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SOUTH-WEST AIRLINE AND THEIR COMPETITORS

Omis 670: Social Media Analytics for Business

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Executive Summary

This project will provide a social media analysis on current data from Southwest Airline and two of their competitors. Southwest Airlines is one of the well-established airline services in the United States. Southwest Airlines motto is “Low fares. Nothing to hide. That’s Transfarency”. This airline is the world’s largest low-cost- carrier in the commercial aviation industry. Customers value paying less and it’s the main reason the airline attracts so many of their current and prospective customers. Southwest Airline carries a wide range of domestic passengers from the United States. In every industry there is competition, Southwest’s current competitors are Spirit Airlines and United Airlines. Both competitors have been giving Southwest stiff competition regarding their flight rates allowing more customers more options when they are booking flights.

With many more issues running these days, we would like to catch the pulse of the public with respect to southwest airlines and its competitors. We are hoping to encounter interesting findings related to the sentiment of the public and the causes for them. The factors that are positively spread about Southwest Airline competitors. We would like to present South-West Airlines an analysis of all our findings which may be used by them to improve their services. During this project, we will also analyze the people’s sentiment on southwest airlines within the past week.

Background

Southwest Airlines Co. has been in operation for more than fifty years, providing high-quality customer service to their clients. Southwest is very dedicated to providing their customers with effective service. Their main mission is to stay competitive in the commercial aviation industry by providing their customers with low-cost flight options.

Spirit Airline was founded over thirty-five years ago, in order to provide flight travel packaging for their customers to use at several different destinations. The airline originally started as a trucking company in 1964 but was later expanded into airline service. Spirit Airline also considers itself to be a super low-cost carrier in the United States. Spirit Airline original name was Charter One which was changed in 1992 after jet equipment was incorporated into their fleet. Spirit Airline current operation is small with them only providing flights from Detroit to Myrtle Beach, Los Angeles, South Carolina, and New York. They plan to stay competitive by expanding their airline services outside of the United States, giving customers more vacation packages for low-cost.

United Airline has been in operation for more than ninety years. United Airline motto is to “Fly the Friendly Skies”. They are an airline that focuses on the work environment that the employees work in. Giving their employee’s inclusive work environment is their focus. The name United Airline is very historic because it’s important for them to have the union of their customers and employees. They believe if they have this union and they united they the airline will run smoothly. “Connecting people. Uniting the world” is their vision and mission for their company. United Airline holds themselves at a high standard when it comes to reliability and safety. They like to give their customer’s the best experience possible and believe in doing thing’s the correct way. As oppose to just doing them, they like to also focus on delivery and delivering their customer’s quality service.

Method and Tools:

- Python Programming Language
- Power BI Data Visualization Software
- Excel Worksheet
- Twitter RestAPI
- Sentiment Analysis
- Topic Modeling
- Word Cloud

Data Extraction:

The best way to catch the pulse is to interact with a social media application. For our case study, we have selected the micro-blogging site “Twitter” as the Data Source. We obtained the keys to access the Rest API through the Twitter developer account. We then Proceeded to the next step which is data retrieval from the twitter site using these access key tokens.

Python programming language is used to extract the dataset. Python’s “tweepy “package, allowed us to collect tweets and various attributes related to tweets for the twitter handles corresponding to the south-west airlines and its competitors.

Steps involved in the process are:

1. Authenticating the user to access the twitter data.
2. Access the data and provide the Hashtag words to filter the interesting tweets from the whole data set.

#SouthWestAirlines is one of the popular hashtags which is commonly used by people who were tweeting about Southwest Airlines. Hence, the same hashtag is used in the query to retrieve all such tweets. Similarly, #SpiritAirlines and #UnitedAir hashtag is used to extract tweets talking about Spirit Airlines and United Airlines respectively.

Data Formatting:

The data extracted is in JSON object format and contains many fields related to the twitter tweets. For our project, we would like to mainly focus on the text within the twitter tweet, and a few other fields. The JSON file is parsed to retrieve the required fields like text, the tweet time, tweet location, likes count, retweet count, user name, user followers, hashtags, tweet source. The data is extracted into a data frame and loaded to another CSV file for further processing.

Data Processing:

The text in each twitter tweet is processed slightly to remove unnecessary tokens. The Twitter tweets are then analyzed for sentiment analysis using the text-blob package provided by the Python programming language. The text-blob analyzes the sentence and provides the polarity and subjectivity of the text data. Polarity provides the emotions/ opinions expressed in the sentence.

When we are using the polarity with the text data, it will divide the sentence into three categories. The three categories are: if the polarity is >1 , the sentence is expressing a positive opinion, polarity $= 0$ is considered as neutral and polarity <1 is considered as negative. After processing each twitter tweet for the sentiment analysis score, the whole data is saved into a CSV file for further analysis.

With the help of data Visualization Software -" PowerBI", we conducted further analysis of the data obtained. When the data is visualized, the results say only 7 % of the people tweeted negatively about southwest airlines Which is a good sign for southwest airlines.

Whereas 24 % of people tweeted positively about Southwest Airlines when compared to 50 % for Spirit Airlines and 45 % for United Airlines.

When compared to all the 3 datasets, united airlines have the highest favorite count of 1418 when compared to 303for southwest airlines and 304 for spirit airlines. Hence united airlines obtained more response than southwest and spirit airlines over the past week.

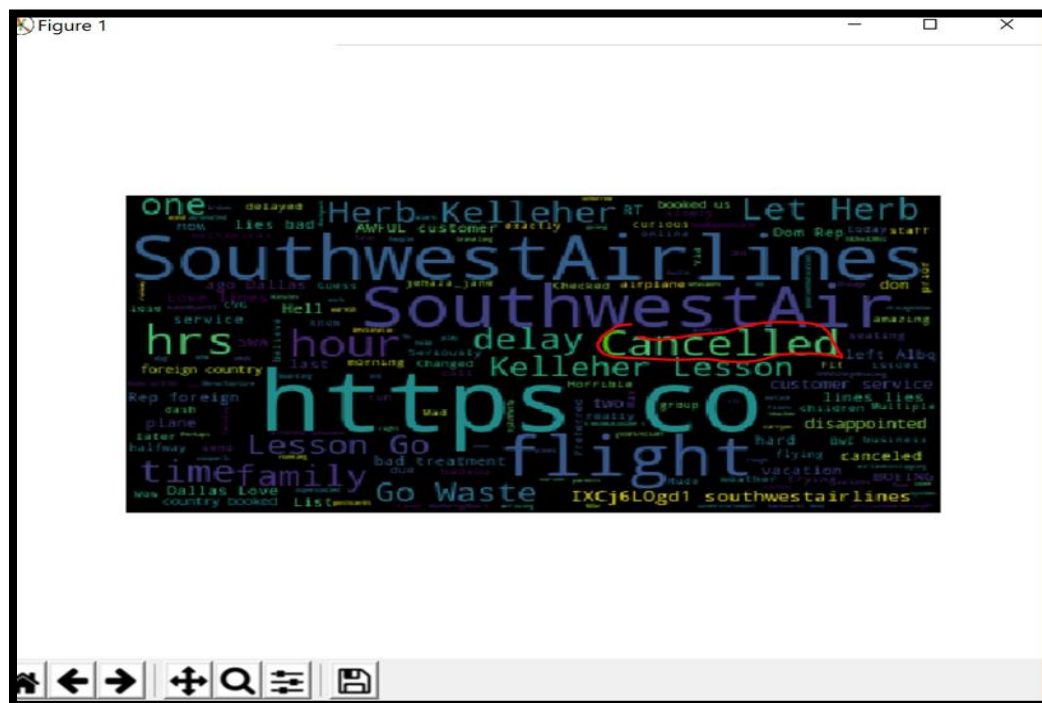
From the Visualization Dashboard in the appendix –Figure 4B,

Southwest Airlines tweets are from the places like Illinois, Denver, Chicago, Portland where the weather is bad over the weekend and that is the main reason for the delay

Word Cloud

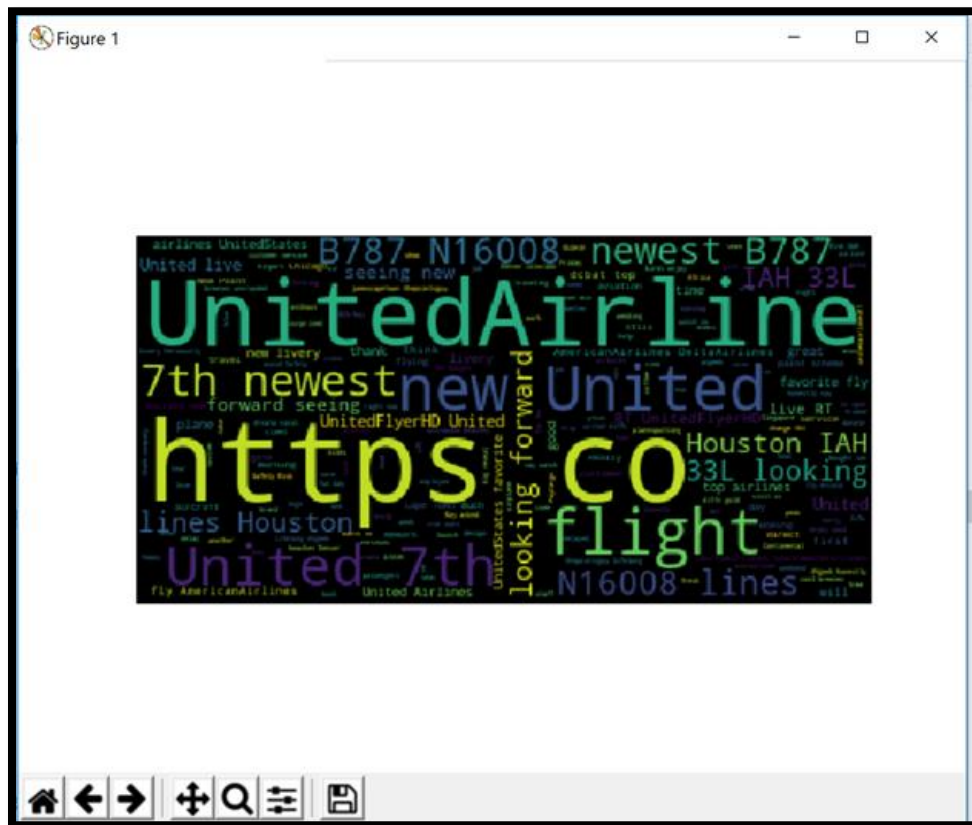
The tweets with negative sentiment are filtered and again processed to find the most frequent words within those twitter tweets.

The result is as follows:



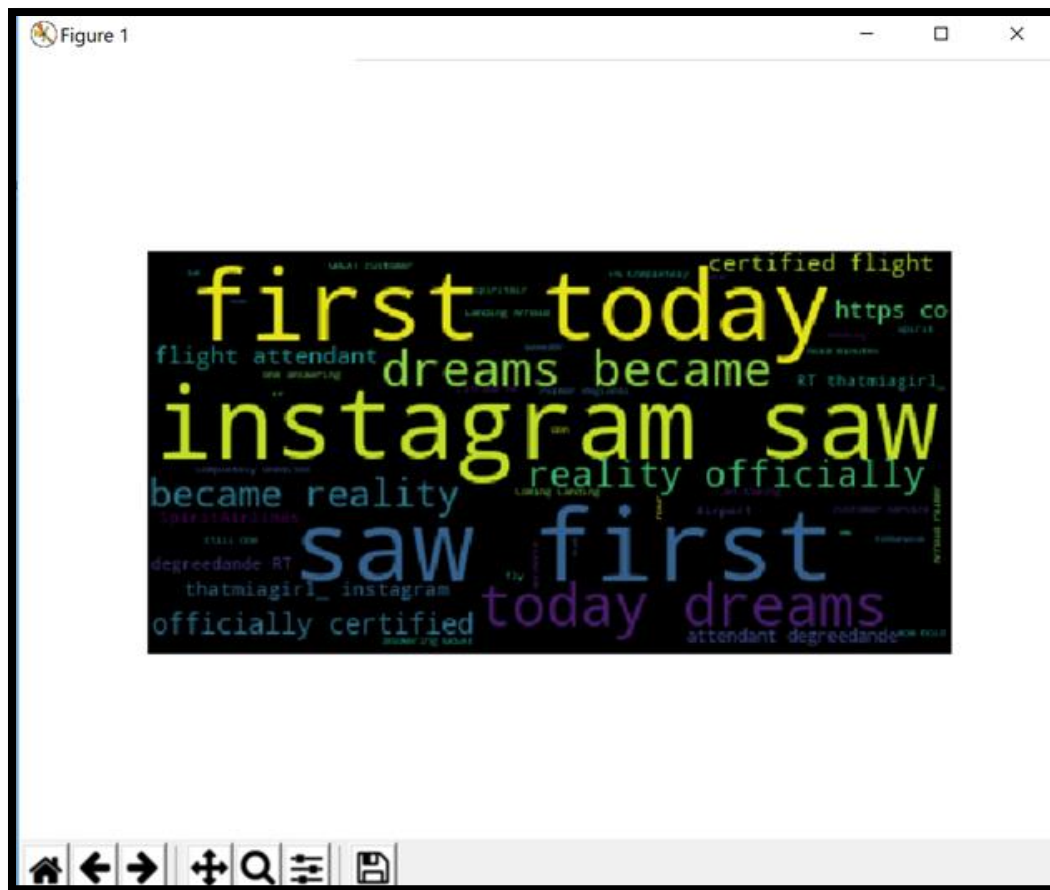
Word Cloud displayed Southwest Airlines in utmost bold letters which clarified that we have extracted the correct data regarding southwest airlines. Other words of interest are “Cancelled” and “Delay” through which we can infer the most obvious reason for the negative opinion of the people towards southwest airlines.

Similarly, Word Cloud for the Positive tweets of United Airlines is as follows:



In the above word cloud, United Airline is displayed with utmost bold letters which clarified that we have extracted the correct data regarding United airlines. Few words of interest would be “Houston”, “B787-N16008”, “looking forward”, which states that people are very much excited about United Airline’s new aircraft B787 which was landing in Houston.

Similarly, Word Cloud for the Positive tweets of Spirit Airlines is as follows:



In the above word cloud few words of interest would be “certified flight”, “dreams became reality”, “flight attendant”, which talks about action of a flight attendant in helping a customer which gained more popularity in the social media and put the spirit airlines in the news which helped them positively to increase business.

Topic Modeling:

We opted to perform more analysis using the topic modeling methods. LDA – latent Dirichlet allocation algorithm is used to perform the topic modeling in this project. This is also performed using python with the help of packages like “nltk” and “gensim”. Topic Modeling is performed on the negative tweets for South West airlines.

After executing the topic modeling algorithm on the selected negative tweets, the results are as follows:

[I have asked for 2 topics and through the iteration of 20 passes]

$$(0, 0.022 * \text{"SouthwestAir"} + 0.018 * \text{"SouthwestAirlines"} + 0.015 * \text{"I"} + 0.013 * \text{"24"} + 0.011 * \text{"a"} + 0.009 * \text{"the"} + 0.009 * \text{"hr"} + 0.009 * \text{"bad"} + 0.007 * \text{"hour"} + 0.007 * \text{"Hell"} + 0.007 * \text{"line"} +$$

0.007*"left" + 0.007*"lies" + 0.007*"ago" + 0.007*"Dallas" + 0.007*"Love" + 0.007*"Albq" + 0.007*"vacation" + 0.007*"'" + 0.006*"flight")

(1, '0.022*"flight" + 0.018*"SouthwestAirlines" + 0.017*"SouthwestAir" + 0.010*"'" + 0.010*"RT" + 0.010*"southwestairlines" + 0.009*"service" + 0.008*"customer" + 0.008*"To" + 0.008*"Kellehers" + 0.008*"Let" + 0.008*"Waste" + 0.008*"Go" + 0.008*"affiliatemarketing" + 0.008*"Herb" + 0.008*"Dont" + 0.008*"httpstcoIXCj6LOgd1" + 0.008*"Lesson" + 0.007*"24" + 0.006*"one")

In both topics, “SouthwestAirlines” word is more common because of obvious reason that the topic is about southwest airlines.

From the set of words in the first topic, we can concentrate on words like Dallas which is talking about a place, and some opinion words like bad, hell and apart from them some words of interest would be 24, hr, flight, vacation. There can be a delay or wait of 24 hours which lead to the frustration in the passengers.

From the set of words in the second topic, we can concentrate on words like customer, service, lesson and some opinion words like “Waste”, and “Don’t”. Again, negativity among the customers, but the reason might be bad service they received. There have been a lot of flight delays and cancellations over the last week which is why customers were frustrated. Over the last week, Southwest Airline has not been doing well. Customers have been giving Southwest negative reviews in the last week, based on their flight delays and cancellations.

Topic modeling for United Airlines has resulted in the following results:

(0, '0.018*"the" + 0.012*"I" + 0.012*"united" + 0.011*"new" + 0.010*"RT" + 0.010*"livery" + 0.009*"flight" + 0.009*"a" + 0.009*"'" + 0.008*"United")

1, '0.036*"United" + 0.034*"'" + 0.027*"I" + 0.024*"new" + 0.022*"RT" + 0.015*"looking" + 0.015*"Houston" + 0.014*"on" + 0.014*"live..." + 0.014*"seeing")

(2, '0.020*"united" + 0.018*"the" + 0.013*"UnitedAirlines" + 0.012*"RT" + 0.010*"United" + 0.010*"is" + 0.010*"fly" + 0.008*"unitedairlines" + 0.007*"top"

From the above results, the top 3 topics that were positively discussed about united airlines are:

- 1) *the new livery/aircraft service started during the weekend of the United Service. This is doing good.*
- 2) *The new airline service is landing in Houston airport.*
- 3) *This information is been retweeted multiple times.*

Southwest air Airlines must observe closely the business with new aircraft of United Airlines for the future reference.

Topic Modelling for positive sentiment tweets for spirit airlines are as follows:

(0, '0.019*"spiritairlines" + 0.019*"bad" + 0.019*"Home" + 0.011*"'" + 0.011*"fly" + 0.011*"a" + 0.011*"airport" + 0.011*"place..." + 0.011*"decided" + 0.011*"possible"')

(1, '0.027*"Spirit" + 0.020*"Arnold" + 0.020*"Palmer" + 0.020*"Landing" + 0.020*"Coming" + 0.020*"Latrobe" + 0.020*"PA" + 0.020*"4132019" + 0.020*"A" + 0.020*"Regional"')

(2, '0.041*"RT" + 0.038*"flight" + 0.035*"today" + 0.035*"officially" + 0.035*"became" + 0.035*"dream" + 0.035*"reality" + 0.035*"Instagram" + 0.035*"attendant" + 0.035*"first"')

From the above group of words, the top 3 topics that were discussed about spirit airlines were

- 1) Passengers are feeling bad about flying back using Spirit Airlines.
- 2) Passengers are feeling bad about flying back using Spirit Airlines.
- 3) An Instagram post is virally retweeted in the twitter about a user who became a flight attendant in spirit airlines which tells spirit is hiring rigorously.

Unfortunately, the limited data set is obtained for spirit airlines which is not enough to make any major inferences for the competitors.

Conclusion

After all the data has been properly analyzed we would like to make some recommendations for South-West to help them to be in the highest rank in the competition. They receive 7% negative opinion because of flight cancellations and delays which contribute to their negative sentiment analysis score. The recommendation we propose regarding this issue is to communicate immediately with customers when there is a flight cancellation. By communicating immediately this will allow customer's the opportunity to make alternative plans. Also, another suggestion for unexpected delays/cancellations is to offer customers discounts or coupons on their next flight. Customer like free items this will show them that you appreciate their business. The saying "Communication & Customer Services goes a long way", is true this will keep the customers coming back if they had a great experience. Southwest should make plans to work on improvising their customer services. Southwest Airline should focus on making customer service a top priority. We suggest that Southwest get feedback from customers, whether is from a survey, or in-person experience. After they have received the customer's feedback, they have used the results to work on area's that need improvement.

Appendix:

1A: Code for authenticating to twitter and retrieving the tweets:

```
CONSUMER_KEY = "XXXXXXXXXXXXX"
CONSUMER_SECRET = "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"

# Access:
ACCESS_TOKEN = "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
ACCESS_SECRET = "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"

# Setup access API
def connect_to_twitter OAuth():
    auth = tweepy.OAuthHandler(CONSUMER_KEY, CONSUMER_SECRET)
    auth.set_access_token(ACCESS_TOKEN, ACCESS_SECRET)

    api = tweepy.API(auth, wait_on_rate_limit=True)
    return api
```

1B:

Query passed to search for southwest airlines:

```
api = connect_to_twitter_OAuth()
query = "#SouthwestAirlines"
# Get those tweets
get_save_tweets('southwestAirlines_tweets.json', api, query)
```

1C:

Query used to retrieve filtered tweets and save to JSON file:

```
with open(lfilepath, 'a') as f:

    # Send the query
    for tweet in tweepy.Cursor(api.search,q=query,since_='2019-02-10',until='2019-04-26',lang=lang).items(max_tweets):

        #Convert to JSON format
        f.write(jsonpickle.encode(tweet._json, unpicklable='false') + '\n')
        tweetCount += 1

    #Display how many tweets we have collected
    print("Downloaded (0) tweets".format(tweetCount))
```

1D:

Code used to parse the JSON file and filter for interesting attributes:

```
import pandas as pd
import jsonpickle
def tweets_to_df():
```

```
tweets = list(open('spiritairlines_tweets.json', 'rt'))
```

```
text = []
```

```
weekday = []
```

```
month = []
```

```
day = []
```

```
hour = []
```

```
hashtag = []
```

```
url = []
```

```
favorite = []
```

```
reply = []
```

```
retweet = []
```

```
follower = []
```

```
following = []
```

```
user = []
```

```
screen_name = []
```

```
lat = []
```

```
long = []
```

```
source = []
```

```
coordinates = []
```

```
for t in tweets:
```

```
    t = jsonpickle.decode(t)
```

```
    # Text
```

```
    text.append(t['text'])
```

```
    # Decompose date
```

```
    date = t['created_at']
```

```
    weekday.append(date.split(' ')[0])
```

```
    month.append(date.split(' ')[1])
```

```
    day.append(date.split(' ')[2])
```

```
    time = date.split(' ')[3].split(':')
```

```
    hour.append(time[0])
```

```
    # Has hashtag
```

```
    if len(t['entities']['hashtags']) == 0:
```

```
        hashtag.append(0)
```

```
    else:
```

```
        hashtag.append(1)
```

```
    # Has url
```

```
    if len(t['entities']['urls']) == 0:
```

```
        url.append(0)
```

```
    else:
```

```

url.append(1)

# Number of favs
favorite.append(t['favorite_count'])

# Is reply?
if t['in_reply_to_status_id'] == None:
    reply.append(0)
else:
    reply.append(1)

# Retweets count
retweet.append(t['retweet_count'])

# Followers number
follower.append(t['user']['followers_count'])

# Following number
following.append(t['user']['friends_count'])

# Add user
user.append(t['user']['name'])

# Add screen name
screen_name.append(t['user']['screen_name'])
# Add source
source.append(t['source'])
#add coordinates
if isinstance(t['coordinates'],dict):
    coordinates.append(t['coordinates']['coordinates'])
else:
    coordinates.append(0)

d = {
    'text': text,
    'weekday': weekday,
    'month' : month,
    'day': day,
    'hour' : hour,
    'has_hashtag': hashtag,
    'has_url': url,
    'fav_count': favorite,
    'is_reply': reply,
    'retweet_count': retweet,
    'followers': follower,
    'following' : following,

```

```

        'user': user,
        'screen_name': screen_name,
        'source': source,
        'coordinates': coordinates

    }

    return pd.DataFrame(data = d)
if __name__ == '__main__':
    tweets_df = pd.DataFrame()
    tweets_df = tweets_to_df()
    tweets_df.to_csv('spiritselec_attr.csv', sep=',')
    tweets_df.to_json('spiritselec_attrbdummy.json')

```

1E: Code used to remove punctuations and analyze the sentiment, and then saved back to a csv file:

```

import pandas as pd
import numpy as np
from textblob import TextBlob
from wordcloud import WordCloud, STOPWORDS
import plotly.plotly as py
import plotly.graph_objs as go
from plotly.offline import iplot
import regex as re
#import cufflinks
#cufflinks.go_offline()
#cufflinks.set_config_file(world_readable=True, theme='pearl', offline=True)

#clean data
def clean_tweet(tweet):
    print("cleaning done")
    return ' '.join(re.sub('([@A-Za-z0-9+])|([^\0-9A-Za-z \t])|(\w+:\/\/\S+)', ' ', tweet).split())

#textblob data
def analyze_sentiment(tweet):
    analysis = TextBlob(tweet)
    print("in sentiment")
    if analysis.sentiment.polarity > 0:
        return 'Positive'
    elif analysis.sentiment.polarity == 0:
        return 'Neutral'
    else:
        return 'Negative'

```


Dataset Overview, after parsing and applied sentiment analysis algorithm:

ID	text	weekday	month	day	hour	has	has	url	fav_count	is_reply	retweet	followers	following	user	screen_name	source	coordin	cleaned_tweet	sentiment
0	#Flight #Crew	Thu	Apr	25	14	1	1		0	0	0	31	117	Tina	tinaclanton	<a href="http://	0	Flight Crew Training Instruct	Neutral
1	Apply now to v	Thu	Apr	25	14	1	1		0	0	0	2	4	Dawn C	dawn_cunni	<a href="http://	0	Apply now to work for South	Neutral
2	New #job oper	Thu	Apr	25	13	1	1		0	0	0	71	175	Lisa B	LisaBPet68	<a href="http://	0	New job opening at Southwe	Positive
3	How my compi	Thu	Apr	25	13	1	1		0	0	0	5	9	HelpMe	help_card	<a href="https://	0	How my companion will be tr	Positive
4	#SouthwestAir	Thu	Apr	25	13	1	1		0	0	0	10	37	Gabe R	Gabe_Rios_	<a href="http://	0	SouthwestAirlines is hiring a	Neutral
5	RT @EConcilio	Thu	Apr	25	13	1	0		0	0	1	520	406	DallasB	DallasBestPl	<a href="https://	0	RT SouthwestAirlines is looki	Neutral
6	RT @sroconn: i	Thu	Apr	25	13	1	1		0	0	1	520	406	DallasB	DallasBestPl	<a href="https://	0	RT SouthwestAirlines is looki	Neutral
7	Seriously, fami	Thu	Apr	25	13	0	1		0	0	0	127	104	Tucker	MadnMattsc	<a href="http://	0	Seriously family boarding wit	Negative
8	#SouthwestAir	Thu	Apr	25	13	1	1		0	0	1	52	170	Susan C	sroconn	<a href="http://	0	SouthwestAirlines is looking	Neutral
9	Ramp #Agent r	Thu	Apr	25	13	1	1		0	0	0	28	97	Melissa	MelissaVers	<a href="http://	0	Ramp Agent needed in Denwi	Neutral
10	#SouthwestAir	Thu	Apr	25	13	1	1		0	0	1	282	283	Ed Conc	EConcilio	<a href="http://	0	SouthwestAirlines is looking	Neutral
11	Check out this	Thu	Apr	25	13	1	1		0	0	0	79	221	Kirstin	CapricornDiv	<a href="http://	0	Check out this job Inflight Cre	Neutral
12	RT @dcbat: Of	Thu	Apr	25	13	1	0		0	0	11	1301	781	dcbat	dcbat	<a href="http://	0	RT Of the top 4 airlines in the	Positive
13	At the airport!	Thu	Apr	25	13	1	0		0	0	0	127	104	Tucker	MadnMattsc	<a href="http://	0	At the airport Ready to see M	Positive
14	A Houston sun	Thu	Apr	25	12	1	1		0	0	0	284	954	Kevin D	Kevin_C_Da	<a href="http://	0	A Houston sunrise to send m	Neutral
15	@SouthwestAi	Thu	Apr	25	11	0	1		1	0	0	52	221	Jessica	jestes468	<a href="http://	0	to say I m disappointed is an	Negative
16	RT @apollo8je	Thu	Apr	25	11	1	0		0	0	1	8	71	Cleo	sibillhayne	<a href="https://	0	RT southwestairlines flight 11	Neutral
17	Herb Kelleher	Thu	Apr	25	10	1	1		1	0	0	20098	14381	Kennet	KennethHol	<a href="https://	0	Herb Kelleher and Your Cust	Neutral
18	@TSA @fly2mi	Thu	Apr	25	10	0	1		0	0	0	1492	2161	melissa	Mommadilli	<a href="http://	0	thought TSA was pretty cool	Positive
19	RT @Eurton: Tl	Thu	Apr	25	6	1	0		0	0	1	6	159	Alexan	Alexand2514	<a href="http://	0	RT The runway snow plows ar	Negative
20	RT	Thu	Apr	25	6	1	1		0	0	1	1675	1306	Twenty	twentytenm	<a href="https://	0	RT Herb Kelleher and Your Cu	Neutral
21	Herb Kelleher	Thu	Apr	25	6	1	1		0	0	1	20098	14381	Kennet	KennethHol	<a href="https://	0	Herb Kelleher and Your Cust	Neutral

Figure 3A: Southwest Airline Twitter Dataset using Excel Worksheet

AutoSaveOff

spiritstentiment - Excel

Damesiha Vance

FileHomeInsertPage LayoutFormulasDataReviewViewHelp

Tell me what you want to do

ClipboardFontAlignmentNumberStylesCellsEditing

ShareComments

General

Conditional FormattingTable Styles

InsertDeleteFormat

AutosumFillClear

Sort & Find & Filter > Select >

ID	text	weekday	month	day	hour	has_hasht	has_url	fav_count	is_reply	retweet_c	followers	following	user	screen_na	source	coordinat	cleaned_t	sentiment
0	When you Thu	Apr	25	14	1	0	0	0	0	0	127	373	Patti Hedr Biggodde	<a href="t	0	When you	Neutral	
1	RT @JDrak Thu	Apr	25	3	0	0	0	0	0	10	711	692	One Ofthe ForbergM	<a href="t	0	RT it is on	Negative	
2	#spiritairl Thu	Apr	25	0	1	1	0	0	0	0	41	74	Christine I Letchie1	<a href="t	0	spiritairl	Negative	
3	My momâ Wed	Apr	24	23	0	1	0	0	0	2	187	458	_adventi Amandaac	<a href="t	-75.1252	My mom s	Positive	
4	Scouting ç Wed	Apr	24	22	0	1	0	0	0	0	89	58	Not Ted C fakespiriti	<a href="t	0	Scouting ç	Positive	
5	@Harrahs Wed	Apr	24	21	1	0	0	0	1	0	1786	4829	MONKEY E MONKEYB	<a href="t	0	send me a	Positive	
6	RT @adeli Wed	Apr	24	20	1	0	0	0	0	10	93	206	Decade La DecadeLa	<a href="t	0	RT ATL NY	Neutral	
7	@SpiritAi Wed	Apr	24	19	0	1	9	0	0	10	615	765	Jennifer Ø JDrake211	<a href="t	0	It is one t	Negative	
8	#spirit air Wed	Apr	24	17	1	0	0	0	0	0	18	274	Feel free jennndhun	<a href="t	0	spirit airli	Negative	
9	RT @adeli Wed	Apr	24	17	1	0	0	0	0	10	12	71	The Glam RealGlam	<a href="t	0	RT ATL NY	Neutral	
10	RT @adeli Wed	Apr	24	12	1	0	0	0	0	10	22	832	Najeb Kah KalyNajeb	<a href="t	0	RT ATL NY	Neutral	
11	RT @adeli Wed	Apr	24	11	1	0	0	0	0	10	319	360	ØYs@_BT _anjane	<a href="t	0	RT ATL NY	Neutral	
12	RT @adeli Wed	Apr	24	10	1	0	0	0	0	10	425	553	Brtya"ē, B28Bright	<a href="t	0	RT ATL NY	Neutral	
13	RT @adeli Wed	Apr	24	10	1	0	0	0	0	10	11	137	Mayank G Mayank87	<a href="t	0	RT ATL NY	Neutral	
14	ATL âœ"i Wed	Apr	24	9	1	0	62	0	10	273747	209725	AdELA adelamus	<a href="t	0	ATL NYC s	Neutral		
15	Spirit Airli Wed	Apr	24	5	0	1	7	0	0	0	244	779	Ted Mikal SuperTedi	<a href="t	0	Spirit Airli	Negative	
16	RT Tue	Apr	23	23	0	0	0	0	1	445	983	Nick Garu NickGaruc	<a href="t	0	RT Spirit J	Positive		
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21	and even Tue	Apr	23	16	1	1	1	1	0	0	185	Katherine YElizabeth	<a href="t	0	and even	Positive		

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Figure 3B: Spirit Airline Dataset using Excel Worksheet

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Unitedsentiment

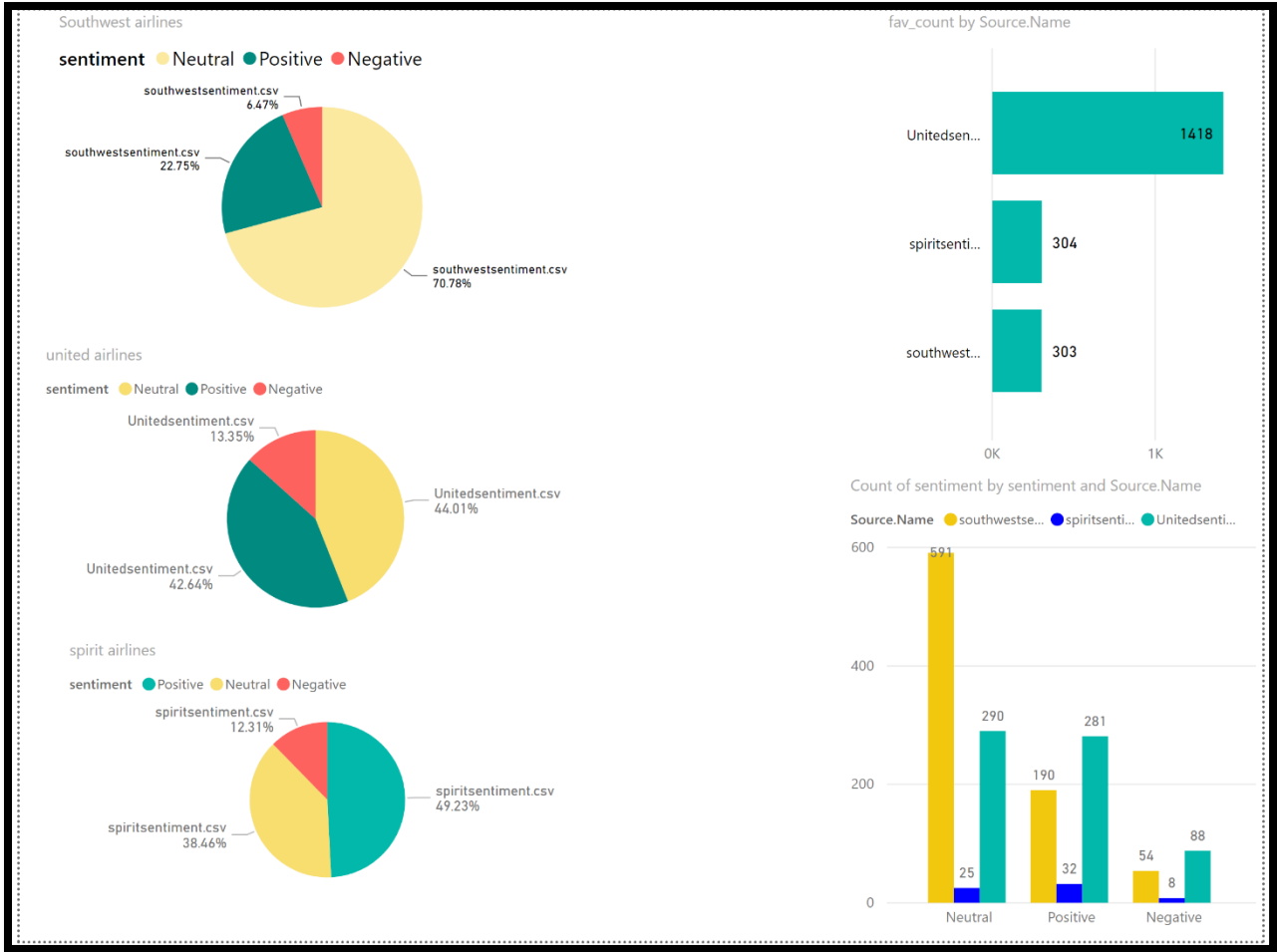
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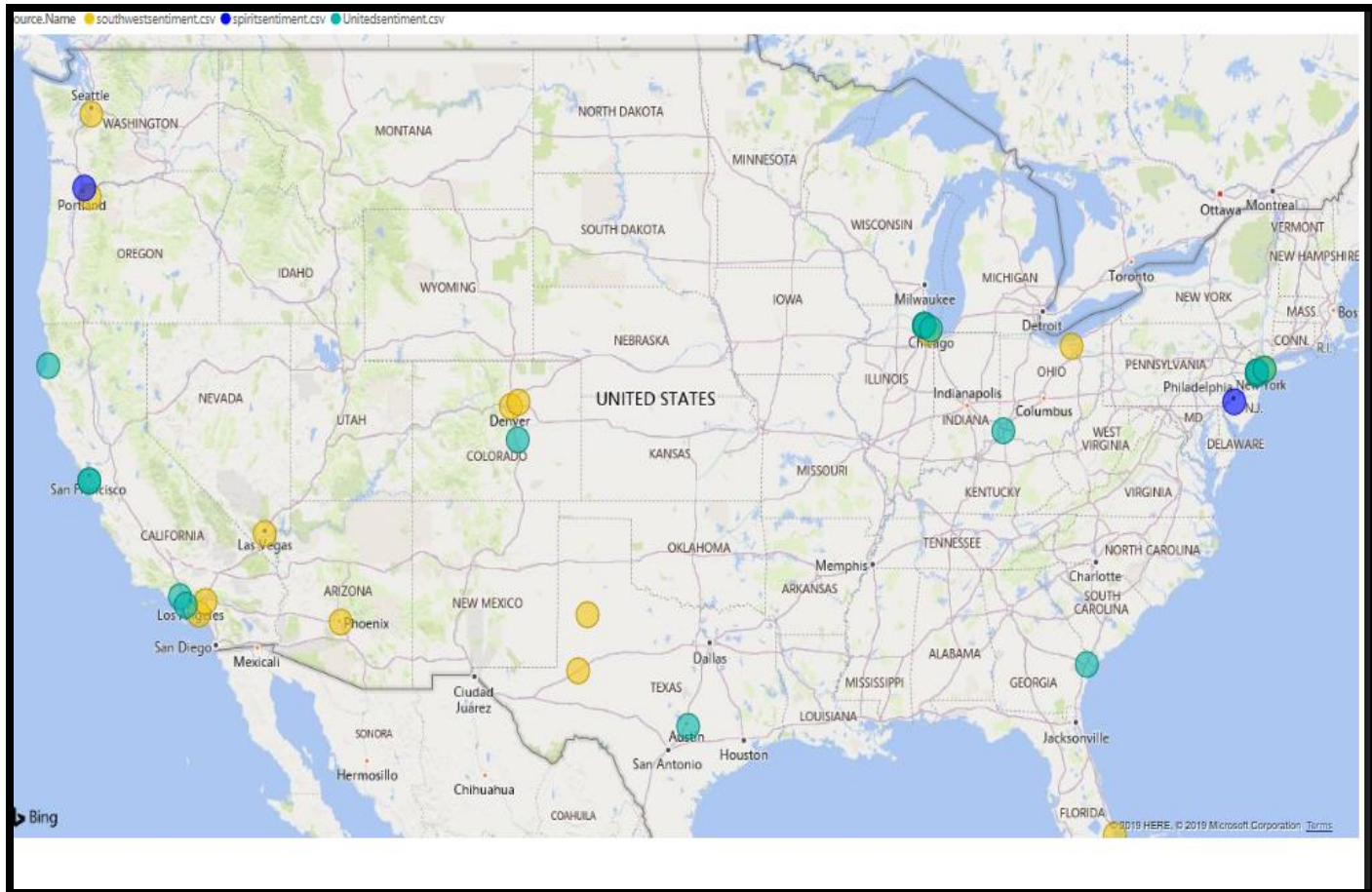
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Figure 1C: United Airline Twitter Dataset using Excel Worksheet

Power BI Dash Board:



Dashboard 4A: Sentiment Analysis for all 3 Airlines.



Dashboard 4B: Locations of Airline Tweets

Power Bi Dashboard Link:

Link to Dashboard 1:

<https://app.powerbi.com/groups/0a8e50d0-e4a2-465d-8713-3527a73e2996/reports/10b61b37-79a5-4e6d-8e4d-f46b462b6841?ctid=ea873390-8c1c-4231-a799-6b5a0235b2e6>

Link to Dashboard2:

<https://app.powerbi.com/groups/0a8e50d0-e4a2-465d-8713-3527a73e2996/reports/7ee1c088-741a-4a2b-ad38-aa295ee73dbf?ctid=ea873390-8c1c-4231-a799-6b5a0235b2e6>