COLLECTING TWEETS USING TWITTER STREAMING API'S

Principles of Big Data Management

(Phase 2 of Project)

Team members

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Abstract:

Phase 2 of this project deals with the following requirements:

1. Writing interesting analytical queries on twitter data that we collected.
2. Developing interesting visualizations.

Title:

Technology in different domains.

Technologies and Tools used:

1. Hadoop
2. Spark
3. Scala
4. Tableau
5. Java and MapReduce programs

Queries and Analysis:

Query-1 :

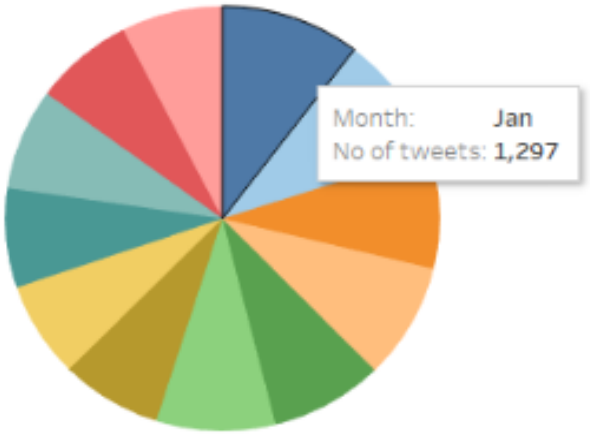
In this query, We found number of users created based on month.

Code :

```
scala> val Query1 = sqlContext.sql("SELECT substring(user.created_at,5,3) as month, count(user.id) from tweetDatatable group by month");
19/05/03 10:08:14 WARN ObjectStore: Failed to get database global_temp, returning NoSuchObjectException
Query1: org.apache.spark.sql.DataFrame = [month: string, count(user.id AS `id`): bigint]

scala> Query1.show();
+-----+----------------------+
|month|count(user.id AS `id`)|
+-----+----------------------+
|  Oct|                   968|
|  Sep|                   946|
|  Dec|                   946|
|  Aug|                   912|
|  May|                  1054|
|  Jun|                  1110|
|  Feb|                  1207|
|  Nov|                   928|
|  Mar|                  1101|
|  Jan|                  1297|
|  Apr|                  1109|
|  Jul|                   943|
+-----+----------------------+
```

Visualization :



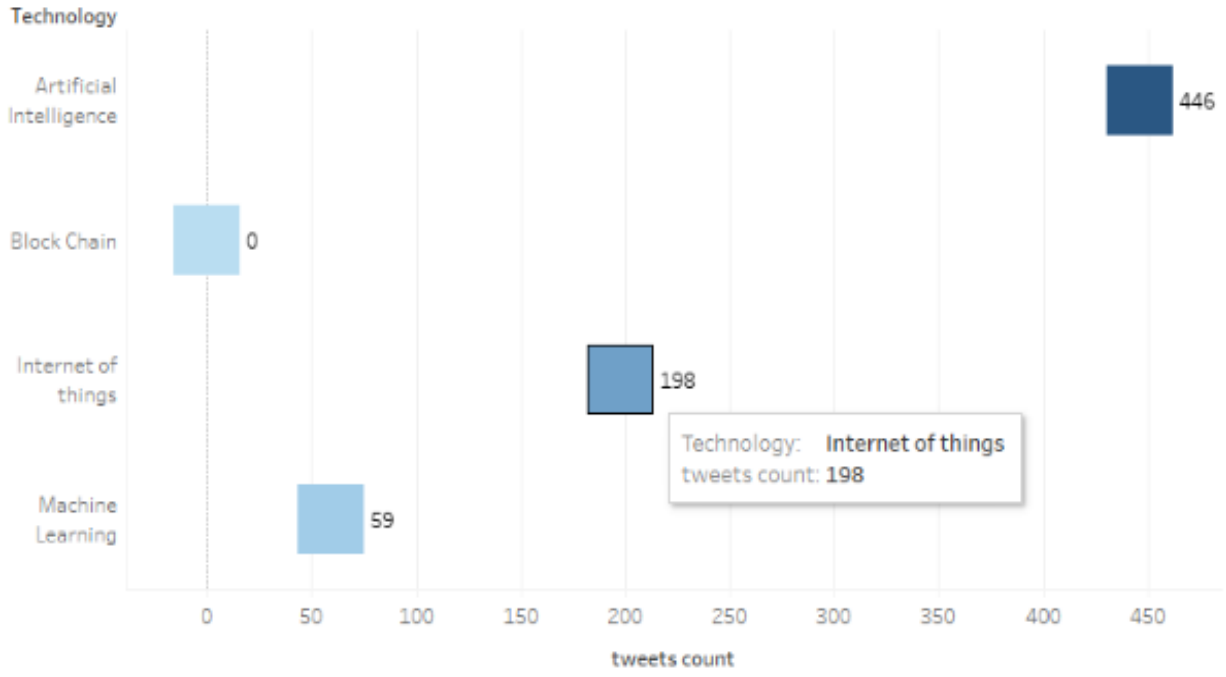
Query-2 :

In this query we found the trend in twitter for Artificial Intelligence, Internet of Things, Machine learning, Block chain etc.,

Code :

```
scala> val Query2 = sqlContext.sql("SELECT COUNT(*) AS NumberOfTweets, 'Artificial Intelligence' as Language FROM Technology where text LIKE '%Artificial Intelligence%' or text like '%AI%' UNION SELECT COUNT(*) AS Number(
Query2:Query2.show();
+-------------+--------------------+
|NumberOfTweets|            Language|
+-------------+--------------------+
|          198|  Internet of things|
|          446|Artificial Intell...|
|            0|         Block Chain|
|           59|    Machine Learning|
+-------------+--------------------+
```

Visualization :



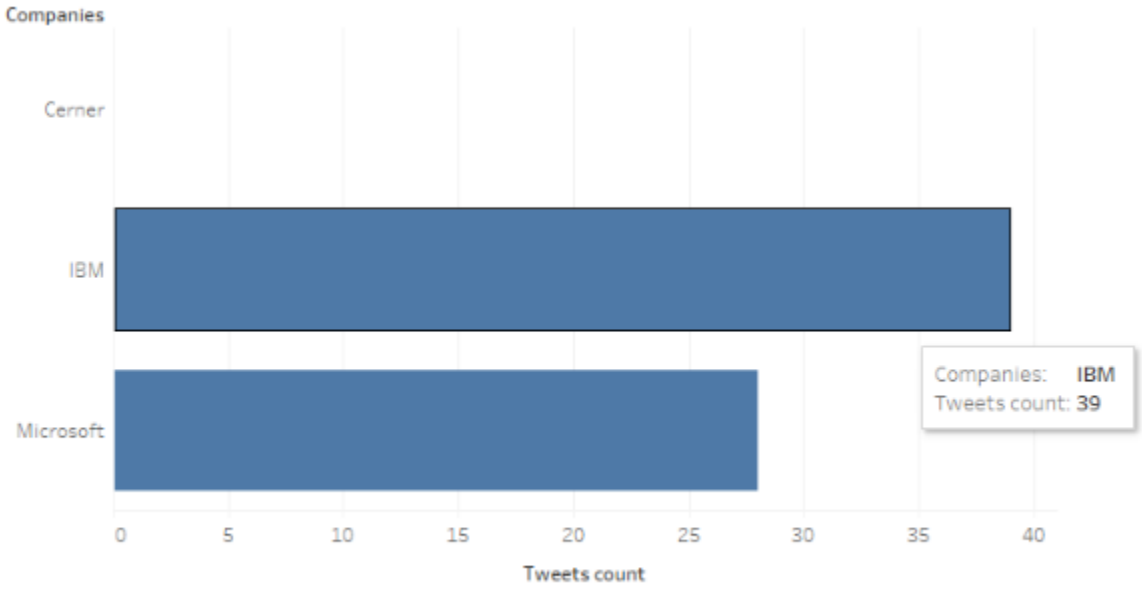
Query-3 :

In this query we found how Microsoft, Cerner and IBM associates/ employees are actively tweeting about AI.

```
scala> val Query3 = sqlContext.sql("SELECT 'Microsoft' as Company, count(*) as Count from Technology where text like '%Microsoft%' and (text like '%technology%' or text like '%tech%') UNION SELECT 'IBM' as Company, count(*)
Query3: org.apache.spark.sql.DataFrame = [Company: string, Count: bigint]

scala> Query3.show();
+---------+-----+
|  Company|Count|
+---------+-----+
|Microsoft|   28|
|   Cerner|    0|
|      IBM|   39|
+---------+-----+
```

Visualization :



Query-4 :

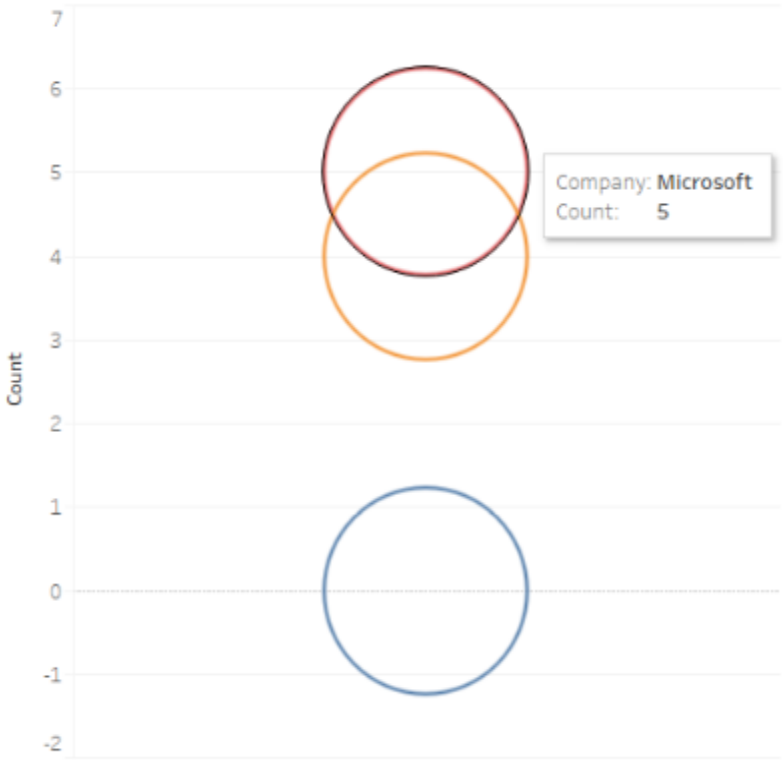
In this query we found number of tweets made by companies like Amazon, Microsoft, IBM on technologies like Artificial Intelligence, Machine Learning, Internet of Things etc.,

Code :

```
scala> val Query4 = sqlContext.sql("SELECT 'Microsoft' as Company, count(*) as Count from Technology where text like '%Microsoft%' and (text like '%AI%' or text like '%IoT%' or text like '%ML%') UNION SELECT 'IBM' as Company
Query4: org.apache.spark.sql.DataFrame = [Company: string, Count: bigint]

scala> Query4.show();
+---------+-----+
|  Company|Count|
+---------+-----+
|   Amazon|    0|
|      IBM|    4|
|Microsoft|    5|
+---------+-----+
```

Visualization :



Query-5 :

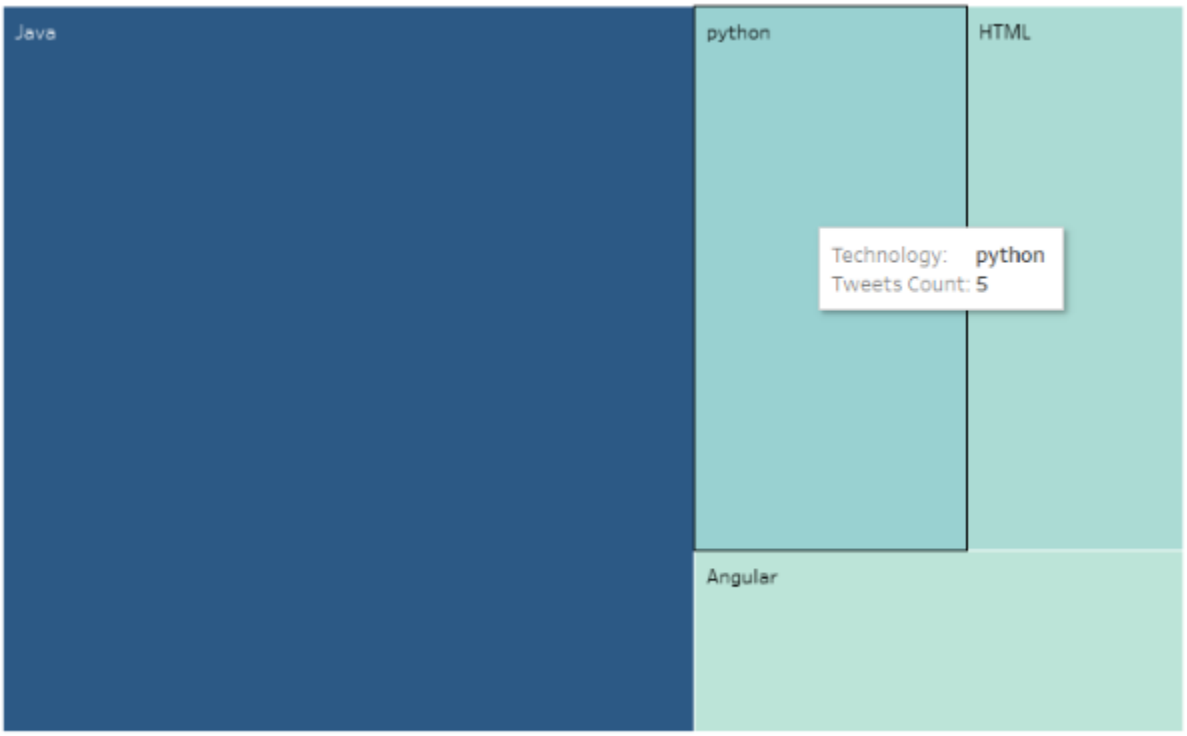
In this query we found number of tweets made on different technologies like Java, Python, HTML, Angular etc.,

Code :

```
scala> val Query5 = sqlContext.sql("SELECT COUNT(*) AS NumberOfTweets, 'HTML' as Language FROM Technology where text LIKE '%HTML%' UNION SELECT COUNT(*) AS NumberOfTweets,'Java' as Language FROM Technology where text LIKE '%
Query5: org.apache.spark.sql.DataFrame = [NumberOfTweets: bigint, Language: string]

scala> Query5.show();
+--------------+--------+
|NumberOfTweets|Language|
+--------------+--------+
|            17|    Java|
|             5|  python|
|             3| Angular|
|             4|    HTML|
+--------------+--------+
```

Visualization :



Query-6 :

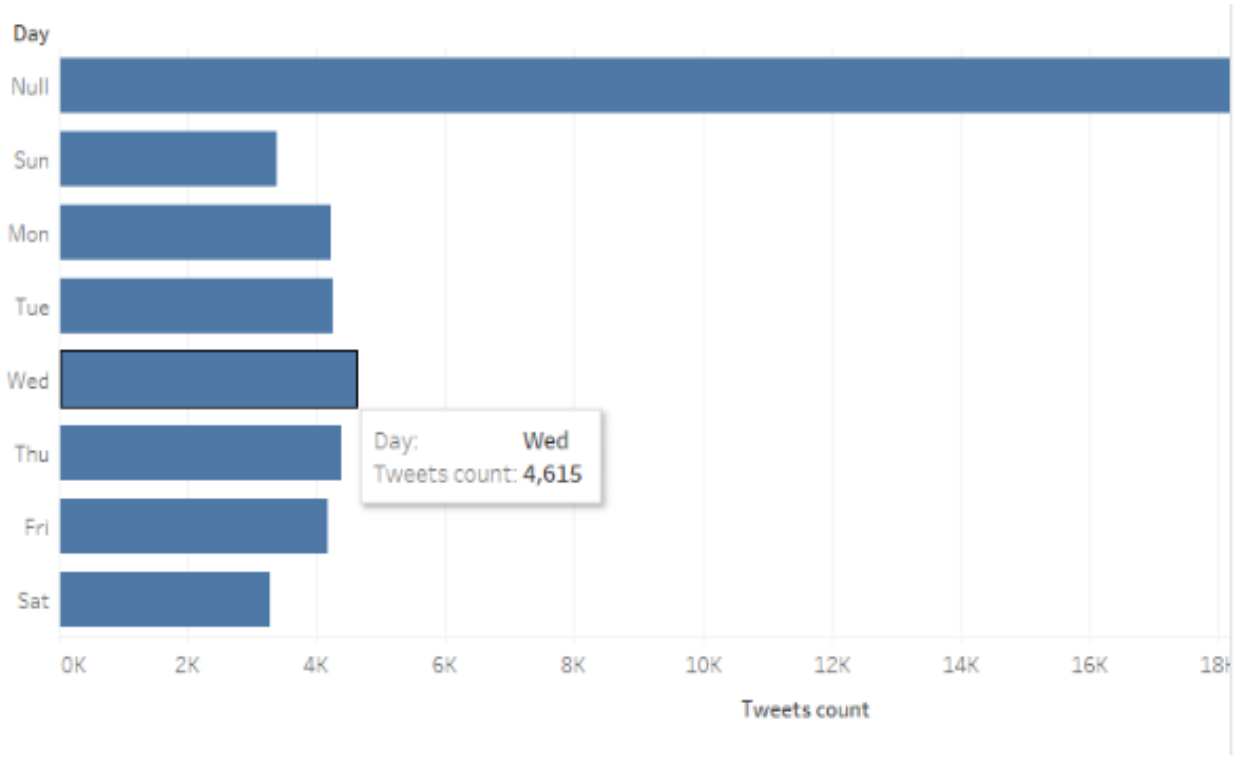
In this query we counted number of tweets made on technologies according to days.

Code :

```
scala> val Query6=sqlContext.sql("SELECT substring(user.created_at,1,3) as day,count(*) as count from technology group by day");
19/05/05 08:36:55 WARN ObjectStore: Failed to get database global_temp, returning NoSuchObjectException
Query6: org.apache.spark.sql.DataFrame = [day: string, count: bigint]

scala> Query6.show();
+----+-----+
| day|count|
+----+-----+
| Sun| 3399|
|null|22095|
| Mon| 4218|
| Thu| 4397|
| Sat| 3277|
| Wed| 4615|
| Tue| 4250|
| Fri| 4184|
+----+-----+
```

Visualization :



Query-7 :

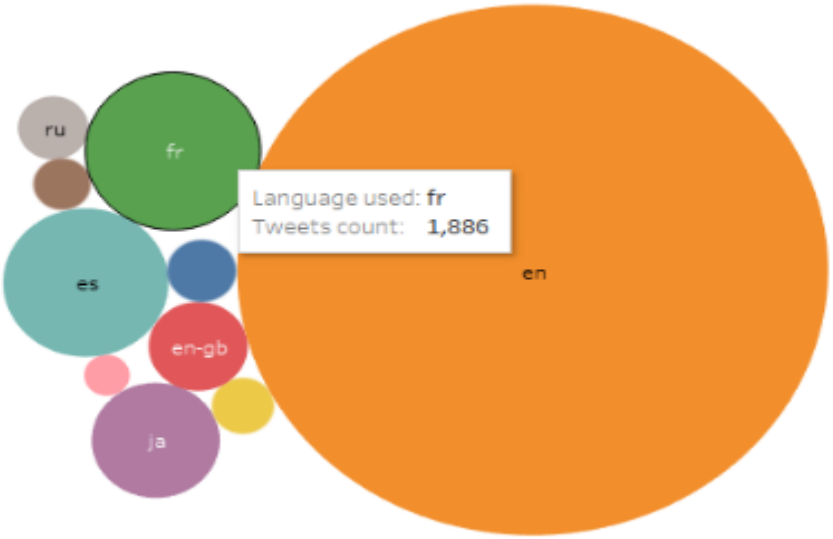
In this query, we found different languages used to tweet about technologies and their count respectively.

Code :

```
scala> val Query5 = sqlContext.sql("SELECT user.lang, count(*) AS count FROM technology WHERE lang<>'null' GROUP BY user.lang ORDER BY count DESC LIMIT 10");
Query5: org.apache.spark.sql.DataFrame = [lang: string, count: bigint]

scala> Query5.show();
+-----+-----+
| lang|count|
+-----+-----+
|   en|21412|
|   fr| 1886|
|   es| 1677|
|   ja| 1007|
|en-gb|  602|
|   ru|  307|
|   de|  295|
|   it|  239|
|   pt|  203|
|   nl|  128|
+-----+-----+
```

Visualization :



Query-8 :

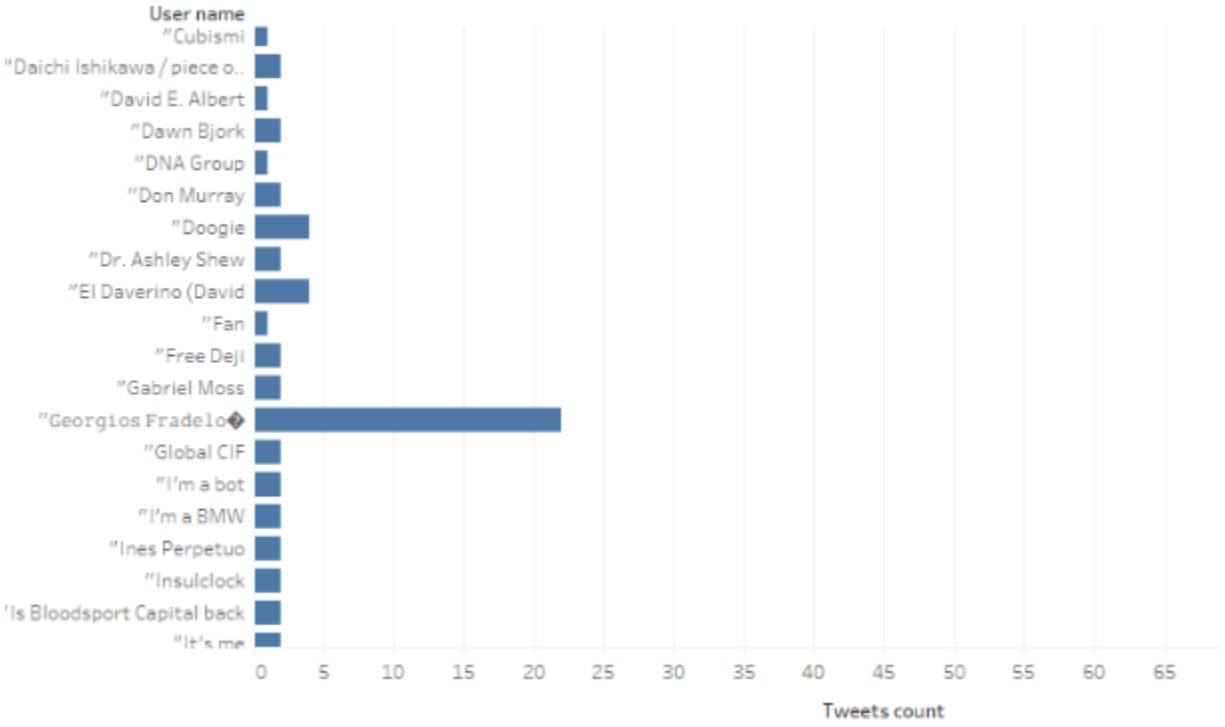
In this query, we found number of tweets made on technologies based on user names.

Code :

```
scala> val Query8 = sqlContext.sql("SELECT count(*) as count, user.name from Technology where user.name is not null group by user.name order by count desc");
Query8: org.apache.spark.sql.DataFrame = [count: bigint, name: string]

scala> Query8.show();
+-----+--------------------------------+
|count|                            name|
+-----+--------------------------------+
|  107|                         Abhishek|
|   85|                  TendenciasTech|
|   82|              SkyPree Marketing|
|   44|             Lauro Espinoza Creel|
|   40|???? ???????????|
|   32|             Money Making Arti...|
|   32|                   startupcrunch|
|   31|            global-tech-news.net|
|   28|             Institute High Tech|
|   28|             ZoeGeop Techonolo...|
|   28|                 QCS Tech Reviews|
|   28|                Podcast Listeners|
|   27|                         technyc|
|   26|                  Business News|
|   25|               The Technology?|
|   22|           ???????? ...|
|   20|                Machine Learning|
|   20|                     Eva Prokop|
|   20|                       Tech Digi|
|   20|                   GoldenHarvest|
+-----+--------------------------------+
only showing top 20 rows
```

Visualization :



Query-9 :

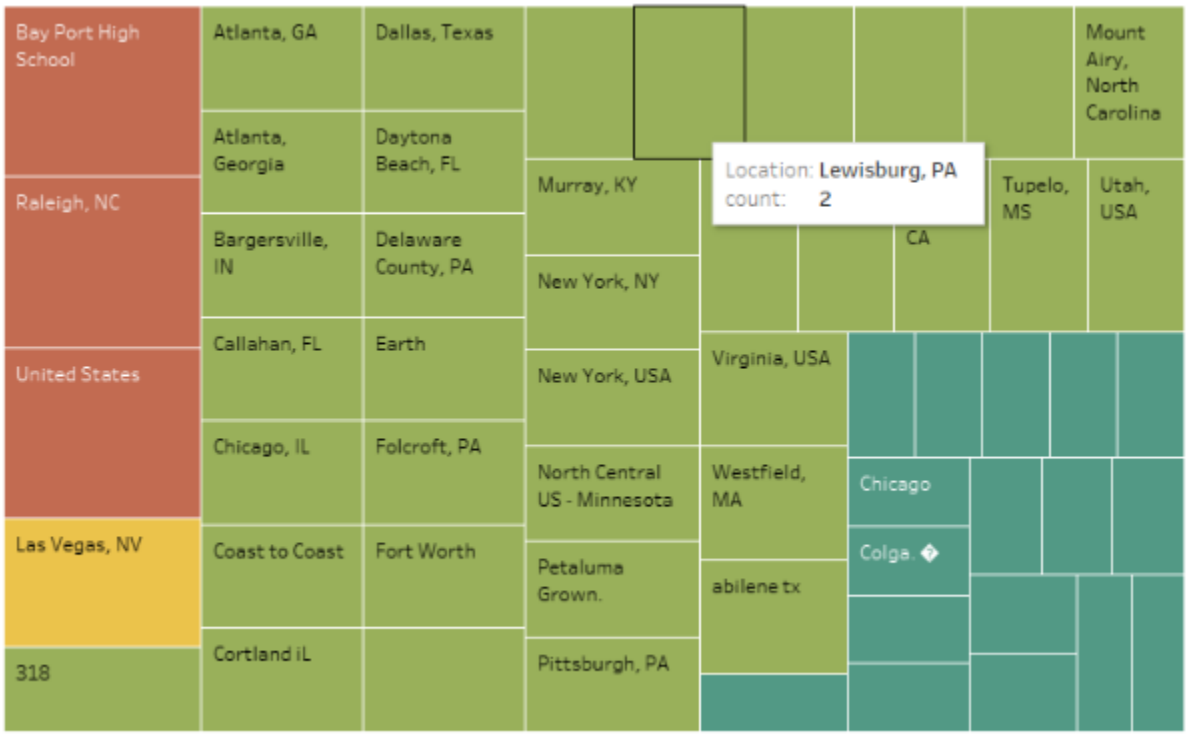
In this query, we found number of tweets made on technologies based on the location.

Code :

```
scala> val Query9=sqlContext.sql("SELECT user.location,count(text) as count FROM technology WHERE place.country='United States' AND user.location is not null GROUP BY user.location ORDER BY coun
Query9: org.apache.spark.sql.DataFrame = [location: string, count: bigint]

scala> Query9.show();
+--------------------+-----+
|            location|count|
+--------------------+-----+
|Bay Port High School|    4|
|       United States|    4|
|         Raleigh, NC|    4|
|       Las Vegas, NV|    3|
| Delaware County, PA|    2|
|Mount Airy, North...|    2|
|        Knoxville, TN|    2|
|North Central US ...|    2|
|     Atlanta, Georgia|    2|
|          Atlanta, GA|    2|
|          Cortland iL|    2|
|    Rancho Mirage, CA|    2|
|               Earth|    2|
|        Callahan, FL|    2|
|           Queens,NY|    2|
|       HARRISONBURG,|    2|
|      Louisiana, USA|    2|
|           Utah, USA|    2|
|    Bargersville, IN|    2|
|       Westfield, MA|    2|
+--------------------+-----+
only showing top 20 rows
```

Visualization :



Query-10 :

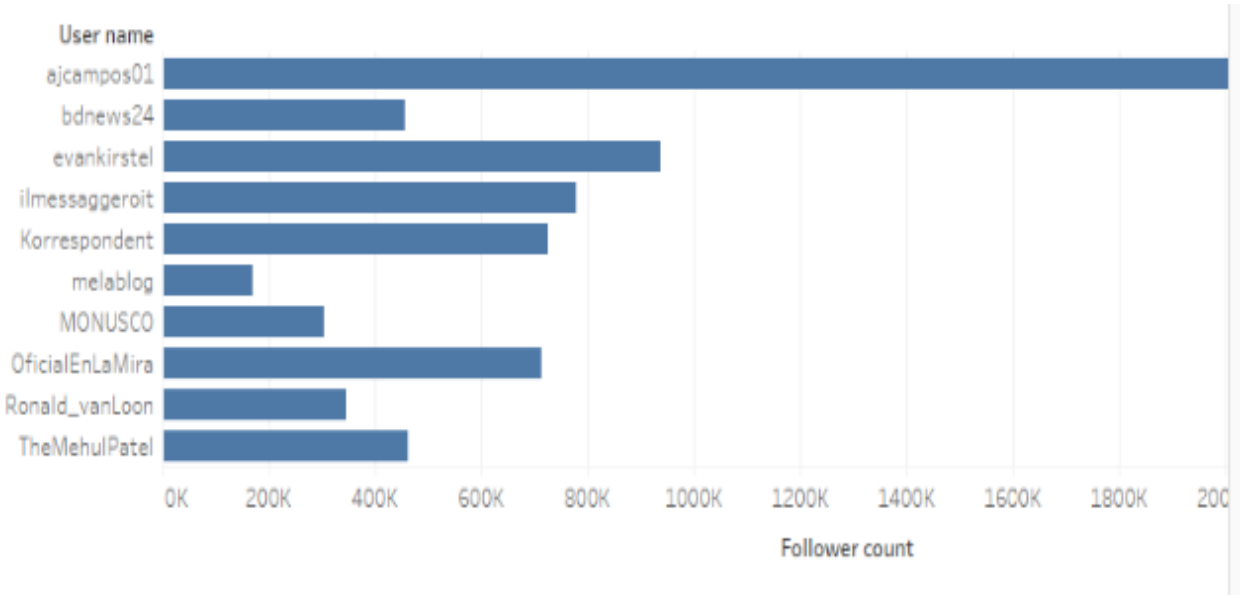
In this query, we found followers count for the non-verified accounts.

Code :

```
scala> val Query10 = sqlContext.sql("SELECT user.screen_name,user.followers_count FROM Technology WHERE user.verified = false ORDER BY user.followers_count DESC LIMIT 2
Query10: org.apache.spark.sql.DataFrame = [screen_name: string, followers_count: bigint]

scala> Query10.show();
+---------------+---------------+
|    screen_name|followers_count|
+---------------+---------------+
|      ajcampos01|        1227793|
|      ajcampos01|        1227793|
|  ilmessaggeroit|         389138|
|  ilmessaggeroit|         389138|
|   Korrespondent|         363049|
|   Korrespondent|         363049|
|OficialEnLaMira |         357310|
|OficialEnLaMira |         357310|
|         MONUSCO|         303123|
|     evankirstel|         234363|
|     evankirstel|         234362|
|     evankirstel|         234362|
|     evankirstel|         234360|
|   TheMehulPatel|         231373|
|   TheMehulPatel|         231373|
|        bdnews24|         227957|
|        bdnews24|         227957|
|  Ronald_vanLoon|         172560|
|  Ronald_vanLoon|         172560|
|         melablog|         171501|
+---------------+---------------+
```

Visualization :



Query-11 :

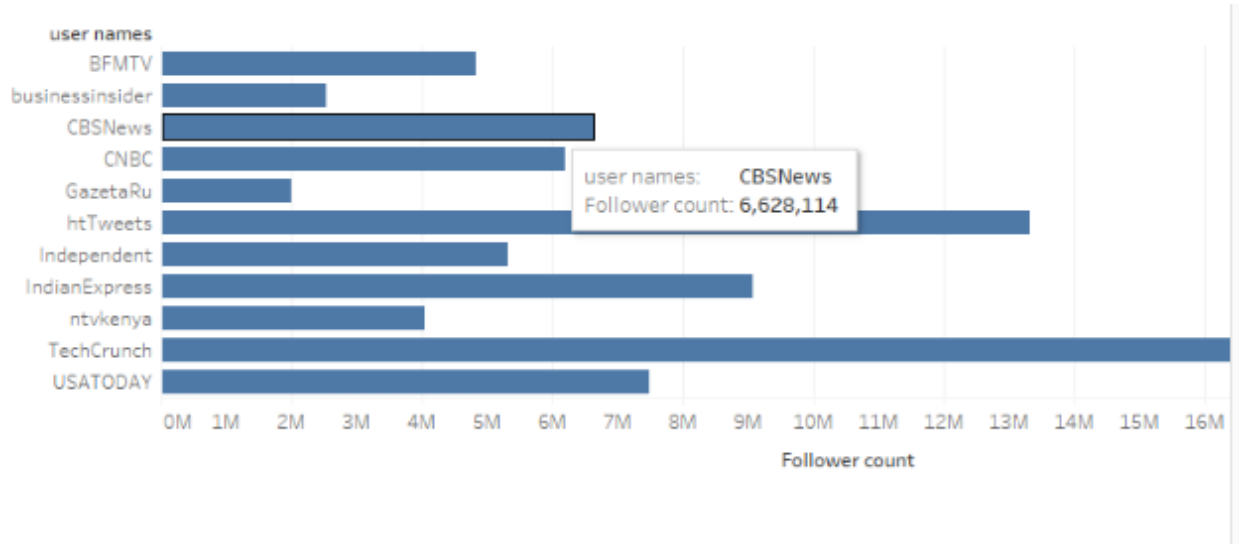
In this query, we found the followers count for verified accounts.

Code :

```
scala> val Query10 = sqlContext.sql("SELECT user.screen_name,user.followers_count FROM Technology WHERE user.verified = true ORDER BY user.followers_count DESC LIMIT 20
Query10: org.apache.spark.sql.DataFrame = [screen_name: string, followers_count: bigint]

scala> Query10.show();
+---------------+---------------+
|    screen_name|followers_count|
+---------------+---------------+
|      TechCrunch|       10031055|
|      TechCrunch|       10031055|
|        htTweets|        6654072|
|        htTweets|        6654072|
|         CBSNews|        6628114|
|        USATODAY|        3741062|
|        USATODAY|        3741062|
|           CNBC|        3093696|
|           CNBC|        3093696|
|  IndianExpress|        3027055|
|  IndianExpress|        3026993|
|  IndianExpress|        3026993|
|    Independent|        2660160|
|    Independent|        2660142|
|businessinsider|        2547083|
|          BFMTV|        2415473|
|          BFMTV|        2415465|
|       ntvkenya|        2027313|
|       ntvkenya|        2027313|
|       GazetaRu|        1995501|
+---------------+---------------+
```

Visualization :



Query-12 :

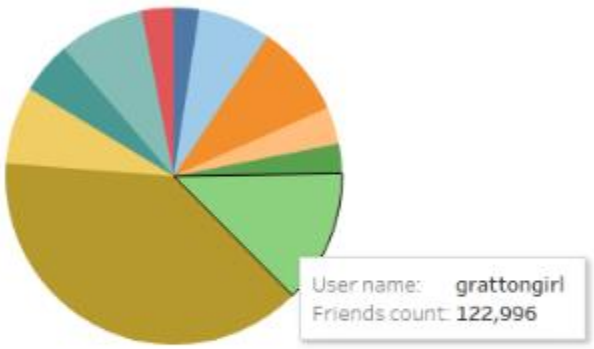
In this query, we found the friends count for verified account

Code :

```
scala> val Query10 = sqlContext.sql("SELECT user.screen_name,user.friends_count FROM Technology WHERE user.verified = true ORDER BY user.friends_count DESC LIMIT 20");
19/05/06 08:12:50 WARN ObjectStore: Failed to get database global_temp, returning NoSuchObjectException
Query10: org.apache.spark.sql.DataFrame = [screen_name: string, friends_count: bigint]

scala> Query10.show();
+-------------+-------------+
|  screen_name|friends_count|
+-------------+-------------+
|  HerbertRSim|       185836|
|  HerbertRSim|       185836|
|  grattongirl|        41002|
|  grattongirl|        40997|
|  grattongirl|        40997|
|nikkeibpITpro|        39535|
|nikkeibpITpro|        39535|
|Kevin_Jackson|        35872|
|Kevin_Jackson|        35872|
|    frenchweb|        34061|
|    DavidPapp|        33418|
|    DavidPapp|        33418|
|       ZAGrrl|        29795|
|derStandardat|        28705|
|derStandardat|        28705|
|derStandardat|        28705|
|  grattonboy|        27341|
|    Lenovodc|        24062|
|    Lenovodc|        24062|
|    cfarivar|        23557|
+-------------+-------------+
```

Visualization :



Query-13 :

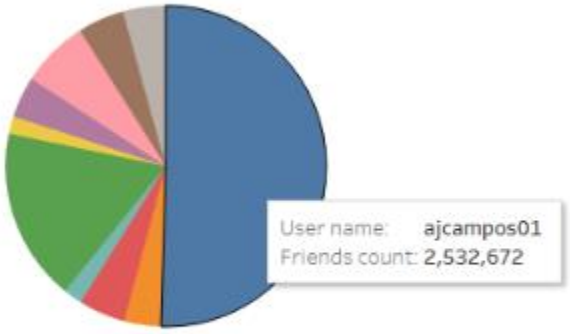
In this query, we found the friends count for the non-verified accounts.

Code :

```
scala> val Query10 = sqlContext.sql("SELECT user.screen_name,user.friends_count FROM Technology WHERE user.verified = false ORDER BY user.friends_count DESC LIMIT 20");
Query10: org.apache.spark.sql.DataFrame = [screen_name: string, friends_count: bigint]

scala> Query10.show();
+--------------+-------------+
|   screen_name|friends_count|
+--------------+-------------+
|     ajcampos01|      1266336|
|     ajcampos01|      1266336|
|    evankirstel|       218615|
|    evankirstel|       218615|
|    evankirstel|       218613|
|    evankirstel|       218613|
|Ronald_vanLoon|       171635|
|Ronald_vanLoon|       171635|
|      BSkylstad|       118228|
|      BSkylstad|       118228|
|stojkovic_alex|       117484|
|stojkovic_alex|       117484|
| The_News_DIVA|       108282|
| The_News_DIVA|       108282|
|    ipfconline1|       103759|
|    ipfconline1|       103759|
|       chrisifg|        96121|
|       bdnews24|        93101|
|       bdnews24|        93101|
| GotStockTips|        88750|
+--------------+-------------+
```

Visualization :



Query-14 :

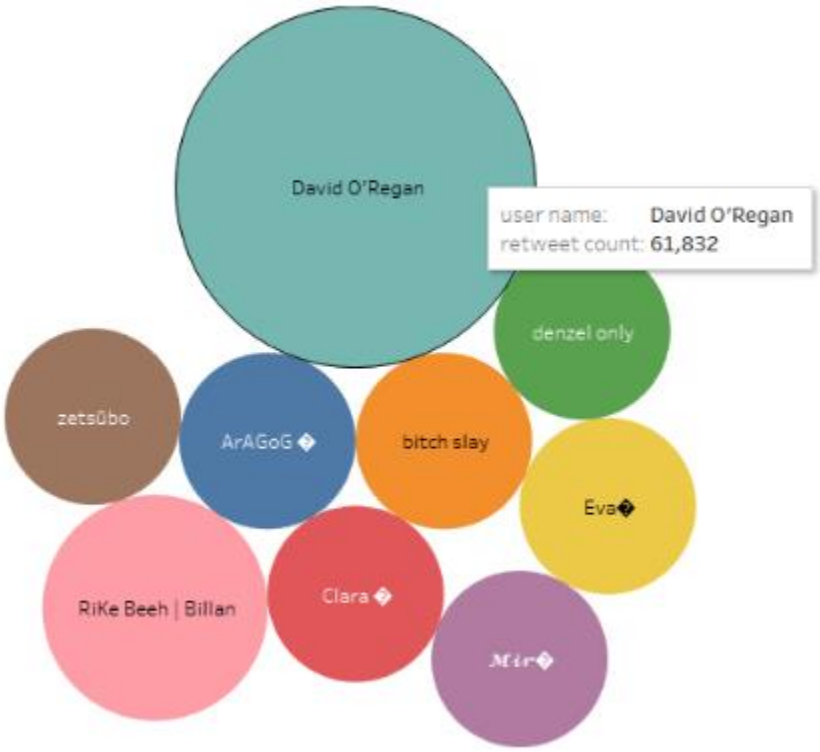
In this query, we the found number of retweets on a particular tweet for a technology based on user.

Code :

```
scala> val Query10 = sqlContext.sql("SELECT user.name ,retweeted_status.retweet_count AS Retweet_Count FROM technology WHERE retweeted_status.retweet_count IS NOT NULL
Query10: org.apache.spark.sql.DataFrame = [name: string, Retweet_Count: bigint]

scala> Query10.show();
+------------------+-------------+
|              name|Retweet_Count|
+------------------+-------------+
|      David O'Regan|        30916|
|      David O'Regan|        30916|
|Rike Beeh | Billan|        24216|
|              Eva?|        14820|
|          ArAGoG ?|        14818|
|            zets?bo|        14817|
|         bitch slay|        14816|
|           Clara ?|        14815|
|        denzel only|        14814|
|              ????|        14813|
+------------------+-------------+
```

Visualization :



Query-15:

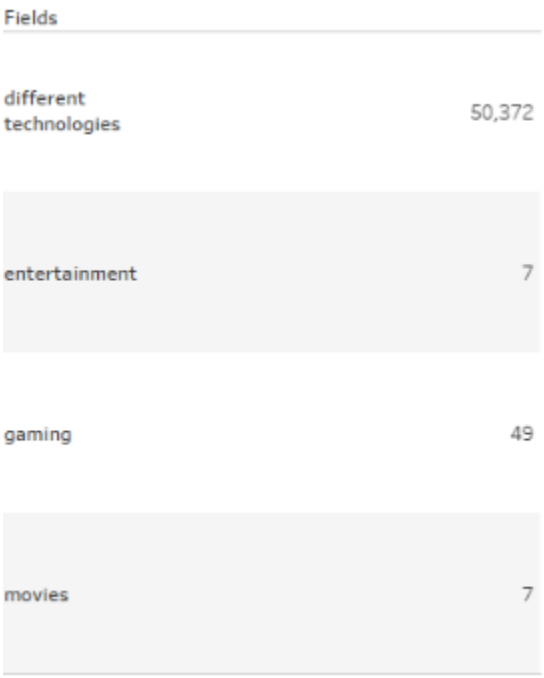
In this query, we found technologies in different fields like gaming, entertainment, movies ets.,

Code :

```
scala> val Query9=sqlContext.sql("select count(*) as count,q.text from (select case when text like '%gaming%' then 'gaming' when text like '%entertainment%' then 'enter
Query9: org.apache.spark.sql.DataFrame = [count: bigint, text: string]

scala> Query9.show();
+-----+--------------------+
|count|                text|
+-----+--------------------+
|    7|              movies|
|    7|       entertainment|
|50372|different technol...|
|   49|              gaming|
+-----+--------------------+
```

Visualization :



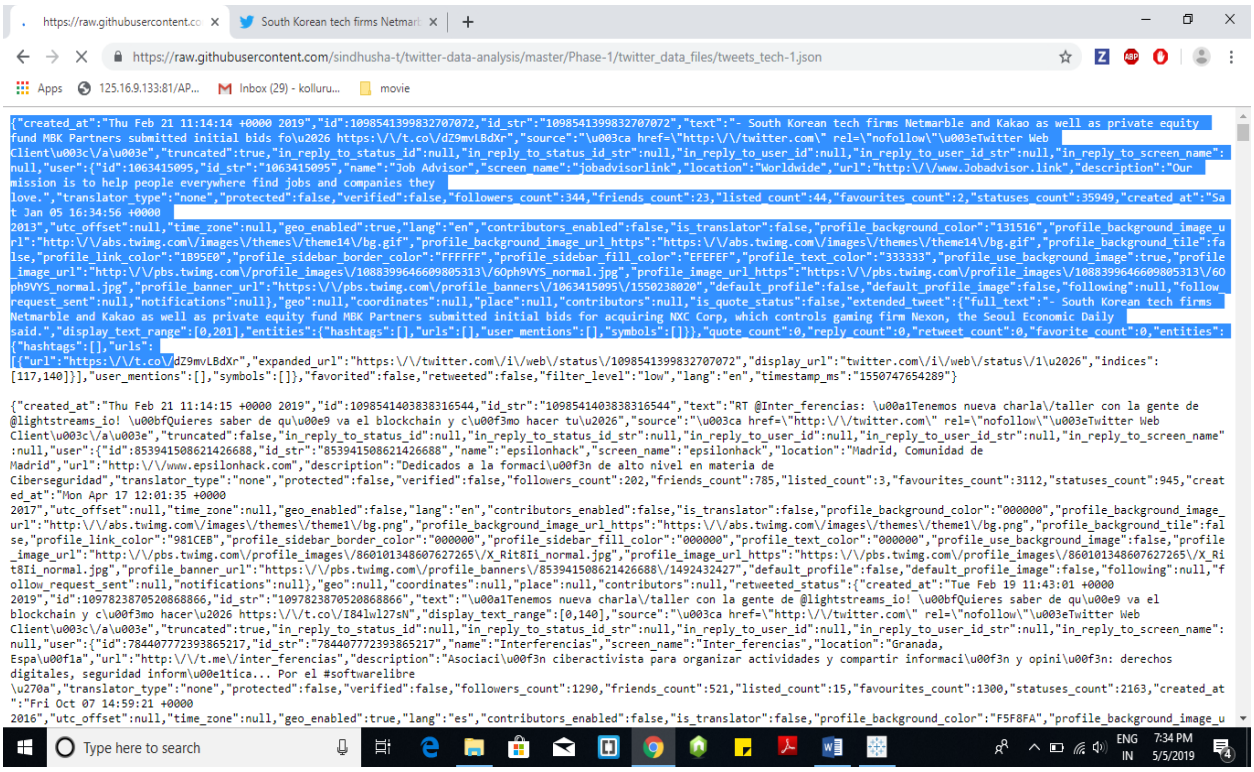
Fields	
different technologies	50,372
entertainment	7
gaming	49
movies	7

Testing

Manual testing :

We tried to test the results manually by taking the text from the collected tweets and finding the tweets using twitter search engine.

For instance consider the text "*South Korean tech firms Netmarble and Kakao as well as private equity fund MBK Partners submitted initial bids*" which is taken from the collected tweets and searched it manually in twitter to find the tweet.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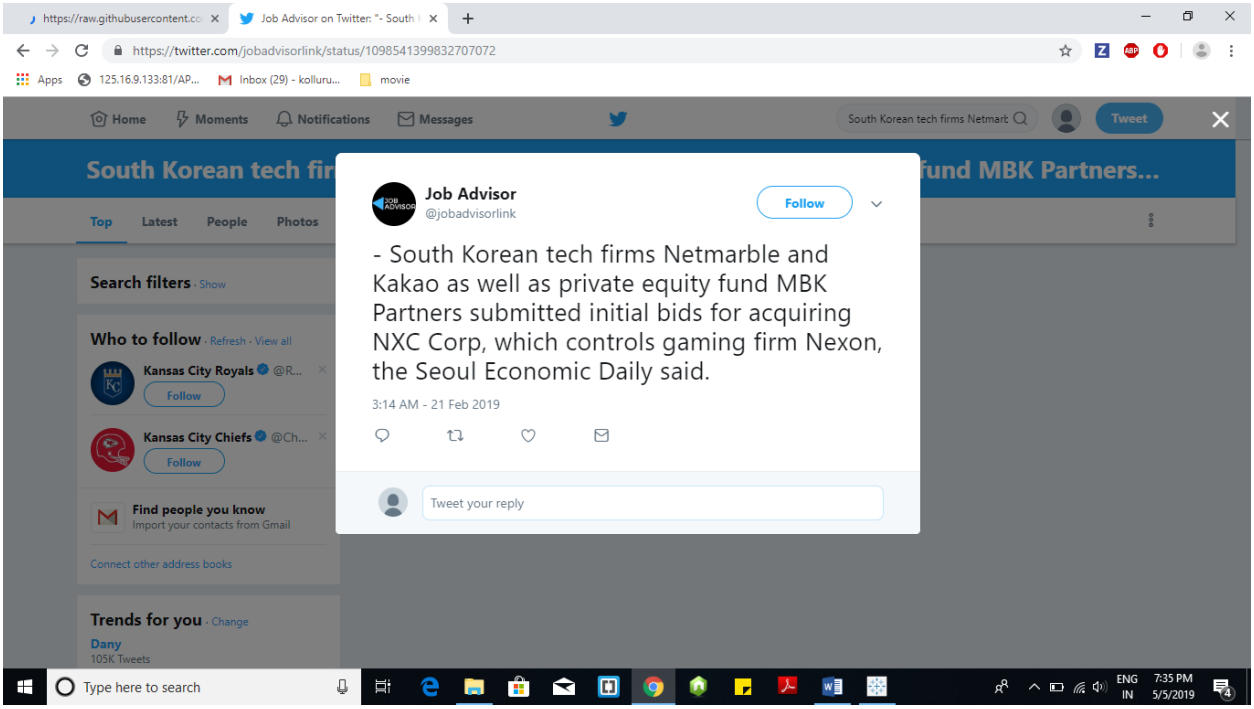
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