



Roy Kim

The Natural Language Processing of Humor

Background Information

- "Reddit is an American social news aggregation, web content rating, and discussion website." (Wikipedia)
- "Natural language processing (NLP) is a subfield of computer science, information engineering, and artificial intelligence concerned with the interactions between computers and human (natural) languages." (Wikipedia)
- Humor is one of the most nuanced and difficult aspects to understand of human language.



Joke

vs.

AntiJoke

↑ r/Jokes · Posted by u/SodaBoda1 18 hours ago
119 ↓

How do you know a joke is a "Dad joke"?

When it becomes apparent.

9 Comments Share Save Hide Report

↑ r/AntiJokes · Posted by u/edder24 13 hours ago
2 ↓

What's red, blue, and pink?

Colors.

3 Comments Share Save Hide Report

Goal

1. Use the Reddit API to extract and analyze the text from two subreddits (**/r/Jokes** and **/r/AntiJokes**).
2. Use a variety of NLP and classification techniques to preprocess data.
3. Build a model to accurately predict what subreddit a post is from.
4. Get a glimpse into how machine learning applies itself to humor.

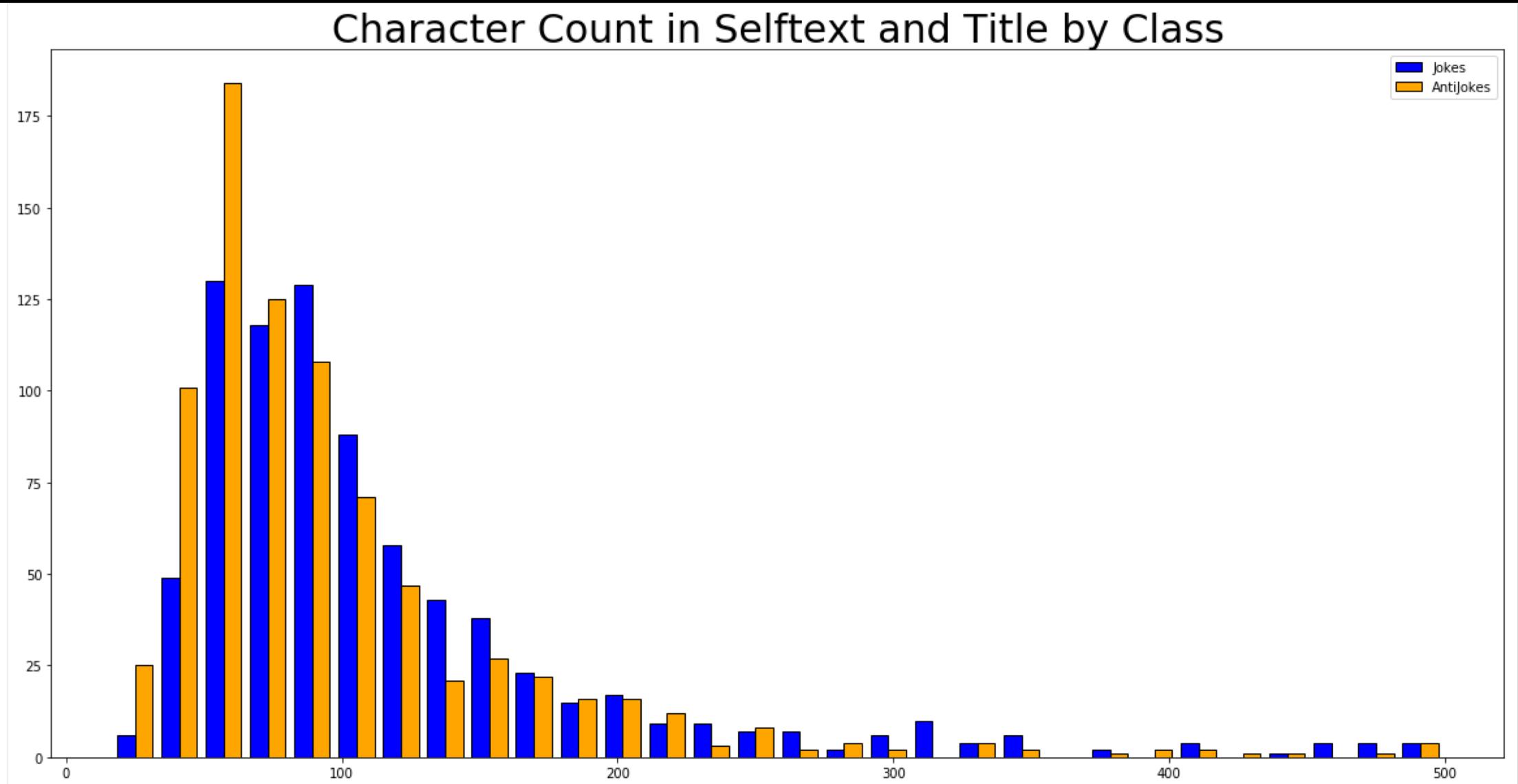
Problem Statement

Using NLP and Classification techniques, can a model be created that predicts that a post belongs to the **/r/AntiJokes** subreddit correctly with greater accuracy than the baseline of 50%?

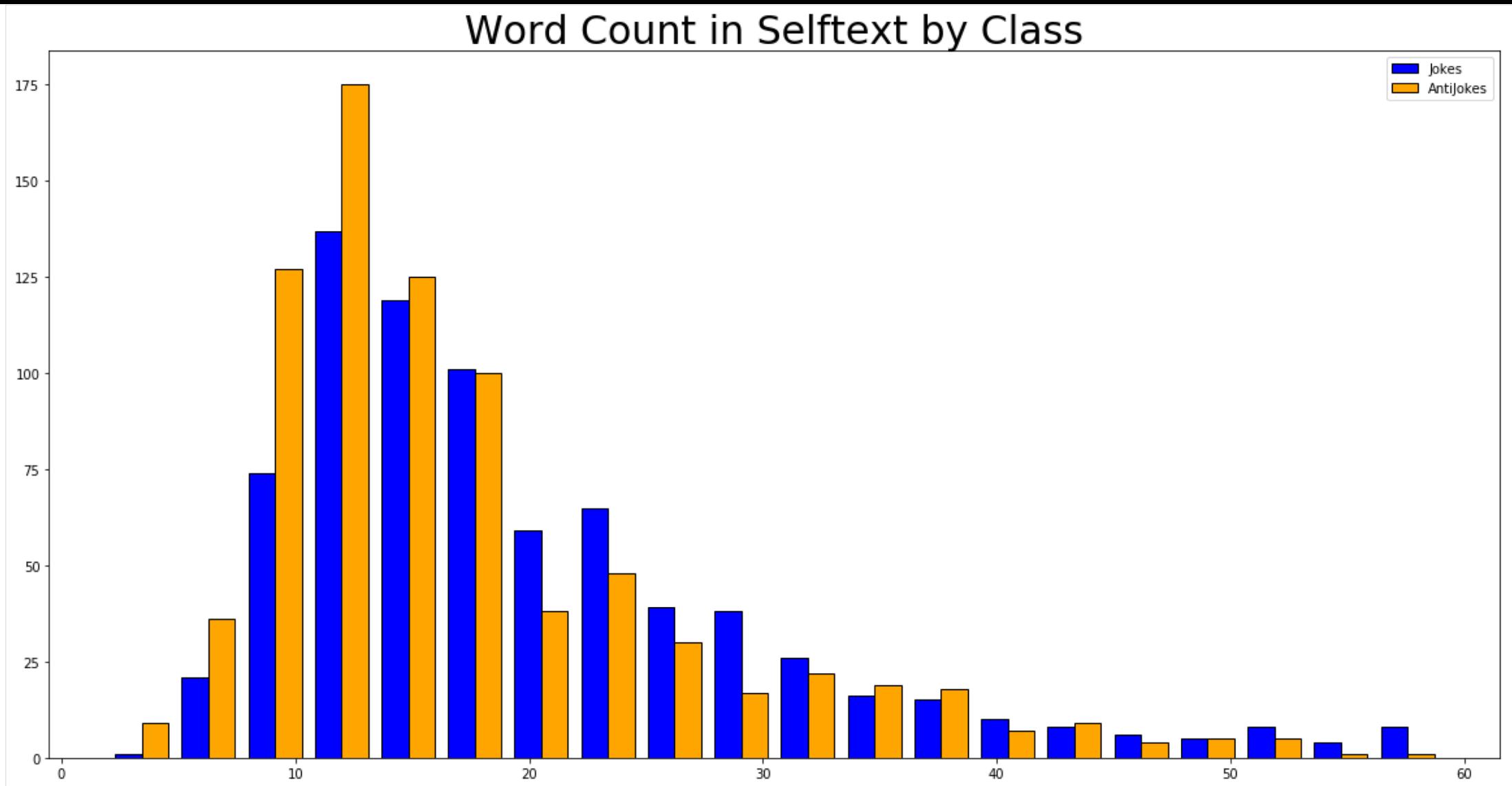
Approach

1. Using the Reddit API, extract data observations from /r/Jokes and /r/AntiJokes subreddits
2. Clean the extracted data (escape chars)
3. Use NLP techniques to preprocess the data and perform EDA
4. Use Latent Semantic Analysis to understand the relationship drawn between words by machine learning
5. Create classification models (Random Forests and Gradient Boosting)
6. Evaluate performance of models and answer problem statement

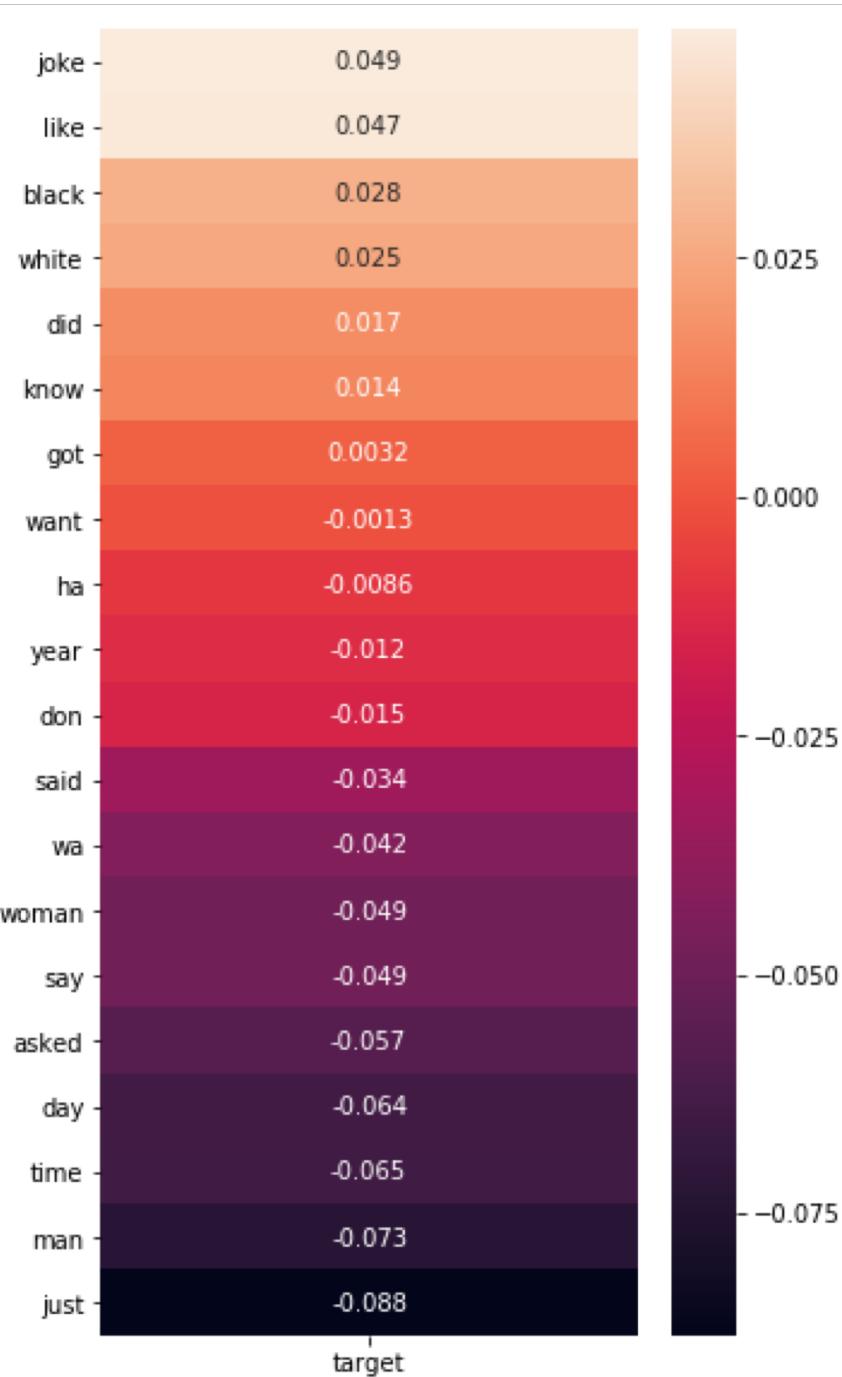
Step 1 Findings / Distribution of Character Count by Class



Step 1 Findings / Distribution of Word Count by Class



Step 2 Findings / Correlation of Top 20 Most Common Words



Step 3 Findings / Sentiment Analysis

- **VADER** (Valence Aware Dictionary and sEntiment Reasoner) Sentiment Analysis by class
- Slightly more negative for class 1 (/r/AntiJokes)
- Slightly more neutral for class 0 (/r/Jokes)

	compound	neg	neu	pos
target				
0	0.065537	0.079879	0.818253	0.101870
1	-0.031315	0.114817	0.783295	0.101897

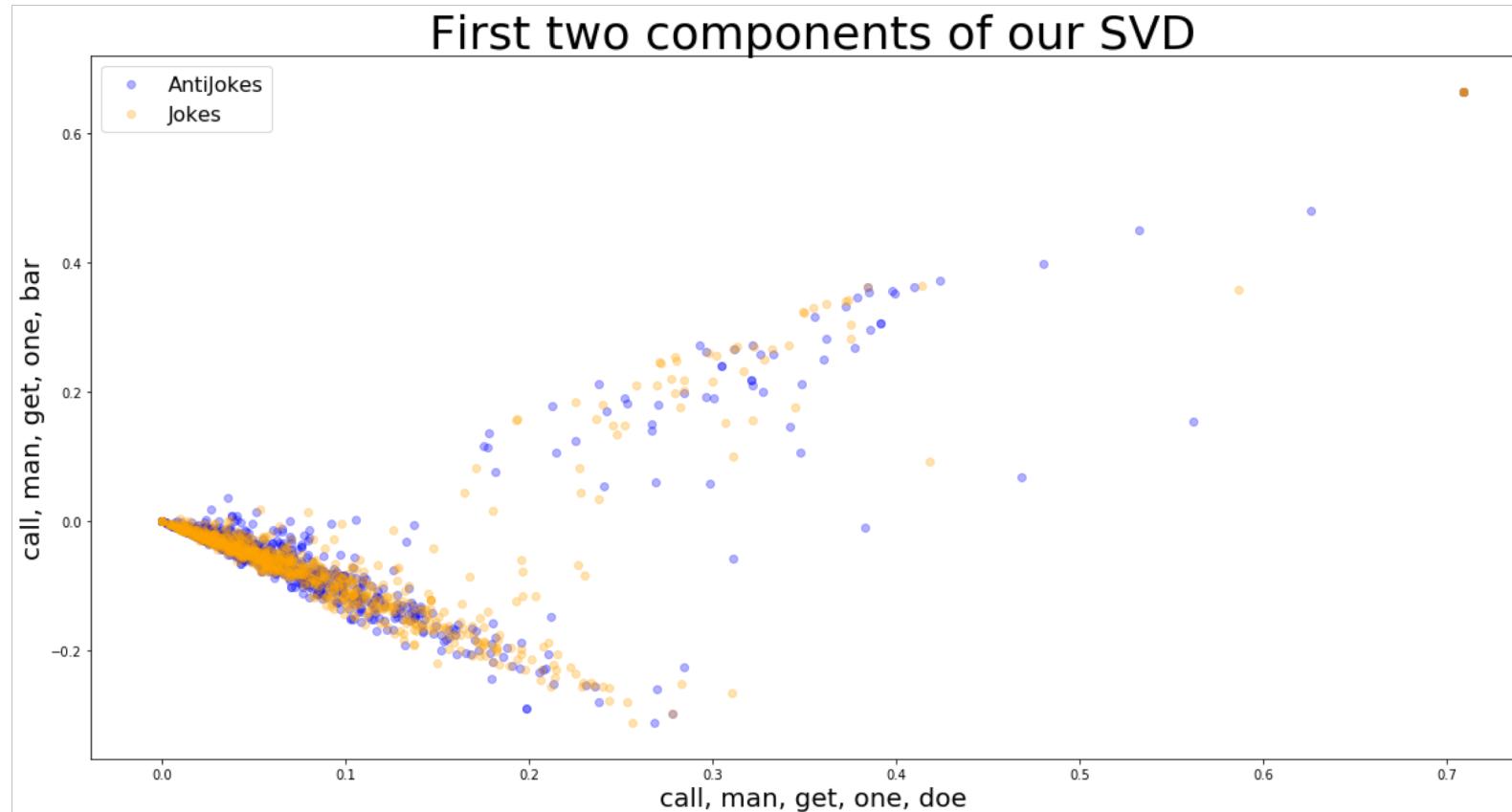


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Step 4 Findings / Latent Semantic Analysis



- Singular Value Decomposition (SVD): 1018 features from TFIDF → 346 principal components ("topics")
- Graph of first two components, though not much classification occurring here

component_1		component_2	
call	0.709003	call	0.664860
man	0.278099	man	-0.299003
get	0.198646	get	-0.290132
one	0.171142	one	-0.189473
doe	0.146227	bar	-0.155230
name	0.121453	go	-0.127068
bar	0.115141	doe	-0.122877
go	0.096117	time	-0.088334
time	0.091166	drink	-0.081723
friend	0.079920	well	-0.080286

Step 4 Findings / Latent Semantic Analysis

component_3	
man	0.646915
get	-0.493107
doe	-0.296179
bar	0.286010
cross	-0.100885
one	-0.100501
many	-0.089500
take	-0.088543
chicken	-0.084675
bartender	0.083373

component_4	
coffee	0.623343
doe	0.549508
get	-0.437316
cross	-0.104043
many	0.101774
take	0.088109
chicken	-0.076160
road	-0.074970
lightbulb	0.053972
one	0.052913

component_5	
coffee	0.724099
doe	-0.534562
get	0.231597
anti	0.127618
many	-0.119272
take	-0.105616
black	0.070809
cross	0.067147
man	-0.057188
lightbulb	-0.056419

Step 4 Findings / Latent Semantic Analysis

Modeling and Conclusion

Baseline accuracy: ~50%

Using SVD:

- KNN: 59%

Using SVD and word_count:

- Random Forests: 64%
- Gradient Boosting: 65%

Recommended Actions

- A joke and antijoke is sometimes difficult even for us to differentiate
- Try different kind of topics in humor (jokes vs. non-joke)



Next Steps / Questions

- "Laughter is a special, higher-order function that only humans possess"
- Years, maybe decades, before AI can understand humor as we do



Figure 3. Visual results obtain using the proposed NJM.