Twitter Sentiment Analysis in Hive
(Big Data Analytics)

Submitted by

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Dice Analytic

ACKNOWLEDGEMENT

First and foremost, I would like to express our gratitude to Almighty Allah for granting me the strength and conviction to advance our project to its current level of accomplishment. Secondly, this dissertation/monograph would not have materialized without the guidance of our instructor, Moeed Tariq. He has been remarkably supportive, and his feedback has significantly enhanced our work. His direct and active involvement in supervising our project is exemplary. His continuous support, endless provision, and consistent inspiration have become our driving force throughout this project.

I also extend our thanks to him for directing us to other individuals involved in the creation of this project. I am deeply appreciative of all those from whom I have gained substantial knowledge:

Our co-instructor, Muhammad Fayyaz, deserves special gratitude for illuminating the right path, providing encouragement during stressful times, having faith in me when confidence was lacking, and dedicating precious time to explain ideas and various aspects of the project. He has offered valuable suggestions, engaged in

Introduction

Introduction:

The field of Twitter Sentiment Analysis has gained significant prominence in recent years, offering a powerful means to comprehend public opinion and reactions on a global scale. This project delves into the abstraction of Twitter Sentiment Analysis, employing Apache Hive for data processing and analysis, and Power BI for visualization.

Objective:

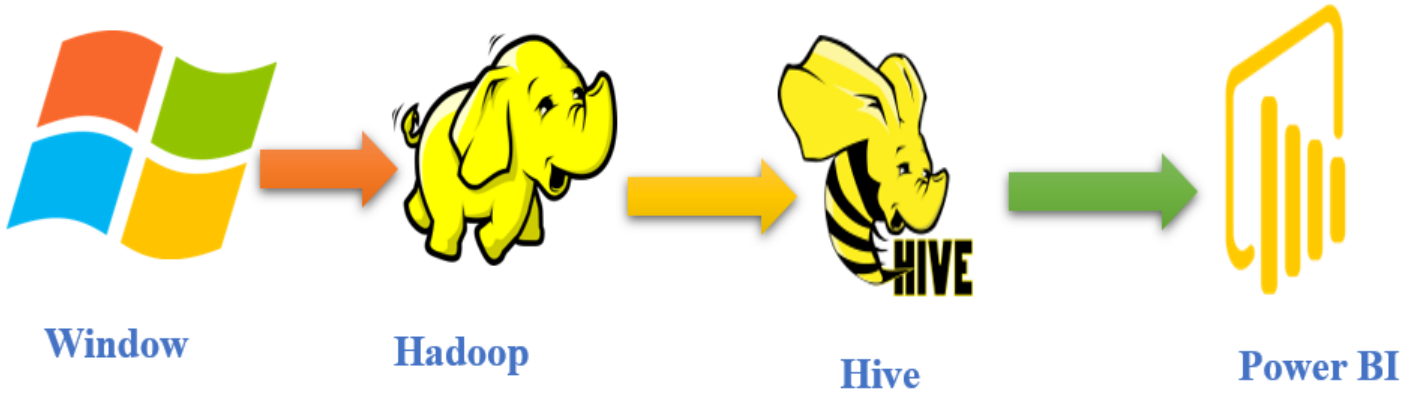
The primary goal of this project is to develop an efficient and scalable solution for Twitter Sentiment Analysis. By utilizing Hive, a data warehousing and SQL-like query language system for Hadoop, in conjunction with Power BI, a robust visualization tool, we aim to provide a comprehensive understanding of sentiments expressed in tweets.

Conclusion:

In summary, this project seeks to offer a robust and scalable solution for Twitter Sentiment Analysis, leveraging the combined capabilities of Apache Hive and Power BI to provide a nuanced understanding of sentiments expressed on the dynamic platform of Twitter.

Work Flow

The workflow ensures a systematic approach to Twitter Sentiment Analysis, integrating the capabilities of Hive for data processing and Power BI for intuitive visualization. It enables users to gain valuable insights from the dynamic landscape of sentiments expressed on Twitter.

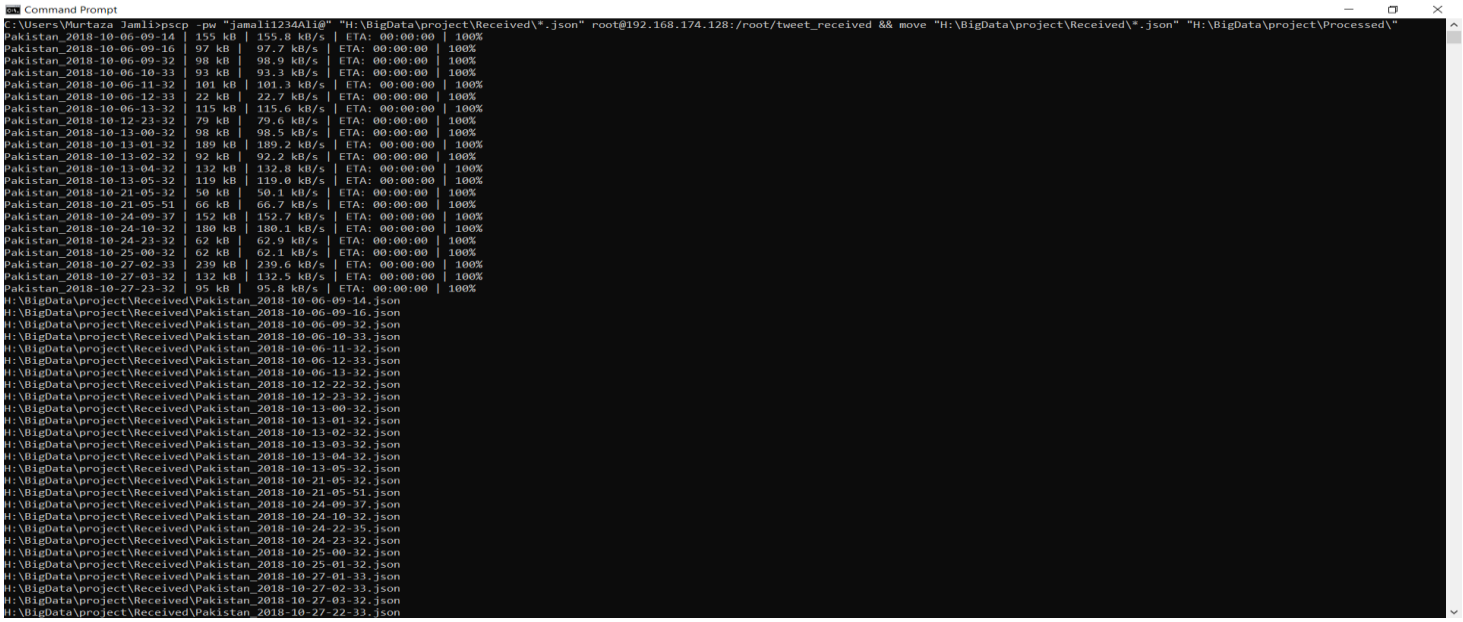


Copy files window to NDFS and Move Files Window Processed folder for backup purpose

This code snippet appears to be a command using the `pscp` utility for secure file transfer. It copies all JSON files from the local directory "H:\BigData\project\Received\" to a remote server with the IP address 192.168.174.128. The destination path on the server is "/root/tsweet_received". Additionally, after the files are successfully transferred, the code uses the ‘move’ command to relocate the same set of JSON files from the local "Received" directory to the "Processed" directory under the same project path. The password for authentication is provided as "jamali1234Ali@" with the `-pw` option in the ‘pscp’ command.

Code:

pscp -pw "jamali1234Ali@" "H:\BigData\project\Received*. json" root@192.168.174.128:/root/tweet_received && move "H:\BigData\project\Received*.json" "H:\BigData\project\Processed\"



```
Command Prompt
C:\Users\Murtaza Jamli>pscp -pw "jamali1234Ali@" "H:\BigData\project\Received\*.json" root@192.168.174.128:/root/tweet_received && move "H:\BigData\project\Received\*.json" "H:\BigData\project\Processed\"
Pakistan_2018-10-06-09-14 | 155 kB | 155.8 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-06-09-16 | 97 kB |  97.7 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-06-09-32 | 98 kB |  98.9 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-06-10-33 | 93 kB |  93.3 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-06-11-32 | 101 kB | 101.3 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-06-12-33 | 22 kB |  22.7 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-06-13-32 | 115 kB | 115.6 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-12-23-32 | 79 kB |  79.6 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-13-00-32 | 98 kB |  98.5 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-13-01-32 | 189 kB | 189.2 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-13-02-32 | 92 kB |  92.2 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-13-04-32 | 132 kB | 132.8 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-13-05-32 | 119 kB | 119.0 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-21-05-32 | 50 kB |  50.1 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-21-05-51 | 66 kB |  66.7 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-24-09-37 | 152 kB | 152.7 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-24-10-32 | 180 kB | 180.1 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-24-23-32 | 62 kB |  62.9 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-25-00-32 | 62 kB |  62.1 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-27-02-33 | 239 kB | 239.6 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-27-03-32 | 132 kB | 132.5 kB/s | ETA: 00:00:00 | 100%
Pakistan_2018-10-27-23-32 | 95 kB |  95.8 kB/s | ETA: 00:00:00 | 100%
H:\BigData\project\Received\Pakistan_2018-10-06-09-14.json
H:\BigData\project\Received\Pakistan_2018-10-06-09-16.json
H:\BigData\project\Received\Pakistan_2018-10-06-09-32.json
H:\BigData\project\Received\Pakistan_2018-10-06-10-33.json
H:\BigData\project\Received\Pakistan_2018-10-06-11-32.json
H:\BigData\project\Received\Pakistan_2018-10-06-12-33.json
H:\BigData\project\Received\Pakistan_2018-10-06-13-32.json
H:\BigData\project\Received\Pakistan_2018-10-12-22-32.json
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H:\BigData\project\Received\Pakistan_2018-10-13-00-32.json
H:\BigData\project\Received\Pakistan_2018-10-13-01-32.json
H:\BigData\project\Received\Pakistan_2018-10-13-02-32.json
H:\BigData\project\Received\Pakistan_2018-10-13-03-32.json
H:\BigData\project\Received\Pakistan_2018-10-13-04-32.json
H:\BigData\project\Received\Pakistan_2018-10-13-05-32.json
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H:\BigData\project\Received\Pakistan_2018-10-24-23-32.json
H:\BigData\project\Received\Pakistan_2018-10-25-00-32.json
H:\BigData\project\Received\Pakistan_2018-10-25-01-32.json
H:\BigData\project\Received\Pakistan_2018-10-27-01-33.json
H:\BigData\project\Received\Pakistan_2018-10-27-02-33.json
H:\BigData\project\Received\Pakistan_2018-10-27-03-32.json
H:\BigData\project\Received\Pakistan_2018-10-27-22-33.json
```
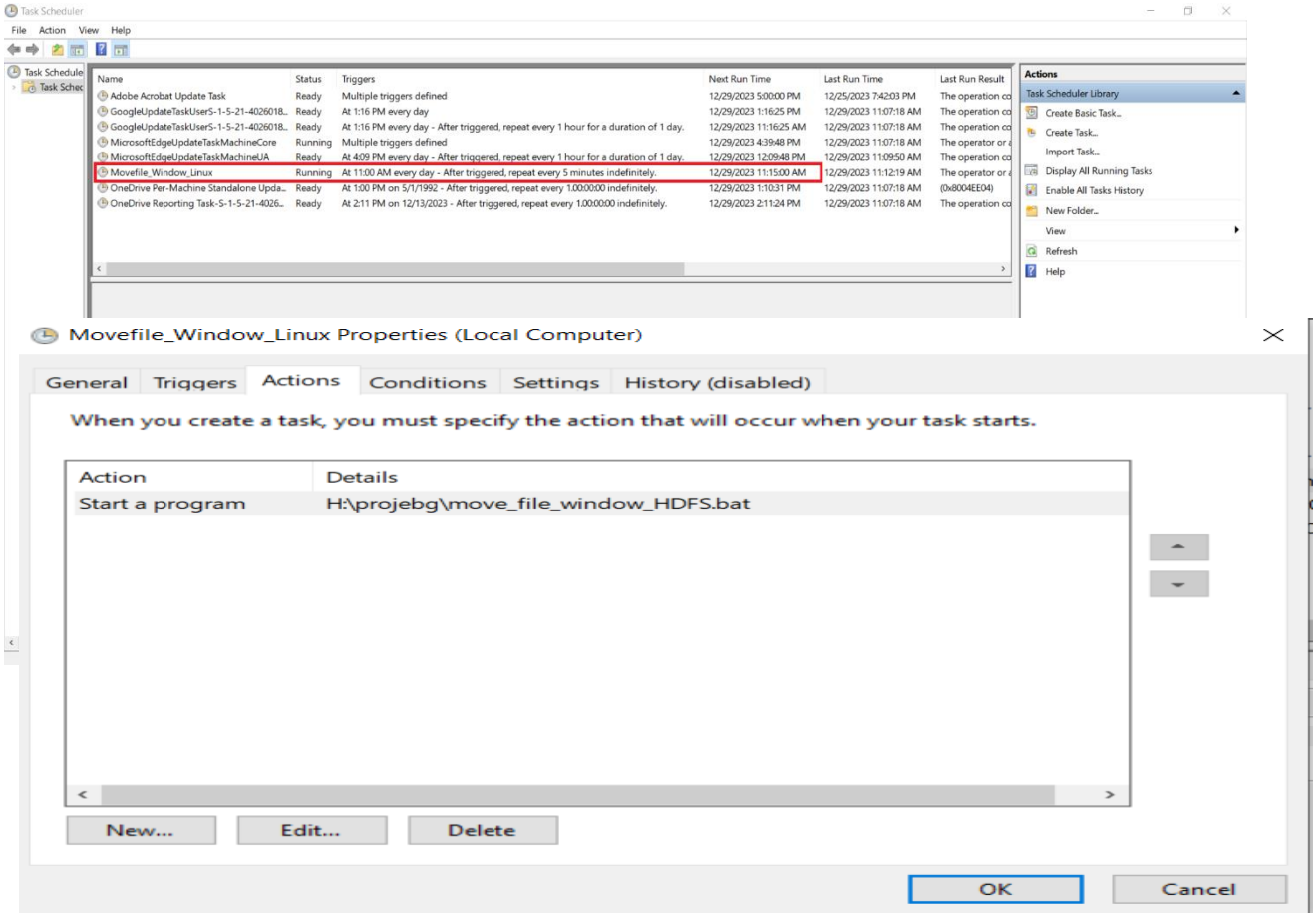

Automation window to NDFS

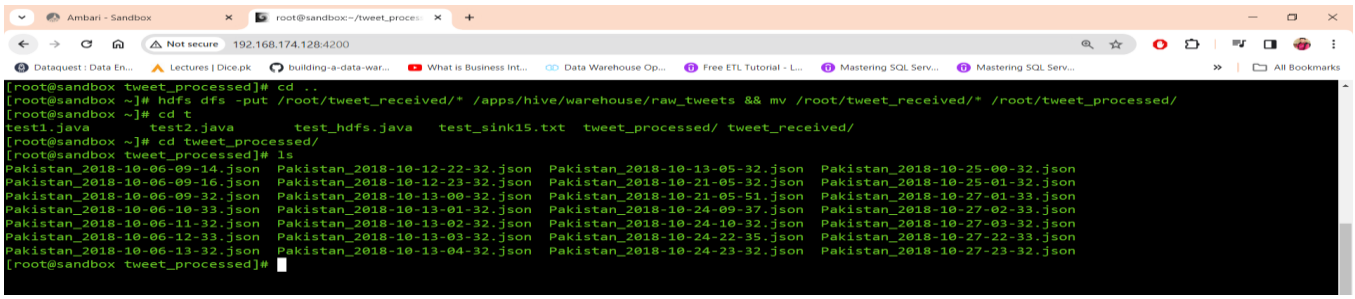


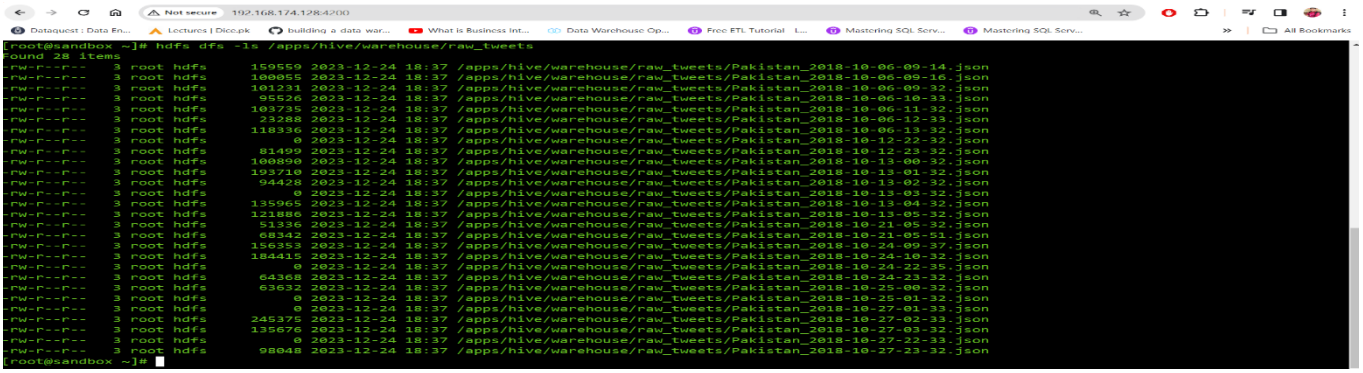
Copy files NDFS to HDFS and Move Files NDFS tweet_processed folder for backup purpose

This sequence suggests a workflow where raw tweet data is initially uploaded to an HDFS location, likely for processing or storage, and then the local copies are moved to a different directory for further processing or archiving.

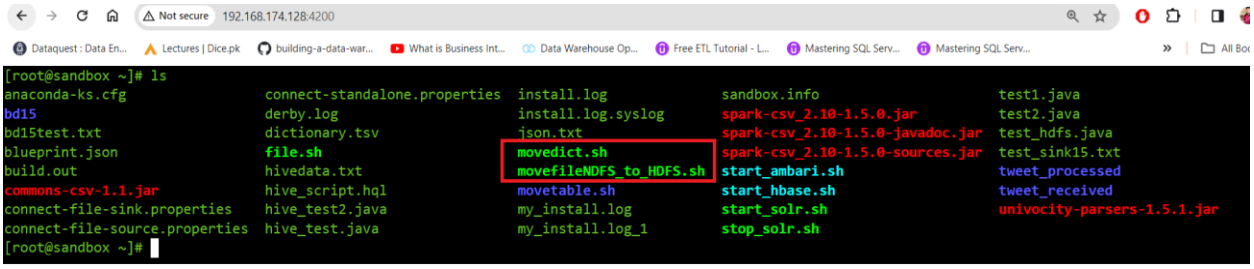
Code:

hdfs dfs -put /root/tsweet_received/* /apps/hive/warehouse/raw_tweets && mv /root/tweet_received/* /root/tweet_processed/





Automation NDFS to HDFS



```
[root@sandbox ~]# crontab -l

#copy disctionary file root to hdfs
48 18 * * * /root/movedict.sh

# move files NDFS to HDFS
50 18 * * * /root/movefileNDFS_to_HDFS.sh
[root@sandbox ~]#
```

```
Not secure 192.168.174.128:4200
Dataquest : Data En...  Lectures | Dice.pk  building-a-data-war...  What is Business Int...  Data Warehouse Op...  Free ETL Tutorial - L...  Mastering SQL Serv...  Mastering SQL Serv...

#!/bin/bash


# Move files to HDFS

hdfs dfs -put /root/tweet_received/* /apps/hive/warehouse/raw_tweets


# Move files locally

mv /root/tweet_received/* /root/tweet_processed/
~
~
~
~
~
~
~
~
~
~
~
~
"movefileNDFS_to_HDFS.sh" 13L, 180C
```

Step:1 Transfer Dictionary window to NDFS:

pscp -pw "jamali1234Ali@" "H:\projebg/dictionary.tsv" root@192.168.174.128:/root/

Step:2 NDFS to HDFS

hdfs dfs -put /root/dictionary.tsv /tmp/dictionary/

Automation Dictionary move

Not secure 192.168.174.128:4200

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```
[root@sandbox ~]#
[root@sandbox ~]#
[root@sandbox ~]# cat movedict.sh
#!/bin/bash

# This script copies a file to HDFS using hdfs dfs -put

# Path to the local file
local_file="/root/dictionary.tsv"

# HDFS destination path
hdfs_destination="/tmp/dictionary/"

# Execute hdfs dfs -put command
hdfs dfs -put "$local_file" "$hdfs_destination"
[root@sandbox ~]#
```

Cron Job Dictionary

```
[root@sandbox ~]# crontab -l

#copy disctionary file root to hdfs
48 18 * * * /root/movedict.sh

# move files NDFS to HDFS
50 18 * * * /root/movefileNDFS_to_HDFS.sh
[root@sandbox ~]#
```

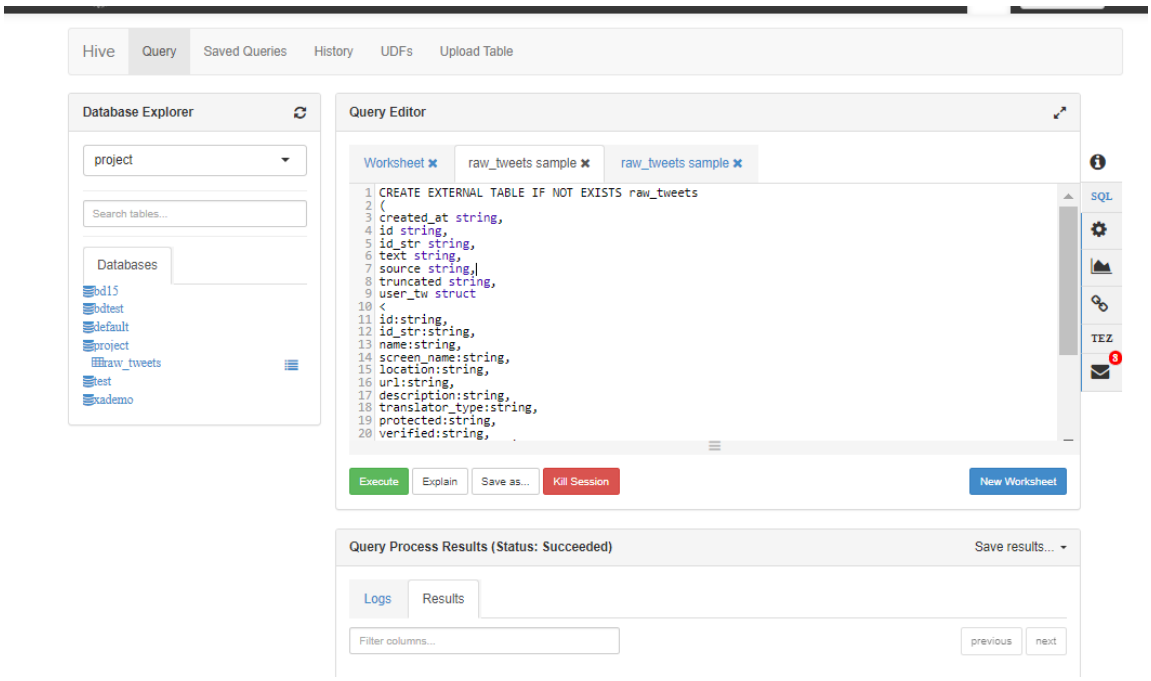
Create Table and Load Raw Tweets

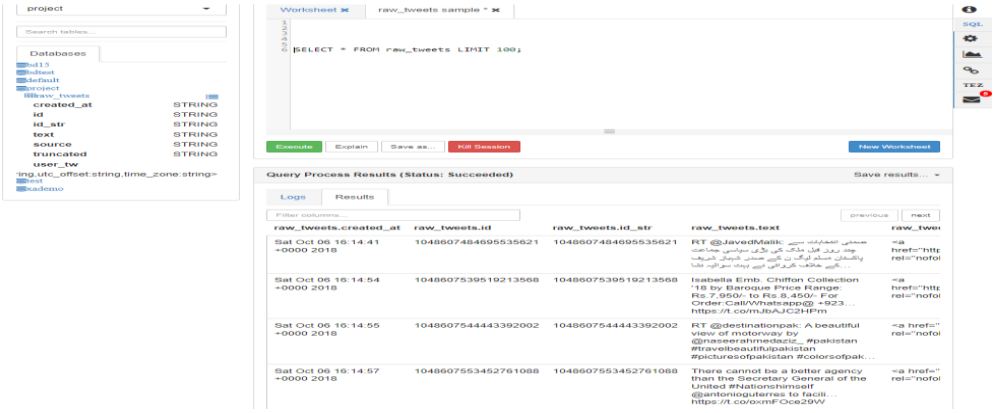
Now we can create the hive table to load tweets in it. In the query below I have only selected some columns from the .json file to show that we can just load the columns we require later in the process. Use the query or modify it to create the table where tweets will be loaded.

Query:

```
CREATE EXTERNAL TABLE IF NOT EXISTS raw_tweets
(
created_at string,
id string,
id_str string,
text string,
source string,
truncated string,
user_tw struct
<
id:string,
id_str:string,
name:string,
screen_name:string,
location:string,
url:string,
description:string,
translator_type:string,
protected:string,
verified:string,
followers_count:string,
friends_count:string,
listed_count:string,
favourites_count:string,
```

```
created_at:string,
utc_offset:string,
time_zone:string
>
)
ROW FORMAT SERDE 'org.apache.hive.hcatalog.data.JsonSerDe'
STORED AS TEXTFILE
LOCATION '/apps/hive/warehouse/raw_tweets/' ;
```

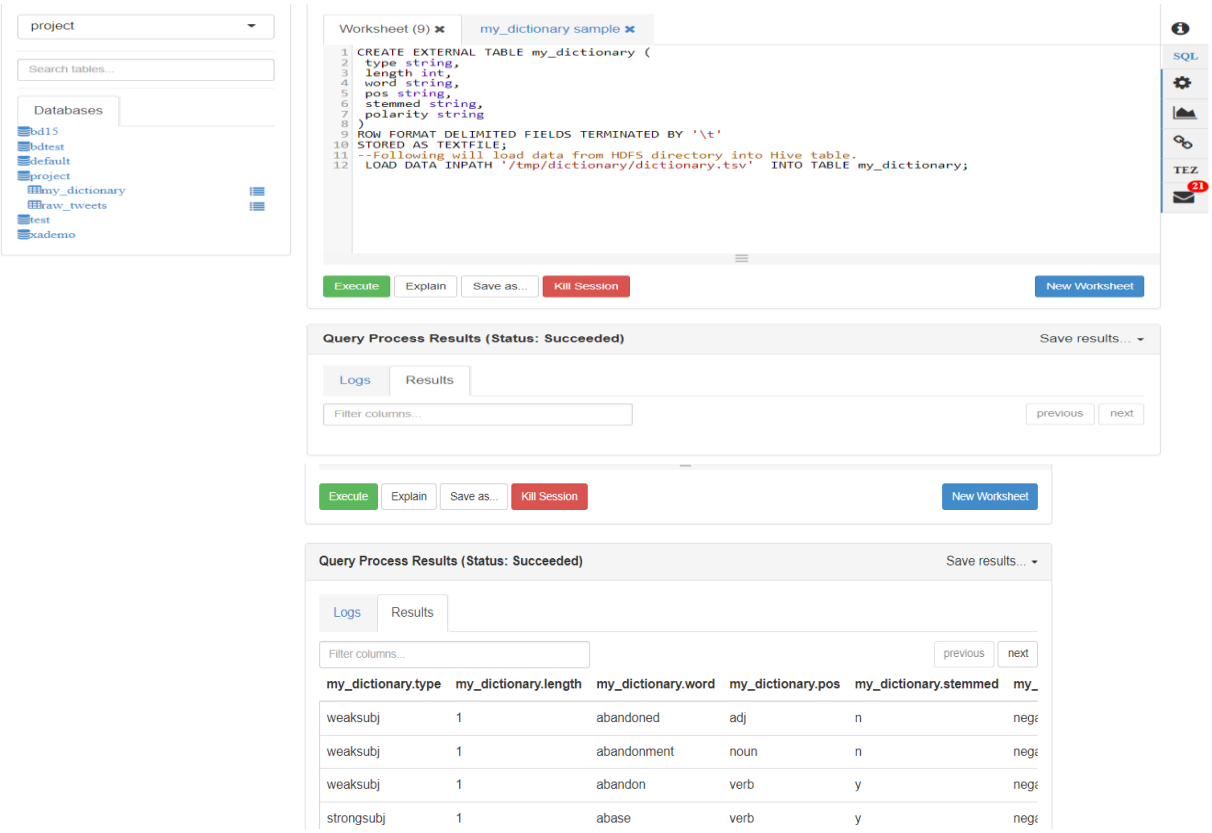




Create Table and Load Dictionary

Now we create table and Load Dictionary

```
CREATE EXTERNAL TABLE my_dictionary (
 type string,
 length int,
 word string,
 pos string,
 stemmed string,
 polarity string
)
ROW FORMAT DELIMITED FIELDS TERMINATED BY '\t'
STORED AS TEXTFILE;
--Following will load data from HDFS directory into Hive table.
 LOAD DATA INPATH '/tmp/dictionary/dictionary.tsv'  INTO TABLE my_dictionary;
```

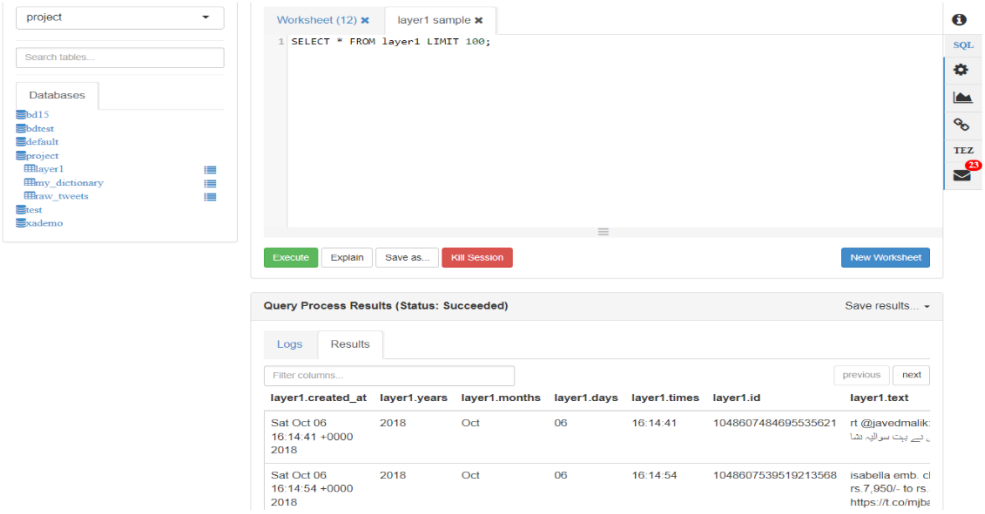


Create L1, L2 and L3 views:

To analyze the sentiment of a tweet, we need to break it down into words so that we can match the sentiment of words from dictionary
table.
First, we will create Layer 1 view which will extract date elements, convert the text to lowercase and remove any new line characters.

Query:

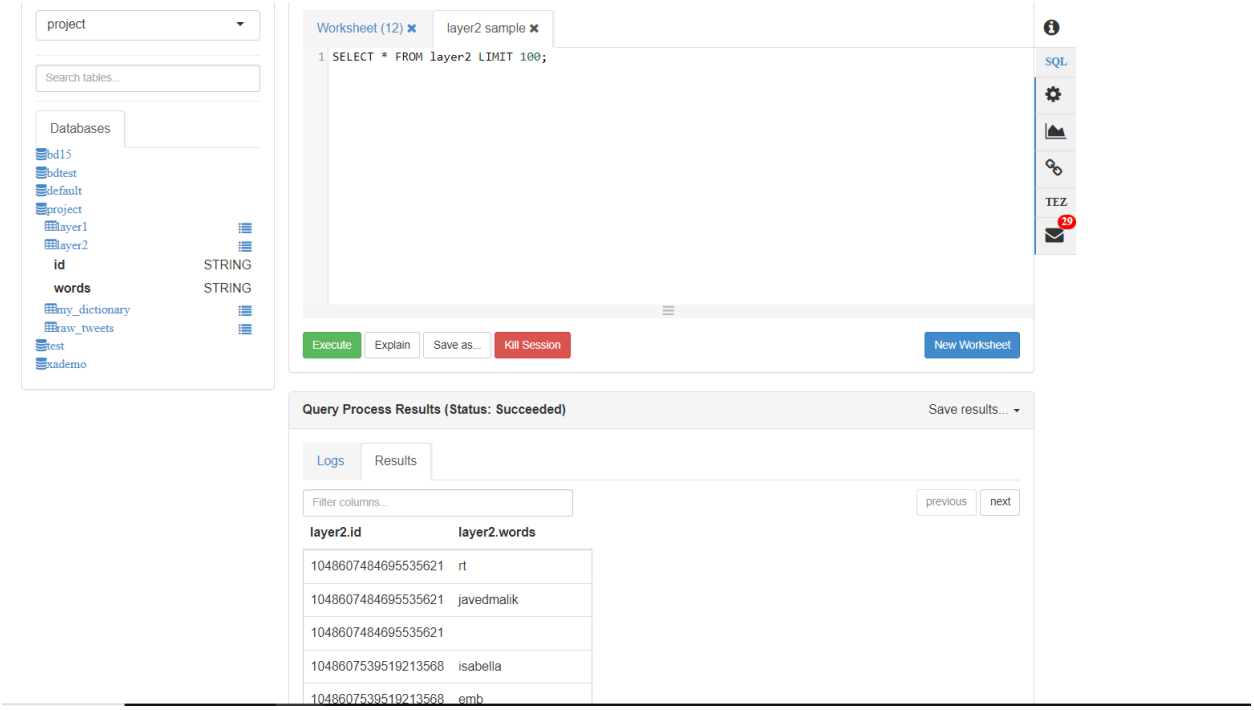
```
CREATE OR REPLACE VIEW project.Layer1 AS

SELECT

    created_at,

    SUBSTR(created_at, 27, 4) AS years,

    SUBSTR(created_at, 5, 3) AS months,

    SUBSTR(created_at, 9, 2) AS days,

    SUBSTR(created_at, 12, 8) AS times,

    id,

    LOWER(REGEXP_REPLACE(text, '\n', '')) AS text

FROM raw_tweets;
```



Layer 2 view will explode the tweet by ID and separate each word into new line.

Query:

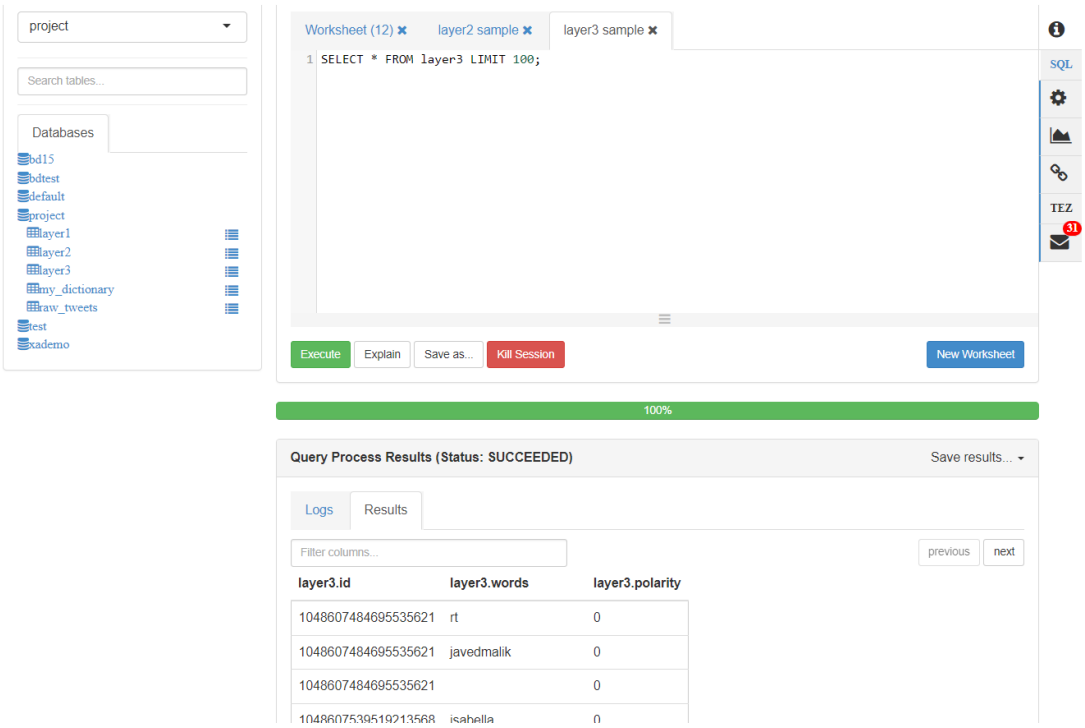
```
CREATE OR REPLACE VIEW project.Layer2 AS
SELECT
id,
words
FROM
project.Layer1
LATERAL VIEW EXPLODE(SPLIT(text, '\\W+')) text AS words;
```



Layer 3 view matches each word with the dictionary table picks whether polarity is negative or positive and assigns a value -1 or +1 respectively.

Query:

```
Create or Replace view project.Layer3 AS
select
id, L2.words,
case d.polarity
 when 'negative' then -1
 when 'positive' then 1
 else 0 end
as polarity
from Layer2 L2 left outer join my_dictionary d
on L2.words=d.word;
```

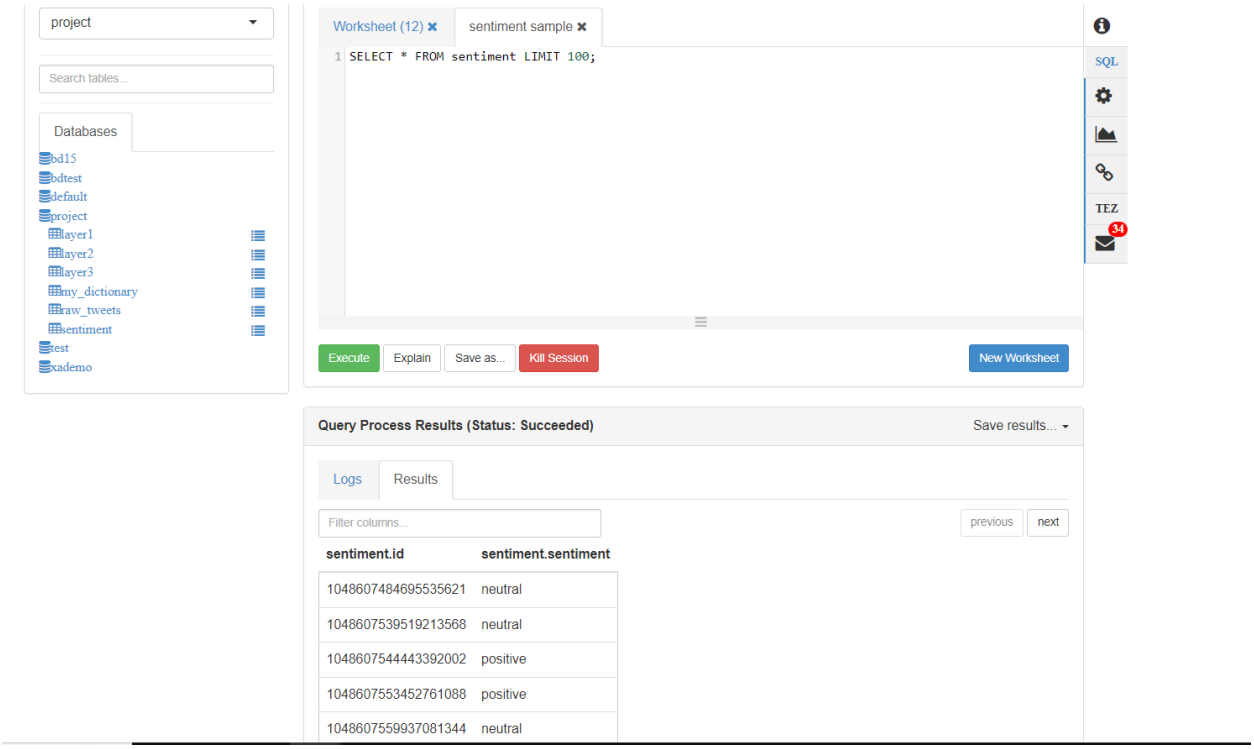


Layer 4

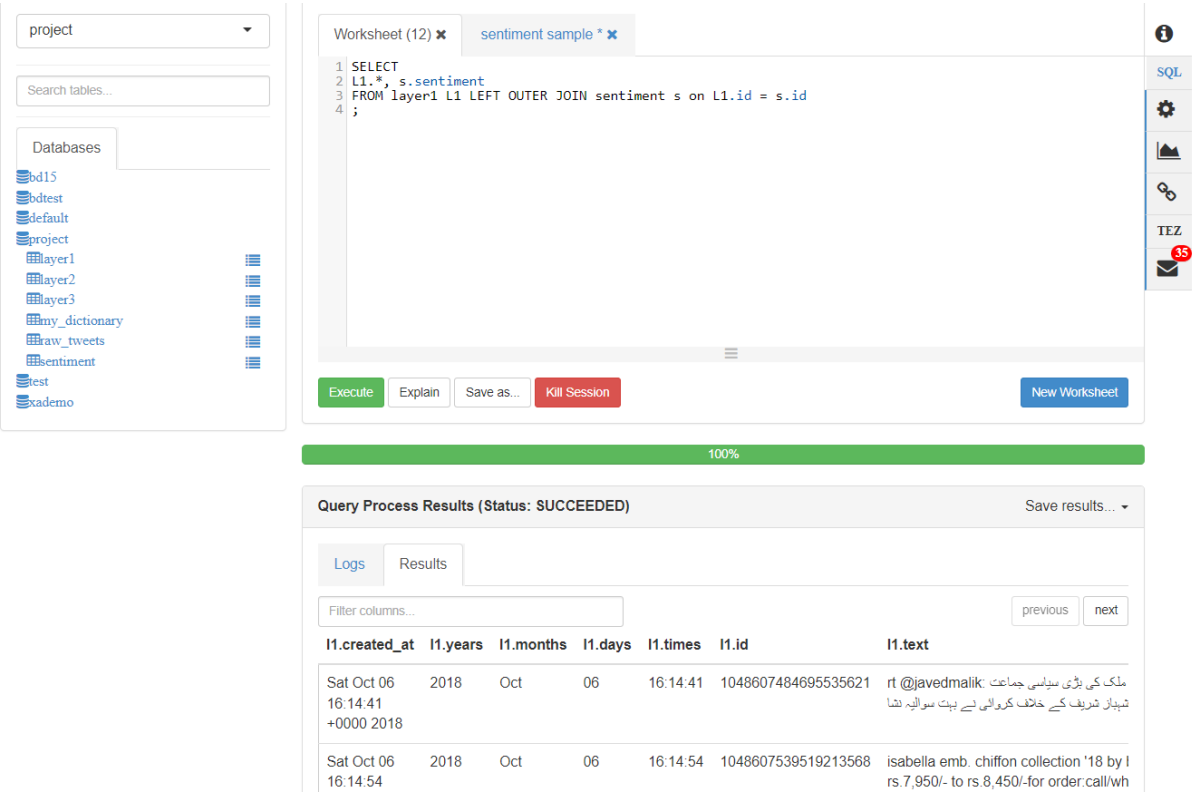
Finally, Layer 4 will sum up the polarity against a particular ID which generates the collective sentiment of the tweet with that ID. If you
are comfortable with writing complex queries, you can also combine Layer 3 and Layer 4 views and just create one view.

Query:

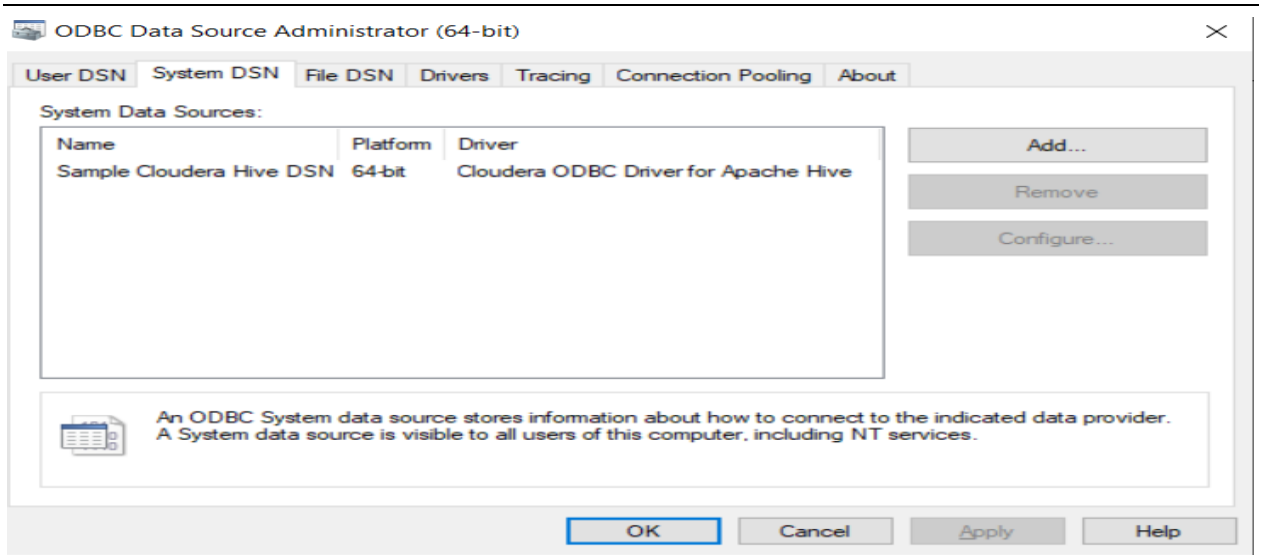
```
create or replace view project.sentiment as

select

 id,

 case

 when sum( polarity ) > 0 then 'positive'

 when sum( polarity ) < 0 then 'negative'

 else 'neutral' end as sentiment

 from layer3 l3 group by id;
```

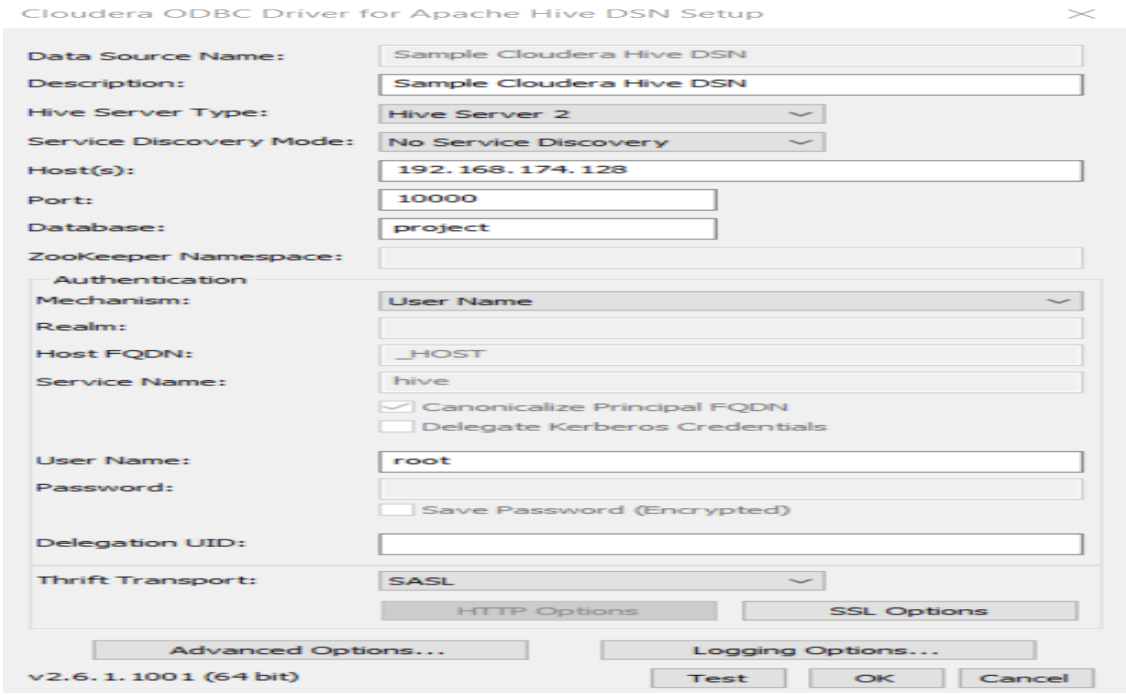


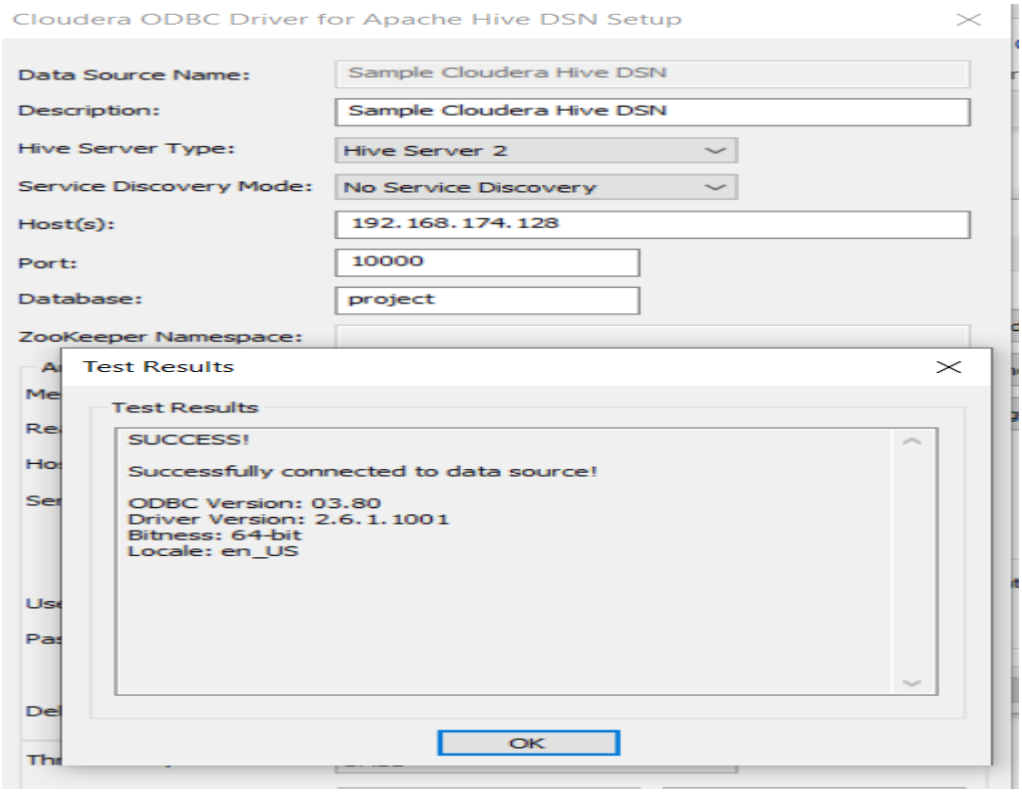
Now, We have the sentiment of each tweet in *project.sentiment* table/view grouped by each ID. If you wish to combine it with the Raw
table or Layer 1 view/table to find the actual content of tweet. You can do so using the following query or create a final table using a
CTAS statement.

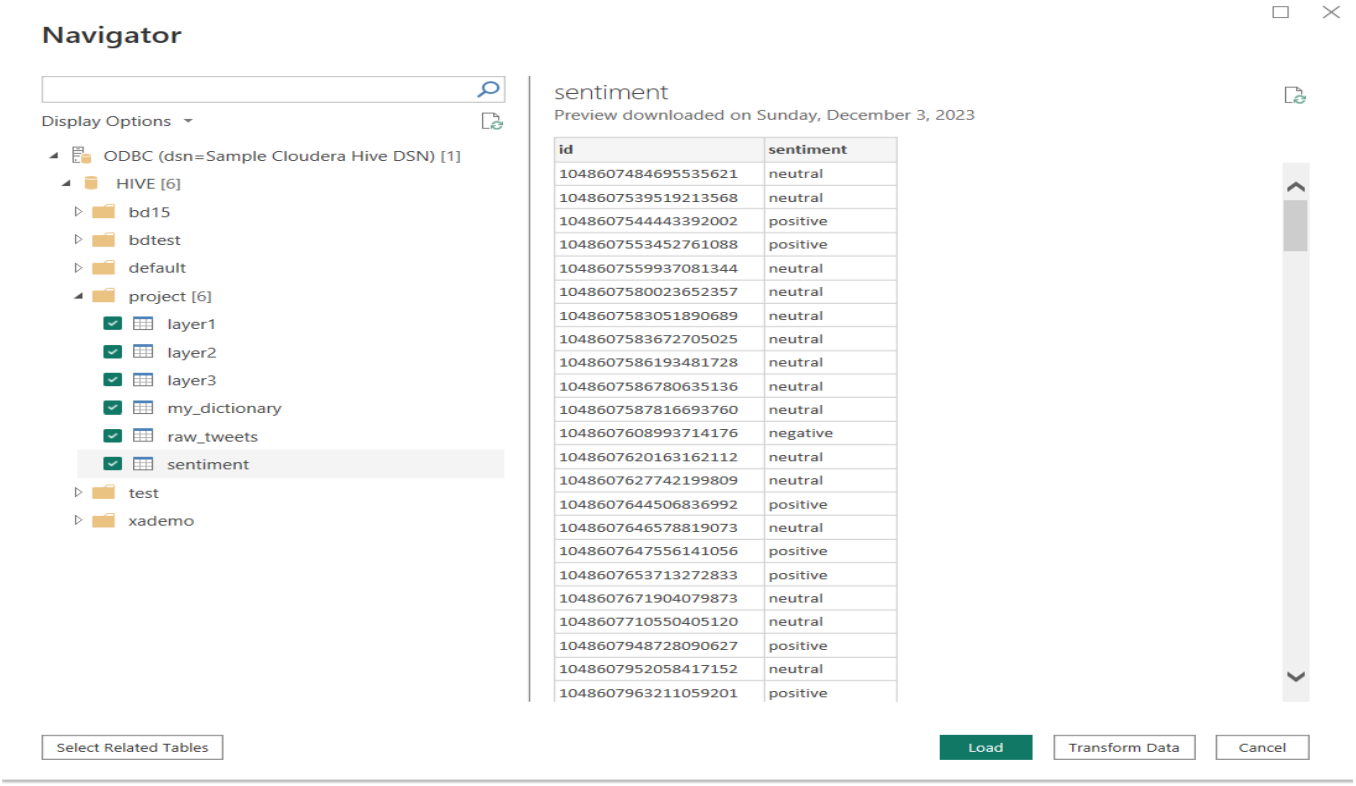


Connect Power BI with Hive:



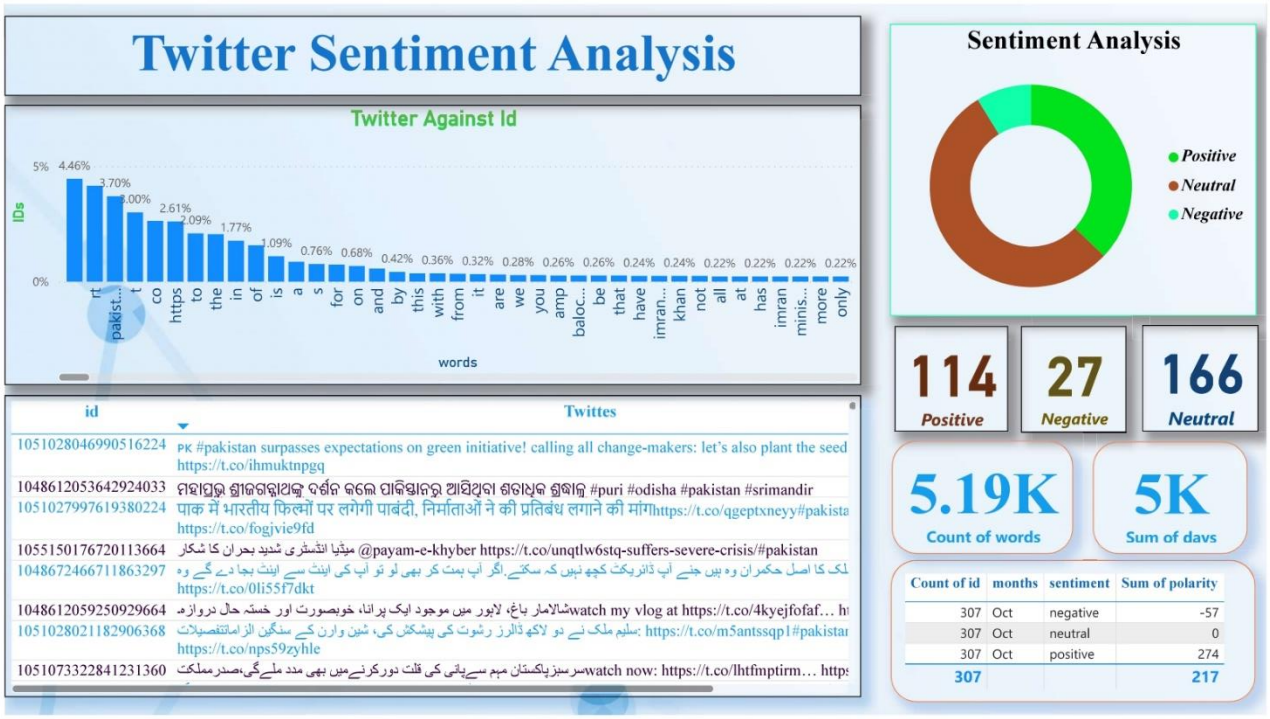






id	sentiment
1048607484695535621	neutral
1048607539519213568	neutral
1048607544443392002	positive
1048607553452761088	positive
1048607559937081344	neutral
1048607580023652357	neutral
1048607583051890689	neutral
1048607583672705025	neutral
1048607586193481728	neutral
1048607586780635136	neutral
1048607587816693760	neutral
1048607608993714176	negative
1048607620163162112	neutral
1048607627742199809	neutral
1048607644506836992	positive
1048607646578819073	neutral
1048607647556141056	positive
1048607653713272833	positive
1048607671904079873	neutral
1048607710550405120	neutral
1048607948728090627	positive
1048607952058417152	neutral
1048607963211059201	positive

Power BI Data Visualization



Please find All files and Assignments from GitHub:

https://github.com/murtaza221/Twitter-Sentiment-Analysis-in-Hive-Big-Data-Analytics-