

Mexican Restaurant Yelp Reviews

Sentiment Analysis and Topic Modeling

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Objective

To perform sentiment analysis and topic modeling of Yelp restaurant reviews, so that:

- Customers can make easier restaurant decisions
- Restaurants can action off of customer reviews



Methodology

DATA

SOURCE: Yelp Dataset Challenge

BUSINESS TYPE: Mexican Restaurant

Restaurants: 1,016

Reviews: 129K

WHERE: Las Vegas, NV

WHEN: 2013 - 2018

TOOLS



python™

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



NLTK



scikit
learn



Sentiment Analysis

Unsupervised to Supervised

PRE-PROCESS

Removed:

- Punctuation
- Stop words
- Numbers
- Uppercase

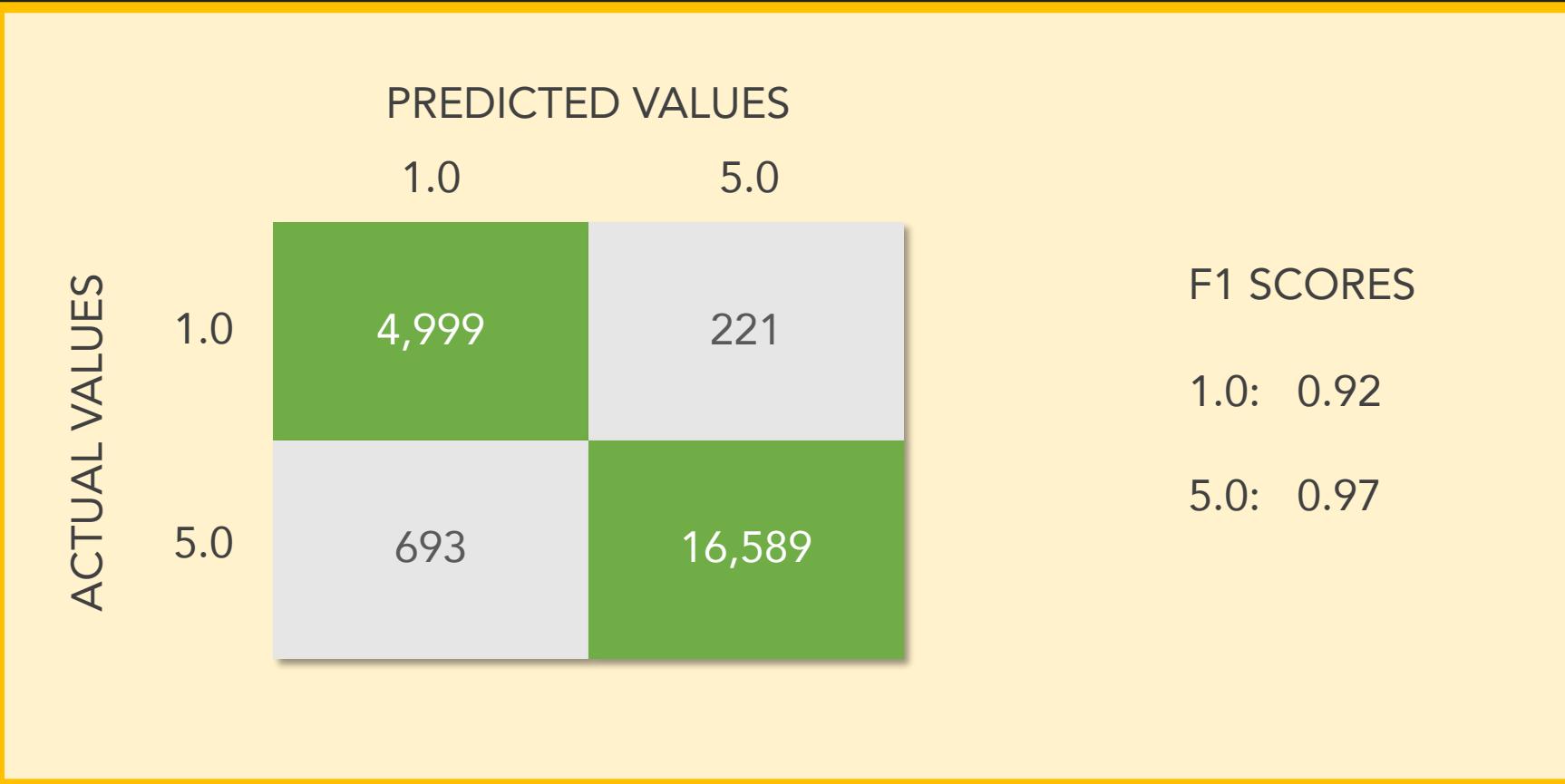
TOKENIZE and VECTORIZE

CountVectorizer

SUPERVISED LEARNING

- Train on 5 and 1 Star Reviews as positive and negative
- Balanced data using **Random Oversampling**
- Modeled with **Multinomial Naïve Bayes**
- Applied to whole dataset

Sentiment Results



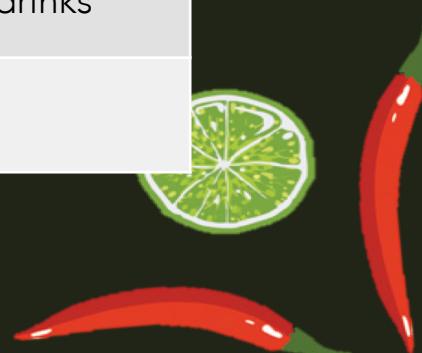
Topic Modeling

by Sentiment



Positive Topics

Topic	Top 10 Words
Ordering	like, one, ordered, chicken, time, salsa, would, also, menu, restaurant
Meat	tacos, taco, asada, carne, pastor, meat, al, get, el, best
Service	food, service, restaurant, best, amazing, always, delicious, fast, friendly, staff
Sides	good, really, pretty, salsa, service, chips, nice, got, also, little
Atmosphere	great, service, back, amazing, friendly, awesome, definitely, atmosphere, staff, drinks
High Praise	place, love, go, try, like, get, always, amazing, burrito, best



Negative Topics

Topic	Top 10 Words
Service	us, came, table, asked, said, service, would, server, one, minutes
Quality	food, service, place, good, great, restaurant, bad, better, eat, quality
Sides	good, like, place, really, chicken, salsa, ordered, burrito, chips, one
Wait	order, time, get, back, go, one, location, said, got, never
Meat	tacos, taco, asada, meat, carne, ordered, fish, line, bell, one



Recommendation

- Review sentiment over time and during specific periods
- Create action plans based off of customer comments by topic

Tableau Demo on next slide



Yelp Reviews - Las Vegas Mexican Restaurants

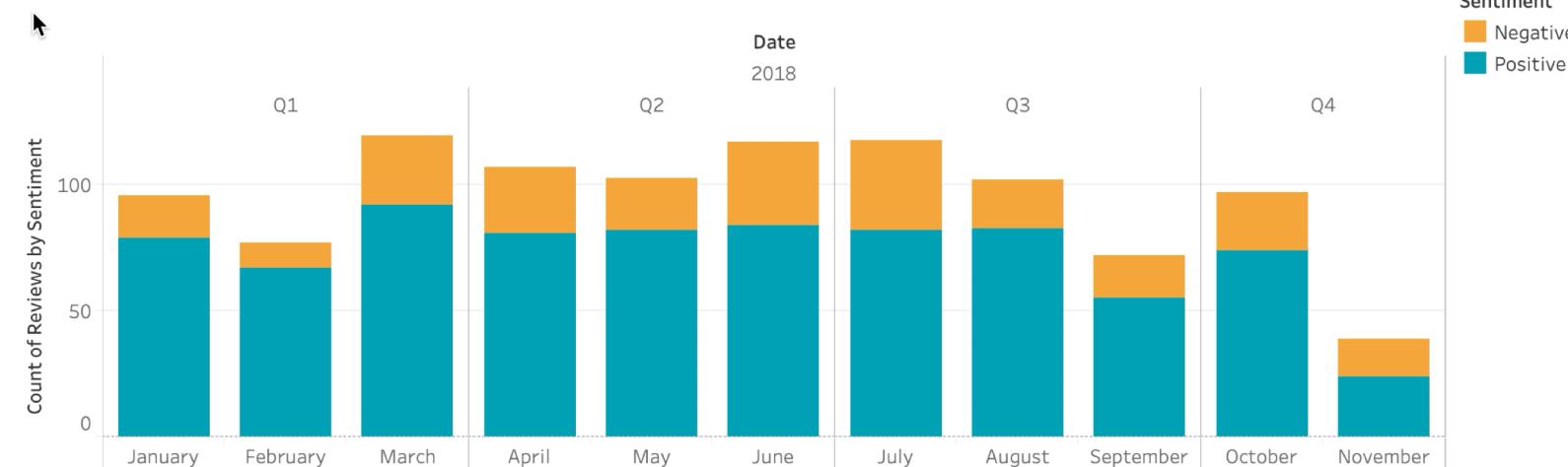
Business Name
Tacos El Gordo

Sentiment
 (All)
 Negative
 Positive

Year
2018

Month
(All)

Sentiment Trend



Reviews

Day of..	Review	Rating
11/14/2018	Hands down the best tacos in Vegas. The Al Pastor tacos are an experience in and of themselves. I wish they were closer and I wish .. Ordered the carne asada tacos and they were good!! Yes, we all heard about the worm in the taco.. I don't care, these are the best tacos in all of Nevada and I've NEVER gotten sick afte..	5.0 4.0 5.0
11/12/2018	The food is cheqp but the time you eat its cold. Idk what happend bit today there system sucked. Not good. Food its good. But you .. The tacos are amazing once a week or more. Best steak tacos north of the boarder just like TJ Mexico. Worth the	3.0 5.0
11/11/2018	Got food poisoned there the day before yesterday..was in bed all day yesterday..and still not feeling great..never going back there Went here based on a bad recommendation from someone I know. Never again!..	1.0 2.0
11/10/2018	I'm only giving it one star because I have to but other than that very upset bad service bad cashier service because the guy was beh.. Talk about a confusing layout. Uh oh!.. The Al Pastor is really good. Other tacos were whatever so stick with the Al Pastor. Gets so crowded so be prepared to wait. Tacos ..	1.0 3.0 4.0
11/9/2018	Best in Vegas worth the wait at all hours of the day. Looks can be deceiving its looks like you would expect a long wait but the cook.. Delicious with every bite. Pastor Tacos highly recommended! We definitely need one in Cali. Eating tacos there is like being transported back to the streets of Tijuana. Absolutely delicious street tacos. It's okay food and a constant crowd for fast food. If you comparing it to Taco Bell then the food is a 10.	5.0 5.0 5.0 3.0

Yelp Reviews - Las Vegas Mexican Restaurants

Business Name
Tacos El Gordo

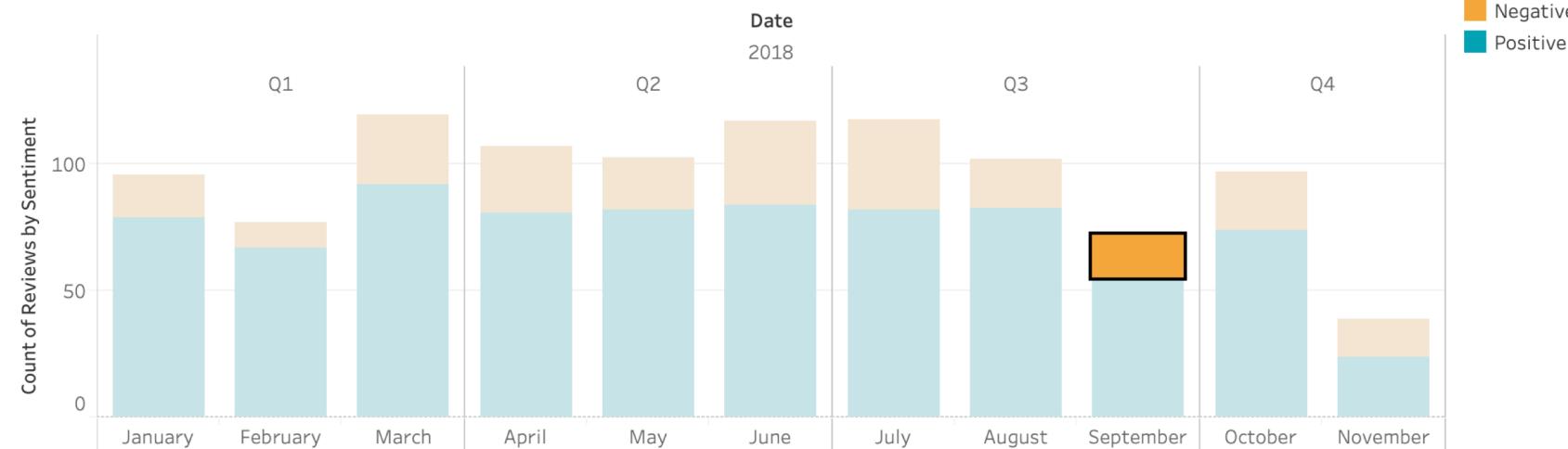
Sentiment

- (All)
- Negative
- Positive

Year
2018

Month
(All)

Sentiment Trend



Reviews

Day of..	Review	Rating
9/30/2018	This place is overhyped , don't get me wrong the tacos are okay but you can find tastier and cheaper tacos anywhere else with muc...	2.0
9/29/2018	Coming from LA, I'm pretty used to trying a variety of Tacos from different places which range from good to ok but these were just ..	1.0
9/28/2018	Ive been to the one off the strip which was good. This location is very subpar. Tacos al pastor are tasteless. Service was very rude. ...	2.0
9/27/2018	Came here on 9/27/18 at 3:30pm..	1.0
9/23/2018	Horrible!!!!!! Never coming back, I went with my wife from Los Angeles, .. I don't get the hype. We waited for half an hour to receive the worst service ever all arou...	1.0
9/18/2018	Straight trash. Very rude people, the meat taste very oily. We tried to get a get a large d...	1.0
9/17/2018	Good tacos but long wait time. I think they really need to work on a better way to stream...	1.0
9/14/2018	Horchata is good, tacos had much better, needs to work on it. Meat a bit burn, needs qua...	1.0
9/11/2018	Todo esta bien con la comida muy buena aunque tenga fila.. yo vengo a este lugar una ve...	1.0
9/10/2018	only reason i gave it a star was because i had to but those are not real tacos people stop...	1.0
9/10/2018	Tacos el gordo is a decent place to get food however it is pretty over hyped. There are pl...	1.0
9/4/2018	This tacos shop is so unorganized they have 5 different meat lines to order from. By the time I got into each line to order, there wa...	1.0

Business Name: Tacos El Gordo
 Review: Ive been to the one off the strip which was good. This location is very subpar. Tacos al pastor are tasteless. Service was very rude. The tortillas were old and stale meat was chewy. Was asked 3 times for my receipt which i left on the table. Compared to others im TJ and other in Vegas, this is junk place to go. This is not authentic Mexican tacos.
 Real Mexican food has taste and the chef takes pride in making.

Day of Date: 9/28/2018
 Review Rating: 2.0

Positive Sentiment - By Topics

Business Name	Tacos El Gordo
Year	2018
Month	(All)

Topic 1 - Ordering

Weight	Review	Rating
0.24	I'll be honest. I was not im..	3.000
0.17	** Tasty and authentic tac..	4.000
0.12	My wife and I saw the sig..	4.000
0.12	Service + Interior: 4..	5.000
0.11	When I found out there w..	4.000
0.11	This is probably one of th..	5.000
0.10	Oh...My...Delicious...	5.000
0.10	Tacos El Gordo has the be..	5.000
0.10	After hearing all of the ra..	4.000
0.09	"Best value" meal on the ..	5.000
0.09	Just tacos ... nope. Delici..	5.000
0.09	It just doesn't get much b..	5.000
0.09	My colleagues recommen..	4.000
0.09	I'm a big fan of Tacos El G..	5.000

Topic 4 - Sides

Weight	Review	Rating
0.22	This place was really good..	5.000
0.22	This place is great we wer..	5.000
0.20	When I found out there w..	4.000
0.19	** Tasty and authentic tac..	4.000
0.17	Great spot to visit off the ..	5.000
0.17	Pretty spacious location, ..	4.000
0.17	Came here based on a rec..	3.000
0.16	I've been wanting to try T..	5.000
0.16	Best tacos in Las Vegas. I ..	5.000
0.16	So when you walk in here ..	4.000
0.16	Service + Interior: 4..	5.000
0.15	Pretty good tacos.the bes..	4.000
0.15	Heard very good things a..	5.000
0.15	Longest line ever, but the ..	4.000

Topic 2 - Meat

Weight	Review	Rating
1.04	"Best value" meal on the ..	5.000
0.96	I'll be honest. I was not im..	3.000
0.84	I just can not say enough ..	5.000
0.76	The tacos here are 100% ..	5.000
0.75	As a Mexican one of the fi..	5.000
0.68	I grew up and live in Los A..	3.000
0.59	LOVE ME SOME TACOS! I f..	5.000
0.51	Service + Interior: 4..	5.000
0.49	Some true authentic taco..	5.000
0.49	For anyone that follows m..	3.000
0.49	Taco cravings never stop....	3.000
0.48	Authentic tacos, different..	4.000
0.47	Some major competition t..	4.000
0.46	If you are looking for the ..	5.000

Topic 5 - Atmosphere

Weight	Review	Rating
0.21	This place is great. Not go..	5.000
0.17	Great tacos and great ser..	5.000
0.16	Omg!!! This ones super cle..	5.000
0.16	Love this place always op..	5.000
0.16	Just solid great tacos!..	4.000
0.15	Omg!! A long line when we..	5.000
0.14	This place is great we wer..	5.000
0.13	The best street tacos I've ..	5.000
0.12	This place has some serio..	5.000
0.12	This place has some serio..	5.000
0.12	My favorite place to visit ..	4.000
0.12	Great tacos great service ..	5.000
0.12	The food is good, not grea..	3.000
0.11	Great selection of authen..	5.000

Topic 3 - Service

Weight	Review	Rating
0.20	Authentic tacos, different..	4.000
0.18	Overall: Tacos El Gordo is ..	3.000
0.18	"Best value" meal on the ..	5.000
0.17	I'm usually not a fan of ta..	5.000
0.17	Adobada! The tacos, but e..	5.000
0.16	I'll be honest. I was not im..	3.000
0.14	This place gets 3.5 stars. ..	3.000
0.14	Some major competition t..	4.000
0.14	Is this the best place in U...	4.000
0.14	I hear about Tacos El Gord..	2.000
0.14	Come on people, how can ..	5.000
0.14	If you are a tacos person, I..	5.000
0.13	The food here is always w..	4.000
0.13	My colleagues recommen..	4.000

Topic 6 - High Praise

Weight	Review	Rating
0.37	BS +++..	5.000
0.33	"Best value" meal on the ..	5.000
0.24	We decided to try this pla..	5.000
0.24	This place is great we wer..	5.000
0.23	This is probably my favori..	5.000
0.23	After hearing all of the ra..	4.000
0.22	As a Mexican one of the fi..	5.000
0.20	I grew up and live in Los A..	3.000
0.18	I probably go here every ti..	4.000
0.18	Absolutely LOVE this plac..	5.000
0.18	Tacos El Gordo takes the c..	5.000
0.18	Love this place always op..	5.000
0.18	All I'm going to say about ..	4.000
0.17	After being here 3 times I ..	5.000

Negative Sentiment - By Topics

Business Name	Tacos El Gordo
Year	2018
Month	(All)

Topic 1 - Service

Weight	Review	Rating
0.34	SECURITY GUARD AT DOO..	1.000
0.11	I was told that they had t..	1.000
0.11	We came around noon an..	4.000
0.09	Came here on 9/27/18 at 3..	1.000
0.08	Overrated and chaotic ..	1.000
0.07	i will never go here im fro..	1.000
0.06	Food was ok. Asada taste..	2.000
0.06	Came here the last day of ..	3.000
0.05	Worst service ever, i am s..	1.000
0.05	Walked in and as mention..	1.000
0.05	Every night while in Vega..	4.000
0.05	I've been to multiple Taco..	1.000
0.04	I wouldn't try Tacos El Go..	1.000
0.04	I have been waiting to visi..	3.000

Topic 2 - Quality

Weight	Review	Rating
0.38	I'd saved this place for ye..	4.000
0.30	Tacos El Hot Mess - is mor..	2.000
0.27	Oh my, do not buy into thi..	2.000
0.23	My family and I wanted to..	1.000
0.22	I visited their location on ..	1.000
0.22	So I decided to give this lo..	4.000
0.19	This place is a 5 star taqu..	4.000
0.18	Got here about 1:30 on a ..	3.000
0.17	Well we decided to see w..	2.000
0.17	I've Been looking for good..	1.000
0.17	This place is definitely the..	4.000
0.16	It's okay food and a const..	3.000
0.16	If you fail to plan, plan to f..	3.000
0.15	My sister said it best, "If ..	4.000

Topic 3 - Sides

Weight	Review	Rating
0.27	Quite honestly I'm not sur..	2.000
0.26	Overrated and chaotic ...	1.000
0.23	I'm from Los Angeles so I ..	3.000
0.19	My sister said it best, "If ..	4.000
0.19	Tacos El Hot Mess - is mor..	2.000
0.19	This place is definitely the..	4.000
0.16	OK I have heard of this pla..	5.000
0.15	Tacos El Gordo seems to b..	3.000
0.15	After going to Vegas so m..	3.000
0.14	First time to this location ..	4.000
0.13	Not worth the wait. I can'..	1.000
0.13	I've Been looking for good..	1.000
0.13	Want to know how good t..	5.000
0.12	After all the billboards an..	3.000

Topic 4 - Wait

Weight	Review	Rating
0.70	I'd saved this place for ye..	4.000
0.54	Quite honestly I'm not sur..	2.000
0.46	Tacos El Hot Mess - is mor..	2.000
0.37	Overrated and chaotic ..	1.000
0.36	SECURITY GUARD AT DOO..	1.000
0.32	Where to start off, we we..	1.000
0.28	Tacos El Gordo seems to b..	3.000
0.28	YUMMY tacos with fresh ..	4.000
0.27	Tacos El Gordo came highl..	3.000
0.26	This place is a 5 star taqu..	4.000
0.25	Omg this place was a seri..	1.000
0.25	Talk about a confusing lay..	3.000
0.25	I've seen my friends post ..	2.000
0.25	The food was great. Only ..	3.000

Topic 5 - Meat

Weight	Review	Rating
0.78	Overrated and chaotic ...	1.000
0.60	Tacos El Hot Mess - is mor..	2.000
0.59	Los tacos estan muy ricos,..	2.000
0.56	I was told that they had t..	1.000
0.54	I'd saved this place for ye..	4.000
0.51	I'm from Los Angeles so I ..	3.000
0.44	YUMMY tacos with fresh ..	4.000
0.38	Tacos El Gordo came highl..	3.000
0.37	I've been to multiple Taco..	1.000
0.36	Based on the reviews, my ..	3.000
0.30	We came around noon an..	4.000
0.30	This place is a 5 star taqu..	4.000
0.29	Tacos malos ,todo mal org..	1.000
0.28	The place is disorganized. ..	1.000

Future Work

- Summarize results with representative sentences
- Recommendation system for restaurants with similar positive comments



Thank You!
Questions?



Appendix

