



Fi Motors (Flatiron Motors): What makes a fun motorcycle?

Phase 3 Project: Josh Ruggles



Business Problem

Our data science team has been contracted by a fairly new up and coming motorcycle manufacturer, Fi Motors, who is struggling to find their new formula for a 'fan favorite' motorcycle.

Being a company of motorcycle riders, they have tasked our team to come up with a plan to replicate the successes of platforms like the **Yamaha MT-07** and the **Suzuki SV650**. Fi Motor's ultimate desire: *figure out what makes a motorcycle that people want to ride.*



Method of approach: classification

As opposed to a regression model, a classification model predicts class outcomes. The class outcomes that we are looking at will be referred to as Features.

The accuracy of our model is often labeled as a %, but for our purposes we will depict this as a confusion matrix.



Project Goal

We will build a predictive model that can tell the client (Fi Motors) what features are most important on a motorcycle for enjoyment. These relevant features will be plugged in and ranked by our model with suggestions most highly correlated to fun.



How did we rate, 'fun'?

- Average 'Rating' score for the MT-07 and SV650 was 3.4
 - This metric is based off of a binary rating score of 0-1.
 - 0 = not as fun as an MT-07/SV650 or less than 3.4
 - 1 = at least as fun as these bikes or more than 3.4

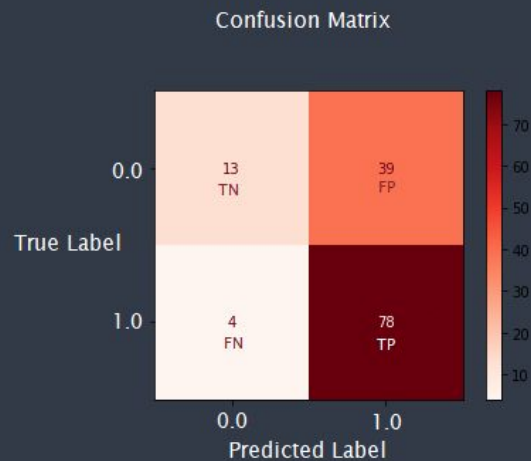


Data and exploration

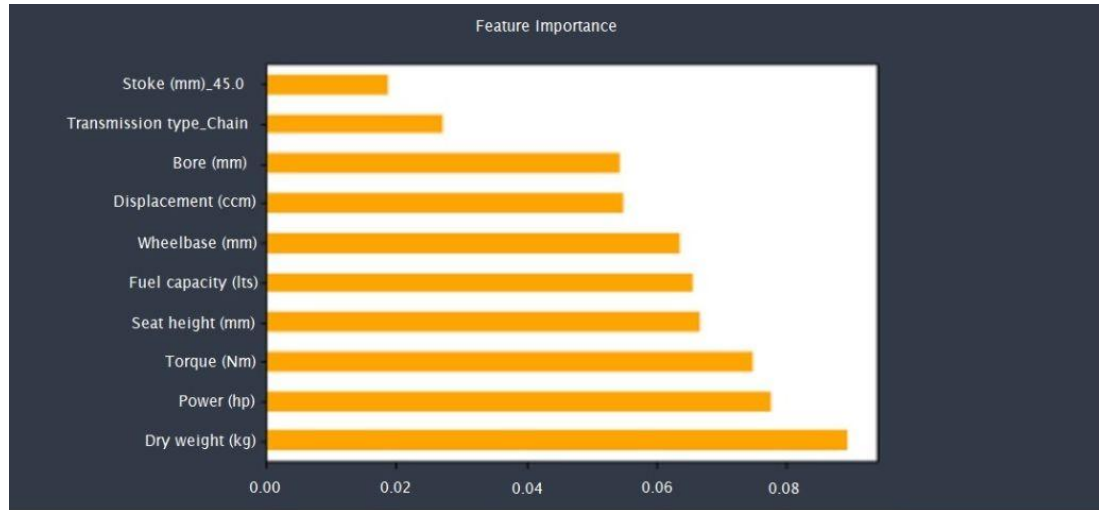
All data was pulled from [kaggle.com](https://www.kaggle.com)

-Dataset “all_bikez_curated.csv” file curated by Emmanuel F. Werr

Confusion Matrix Accuracy: 67.9%



Feature Importance



These 10 features are the most highly correlated with bikes that are considered a ratings success.



For your consideration:

Based on the top 10 features these were our findings (totals based on averages of bikes with ratings of 3.4 or better)

- Dry weight of 188.89 kg
- ~70 horsepower
- ~75 Nm torque
- Seat height around 790 mm
- Fuel capacity of 16.86 liters (more obviously if you are considering a touring machine)
- Wheelbase of 1483.67 mm
- Displacement of 848 ccm
- Bore of 81.37 mm
- Final drive: Chain
- Engine stroke: 45 mm



Further Considerations

Consider making the engine in this potential motorcycle a 4 cylinder.

-Stroke of (45mm) x Bore (81.37 mm) = 231.9 ccm (cubic centimeters)

- Multiplied by 4 (the number of cylinders recommended) = 927.5 ccm (cubic centimeters), just over the recommended engine displacement of 848 ccm



Limitations of the data

- After preprocessing, there is not a large sample size to pull from
- Though this was not part of the business problem, there is no pricing consideration in this model: price to manufacture or otherwise
- Large amount of false positives



Conclusions

- Based on the predictions we have taken from the model there are a few examples of motorcycles to consider replicating in some way, shape, or form:
 - The majority of bikes @ 790 mm seat height are naked sport bikes
 - The data supports the creation of a 4 cylinder engine with an engine displacement somewhere between 848-927 ccm
 - Target power: 70 horsepower
 - Target torque: 75 Nm



Thank you!

For questions or concerns please contact:

-Josh Ruggles: jkrugg@gmail.com