Data Intensive Computing

LAB2 Report

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Objectives

Data Crawling

- Collecting Data from different Sources (NY Time's, Twitter, Common crawl).

Big Data Analytics

- Processing the Data collected Using Hadoop Map Reduce.

Visualization

- Visualizing the Data Using Tableau /D3.js.

DATA COLLECTION:

We collected data for topic **Terrorist** using python from the following Sources

- 1.TWITTER-Using Twitter API.
- 2.NEW YORK TIMES- Using New York Times API.
- 3.Common Crawl- Crawling & processing warc files from Common crawl Index.

Data Magnitude : Collected both Small Data and Big Data

- Small data : Collected Over a period of 1 month.
- Big Data : Collected Over a period of last 3 and Half months.

Also collected Data for sub topics related to Main Keyword.

- Guns
- Shooting

Challenges:

Getting required data from huge common crawl data was tough but solved by indexing required .gz files using required URLS where our Keyword is frequently found.

BIG DATA ANALYTICS:

- We obtained enormous data from different Sources and this voluminous data is processed using Hadoop MR to obtain word count and Word Co-occurrence's.
- We have installed Cloudera Hadoop docker client to interact with HDFS where we process the big data parallelly.

- All the data is moved to Hadoop Infrastructure (HDFS) using cloudera Hadoop docker client.
  $hadoop fs -put /src/data/*.txt /user/ss/MR/input
- The data processing instructions are specified by our custom mapper and reducer files.
- Both Mapper and Reducer are implemented in python Language.
- Mapper and Reducer are run using hadoop streaming jar.

Mapper.py:

- All the lines in text are split line by line and stop words are removed from processing using python stemmer library and also programmatically checking for stop words in a custom stop words list.
- Words separated by spaces ae tokenized and associated with a counter of 1.
- These tokens are written to the standard output which are is as input to reducers.

Dependencies for Mapper:

- Libraries required in mapper for stemming and removing stop words can be installed using following commands
  - yum install epel-release
  - yum install python-pip
  - pip install stemming

Reducer.py

- All The stdout from mappers are collected by reducers and the reducers group similar words by incrementing counters.
- All the reducer outputs are consolidated and written into a output file which can be obtained to our local system using the following command.
  $Hadoop fs -get /user/ss/MR/output.

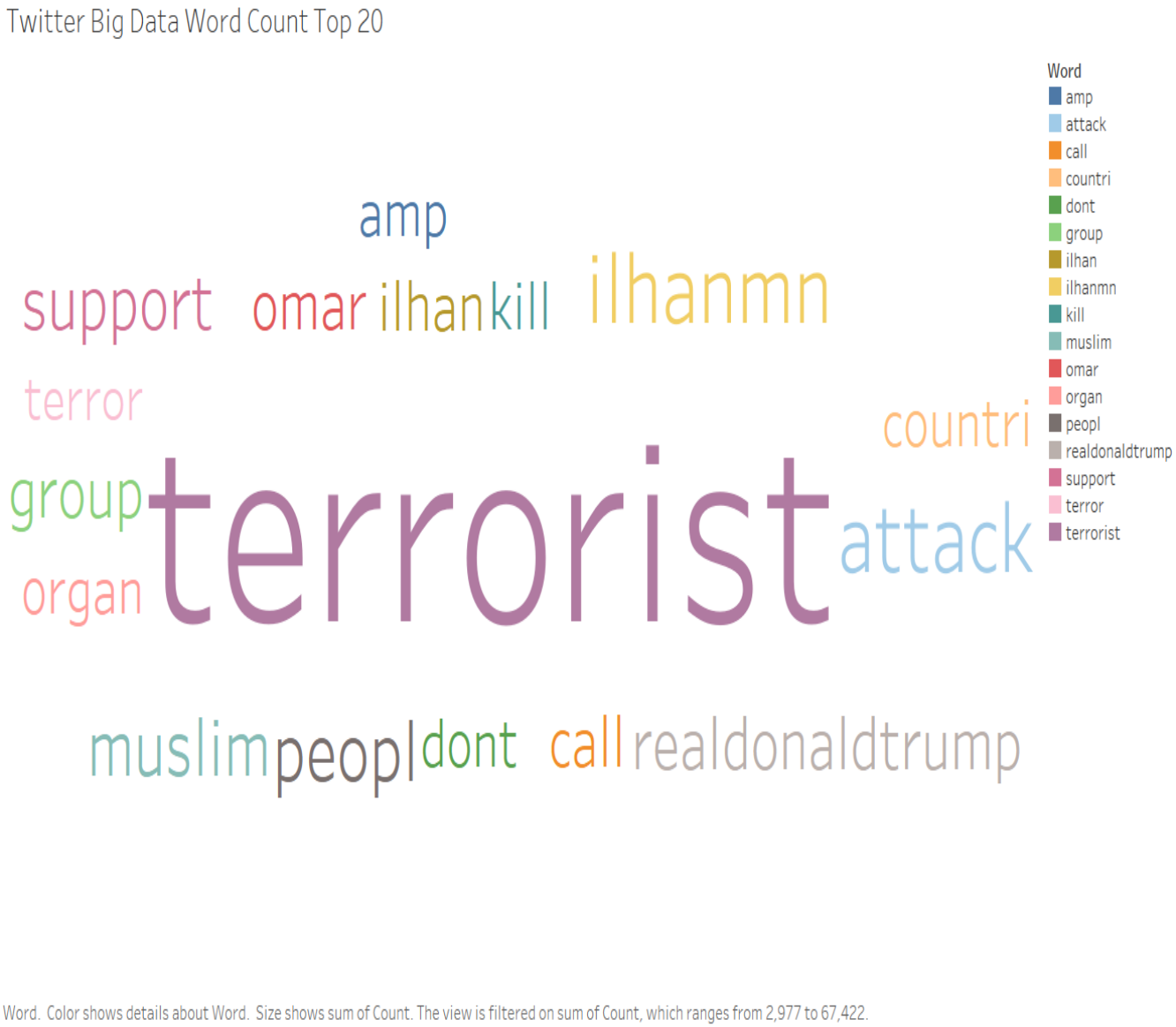
Observation:

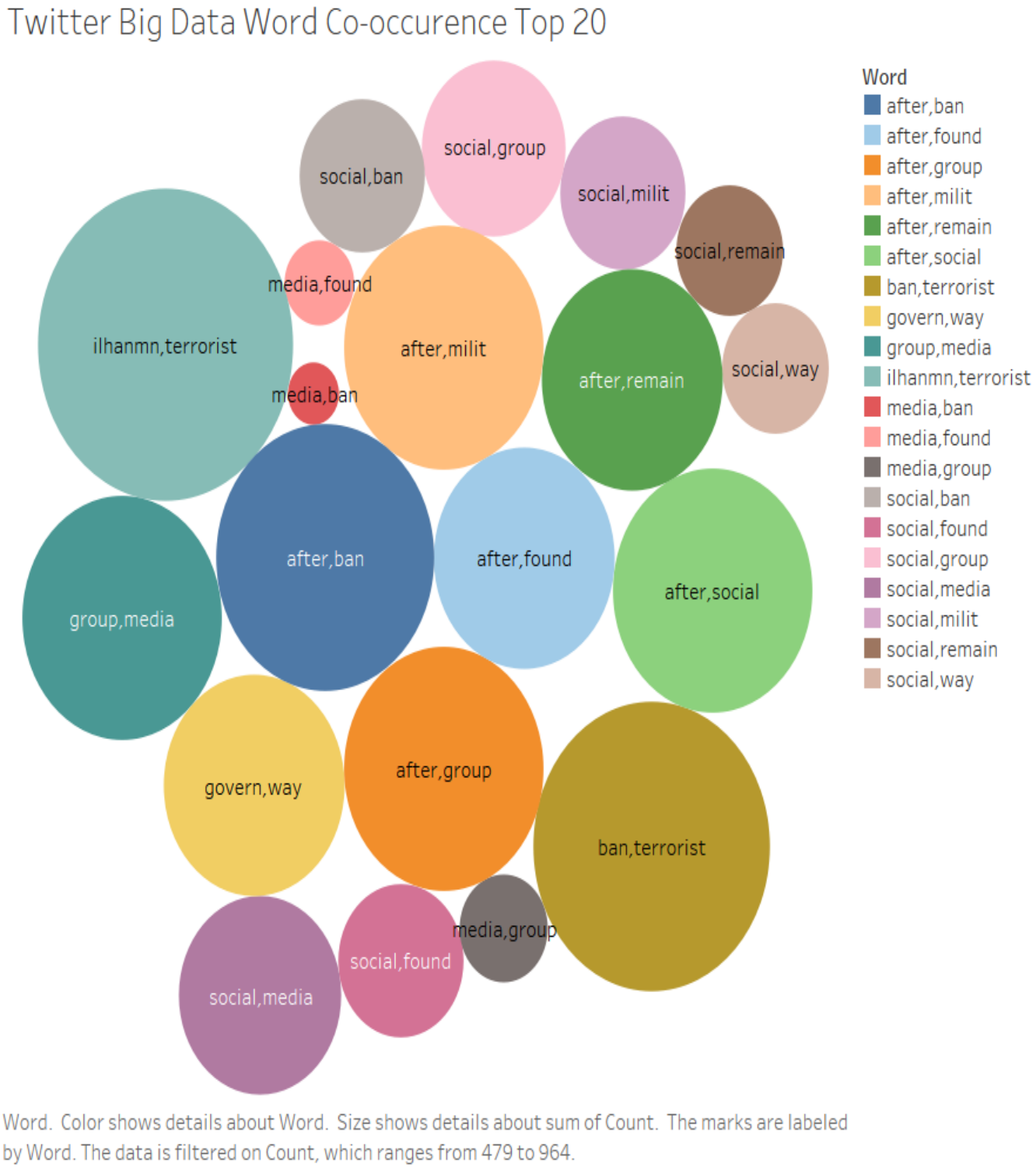
As Hadoop processes the data parallelly we are able to process Big data in less time.

Word Count for 100 MB file:
Using Sequential programming:
Time:15 mins.
Using Cloudera Hadoop:
Time:<5 mins.

DATA VISUALIZATION:

We have visualized both Word Count and Word Co-occurrence for inferring knowledge on data using Tableau.





With the help of visualization, we inferred that the most frequent word, Co-occurred words in our dataset are "**Terrorist, ilhanmn**" etc.

Flow Diagram: