



Detecting Fake Reviews With NLP

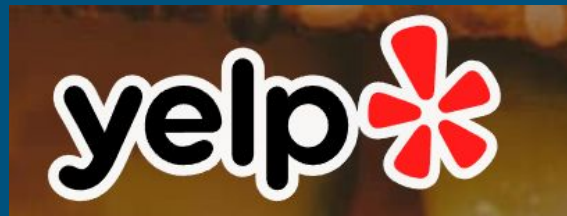


Mitch McElderry



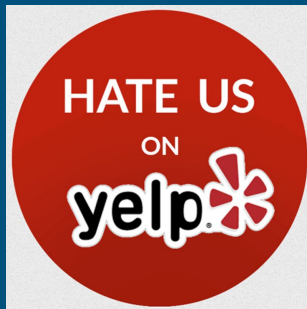
Outline

- Business Problem
- Data and Methods
- Model
- Conclusions



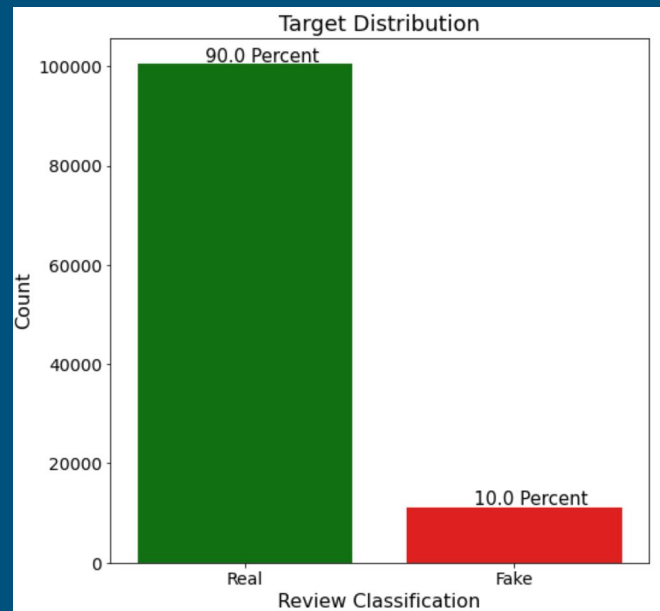
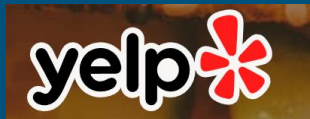
Business Problem

- Develop model to catch fake reviews on restaurants on Yelp
- 5 star reviews can be bought by businesses - this is false advertising
- An extra star for restaurant on reputable review site increases revenue 5% - 9%



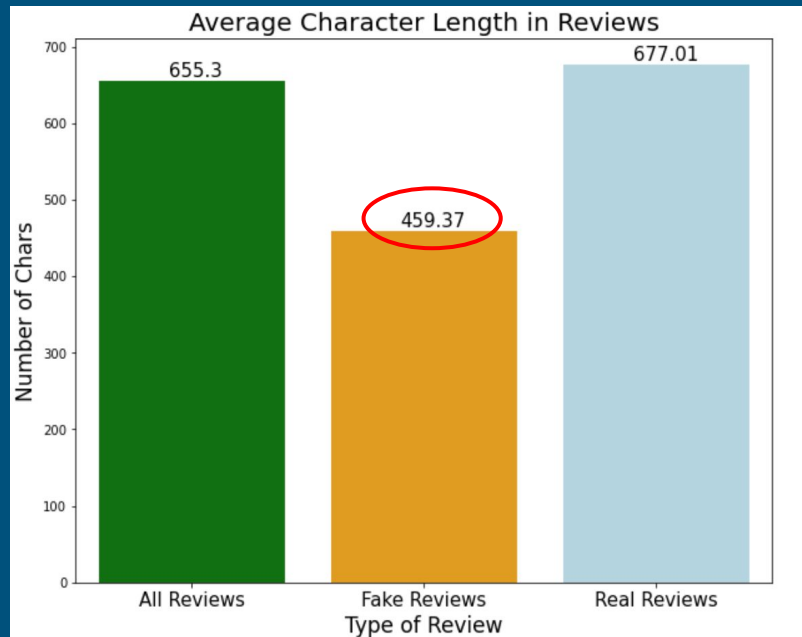
Data and Methods

- Model trained on Yelp reviews from Kaggle 2008-2014
- Present data scraped from Yelp to test model



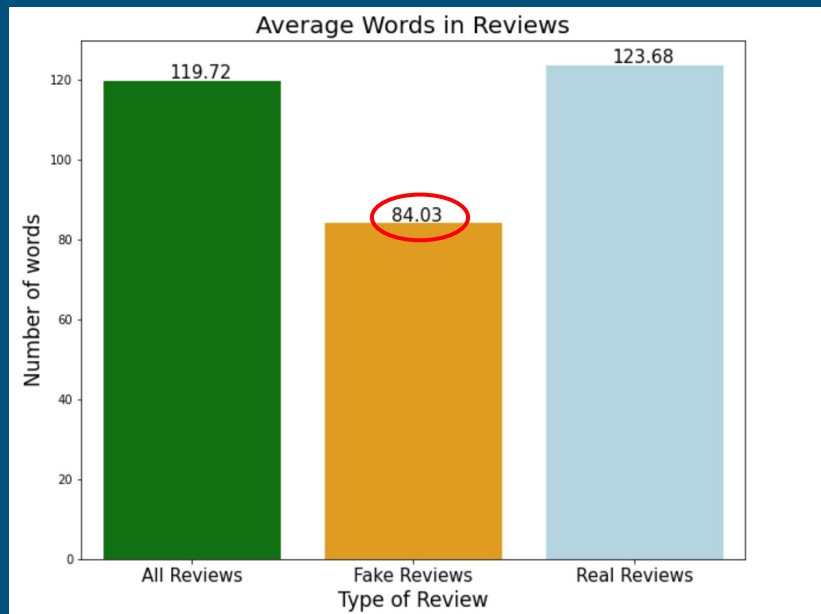
Average Characters in Review

Fake Reviews use less characters



Average Words in Reviews

Fake reviews use less words



Real vs Fake Review

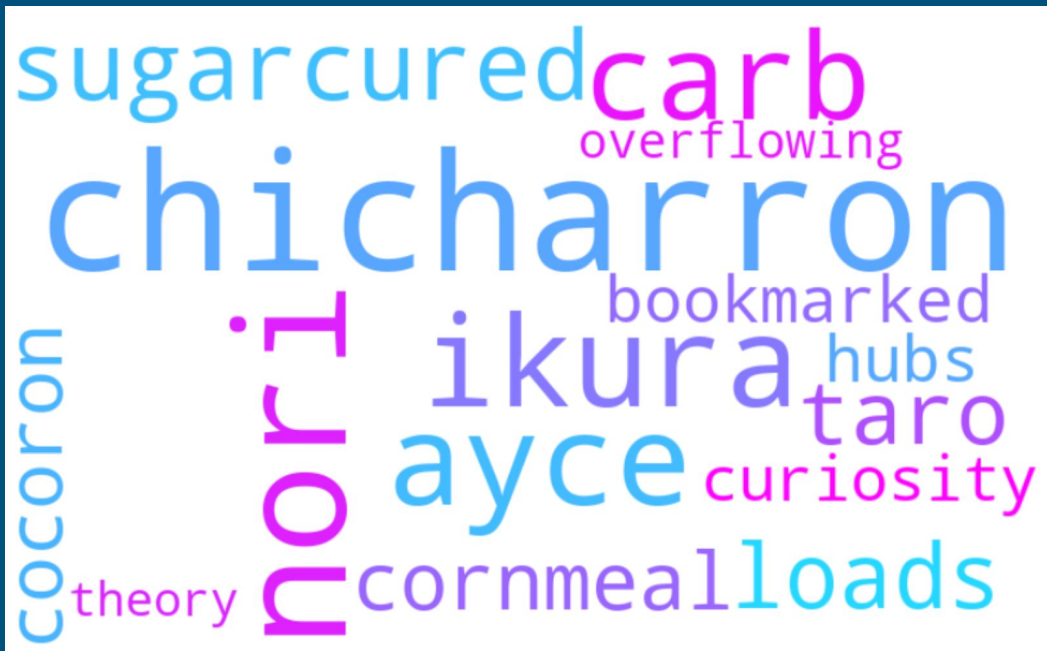
The food here is SLAMMIN'!!! I truly love when you try a restaurant for the first time and the workers/owners are all so happy you came! The service is really a major plus. I felt like I walked into my aunt's house or something. I've tried a few of the items on the menu but the standout by far would be the honey bbq wings. They are so sweet and tangy! I have not had wings that juicy and good in a very long time. The homemade baked good are equally stellar. I hate cheesecake, but the sweet potato cheesecake here changed my mind! The yellow cake with chocolate frosting, the lemon cake all hits! Any of the sides you choose for your meal will be well seasoned and tasty! Wash it all down with a ha! and half and you will be in heaven. I have not tried the breakfast and to be honest I am scared to do it. Grits, salmon cakes, waffles with nutella...These things could be a major wardrobe shrinker. I am very confident that when I do, it will be worth every calorie. Get yourself over there ASAP!!

Real Review - longer and more detailed

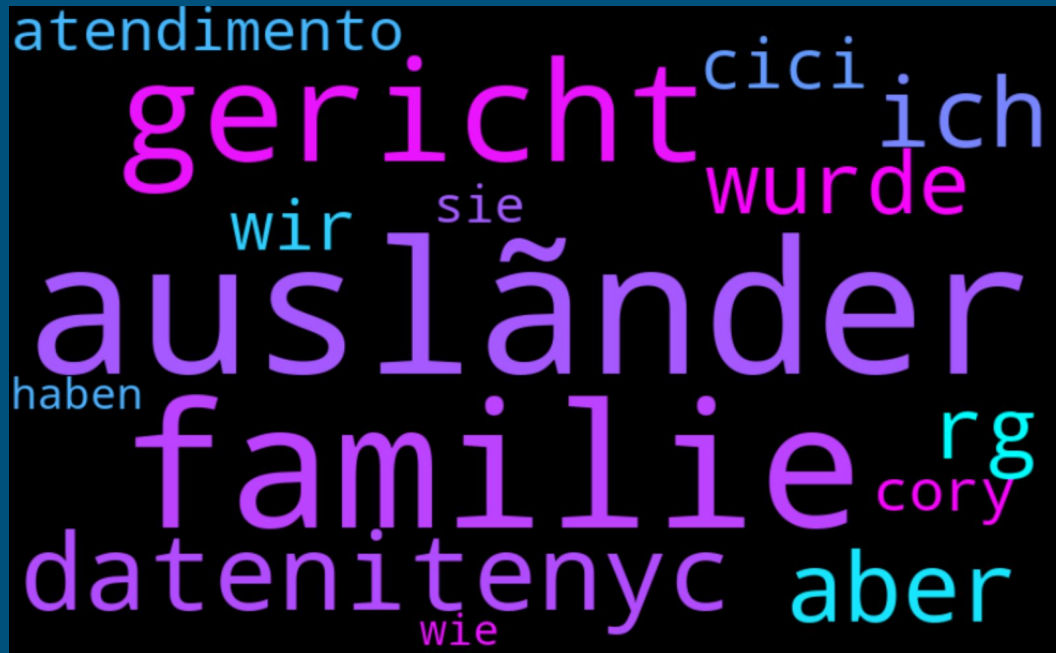
Bangin!!! The honey bbq wings and mac and cheese are to die for, and once I tried it other places in the neighborhood paled in comparison. This family owned restaurant will satisfy any craving for a homey slice of southern comfort. Also, dont miss out on the top notch cakes and pastries--More cheese biscuits please!

Fake Review - shorter with less details

Words Only in Real Reviews



Words Only in Fake Reviews



Preparation for Modeling

The food at snack is a selection of popular Greek dishes. The appetizer tray is good as is the Greek salad. We were underwhelmed with the main courses. There are 4-5 tables here so it's sometimes hard to get seated.

Punctuation and numbers removed. Words stemmed.

the food at snack is a select of popular greek dish the appet tray is good as is the greek salad we were underwhelm with the main cours there are tabl here so it sometim hard to get seat

Numerical stats for each review (Before editing)

Number of Words	Character Review Length	Sentence Count	Avg Words Per Sentence
40	215	4	10.000000

Model

**TFIDFVectorizer
with Logistic
Regression**

Recall: 70%



- False positives still problem
- Caught over 1900 fake reviews out of ~ 2700

Model on Local Reviews

★★★★☆

10/4/2021

It was a great dining experience as far as the ambiance and people. We had a fabulous waitress, Lorena. Our drinks and appetizers Stuffed Mushrooms and Meat Pies were spot on. I got the specialized Snapper and it was like warm and they had given my friend well done prime rib instead of med. rare because they had run out and not communicated that to our waitress. We had a great time in spite of the entrees not being up to expectations. We would give it a second chance for sure.

Useful

Funny

Cost

Monique V.

Business Customer Service

10/18/2021

joy, We appreciate the opportunity to serve you. Our goal is your satisfaction. We invite you to speak to a member of our management team any time you have an issue or concern so that we may be able to address...

Read more

Stephanie W.

Denham Springs, LA

@ 0 1

9/26/2021

Boyfriend and I were looking for a new brunch spot in town and we found this place not far from the house...TOTAL WINNER in our book. We went for Sunday brunch. Got bottomless mimosas and were surprised by complementary garlic bread. Ordered the cheese toast with pepper jelly as an appetizer and WOW can't believe they made something so simple taste so good! We had the grits and grillades and crab cake benies; both were delightful. Live music was a plus, but we were sat right next to the stage so it was pretty loud. Can't wait to go back!

Useful

Funny

Cost

Monique V.

Business Customer Service

10/18/2021

Stephanie, Thank you for dining with us for Brunch. Our goal is to serve you good times and good food!! We are glad to hear that you had both on your recent visit. Please dine with us again soon.

Read more

Sarah G.

Houston, TX

@ 157 198 141

10/22/2021

My review is based on takeout with DoorDash, so I cannot speak for my personal experience at the restaurant.

I was in town on business and took advantage of delivery with DoorDash. My personal role is to try as many local places as possible, and being in calun country, it was a must. I kept seeing Bon Temps pop up on Yelp and DoorDash and decided to give it a try.

1 photo

Order Food

Delivery Takeout

Free Delivery 50 min 30-40 mins

Delivery address

Start Order

bontempsgill.com

(337) 706-8850

Get Directions

1211 W Pinhook Rd Lafayette, LA 70503

Message the Business

You Might Also Consider.

Sponsored

Chuy's

★★★★☆ 104

0.8 miles

"Tried this place out for the first time on a Friday evening. It hasn't been open..." [read more](#)

McAlister's Deli

★★★★☆ 3

0.8 miles

"I love McAlister's Deli so having one on UL campus is probably the best thing ever..." [read more](#)

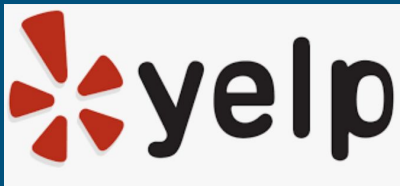
~ 1800 Reviews
scraped from local
restaurants on Yelp

Local Reviews Prediction

Prediction	Number of Predictions
Predicted Real	494
Predicted Fake	1325

Conclusion

- Data such as user location and activity will help model
- Fake reviews shorter on average
- Machine learning and NLP help minimize fake reviews



Thank you!

Mitch McElderry

Github: <https://github.com/mmcelld2>

Linked in: <https://www.linkedin.com/in/mitch-mcelderry-35a47a99/>