Reddit Post Analysis of r/fountainpens and r/pens

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A Potential Market Research and Sentiment Analysis Tool For the Goulet Pen Company

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The Goulet Pen Company - Online Only Fountain Pen Retail Business

- Started in 2009
- Specializes in fountain pens, ink, paper, and other accessories centered around fountain pens
- Small business that has no plans to expand to a ‘brick and mortar’ business model

Natural Language Processing - Tool For Market Research & Sentiment Analysis

How can Goulet Pens keep track of customer opinions and what potential customers want?

The r/fountainpens and r/pens community! The r/fountainpens community has 293k member and r/pens has 106k.

Utilizing natural language processing can provide insight into what these communities are interested in as well as opinions of Goulet Pens.

Testing Models - Pen or Fountain Pen? - No False Positives!

Goal: Create a model that can predict if a post belongs in the r/fountainpens or r/pens community. Emphasis on never classifying a pen post incorrectly as a fountain pen post. Accuracy is also important. r/fountainpens is considered the positive outcome.

	Posts
r/fountainpens	1557
r/pens	1243
Total Posts	2800

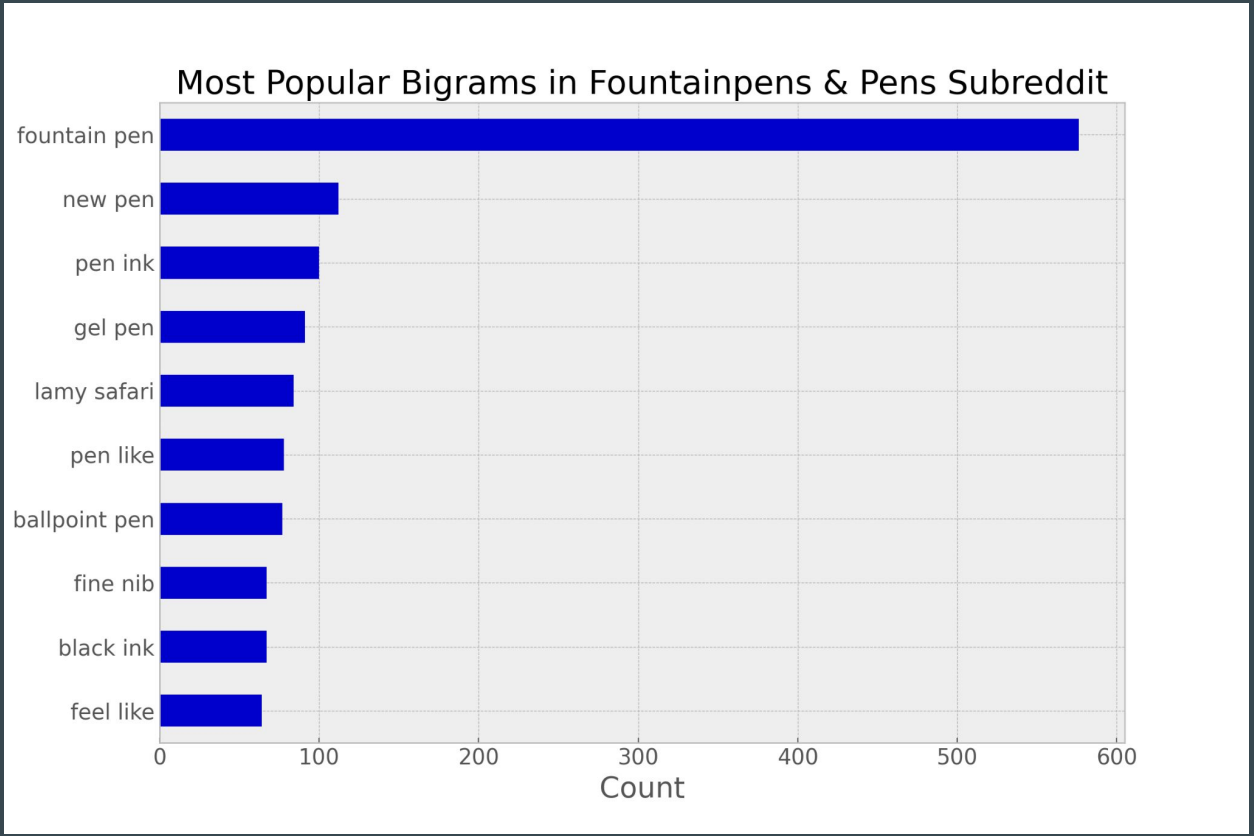
** Four posts dropped due to null data. A post consists of the title and body.

Model Results - Bernoulli Naive Bayes vs. Logistic Regression

Base Model is 56%	Training Data Accuracy	Testing Data Accuracy	Prediction Accuracy	Sensitivity/Recall	***Specificity (Goal Metric)***	Precision
Logistic Regression & CountVectorizer	98%	89%	89%	92%	87%	90%
Logistic Regression & TF IDF	89%	87%	87%	91%	82%	86%
Multinomial Naive Bayes & CountVectorizer	91%	91%	91%	93%	88%	91%
Bernoulli Naive Bayes & CountVectorier	90%	90%	90%	88%	91%	93%

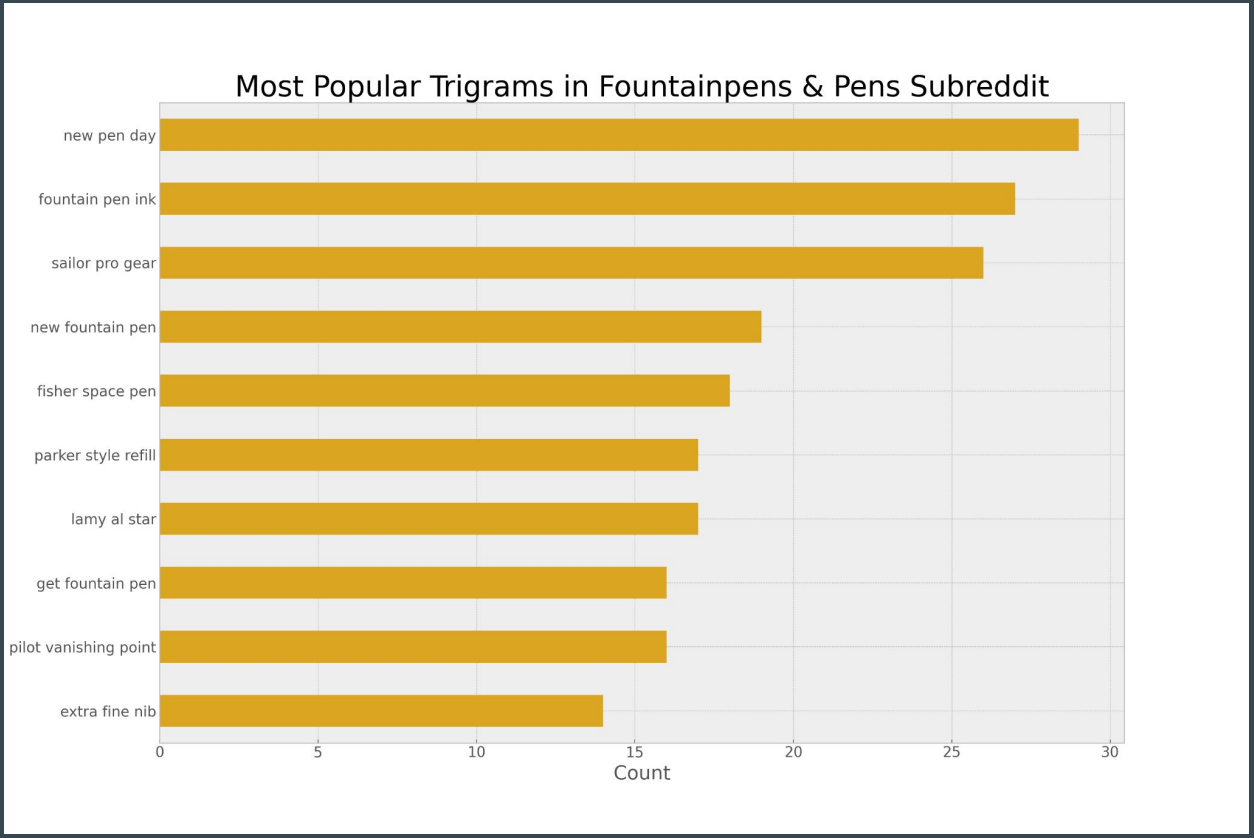
- All models implemented SpaCy for natural language processing.
- Logistic Regression with CountVectorizer is overfit.
- Logistic Regression with TF IDF generalizes data better, but specificity is lower.
- Bernoulli Naive Bayes with CountVectorizer performs best with specificity and is generally a nice model.

Now For the Fun Stuff - What Are Pen Enthusiasts Talking About?



- ...it's fountain pens
- Lamy Safari
- Gel/Ballpoint pens
- Black Ink

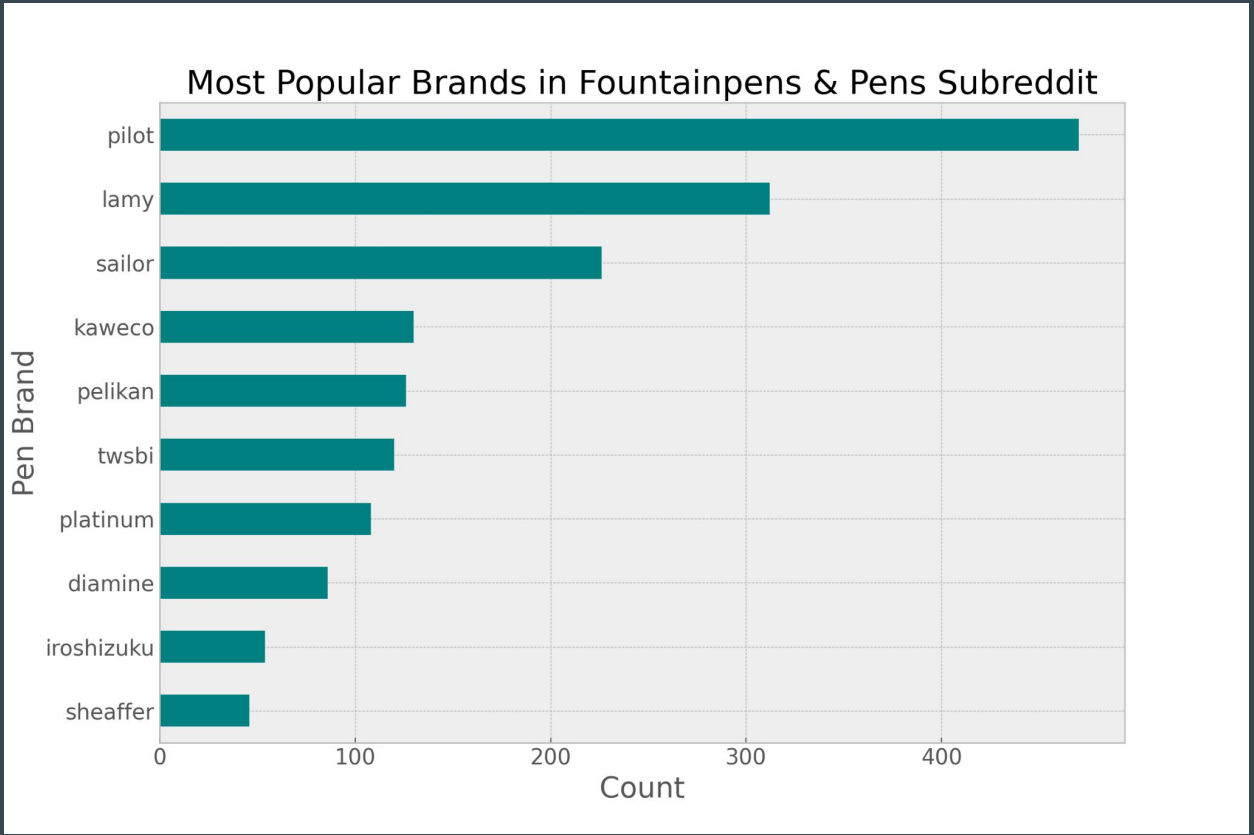
Triple Threat Words - The Trigram!



- New Pen Day!
- Sailor Pro Gear
- Lamy AL Star
- Pilot Vanishing Point

Best performing model uses trigrams.

Most Talked About Brands Sold at Goulet Pens



- Pilot pens and ink
- Lamy strikes again
- Sailor also near top

‘Goulet’ was #19 on list of brands generated for analysis.

Suggestions and Improvements

- Goulet Pens offer a ‘Beginner Set’ which includes a Lamy Safari fountain pen with a fine nib and sample of Diamine or Iroshizuku black ink.
- Emphasize marketing on Sailor Pro Gear and Pro Gear Slim pens as new editions are released.
- Further research implementing SpaCy natural language processing. Comments!
- Modify model to focus on sentiment analysis for Goulet Pens.

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