**Capstone Project Group 3**

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**Project Proposal:** Craft beer style classifier.

## Introduction to the Topic:

Brewing beer isn't as straightforward as some might think. Sometimes a recipe for a beer turns out to be exactly what the brewer intended. In other cases, a beer ended up being wildly different than expected. Even at a commercial level, it's not uncommon for a brewery to pivot on the original plan for a batch of beer. Often, this pivot ultimately results in labeling a beer as different style than the one intended. At a homebrew level, most brewers are inexperienced when it comes to designing their own recipes. Their lack of experience is most noticeable when it comes to objectively thinking about beer. Drinking beer is a subjective experience, brewing beer and judging beer is objective. All beer styles have certain parameters that are used to distinguish themselves from other styles. Most of the time when homebrewers are trying to figure out what it is that they brewed, they go to their local homebrew club and sit in a circle sipping the beer and describing the flavors that they taste. We want to take a more analytical approach.

Brewing beer is a science that involves a lot of math, and frankly, a lot of data. Flavor is important, but so are the stats on a beer when it comes to objectively classifying it within a style. These stats include Original Gravity (OG), Final Gravity (FG), Alcohol Content (ABV), Standard Reference Method (SRM), and International Bitterness Units (IBU). Our goal is to use these parameters (along with flavor) to create a beer classifier. Users will be able to input the data on their batch of beer and then our model will compare it to the Beer Judge Certification Program dataset. This will ultimately tell users what the closest style of beer their batch falls under. Then the model will use another dataset that contains thousands of known commercial beers within the US that are the same style. There's another dataset that has the top 250 commercial beers produced. The goal of including known and reputable beers will be for the users of our model to be able to go out on their own and purchase a beer of the same style to compare it to the beer that they made. Developing a beer recipe is all about trying other beers and finding things that you like and don't like and then adjusting from there.

## Inspiration:

https://www.bjcp.org/bjcp-style-guidelines/

# Colors:

https://www.schemecolor.com/chilled-beer-colors.php



FFF897    FAE96F    F6C101    EC9D00    DF8D03    C96E12

# Prediction:

Depending on how well we organize the parameters for defining our potential outcomes for beer styles, users might get more than one answer. A user's beer might be close to two styles, and then we would give them an answer based on similarity. The more information we can get on the flavor profile of the beer, the easier it will be to narrow down the results. However, flavor is subjective and if the user doesn't have palate or the knowledge to properly describe what they're tasting in their own beer, that might make it a little more difficult. The more information we can provide them through check boxes, the better the results will be and the more they will learn about their own beer. This might have to be a multi-step process for gathering user input to slowly narrow down the selection process.

# Basic Design Concepts for Dashboard:

Input boxes for OG (ex. 1.048), FG (ex. 1.007), ABV (ex. 5.4%), SRM (ex. 12), IBU (ex. 18). Check boxes of buzz words for flavor derived from malts, hops, and yeast.

# Roles:

Bassem: Tableau

David: ML, GitHub

Jared: Tableau, Write-ups

Suraj: Float

## Extra Information:

**Original Gravity (OG):** How much sugar is in your beer before fermentation (brewers extract sugars from grain).



**Final Gravity (FG):** All beer styles have a certain range of where the FG should be. The higher the FG, the more body the beer is going to have. Aka, how thick the beer is due to the sugars left over in the beer. Thickness/body can best be described as how it feels in your mouth when you're drinking it. Orange juice for example is very thick compared to a glass of water. A light lager is going to have fewer leftover sugars than a stout for example.
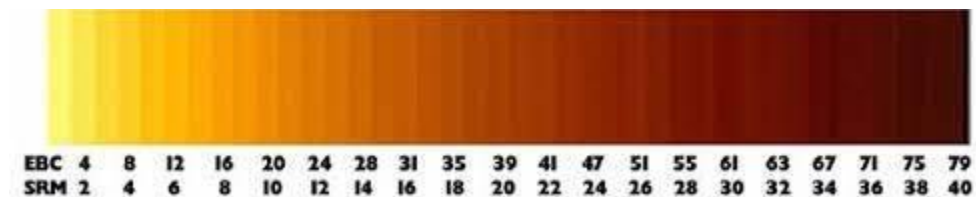
**Alcohol Content (ABV):** During fermentation, yeast turns those sugars into alcohol. How much alcohol is in your beer after fermentation is determined by measuring how much sugar is leftover; FG (final gravity). Attenuation is the process of comparing OG to FG to determine how much alcohol (ABV) is in your beer.

**Standard Reference Method (SRM):** It is North America's gold standard for measuring the color of your beer. It's literally a number assigned to a color. All we need to do is have a user select which color looks closest to the color of their beer and then we'll know the SRM.

| # Value | Color | Beer Style |
|---|---|---|
| 2 | | light lager |
| 3 | | pilsner |
| 4 | | hefeweizen |
| 6 | | american pale ale |
| 7 | | gueze |
| 10 | | extra special bitter |
| 13 | | enlish strong ale |
| 17 | | red ale |
| 22 | | dunkel |
| 24 | | porter |
| 30 | | stout |
| 38+ | | imperial stout |

| EBC | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 31 | 35 | 39 | 41 | 47 | 51 | 55 | 61 | 63 | 67 | 71 | 75 | 79 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SRM | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 |

**International Bitterness Units (IBU):** Hops add bitterness to beer when added to the beer when it's boiling in the kettle.

**Flavors in Beer:**