

CSEE5590/490: BIG DATA PROGRAMMING

ANALYSIS ON US ELECTION USING SOCIAL MEDIA

1. TEAM MEMBERS:

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2. GOALS AND OBJECTIVES:

• MOTIVATION:

The world has been advancing significantly day by day, so as the data. Nowadays the data has become so vast such that it could not be stored in a single cluster or a machine, thus the concept of big data arisen, and its services have been implemented in various sectors. Many tools and technologies are arriving in the market very frequently to work with this big data. We thought of analysing social media using the existing techniques, visualize the data, aggregate, and model it in a user-friendly way.

• SIGNIFICANCE:

People are very curious about the recent trending issues across the globe, Since the 2020 US elections have been trending now the people want to know about the different views across the country on participating election candidates. So, we are collecting social media data to analyze different views and opinions, so that people can get awareness.

• OBJECTIVES:

Our Undertaking's fundamental thought is to do the ETL cycle utilizing Spark Cluster Handling, Cleaning the data, performing sentimental analysis, visualizing the data, and Incorporating visualization with Web UI. The wellspring of our framework is Twitter information and we would utilize Tweepy API to gather the information. We would deploy the web UI incorporating the visualizations in the Cloud environment.

• FEATURES:

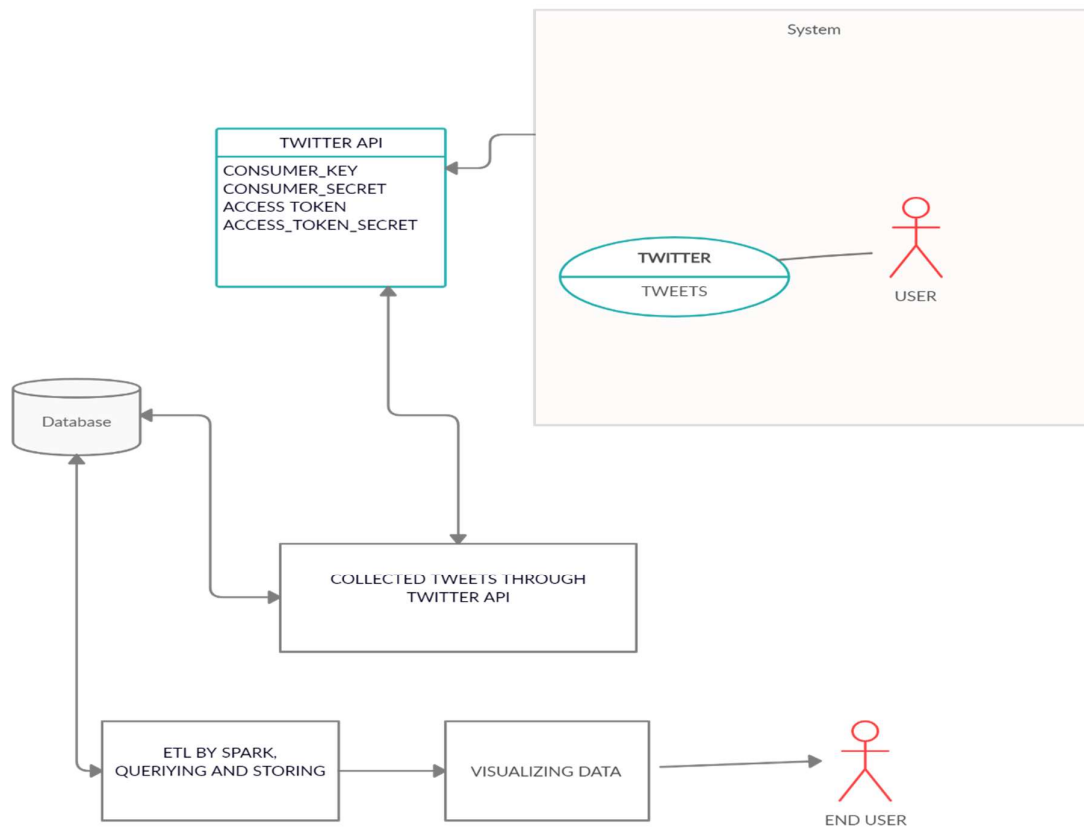
This project includes streaming of live twitter data and processing it through SPARK ETL and using TextBlob from NLTK to process the data and predict the sentiment and Creating a Web UI incorporating the visualization of data and deploying it to the Cloud environment.

3. DATA SET:

Twitter data on Donald Trump and Joe Biden (US ELECTION 2020)

This dataset has all the recent tweets about Joe Biden and Donald Trump and tweet json object has all the attributes which gives a precise and vital view about what and where things are going around the candidates.

4 DESIGN:



STEPS:

1. User will tweet to the twitter server
2. Using developer account using tweepy API we extract the tweets
3. Extracted tweets are stored
4. We use Spark ETL to process the data by querying and retrieving only the vital information from the tweets stored.
5. We visualize the information to the end user.

5. ANALYSIS

A typical tweet has the following fields

```
{
  "created_at": "Mon Oct 26 16:00:23 +0000 2020",
  "id": 1320757176017784832,
  "id_str": "1320757176017784832",
  "text": "RT @JoeBiden: Character is on the ballot.\n\nVote: https://t.co/veoxT07d7QB https://t.co/PYq3FZTEia",
  "source": "\u003ca href='\"http://twitter.com/download/android\"' rel='\"nofollow\"'\u003eTwitter for Android\u003c/a\u003e",
  "truncated": false,
  "in_reply_to_status_id": null,
  "in_reply_to_status_id_str": null,
  "in_reply_to_user_id": null,
  "in_reply_to_user_id_str": null,
  "in_reply_to_screen_name": null,
  "user": {
    "id": 1340481373,
    "id_str": "1340481373",
    "name": "\ud83d\udc80\ud83c\udf83\ud83d\ude0fKelli Crackel\ud83d\udc80\ud83c\udf83\ud83d\ude0f",
    "screen_name": "KelliCrackel",
    "location": "Georgia, USA",
    "url": null,
    "description": "Wife to @felishaC14, Mom, Liberal, Redneck(yes really), Whovian, UGA football fan. Go Dawgs! #MeToo #GunControlNOW #NeverAgain #StrongerTogether",
    "translator_type": "none",
    "protected": false,
    "verified": false,
    "followers_count": 17291,
    "friends_count": 18725,
    "listed_count": 15,
    "favourites_count": 96739,
    "statuses_count": 29117,
    "created_at": "Tue Apr 09 23:17:15 +0000 2013",
    "utc_offset": null,
    "time_zone": null,
    "geo_enabled": false,
    "lang": null,
  },
  "geo": null,
  "coordinates": null,
  "place": null,
  "contributors": null,
  "retweeted_status": {
    "created_at": "Mon Oct 26 16:00:02 +0000 2020",
    "id": 1320757084225495042,
    "id_str": "1320757084225495042",
    "text": "Character is on the ballot.\n\nVote: https://t.co/veoxT07d7QB https://t.co/PYq3FZTEia",
    "display_text_range": [
      0,
      58
    ],
  },
  "source": "\u003ca href='\"https://studio.twitter.com\"' rel='\"nofollow\"'\u003eTwitter Media Studio\u003c/a\u003e",
  "truncated": false,
  "in_reply_to_status_id": null,
  "in_reply_to_status_id_str": null,
  "in_reply_to_user_id": null,
  "in_reply_to_user_id_str": null,
  "in_reply_to_screen_name": null,
  "user": {
    "id": 939091,
    "id_str": "939091",
    "name": "Joe Biden",
    "screen_name": "JoeBiden",
    "location": "Wilmington, DE",
    "url": "http://joebiden.com",
    "description": "Senator, Vice President, 2020 candidate for President of the United States, husband to @DrBiden, proud father & grandfather. Loves ice cream, aviators & @Amtrak",
    "translator_type": "none",
    "protected": false,
    "verified": true,
    "followers_count": 11546632,
    "friends_count": 29,
    "listed_count": 22750,
  }
}
```

```

    "favourites_count":20,
    "statuses_count":6442,
    "created_at":"Sun Mar 11 17:51:24 +0000 2007",
    "utc_offset":null,
    "time_zone":null,
    "geo_enabled":false,
    "lang":null,
    "contributors_enabled":false,
    "is_translator":false,
  },
  "geo":null,
  "coordinates":null,
  "place":null,
  "contributors":null,
  "is_quote_status":false,
  "quote_count":2,
  "reply_count":9,
  "retweet_count":24,
  "favorite_count":110,
  ,
  "favorited":false,
  "retweeted":false,
  "possibly_sensitive":false,
  "filter_level":"low",
  "lang":"en"
},
"is_quote_status":false,
"quote_count":0,
"reply_count":0,
"retweet_count":0,
"favorite_count":0,
"entities":{
  "hashtags":[

],
  "urls":[
    {
      "url":"https://t.co/eoxT07d7QB",
      "expanded_url":"http://iwillvote.com",
      "display_url":"iwillvote.com",
      "indices":[
        49,
        72
      ]
    }
  ],
  "user_mentions":[
    {
      "screen_name":"JoeBiden",
      "name":"Joe Biden",
      "id":939091,
      "id_str":"939091",
      "indices":[
        3,
        12
      ]
    }
  ],
  "symbols":[

],

  "favorited":false,
  "retweeted":false,
  "possibly_sensitive":false,
  "filter_level":"low",
  "lang":"en",
  "timestamp_ms":"1603728023901"
}

```

```
nithin@nithin-VirtualBox: ~
File Edit View Search Terminal Help
scala> val q1 = sqlContext.sql("select distinct(place.country) from Presidents ");
20/10/2018 10:00:00 AM org.apache.spark.sql.DataFrame$ showObjectException
q1: org.apache.spark.sql.DataFrame = [country: string]

scala> q1.show();
-----+-----+
country|
-----+-----+
Sweden|
The Netherlands|
Etats-Unis|
Germany|
France|
Kosovo|
+ RW|
Sri Lanka|
null|
Argentina|
Belgium|
België|
Albania|
Finland|
Sierra Leone|
United States|
India|
Bahamas|
Malta|
Roemenië|
-----+-----+
only showing top 20 rows

scala> q1.coalesce(1).write.csv("/home/nithin/Desktop/q20.csv");
```

This is information will be useful to know where this topic is going trending.

2. NUMBER OF TWEETS FOR PARTICULAR CANDIDATE

```
File Edit View Search Terminal Help
nithin@nithin-VirtualBox: ~
at org.apache.spark.sql.catalyst.analysis.Analyzer.org$apache$spark$sql$catalyst$analysis$Analyzer$$executeSameContext(Analyzer.scala:127)
at org.apache.spark.sql.catalyst.analysis.Analyzer.execute(Analyzer.scala:121)
at org.apache.spark.sql.catalyst.analysis.Analyzer.$anonfun$executeAndCheck$1.apply(Analyzer.scala:180)
at org.apache.spark.sql.catalyst.analysis.Analyzer.$anonfun$executeAndCheck$1.apply(Analyzer.scala:180)
at org.apache.spark.sql.catalyst.plans.logical.AnalysisHelper$.markInAnalyzer(AnalysisHelper.scala:201)
at org.apache.spark.sql.catalyst.analysis.Analyzer.executeAndCheck(Analyzer.scala:185)
at org.apache.spark.sql.execution.QueryExecution.analyzed$zycompute(QueryExecution.scala:58)
at org.apache.spark.sql.execution.QueryExecution.analyzed(QueryExecution.scala:56)
at org.apache.spark.sql.execution.QueryExecution.assertAnalyzed(QueryExecution.scala:48)
at org.apache.spark.sql.Dataset$.ofRows(Dataset.scala:78)
at org.apache.spark.sql.DataFrameWriter.write(DataFrameWriter.scala:642)
at org.apache.spark.sql.SQLContext.sql(SQLContext.scala:694)
... $1 elided

scala> val q2 = sqlContext.sql("SELECT SUM(user.favorites_count) AS NumberOfLikes, 'JOE BIDEN' as PRESIDENT FROM Presidents where text LIKE '% joe %' UNION SELECT SUM(user.favorites_count) AS NumberOfLikes, 'DONAL TRUMP' as PRESIDENT FROM Presidents where text LIKE '% trump %' order by NumberOfLikes desc");
q2: org.apache.spark.sql.DataFrame = [NumberOfLikes: integer, PRESIDENT: string]

scala> q2.show();
-----+-----+
|NumberOfLikes| PRESIDENT|
-----+-----+
|      5689142| DONAL TRUMP|
|      5533644|  JOE BIDEN|
-----+-----+

scala> q2.coalesce(1).write.csv("/home/nithin/Desktop/q22.csv");

scala> val q3 = sqlContext.sql("select count(extended_tweet.full_text) AS Count_of_tweets, &#39;EMOJI&#39; AS
<console>:1: error: ';' expected but ',' found.
val q3 = sqlContext.sql("select count(extended_tweet.full_text) AS Count_of_tweets, &#39;EMOJI&#39; AS
<console>:1: error: ';' expected but ',' found.
val q3 = sqlContext.sql("select count(extended_tweet.full_text) AS Count_of_tweets, &#39;EMOJI&#39; AS
                                     ^
scala> WITH_OR_WITHOUT FROM DiseaseTweetsTable where extended_tweet.full_text LIKE &#39;%emoj&#39; UNION
<console>:1: error: ';' expected but integer literal found.
```

Through this query we can have a picture who is more trending on twitter, on further analysis we can say it whether it is positive or negative.

3. Number of Likes for Tweets about particular candidate.

```
File Edit View Search Terminal Help
nithin@nithin-VirtualBox: ~
null
Argentina
Belgium
Belgie
Albania
Finland
Sierra Leone
United States
India
Bahamas
Malta
Roemenie
only showing top 20 rows

scala> q1.coalesce(1).write.csv("/home/nithin/Desktop/q20.csv");

scala> val q2 = sqlContext.sql("SELECT COUNT(*) AS NumberOfTweets, 'JOE BIDEN' as PRESIDENT FROM Presidents where text LIKE '% joe %' UNION SELECT COUNT(*) AS NumberOfTweets, 'DONAL TRUMP' as PRESIDENT FROM Presidents where text LIKE '% trump %' order by NumberOfTweets desc");
q2: org.apache.spark.sql.DataFrame = [NumberOfTweets: integer, PRESIDENT: string]

scala> q2.show();
-----+-----+
|NumberOfTweets| PRESIDENT|
-----+-----+
|          1405| DONAL TRUMP|
|           306|  JOE BIDEN|
-----+-----+

scala> q2.coalesce(1).write.csv("/home/nithin/Desktop/q21.csv");

scala> val q3 = sqlContext.sql("SELECT SUM(favorite_count) AS NumberOfLikes, 'JOE BIDEN' as PRESIDENT FROM Presidents where text LIKE '% joe %' UNION SELECT SUM(favorite_count) AS NumberOfLikes, 'DONAL TRUMP' as PRESIDENT FROM Presidents where text LIKE '% trump %' order by NumberOfLikes desc");
q3: org.apache.spark.sql.DataFrame = [NumberOfLikes: integer, PRESIDENT: string]

scala> q3.show();
-----+-----+
|NumberOfLikes| PRESIDENT|
-----+-----+
|      5689142| DONAL TRUMP|
|      5533644|  JOE BIDEN|
-----+-----+

scala> q3.coalesce(1).write.csv("/home/nithin/Desktop/q22.csv");

scala> val q4 = sqlContext.sql("SELECT COUNT(extended_tweet.full_text) AS Count_without_emojis, &#39;without_EMOJI&#39; AS
<console>:1: error: ';' expected but integer literal found.
WITH_OR_WITHOUT FROM DiseaseTweetsTable where extended_tweet.full_text LIKE &#39;%emoj&#39; UNION
<console>:1: error: ';' expected but integer literal found.
WITH_OR_WITHOUT FROM DiseaseTweetsTable where extended_tweet.full_text LIKE &#39;%emoj&#39; UNION
                                     ^
scala> select count(extended_tweet.full_text) AS Count_without_emojis, &#39;without_EMOJI&#39; AS
<console>:1: error: ';' expected but ',' found.
select count(extended_tweet.full_text) AS Count_without_emojis, &#39;without_EMOJI&#39; AS
                                     ^
scala> val q4 = sqlContext.sql("SELECT Count(extended_tweet.full_text) AS NumberOfTweets, 'EMOJI' as WITH_OR_WITHOUT FROM Presidents where text LIKE '% emoji %' UNION SELECT count(extended_tweet.full_text) AS NumberOfTweets, 'WITHOUT EMOJI' as WITH_OR_WITHOUT FROM Presidents where extended_tweet.full_text NOT LIKE '% emoji %' order by NumberOfTweets desc");
q4: org.apache.spark.sql.DataFrame = [NumberOfTweets: integer, WITH_OR_WITHOUT: string]

scala> q4.show();
-----+-----+
|NumberOfTweets|WITH_OR_WITHOUT|
-----+-----+
|          439831|  WITHOUT EMOJI|
|              1|      WITH EMOJI|
-----+-----+

scala> q4.coalesce(1).write.csv("/home/nithin/Desktop/q23.csv");

scala> val q5 = sqlContext.sql("select user.location AS LOCATION from Presidents where user.location IS NOT NULL ");
q5: org.apache.spark.sql.DataFrame = [LOCATION: string]

scala> q5.show();
-----+-----+
|      LOCATION|
-----+-----+
|      Georgia, USA|
|      Animal Crossing|
|      Making Calls For Joe|
```

After analysing the data whether we have to know the support of people for that tweet, this query data can be vital in knowing that.

4. Tweets which contains emojis vs non emoji tweets

```
File Edit View Search Terminal Help
nithin@nithin-VirtualBox: ~
scala> WITH_OR_WITHOUT FROM DiseaseTweetsTable where extended_tweet.full_text LIKE &#39;%emoj&#39; UNION
<console>:1: error: ';' expected but integer literal found.
WITH_OR_WITHOUT FROM DiseaseTweetsTable where extended_tweet.full_text LIKE &#39;%emoj&#39; UNION
                                     ^
<console>:1: error: ';' expected but integer literal found.
WITH_OR_WITHOUT FROM DiseaseTweetsTable where extended_tweet.full_text LIKE &#39;%emoj&#39; UNION
                                     ^
scala> select count(extended_tweet.full_text) AS Count_without_emojis, &#39;without_EMOJI&#39; AS
<console>:1: error: ';' expected but ',' found.
select count(extended_tweet.full_text) AS Count_without_emojis, &#39;without_EMOJI&#39; AS
                                     ^
scala> val q4 = sqlContext.sql("SELECT Count(extended_tweet.full_text) AS NumberOfTweets, 'EMOJI' as WITH_OR_WITHOUT FROM Presidents where text LIKE '% emoji %' UNION SELECT count(extended_tweet.full_text) AS NumberOfTweets, 'WITHOUT EMOJI' as WITH_OR_WITHOUT FROM Presidents where extended_tweet.full_text NOT LIKE '% emoji %' order by NumberOfTweets desc");
q4: org.apache.spark.sql.DataFrame = [NumberOfTweets: integer, WITH_OR_WITHOUT: string]

scala> q4.show();
-----+-----+
|NumberOfTweets|WITH_OR_WITHOUT|
-----+-----+
|          439831|  WITHOUT EMOJI|
|              1|      WITH EMOJI|
-----+-----+

scala> q4.coalesce(1).write.csv("/home/nithin/Desktop/q23.csv");

scala> val q5 = sqlContext.sql("select user.location AS LOCATION from Presidents where user.location IS NOT NULL ");
q5: org.apache.spark.sql.DataFrame = [LOCATION: string]

scala> q5.show();
-----+-----+
|      LOCATION|
-----+-----+
|      Georgia, USA|
|      Animal Crossing|
|      Making Calls For Joe|
```

This query can be useful while processing the data(during sentimental analysis).

5. Geo location of user

```
nithin@nithin-VirtualBox: ~
File Edit View Search Terminal Help
only showing top 20 rows

scala> val q5= sqlContext.sql("select geo.coordinates[0],geo.coordinates[1] from Presidents where geo IS NOT NULL ");
5: org.apache.spark.sql.DataFrame = [geo.coordinates AS 'coordinates'[0]: double, geo.coordinates AS 'coordinates'[1]: double]

scala> q5.show()
-----+-----+
geo.coordinates AS 'coordinates'[0]|geo.coordinates AS 'coordinates'[1]|
-----+-----+
40.09322238|-88.19766625|
41.92425|-87.6972751|
29.71171171|-95.5741171|
51.4853|-3.1867|
39.02464385|-77.12560943|
41.14685|-73.98025|
32.92|-96.4597|
29.60959809|-98.50893629|
38.8976805|-77.0387238|
34.1467|-118.1488|
38.9215|-79.8508|
40.73562841|-73.99058927|
29.799072|-95.568947|
27.9473|-82.4558|
33.59552743|-83.99035256|
42.24730806|-84.75071212|
33.0351|-83.9381|
34.1467|-118.1488|
40.6017|-75.4773|
-----+-----+

scala> val q6= sqlContext.sql("select COUNT(DISTINCT user.id) AS USERS, 'VERIFIED' AS USER_STATUS from Presidents where user.verified=true UNION select COUNT(DISTINCT user.id) AS USERS, 'UNVERIFIED' AS USER_STATUS from Presidents where user.verified=false");
q6: org.apache.spark.sql.DataFrame = [USERS: bigint, USER_STATUS: string]

scala> q6.show()
-----+-----+
USERS|USER_STATUS|
-----+-----+
1073|VERIFIED|
177489|UNVERIFIED|
-----+-----+
```

This can be helpful in knowing the hot spot about the discussion going about candidates.

6. Celebrity vs Normal people.

```
nithin@nithin-VirtualBox: ~
File Edit View Search Terminal Help

41.92425|-87.6972751|
29.71171171|-95.5741171|
51.4853|-3.1867|
39.02464385|-77.12560943|
41.14685|-73.98025|
32.92|-96.4597|
29.60959809|-98.50893629|
38.8976805|-77.0387238|
34.1467|-118.1488|
38.9215|-79.8508|
40.73562841|-73.99058927|
29.799072|-95.568947|
27.9473|-82.4558|
33.59552743|-83.99035256|
42.24730806|-84.75071212|
33.0351|-83.9381|
34.1467|-118.1488|
40.6017|-75.4773|
-----+-----+

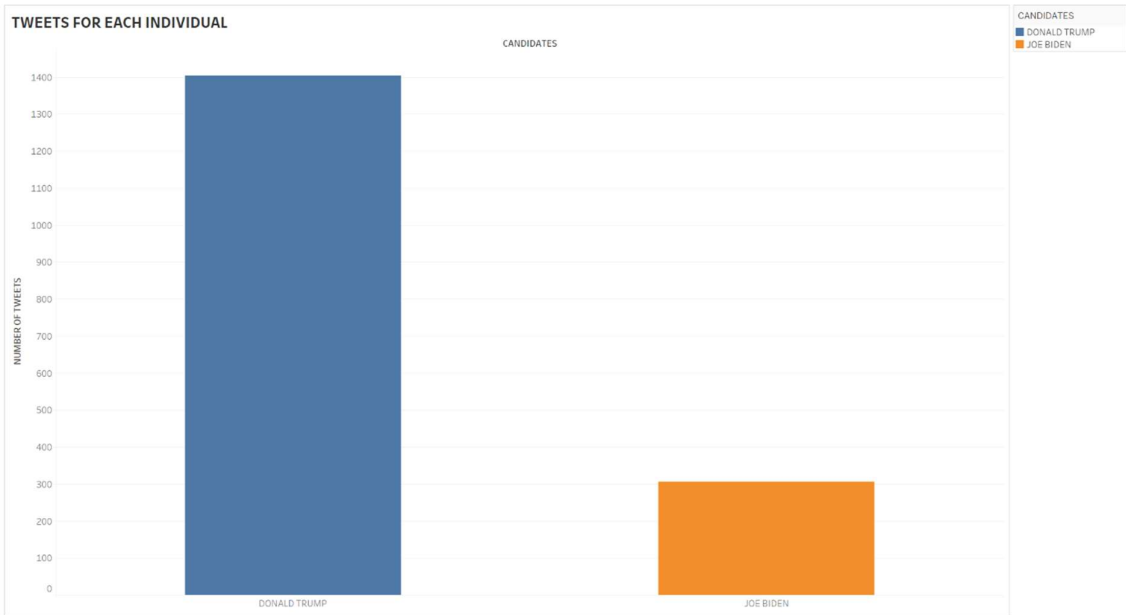
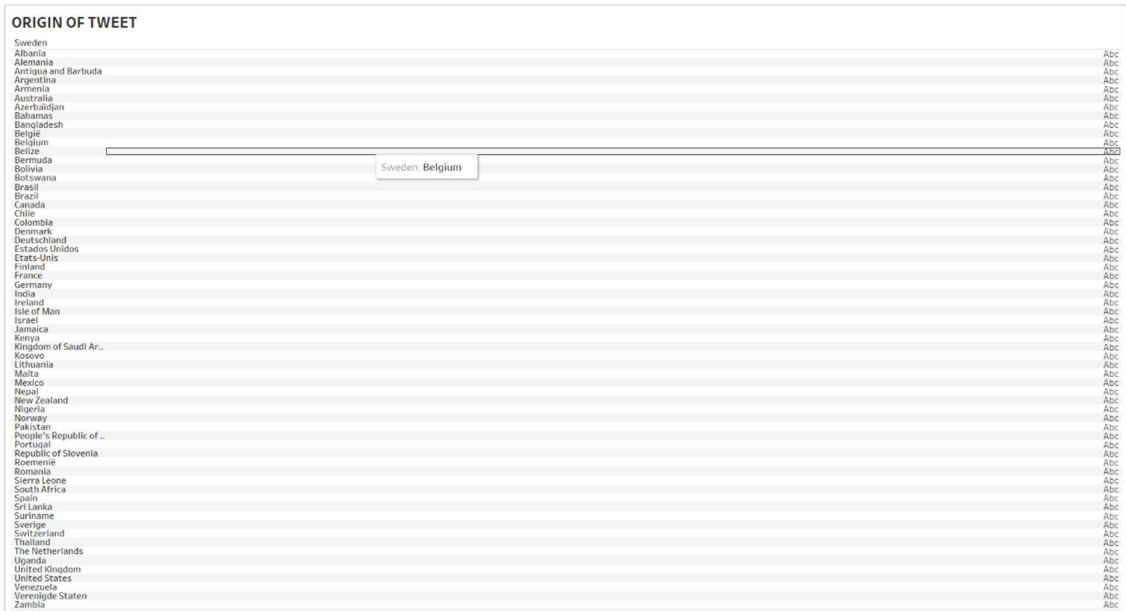
scala> val q6= sqlContext.sql("select COUNT(DISTINCT user.id) AS USERS, 'VERIFIED' AS USER_STATUS from Presidents where user.verified=true UNION select COUNT(DISTINCT user.id) AS USERS, 'UNVERIFIED' AS USER_STATUS from Presidents where user.verified=false");
q6: org.apache.spark.sql.DataFrame = [USERS: bigint, USER_STATUS: string]

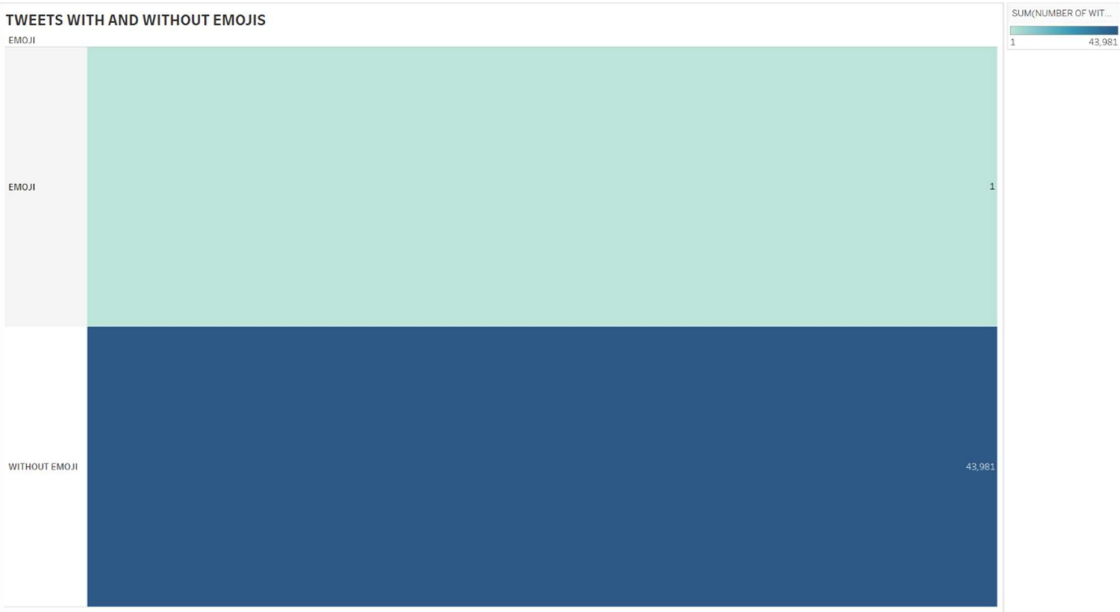
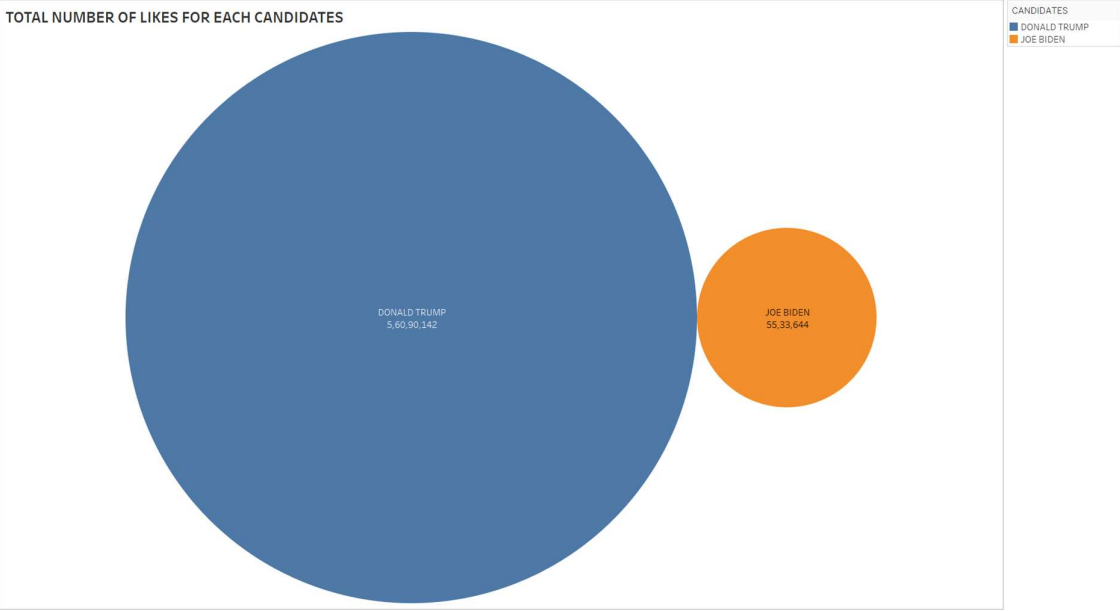
scala> q6.show()
-----+-----+
USERS|USER_STATUS|
-----+-----+
1073|VERIFIED|
177489|UNVERIFIED|
-----+-----+

scala> q5.coalesce(1).write.csv("/home/nithin/Desktop/q24.csv");
scala> q6.coalesce(1).write.csv("/home/nithin/Desktop/q25.csv");
scala>
```

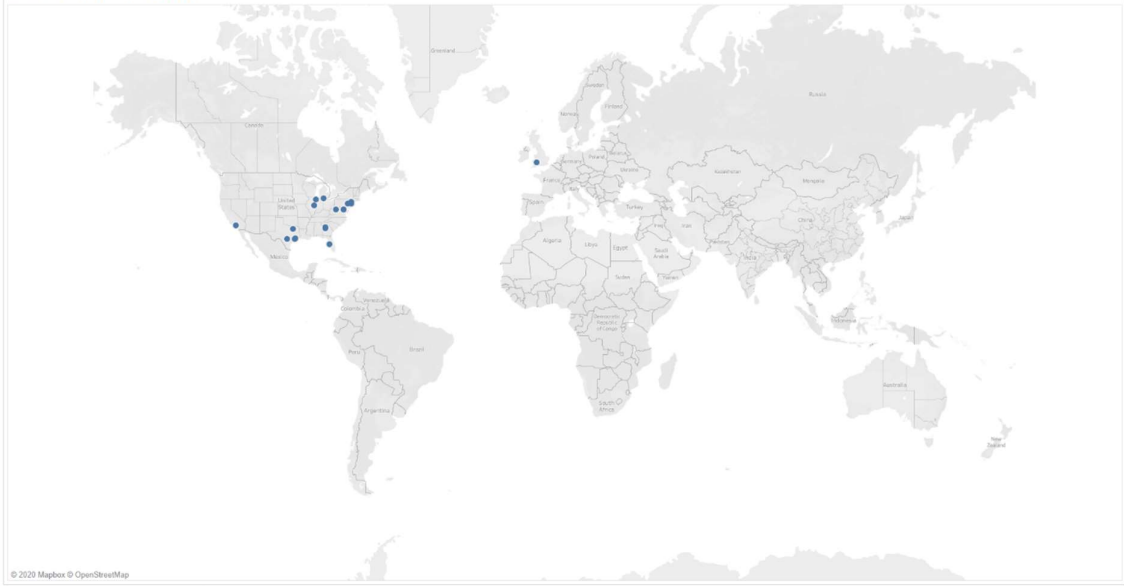
In general case we can trust more on tweets that is been given by celebrity. In order to give weightage to a tweet we can use this information.

7. Visualization Report:

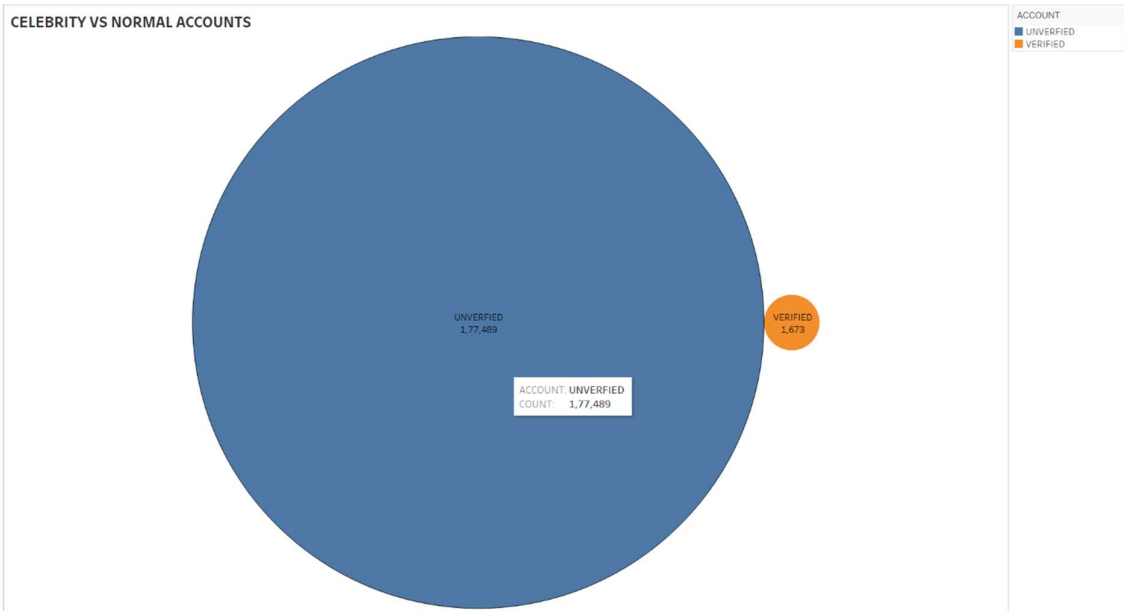




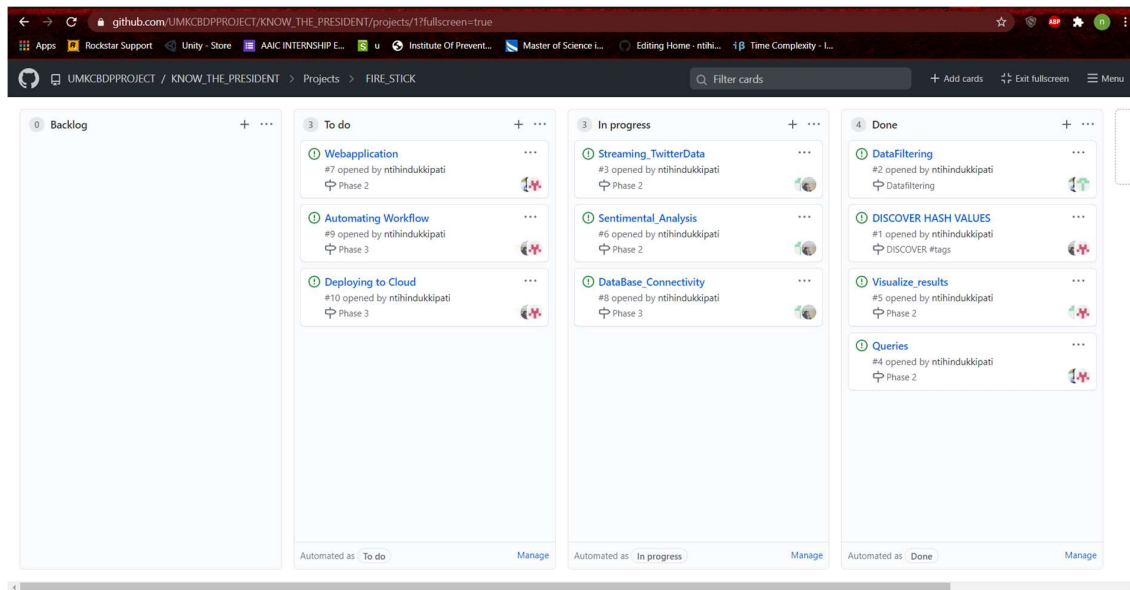
GEO-GRAPHICAL LOCATION



CELEBRITY VS NORMAL ACCOUNTS



PROJECT MANAGEMENT:



WORK COMPLETED:

1. Gathering requirements for the use case (Chaitanya, Eswar, Nikhitha, Nithin)
2. Tweets extracting using Hash Tags (Chaitanya, Nikhitha)
3. Querying the data using spark ETL in Scala prompt (Eswar, Nithin)
4. Visualizing data using Tableau (Eswar, Nithin)

WORK IN PROGRESS:

1. Streaming data from twitter using Spark Streaming Library (Scala). (Chaitanya, Nithin)
2. Designing website for visualizing real time data. (Nikhitha, Eswar)

ISSUES AND CONCERNS:

Spark Streaming library and dependency issues while performing Sentiment Analysis with streaming data

CODE:

```
Sentimental.scala x build.sbt x
10
11 def main(args: Array[String]) {
12
13     // val Array(StreamingExamples.consumer_key, StreamingExamples.consumer_secret, StreamingExamples.access_token, StreamingExamples.access_token_secret)
14     val a: Array[String] = new Array[String](4)
15
16     a(0) = StreamingExamples.consumer_key
17     a(1) = StreamingExamples.consumer_secret
18     a(2) = StreamingExamples.access_token
19     a(3) = StreamingExamples.access_token_secret
20
21     if (a.length < 4) {
22         print(a.length)
23         // System.err.println("Usage: TwitterPopularTags <consumer key> <consumer secret> " + "<access token> <access token secret> [<filters>]")
24         // System.exit(1)
25     }
26
27     val filters = args.takeRight(a.length - 4)
28
29     //Passing our Twitter keys and tokens as arguments for authorization
30
31
32     // Set the system properties so that Twitter4j library used by twitter stream
33     // Use them to generate OAuth credentials
34     System.setProperty("twitter4j.oauth.consumerKey", StreamingExamples.consumer_key)
35     System.setProperty("twitter4j.oauth.consumerSecret", StreamingExamples.consumer_secret)
36     System.setProperty("twitter4j.oauth.accessToken", StreamingExamples.access_token)
37     System.setProperty("twitter4j.oauth.accessTokenSecret", StreamingExamples.access_token_secret)
38
39
40 }
41
42 Sentimental
IntelliJ IDEA and plugin updates
Restart to activate plugin updates
Run sbt shell Build
3 s 175 ms (today 2:08 AM)
```

```
val sparkConf = new SparkConf().setAppName("twitterSentiment").setMaster("local[2]")
val ssc = new StreamingContext(sparkConf, seconds(5))
val stream = TwitterUtils.createStream(ssc, None)

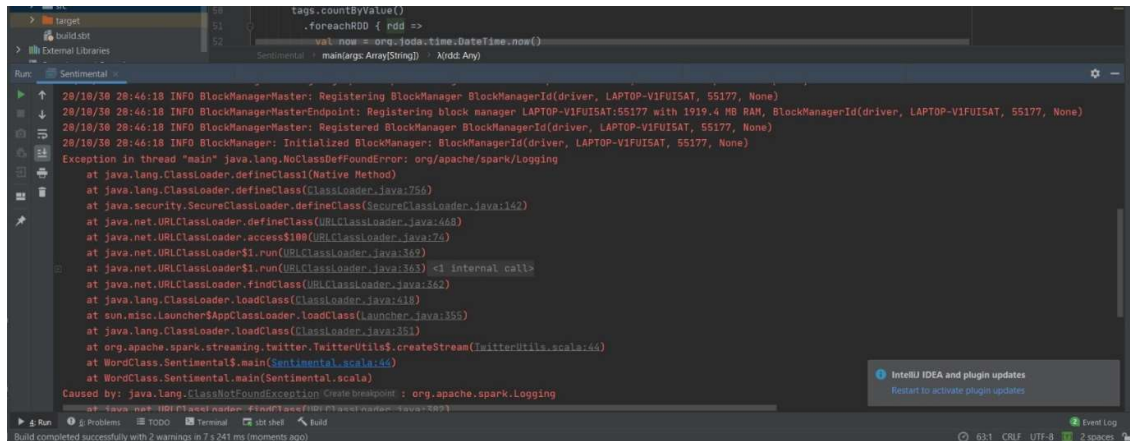
//Input DStream transformation using flatMap
val tags = stream.flatMap { status => status.getHashtagEntities.map(_.getText) }

//RDD transformation using sortBy and then map function
tags.countByValue()
.foreachRDD { rdd =>
    val now = org.joda.time.DateTime.now()
    rdd
        .sortBy(_._2)
        .map(x => (x, now))
        //Saving our output to local directory
        .saveAsTextFile(path = "C:/Users/Chaitanya/Fall2020/BDP/Streaming/$now")
}

//DStream transformation using filter and map functions
val tweets = stream.filter { t =>
    val tags = t.getText.split(regex = "[#]").filter(_.startsWith("DonaldTrump")).map(_.toLowerCase)
    tags.exists { x => true }
}
```

```
Project x Sentimental.scala x build.sbt x
BDP C:/Users/vaghu/idesProjects/BDP
idea
input
inputport
output_WordCount
outputport
project [BDP-build] sources root
src
target
build.sbt
External Libraries
Scratches and Consoles
81 .saveAsTextFile(path = "C:/Users/Chaitanya/Fall2020/BDP/Streaming/$now")
82 }
83
84 //DStream transformation using filter and map functions
85 val tweets = stream.filter { t =>
86     val tags = t.getText.split(regex = "[#]").filter(_.startsWith("DonaldTrump")).map(_.toLowerCase)
87     tags.exists { x => true }
88 }
89
90 /* val data = tweets.map { status =>
91     val sentiment = SentimentAnalysisUtils.detectSentiment(status.getText)
92     val tags = status.getHashtagEntities.map(_.getText.toLowerCase)
93     (status.getText, sentiment.toString, tags.toString())
94 }
95
96 tweets.print()
97 //Saving our output at ~/ with filenames starting like twitters
98 print("Saving into files")
99 tweets.saveAsTextFiles(prefix = "C:/Users/Chaitanya/Fall2020/BDP/Streaming/$now", suffix = "20000")
100 print("Saved to files")
101 ssc.start()
102 ssc.awaitTermination()
103 }
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ISSUE:



```
tags.countByValue()
.foreachRDD { rdd =>
    val now = org.joda.time.DateTime.now()
    main(args: Array[String]) }

Run: Sentimental
20/10/30 20:46:10 INFO BlockManagerMaster: Registering BlockManager BlockManagerId(driver, LAPTOP-VIFUISAT, 55177, None)
20/10/30 20:46:10 INFO BlockManagerMasterEndpoint: Registering block manager LAPTOP-VIFUISAT:55177 with 1919.4 MB RAM, BlockManagerId(driver, LAPTOP-VIFUISAT, 55177, None)
20/10/30 20:46:10 INFO BlockManagerMaster: Registered BlockManager BlockManagerId(driver, LAPTOP-VIFUISAT, 55177, None)
20/10/30 20:46:10 INFO BlockManager: Initialized BlockManager: BlockManagerId(driver, LAPTOP-VIFUISAT, 55177, None)
Exception in thread "main" java.lang.NoClassDefFoundError: org/apache/spark/Logging
    at java.lang.ClassLoader.defineClass1(Native Method)
    at java.lang.ClassLoader.defineClass(ClassLoader.java:756)
    at java.security.SecureClassLoader.defineClass(SecureClassLoader.java:142)
    at java.net.URLClassLoader.defineClass(URLClassLoader.java:469)
    at java.net.URLClassLoader.access$100(URLClassLoader.java:74)
    at java.net.URLClassLoader$1.run(URLClassLoader.java:363)
    at java.net.URLClassLoader$1.run(URLClassLoader.java:363) <1 internal call>
    at java.net.URLClassLoader.findClass(URLClassLoader.java:362)
    at java.lang.ClassLoader.loadClass(ClassLoader.java:418)
    at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:355)
    at java.lang.ClassLoader.loadClass(ClassLoader.java:351)
    at org.apache.spark.streaming.twitter.TwitterUtils$.createStream(TwitterUtils.scala:44)
    at WordClass.Sentimental$.main(Sentimental.scala:46)
    at WordClass.Sentimental.main(Sentimental.scala)
Caused by: java.lang.ClassNotFoundException: Create breakpoint : org.apache.spark.Logging
    at java.net.URLClassLoader.findClass(URLClassLoader.java:362)
    at java.lang.ClassLoader.loadClass(ClassLoader.java:418)
    at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:355)
    at java.lang.ClassLoader.loadClass(ClassLoader.java:351)
    at org.apache.spark.streaming.twitter.TwitterUtils$.createStream(TwitterUtils.scala:44)
    at WordClass.Sentimental$.main(Sentimental.scala:46)
    at WordClass.Sentimental.main(Sentimental.scala)
Build completed successfully with 2 warnings in 7 s 241 ms (increments app)
```

8. STORY

- **WHO?**

The dataset is about Joe Biden and Donald Trump related to US 2020 Elections, there are no under sampled data and over sampled data. There is no risk in disclosing information as there is no sampling issue.

- **WHAT?**

From the collected data noticeable fields like retweeted, likes, text, timestamp, location, followers count, likes, geo coordinates, friends, dislikes, display name, username etc. are queried and visualized.

- **WHEN?**

During US ELECTION 2020 the data was streamed from the twitter mostly real time data, the data collected is longitudinal data as it is only collect at this point of particular time across the world. The generalisation can be done whenever required for at different point of events by changing the hashtags while collecting the data.

- **WHERE?**

The event is taking place in US, this data is been streamed from twitter over time, This data is collected across the globe and contains GIS information of user like geo coordinates. The generalisation can be done wherever required for at different locations by changing the hashtags while collecting the data.

- **WHY?**

The data was collected to bring awareness among the people about the US elections by considering various attributes.

REFERENCES:

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<https://www.edureka.co/blog/spark-streaming/>

<https://stackoverflow.com/questions/31466435/how-to-find-source-of-scala-matcherror>

<https://github.com/PacktPublishing/Hands-On-Deep-Learning-with-Apache-Spark/issues/1>