CASE STUDY 1

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1. INTRODUCTION

Case Study 1 as part of the course DS-501 analyzes live feed from twitter and involves performing basic analysis on the collected data. It begins with gathering the data and storing it initially. It gives a hands-on experience of working with real-time raw data. The data (Tweets) then undergoes analysis such as extraction, cleaning, and finally deducing useful predictions. The case study takes us through this process in four different problems, starting with the first problem of gathering the data (tweets). Then the second problem deals with performing basic retrieval of words of interest, narrowing down the data. The third problem brings in a new aspect of retrieving followers on Twitter. And finally, business question is where the data collected in first three problems is used to come up with a prediction/solution. All four problems are solved in relevance with Apple Inc. tweets, focusing on the iPhone X launch.

Apple Inc. and iPhone X is chosen as the focus for analysis considering the timing of its launch and the hype of the product which brings up a huge amount of data on Social Media (Twitter in this case). This pool of data has a possibility of bringing out various interesting results and predictions.

2. OBJECTIVE

To collect live tweets related to iPhone X from Twitter API. Cleaning this data and storing it in our local hard-drive. Based on this data, extracted the Top 10 high frequency words, hashtags, user mentions and the most popular tweets during the apple event. The analysis involves tracing followers and friends of Apple and a brief understanding of Apple's presence on twitter.

iPath aims at designing a path for the Apple product from its launch to shipping date using data from twitter. Using this data and understanding the environment on twitter, our aim is to develop ways in which Apple can use all its revolutionary features in the new product in order to maintain the hype created at the launch event.

3. ANALYSIS

Twitter is an online news and social networking service where users post and interact with messages, "tweets", restricted to 140 characters. It allows developers to extract live data using the Twitter Application Programming Interface. Every developer is assigned a unique

token and a unique consumer key which authorizes him/her to download live tweets. These tweets are obtained as a JSON lightweight data-interchange format. It is easy for humans to read and write and easy for machines to parse and generate. Our project extracted 4115 tweets over a period of 45 minutes during the Apple event – Keynote on 12th September 2017.

The Jupyter Notebook is an open-source web application that allows us to create and share documents that contain live code, equations, visualizations and explanatory text. The project analyzed all the tweets using Jupyter Notebook initially cleaning the raw data JSON file and harvesting all the text from different classes of tweets extracted by the Twiiter API. The result provides us with a list of all tweets along with the user creating these tweets. The approach was to find all the information from this cleaned file and use this result to in order to infer where the company must devote its resources in order to fulfill the objective.

Tweets are messages which in most cases convey sentiments of users related to certain topic of interest. Understanding the Most Popular Words from the tweets downloaded from twitter, an analysis can manifest the current interest of the people. Our project incorporated this approach by analyzing the Top 30 words from our list of 4115 tweets and listed them on a single table. The results were filtered to display only English words in order to remove ambiguities in the result.

The next step was to find the most popular subjects trending around the world. A hashtag is a keyword or a phrase used to describe a topic or a theme. We found the top 10 hashtags in our collection of data to analyze the most talked about subjects and what users relate to. From the hashtags, the next step of analysis was to find the list of most famous tweets. According to Twitter, a Tweet that you share publicly with your followers is known as a retweet. We extracted the top 10 tweets in order to understand what people relate to.

In Twitter terminology and within some Apps, those that you choose to follow are known as "Friends" while those who follow you are known as "Followers". As part of the Case Study, we have derived a fraction of the Friends and followers of Apple Inc. CEO Tim Cook. Further, we looked at the intersection of these two attributes to understand the mutual friends among the follower list.

Using these resources, we developed a business model for Apple Inc. to design a path for marketing the Apple iPhoneX and amplify the sales by displaying and publicizing its cutting edge technology and revolutionary features. The principal goal is to indecisive and skeptic customers. Indecisive customers are one which scrutinizes

, weighs and compares all options and select what suits them the best. Whereas, skeptic customer doubt every inch of the product until they are completely satisfied with the result. The project has designed a pathway for Apple to exhibit that the product is worth its price.

4. OBSERVATIONS & INFERENCES

1. Top 30 words and their frequencies

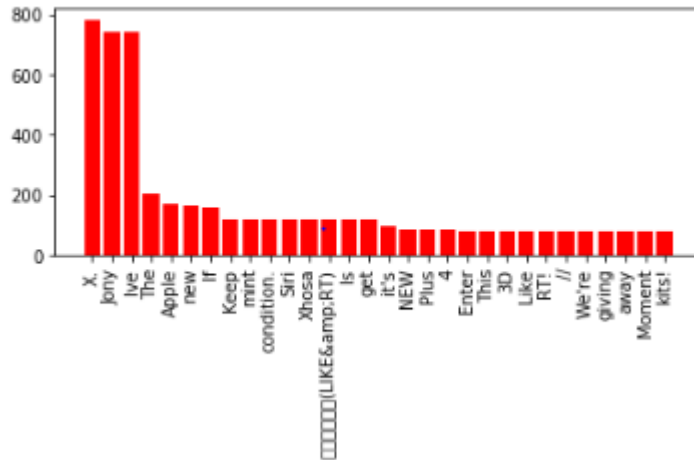| Word	Count
X.	782
Jony	742
Ive	742
The	202
Apple	171
new	165
If	160
Keep	121
mint	121
condition.	121
Siri	120
Xhosa	120
😂😂😂(LIKE&RT)	120
Is	120
get	120
it's	96
NEW	87
Plus	87
4	82
Enter	81
This	81
3D	81
Like	81
RT!	81
//	81
We're	81
giving	81
away	81
Moment	81
kits!	81

Fig. Top 30 words and their count

Looking at the top words and their frequencies "Apple","Siri" and "Plus" could be inferred. This laid out the path for our analysis on Apple.

2. Most popular tweets and the count of their retweets

Count	Screen Name	Text
351552	JohnCena	RT @JohnCena: Sooo #iPhoneX about #FaceID ...ummmmm .... what do I do?
72659	TopAchat	RT @TopAchat: 🎁 #Concours 🎁 2 #iPhoneX à gagner ! 😄 RT + Follow @TopAchat Mentionne un ami en réponse (un iPhone X chacun) https://t.co/F…
9575	its_kachi	RT @its_kachi: How you gotta sleep next to your girl after you cop the new #iPhoneX https://t.co/SVZKVsmm9u
5612	gankstars	RT @gankstars: 📲 #iPhoneX #Giveaway 📲 -Tag Your Friends -Turn Notifications On -RT, Like & Follow @Gankstars Click Here: https://t.co/wZnb5…
4864	ParisHilton	RT @ParisHilton: #iPhoneX is hot
4173	MyAppleDotMy	RT @MyAppleDotMy: Harga iPhone X bermula dengan +-RM4200 utk 64GB. #iPhoneX https://t.co/kg51NYpOIs
3200	iPhoneXOffer	RT @iPhoneXOffer: Enter for a chance to get a BRAND NEW iPhone X 📱us. To get an iPhone X go here: https://t.co/kP23gNRUKo #iPhoneX #iPhone…
2504	jonestowncoffee	RT @jonestowncoffee: The #iPhoneX 3D facial recognition: https://t.co/Lfa1Xf0x2h
2078	DaReam15	RT @DaReam15: I7หลังหักกันไปตามๆกัน ถ้าราคาตามนี้ #iPhoneX #iPhoneTH #IPhone7 https://t.co/fG90iK4abh
1271	lutsekeZA	RT @lutsekeZA: If the #Iphone8 Siri was Xhosa 😂😂😂(LIKE&RT) #AppleEvent #iPhoneX https://t.co/DTunnS3duJ

Fig. Popular tweets based on the retweets

3. Most popular tweet entities

    a.   Top 10 hashtags

```
+--------------------------+-------+
| Hashtag                  | Count |
+--------------------------+-------+
| iPhoneX                  |  3194 |
| iPhone8                  |   396 |
| Apple                    |   354 |
| Iphone8                  |   310 |
| iPhone                   |   261 |
| IphoneX                  |   233 |
| iphoneX                  |   221 |
| apple                    |   220 |
| Virginradio              |   190 |
| عبر_عن_حبك_للوطن_مع_رامه  |   176 |
+--------------------------+-------+
```
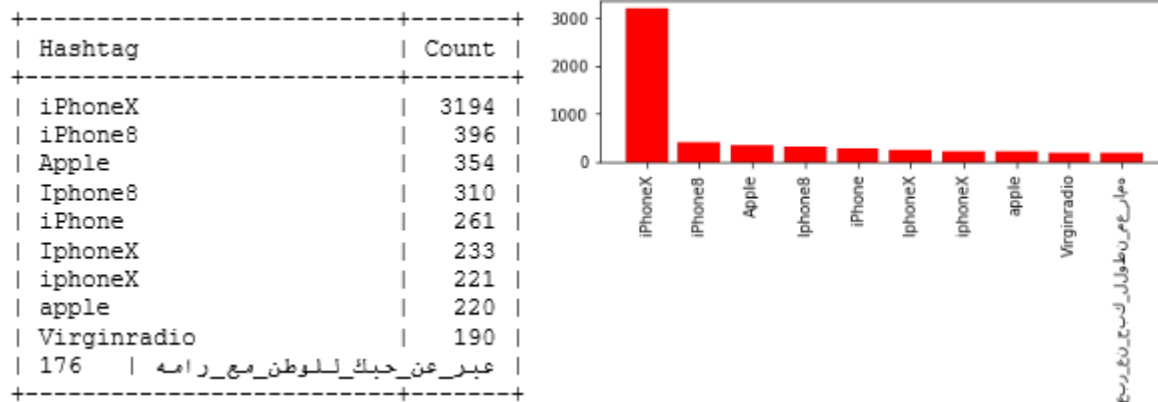
Fig. Frequency of Top 10 hashtags

iPhone X, FaceID and iPhone 8 were the most popular hashtags used in the tweets that were analyzed. This further narrowed down our analysis on iPhone X.

    b.   Top 10 popular user mentions

```
+------------------+-------+
| User Name        | Count |
+------------------+-------+
| DasBule          |   742 |
| TopAchat         |   324 |
| VirginRadiofr    |   270 |
| ramahwater       |   176 |
| Apple            |   160 |
| LiveLife101Twit  |   120 |
| lutsekeZA        |   120 |
| JohnCena         |    84 |
| pierrealexVR     |    80 |
| gankstars        |    80 |
+------------------+-------+
```

Fig. Count of Top 10 popular user mentions

4. List of 20 followers, ID numbers and screen names for Tim Cook

```
+--------------------+--------------------+
|         ID         |   Follower Name    |
+--------------------+--------------------+
| 910681170144137216 |       Sandra       |
| 910681834538668032 |  Michael Kennemer  |
| 910680565770108928 |   Blanca Flores    |
| 910681737230819328 |  Катя Филимонова   |
| 910681198627717120 |       anny         |
| 910681552920514560 |      Yethuya       |
| 910680994751172609 |    sidra ramzan    |
| 910675067113160704 |       inoo         |
|     2975570135     |  Gerardo Alvarado  |
| 910679631988166657 |  Анастасия Шахова  |
| 910681520322392064 | Ram Nivas Ram Nivas|
| 910682057361076224 |   Kim hernanndsz   |
|      50777670      |   Ricky McNally    |
| 910681674073169921 |   Катюня Титова    |
| 910681349215916032 |        K           |
| 910681632365056000 |  Gabrielle Lewis   |
| 910679875400404993 |  Glorious Warrior  |
| 910681577180487680 |       高伟         |
| 910681588819648512 |       James        |
| 910681430220464128 |    @KelanaBekti     |
+--------------------+--------------------+
```

5. List of 20 friends, ID numbers and screen names for Tim Cook

```
+--------------------+----------------------+
|         ID         |     Friend Name      |
+--------------------+----------------------+
| 823307478360150018 |     Robert Iger      |
| 875395670567514112 |    Made With ARKit   |
|           36771809 | NationalParkService  |
|          937499232 |        Malala        |
|          597726943 |          JR          |
|         2690190536 |     Sady Paulson     |
|         2729911969 | Mary Robinson Centre |
|         1859861863 |     Andrea Jung      |
|           17446359 |    Beth Comstock     |
|         1339835893 |   Hillary Clinton    |
|           90420314 | Neil Patrick Harris  |
|           29450962 |      John Lewis      |
|                 12 |         jack         |
|           14130366 |    Sundar Pichai     |
|         3257608936 |      Apple News      |
|         1205322793 |    Marcus Spears     |
|           21872269 |    Laurene Powell    |
|           16303106 |   Stephen Colbert    |
|           21288052 |      Zane Lowe       |
|               1605 |      Sam Altman      |
+--------------------+----------------------+
```

Fig. List of ID and friend screen names

6. List of users in both, friend list and follower list, their ID numbers and screen names

```
+----+------+
| ID | Name |
+----+------+
+----+------+
```

There are no mutual friends between the followers and friends for Tim Cook.

5. BUSINESS CASE

Apple Inc. launched the Apple iPhone 8 and iPhone X on 12th September 2017. With the revolutionary iPhone X introducing new features like FACE ID, Animoji and OLED Display, the phone promises to be the benchmark of smartphones in the next 10 years. However, Apple plans to ship the first batch of iPhone X on 2nd November 2017. The objective of this case study is to design a roadmap for Apple Inc. from September to November by analyzing data from Twitter. The goal is to trace the trending features of iPhone X and how Apple can maintain and increase the hype.

Historically, Apple has introduced revolutionary products which have redefined the smartphone industry since its inception. This regular advancement in technology has gained the company millions of customers willing to buy every new product introduced. We define this part of the population as "Loyalist". Upon further research on the popularity of the Apple products and followers we found some interesting results. Apple loyalist could be categorized into 4 distinct classes.

True Friends: The "Apple Fanboys" that buy whatever product Apple releases simply because they think so highly of the company.

Butterfly: Butterflies are not particularly loyal, but have spent money on your products and brought in good revenue. An example of a butterfly would be someone that supports Microsoft in general, but buys the iPhone since it happened to be the best available phone on the market.

Barnacles: A customer that rarely makes an Apple product purchase but keeps using the upgraded technology. Example, the one who has an iPhone 5 or an older phone but still downloads all the latest iOS releases on it.

Strangers: Someone who just buys one Apple product like "iPhone" but never purchases any other Apple product

Indecisive: Someone who can't make up his mind or make decisions. Example, A user who is confused to make a choice between iPhone and Samsung Note.

Skeptic: A person who maintains a doubting attitude towards decisions and purchase. Example, a user who will doubt his purchase of iPhone X because of the new features that it claims. Furthermore, the FaceID feature in the new iPhone X failed which increases the rate of skeptic customers.

Analysis on @apple twitter account
After looking at the trends from the tweets collected, more analysis was performed on Apple's twitter accounts. It was observed that Apple has multiple twitter accounts with handle names: @iTunes, @AppleSupport, @AppleNews, @AppleMusic, @ApplePodcasts, @iBooks, @AppStore but there was no universal account "@apple" till 2014. According to a report run by CNBC, the analysis for tech companies on twitter were:
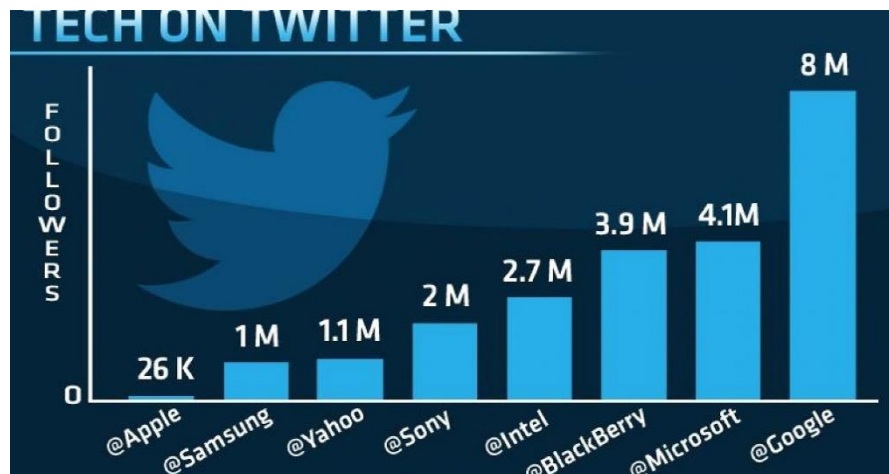
@apple had the least number of followers on twitter because the handle was not verified. Though Apple has more than 13 million Twitter followers on various accounts, not one represents the official voice of the company. But recently Apple changed its twitter

profile and got the @apple twitter account verified. But still Apple hasn't tweeted yet and the account remains inactive.

Further analysis was done on hashtags used in the data collected and the observations showed that "#FaceID" was the most talked about feature of iPhone X but no twitter user was talking about "#Animoji" and "#OLED".
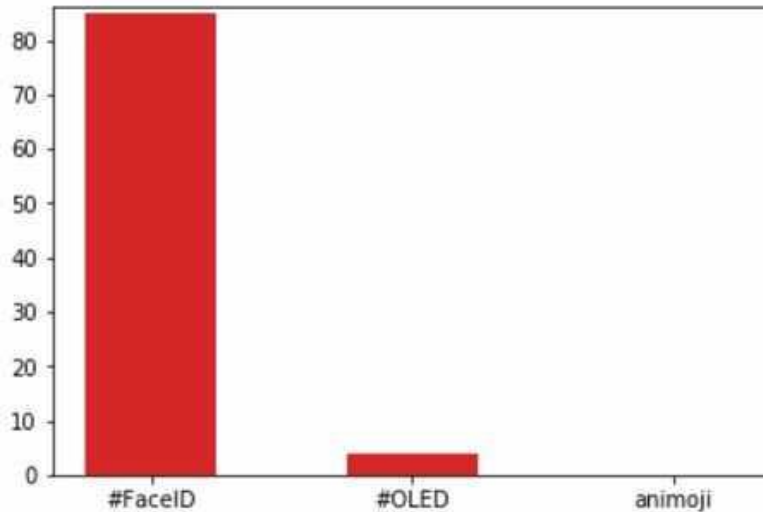

Fig. Count of FaceID, OLED and animoji hashtags

The graph shows the trend and popularity of the FaceID feature in the new iPhoneX but the other features like Animoji and the new OLED Display have not been talked about.

The topmost retweet in our data is from John Cena, where again he has mentioned #FaceID.

Fig. Snapshot of the highest retweet

In the new iPhone X launch there was a malfunction in the FaceID feature and failure in displaying its true potential. "Face ID is the future of how we unlock iPhones and protect sensitive information," said Apple. In the event a flustered Craig Federighi struggled to unlock the device while demonstrating Face ID. "Unlocking it is as easy as looking at it and swiping up," he explained. When it failed to unlock, he told the audience: "Let's try that again." After being prompted to enter his passcode, Federighi was forced to grab a backup device to continue with the demonstration.

Fig. Failed FaceID tweet

This created a skeptical and negative impact on the audience.

What should Apple do and how should it spend its resources?

Based on the demographics described for the Apple customer population Apple should come up with different marketing strategies to cater their needs. A loyalist will not require much marketing but Apple should ensure and maintain the customer base. An indecisive user will always weigh and compare, so Apple should market the iPhone X such that the product dignifies the cost.

Collaboration:
John Cena's tweet on iPhone X and the FaceID feature has the highest amount of retweets and similarly, memes about FaceID with the famous Game of Thrones star "Arya Stark" is trending on twitter. Apple could use this to their advantage by collaborating with them. This could be an impactful marketing and sales strategy as Game of Thrones is one of the highest rated and most popular shows currently. An example would be to officially use the Game of Thrones star "Arya Stark" in the iPhone X advertisements.

Efficiently using Twitter:
Apple has not tweeted since the @apple account got verified. Though it has several twitter accounts with different handle names with a lot of followers but for user convenience and interaction it is vital to have a single twitter account. The users will have a single source of information on Apple. The account should be made more interactive with its users which will bring a new key to the customer relationship for apple.

Showcasing Power of FaceID
Performing sentiment analysis on the features of iPhone X revealed that the Animoji feature has a positive sentiment of 0.05 and the FaceID feature had a relatively neutral sentiment of 0.005. This inferred that people are skeptical about the technology.
Currently FaceID seems like a setback and there is validity to that view. Apple touted Face ID as both more secure and more convenient than a fingerprint but the onstage demos certainly did not make it look that way. It's very fast; about as snappy as Touch ID. But Samsung and others have already tried to make the feature work, and it's been neither secure nor convenient. There were similar apprehensions about TouchID when it was released a decade ago. But now this feature is the next chapter in mobile security and

it will be superior than the past implementations. Apple should demonstrate these capabilities to the customers in a better way and through different mediums.

Promoting features other than FaceID
From our analysis we observed that the FaceID feature was the most talked about. But the revolutionary features like the new Super Retina OLED Display is the highest resolution iPhone to date. It also features Apple's True Tone display tech much like the new Apple TV. Animoji and wireless charging are among the other features that are not being talked about. Apple should focus on building strategies around these features and promoting them.

6. REFERNCES

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