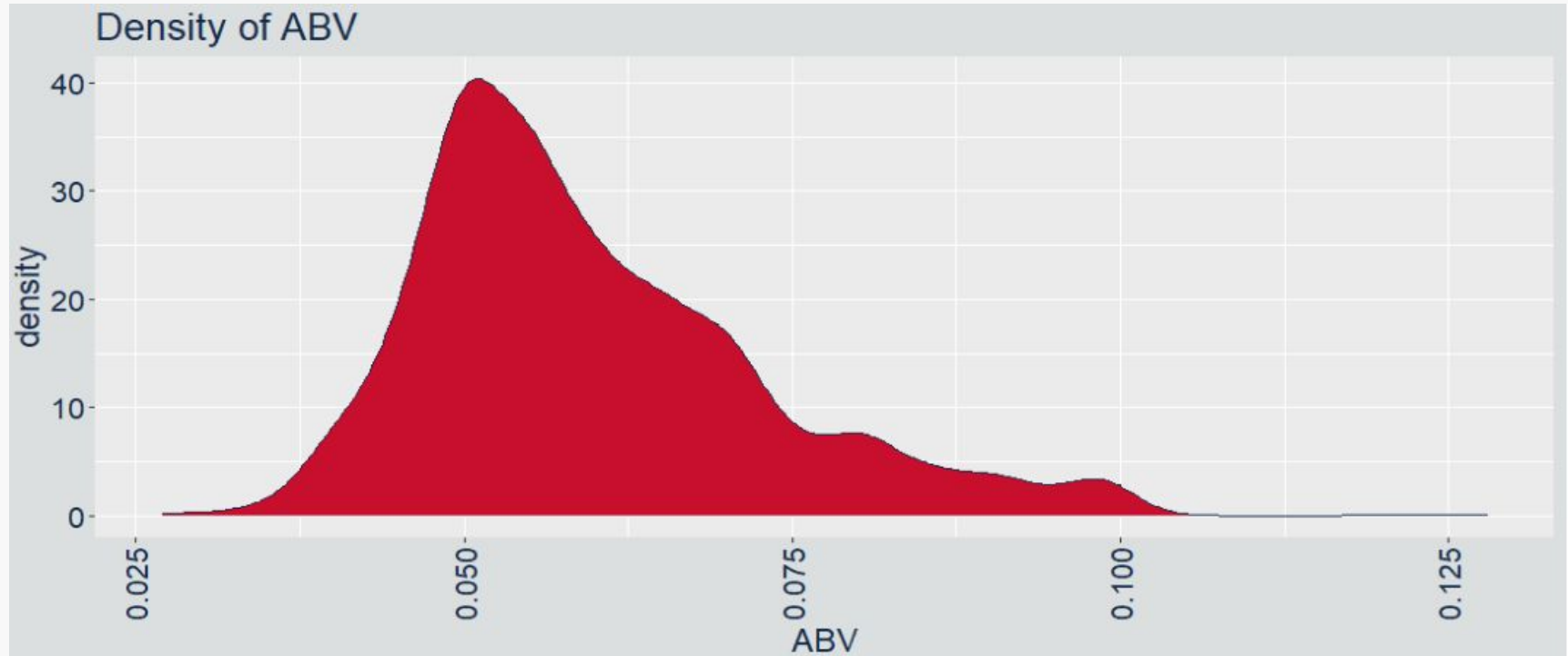
Style: Quadrupel

State with Highest IBU: Oregon 138

Beer: Bitter Bitch Imperial IPA

Style: American Double/Imperial IPA

ABV Density



ABV Summary Statistics

Min

ABV: 0.02700
Style: American IPA

Median

ABV: 0.05600
69 Beers with the
median ABV

Max

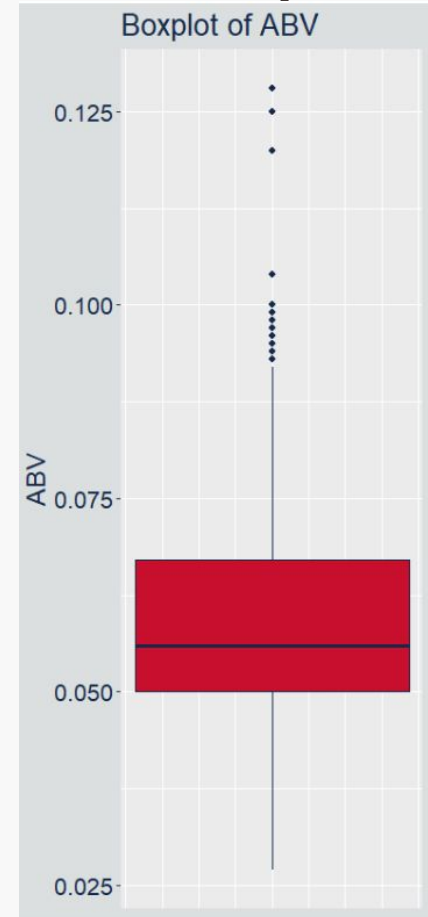
ABV: 0.128
Style: Quadrupel

Mean

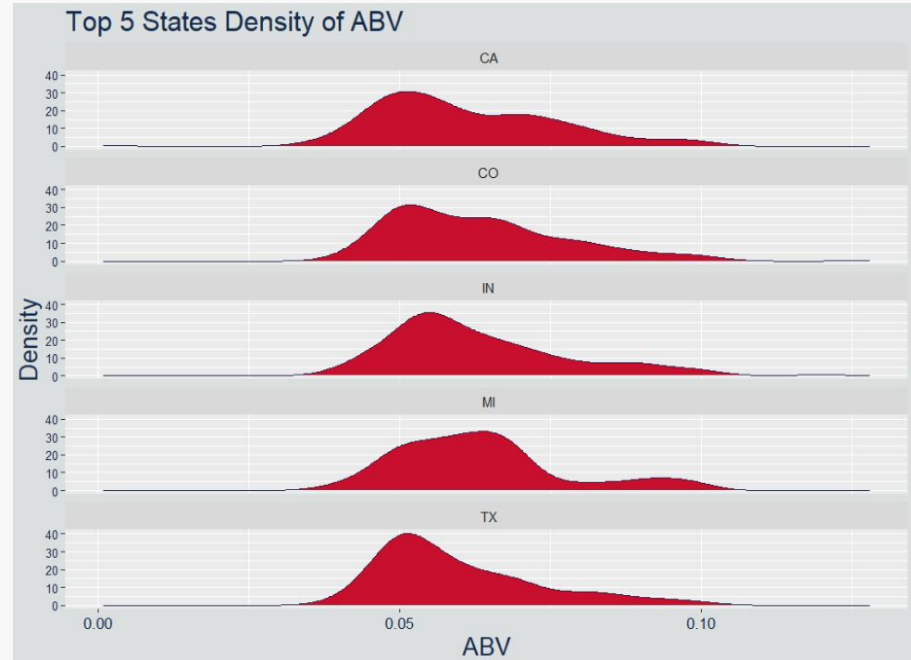
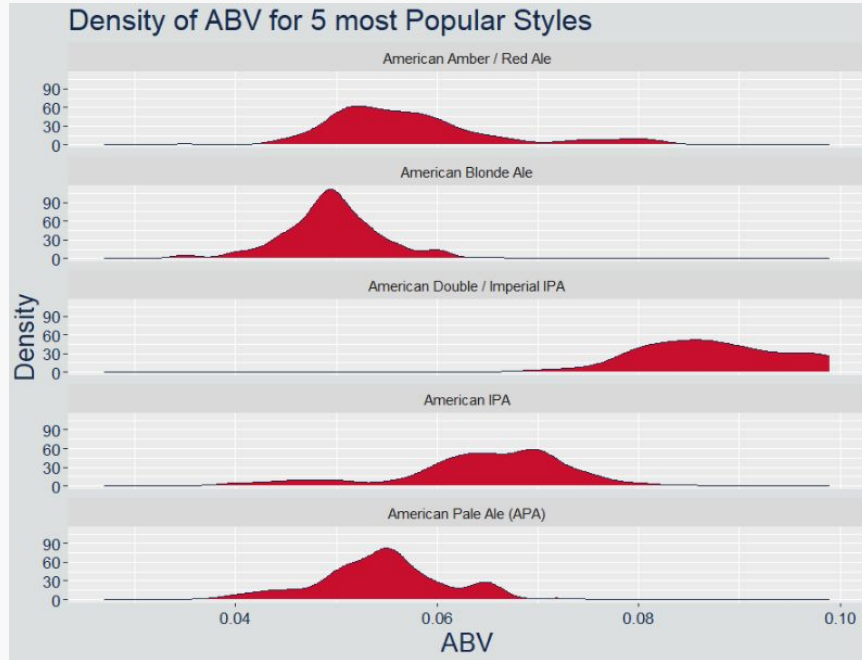
ABV: 0.05973

Quantiles

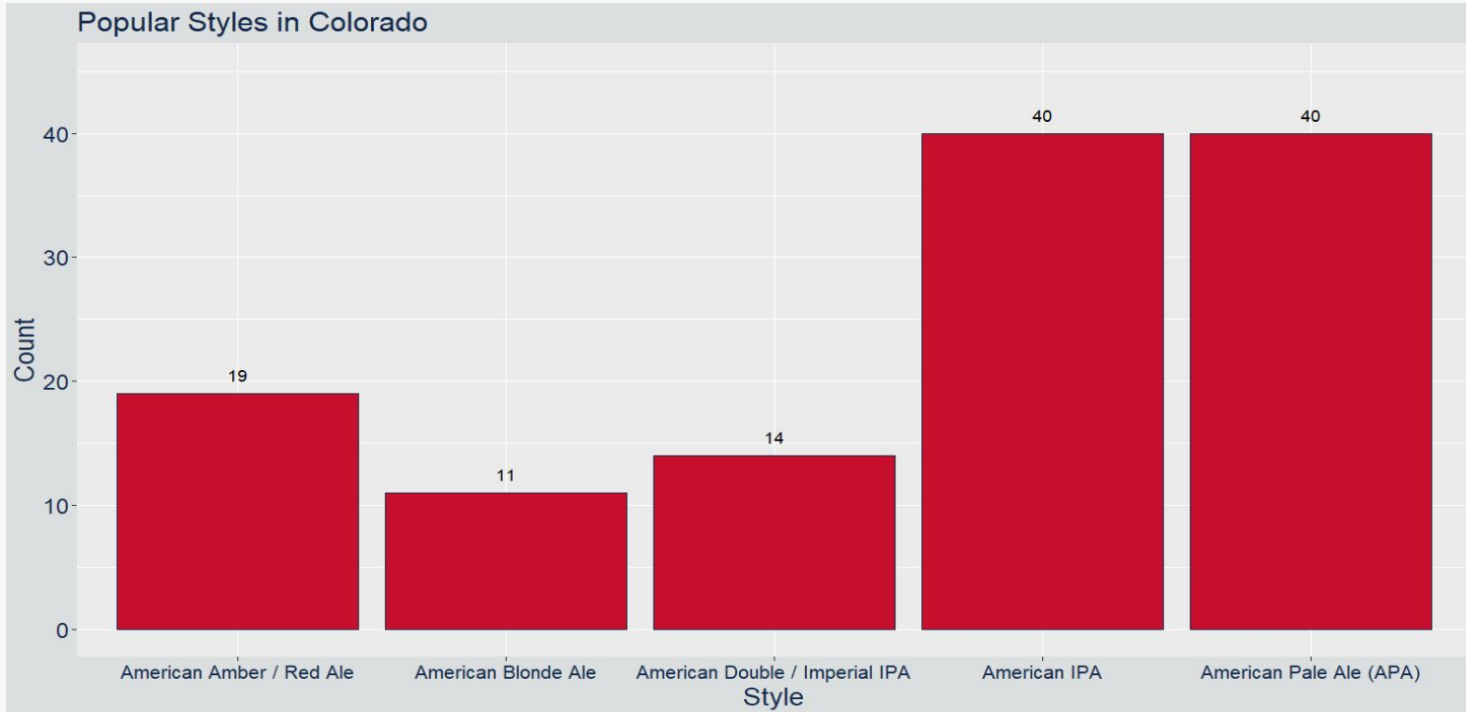
Upper Quantile ABV: 0.06700
Lower Quantile ABV: 0.05000

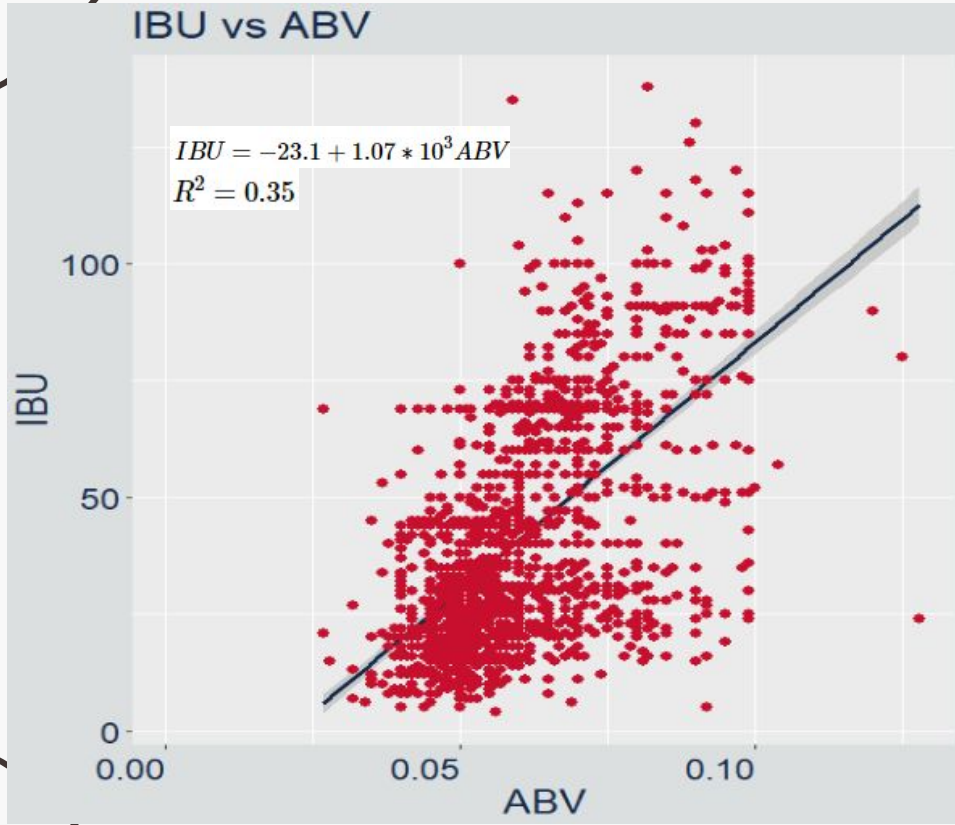


ABV of Top 5 States and Styles



Top Styles of Colorado



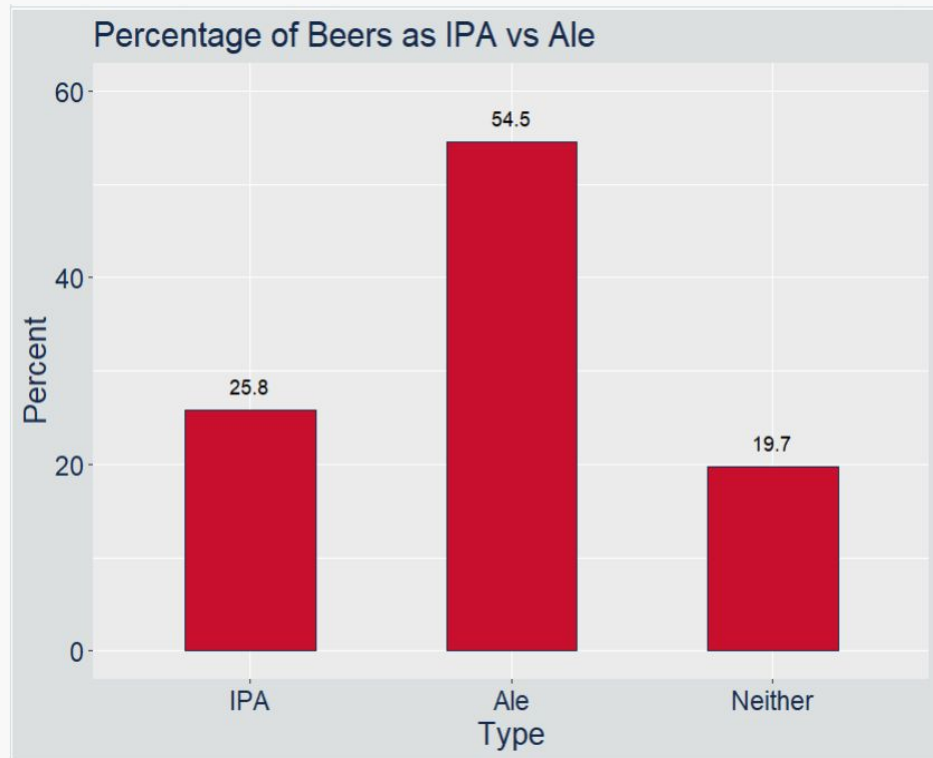


IBU vs ABV

Weak positive correlation
between ABV and IBU

IPAs vs Ales vs Neither

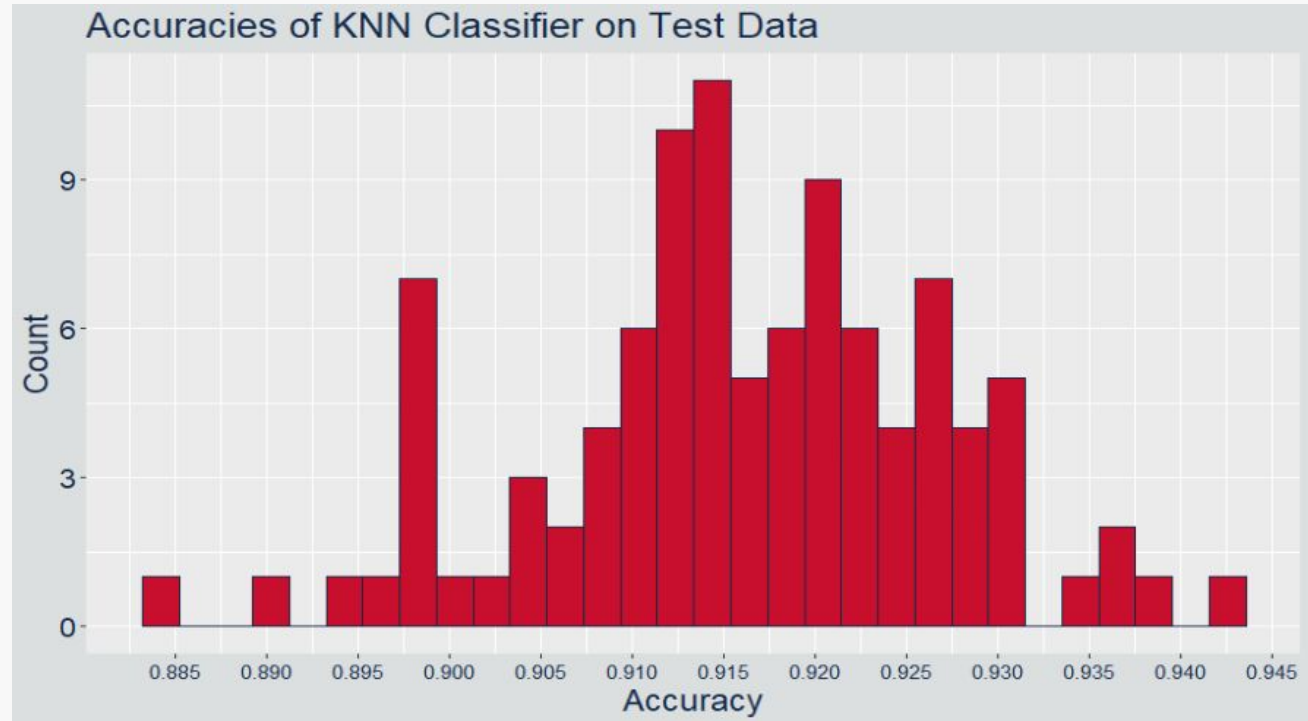
IPAs, Ales, or neither determined by style, beer name, and ChatGPT



KNN Classifier Accuracy

Min: 0.863

Max: 0.921

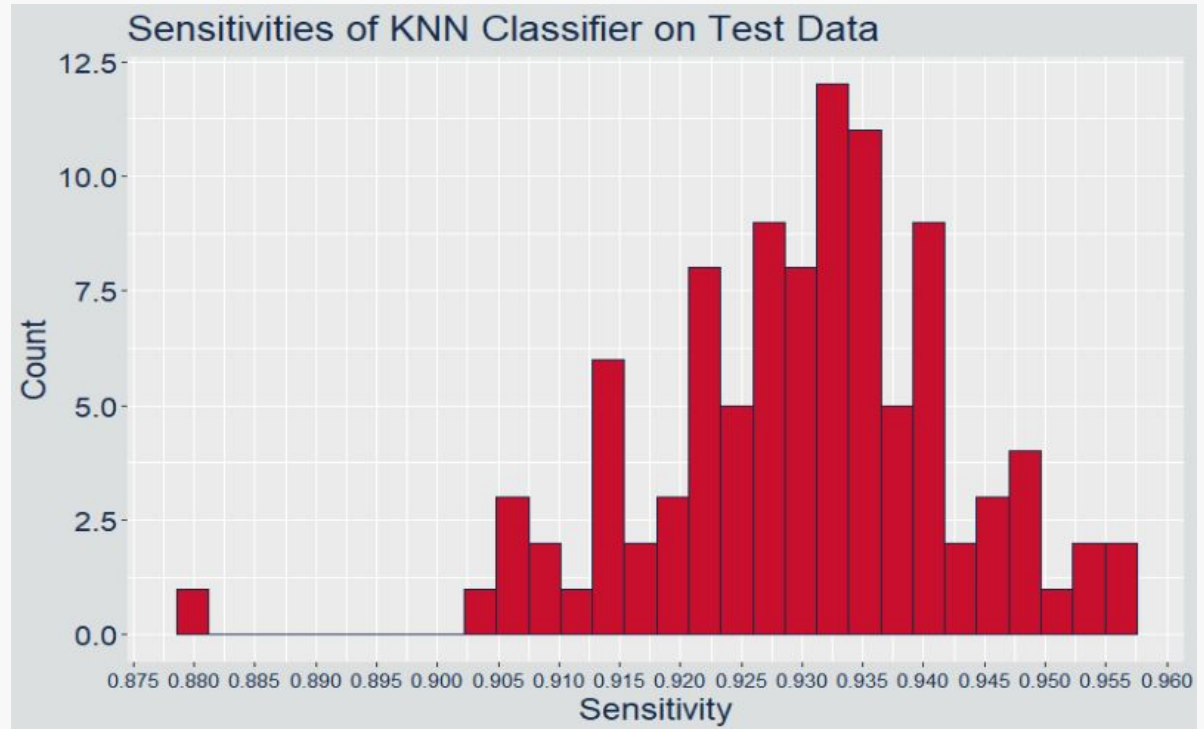


KNN Classifier Sensitivity

Min: 0.892

Max: 0.951

Ales Correctly
Identified as Ales

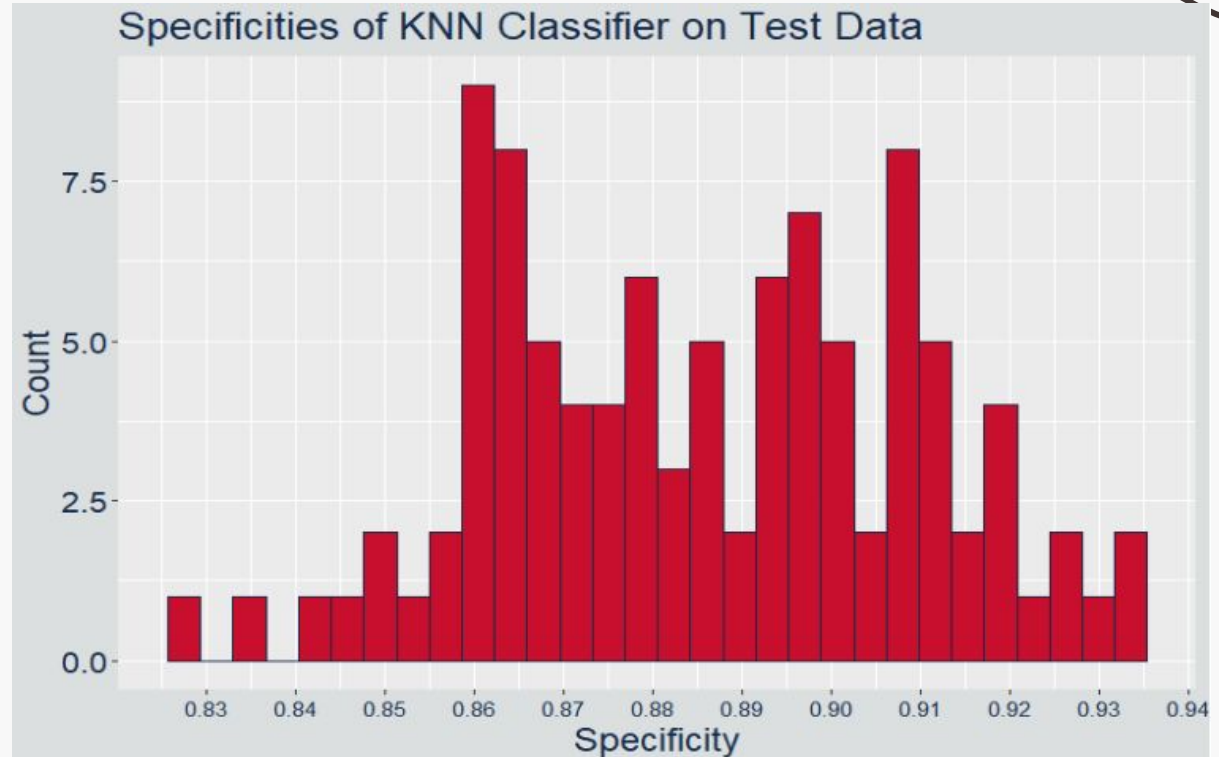


KNN Classifier Specificity

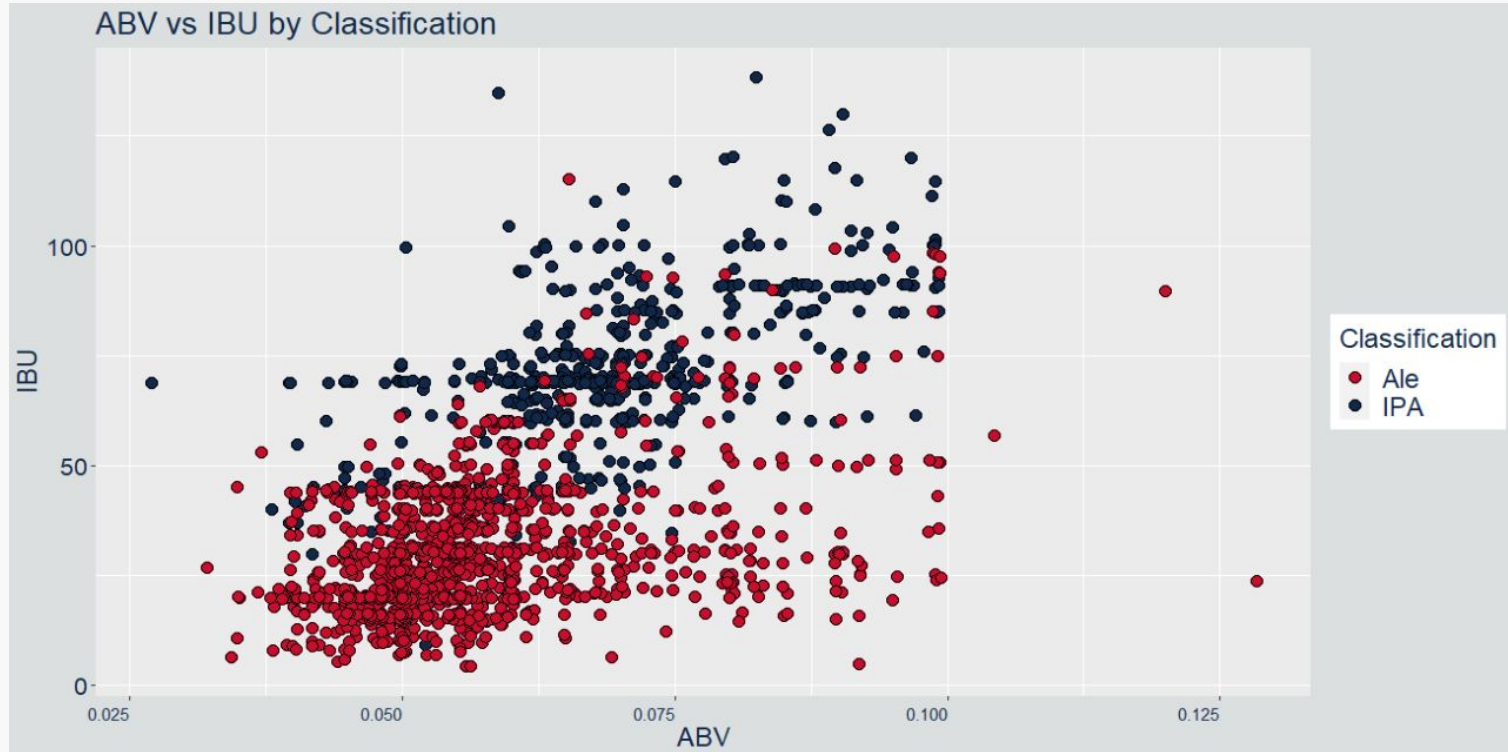
Min: 0.797

Max: 0.906

IPA correctly
Identified as IPA



ABV vs IBU for Ales and IPAs



The image features two thin, dark horizontal lines. The top line starts with a curved segment on the left side, and the bottom line ends with a curved segment on the right side.

Thank You



Youtube Link

<https://youtu.be/5ZNHbrzQQ1w>

