**Final Project:**

Link to Coffee Quality Predictor webpage <https://coffee334.herokuapp.com/>

Github Group Page

<https://github.com/laurelwilliamson/finalproject>

**Project Overview Requirements:**

1- Finding a problem worth solving, analyzing, or visualizing

2- Use ML in the context of technologies learned.

3- Must use Scikit-Learn and or another machine learning library.

4- Must use at least two of the below:

5- Python Pandas, Python Matplotlib, HTML/CSS/Bootstrap, JavaScript Plotly, JavaScript D3.js, JavaScript Leaflet, QL Database, MongoDB Database, Google Cloud SQL, Amazon AWS, Tableau

6- Host application using Heroku.

**The project:**

- Software: HTML/CSS, JavaScript, Visual Studio Code 1.49.1, BootStrap 4.0.0, pandas/Lux, sklearn, Google Maps.

For the model I will use 17 independent variables. The original dataset has 44 variables.

Dependent variable:

Total cup points: Number of points the end product coffee has stored by the CQI jury (1-100 points; 100 is the highest score)

Independent variables:

Country of Origin, Species, Aroma, Flavor, Aftertaste, Acidity, Body, Balance, Uniformity, Clean Cup, Sweetness, Cupper Points, Region, Processing Method, Quakers, Total Cup Points, Altitude mean in meters

**Definitions:**

Country of origin: Where the coffee comes from

Aroma: Aroma refers to sensations perceived by the olfactory bulb and conveyed to the brain; whether through the nose or retro-nasally: The aromatics of a coffee.

Species: Arabica and Robusta all with different varieties

Processing method: Which method was used to process it before roasting.

aftertaste: Refers to lingering residual sensations in the mouth after coffee has swallowed. It might be distinguished from finish which is the final sensations of the coffee while it leaves the mouth

Quackers - Category one defects: How many cat. 1 defects the coffee has

Category two defects: How many cat. 2 defects the coffee has

Mean altitude (m): At which mean altitude this coffee is cultured

Uniformity: Is refer to one of the particular amount of cups on which you evaluate if elements (acidity, body,etc) shows an stable behavior during the time (time in this case is in a each other slurp in that cup). Cleanness of cup is referred to the consistency of each cup according to it's uniformity.

Body: Associated with and sensed by mouthfeel, how a coffee feels in the mouth or its apparent texture, a tactile sensation.

Flavor: The overall impression in the mouth, including the origin In coffee talk, it refers to a coffee-producing region or country; such as, "I was just at origin." Of course "Origin" for most product we use is not a beautiful farm in a temperate climate, character as well as tastes that come from the roast.:

This is the overall impression in the mouth, including the above ratings as well as tastes that come from the roast.

Cupper Points: The cupper’s correction is a term we use to measure the “intangible” qualities of a cup: if, for instance, a coffee totals 88 points, but it is high quality enough that we feel it should< be a 90, we add in a +2 cupper's correction.: The cupper's correction is a term we use to measure the "intangible" qualities of a cup: if, for instance, a coffee totals 88 points, but it is high quality enough that we feel it should be a 90, we add in a +2 cupper's correction.

Sweetness: Sweetness is an important positive quality in fine coffees, and is one of five basic tastes: Sour Sour is one of four basic sapid (in the mouth) tastes: Sour, Sweet, Salty, Bitter (and possibly a 5th called Umami which indicates savory flavors). In coffee, sourness in moderate amounts of favorable, although the More , Sweet, Salty Salty is one of four basic sapid (in the mouth) tastes: Sour, Sweet, Salty, Bitter (and possibly a 5th called Umami which indicates savory flavors). In coffee, saltiness is not usually a positive quality, but More , Bittersalty-sweet-sour-bitter Bitterness is one of 5 basic tastes: Sour, Sweet, Salty, Bitter and Umami (savory flavors).

Total Cup Points: The cupper’s correction is a term used to measure the “intangible” qualities of a cup: if, for instance, a coffee totals 88 points, but it is high quality enough that we feel it should< be a 90, we add in a +2 cupper's correction.: The cupper's correction is a term we use to measure the "intangible" qualities of a cup: if, for instance, a coffee totals 88 points, but it is high quality enough that we feel it should be a 90, we add in a +2 cupper's correction.

Clean Cup: Clean cup refers to a coffee free of taints and defects. It does not imply sanitary cleanliness, or that coffees that are not clean (which are dirty) are unsanitary. It refers to the flavors, specifically the absence of hard notes, fruity-fermenty flavors, earthy Earthy is a flavor term with some ambivalence, used positively in some cases, negatively in others.: Sumatra coffees can have a positive earthy flavor, sometimes described as "wet earth" or "humus" or "forest" flavors. But More flavors or other off notes.

**Conclusion**

Originally our analysis wanted to prove that altitude for growing coffee was a significant factor for good quality coffee, but as the model predicted, altitude happens to be a constant variable in all the coffee growing regions and not the sole determines of great quality coffee. As the linear regression model predictor analysis, there is sufficient correlation on the results, given that the major component dictates that the washed/wet method seems to be the most ideal processing method for higher altitudes.

There are two different methods use for separating bean from cherry – the Dry Method and Wet Method. The Dry Method involves drying the cherry so that the fruit will fall away from the beans. The cherries are first cleaned and hand-sorted for ripeness. The cherries are then spread thin on a patio of concrete slab which receives plenty of sunlight. As the cherries dry they are turned to speed up the drying process. This can take several days and is occasionally done in a machine-dryer to minimize time cost. Once the moisture content is below 12.5%, the outer layer of the cherry can be removed to produce what’s called “green coffee”. (“Where Coffee Grow”)

The Wet Method utilizes special machinery and access to abundant water sources in order to remove the fruit from the cherry. A pulping machine removes most of the fruit from the bean, then the bean is submerged in a large tank to break down and remove the rest of the natural mucilage. This process takes roughly one day. The beans are then sat in the sun for eight to ten days in order to drop the moisture content down to 12.5%. (“Where Coffee Grow”)

Both methods conclude with cleaning, sorting, and grading. This preps the beans to be marketed to their respective buyers now that all the fruit has been removed.

**Group Members:**

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**Resources**

Data Source: <https://www.kaggle.com/reminho/coffee-quality-score-prediction-using-tree-models>

<https://u.osu.edu/ryanrichardscoffeecommoditychain>

<http://www.coffeeresearch.org/agriculture/processing.htm>

<https://www.coffeereview.com/interpret-coffee/>

<https://library.sweetmarias.com/glossary/body/>

<https://seasia.co/2018/01/27/the-coffee-belt-a-world-map-of-the-major-coffee-producers>