Exercise 2: Tweet Word Count with Apache Storm
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UCB MIDS w205 Spring 2017

Application Idea

This tweet word count application creates a real-time data stream of Twitter tweets using the Tweepy package and stores the counts of individual words to a Postgres database which can be read by two Python programs. The tweet word count application consists of a three-layered architecture: the Processing Layer, the Storage Layer, and the Application Layer. This architecture allows for a separation of responsibilities for processing, storing, and analyzing data.

1. Processing Layer

   This layer consists of an Apache Storm topography, which includes one spout and two bolts as displayed in the architecture diagram below. The spout "tweet-spout" uses the Tweepy package and Twitter API to create a live tweet data stream. The tweets in this stream go through the bolt "parse-tweet-bolt" which uses the Streamparse package to split tweets into the individual words and then filters out hash tags, user mentions, retweet tags, urls, and punctuation. The resulting words get processed by the "count-bolt" which uses PsycoPG2 to connect to a Postgres database to write word counts to a table.

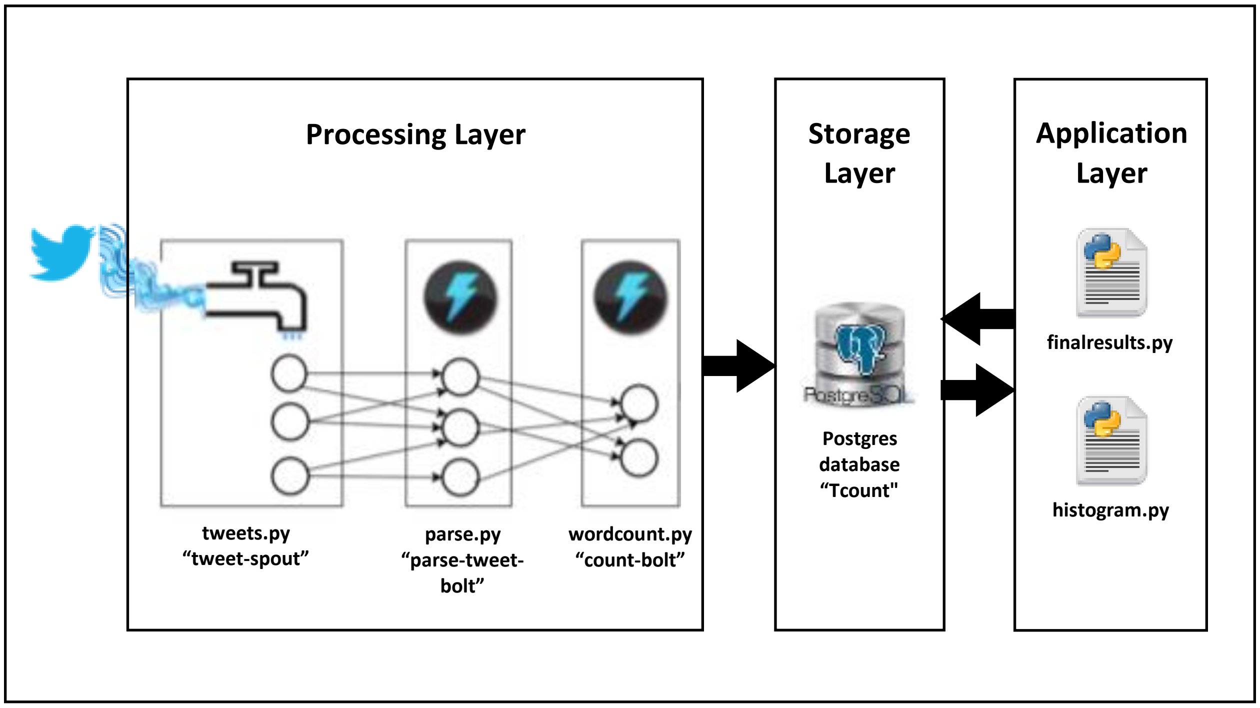
2. Storage Layer

   The purpose of this layer is to store words and counts emitted by the processing layer. This layer consists of a Postgres database called Tcount. Words and their counts are written to the Tweetwordcount table within this database. New words are recorded and existing words are incremented as they flow from the processing layer into the storage layer.

3. Application Layer

   The responsibility of this layer is to provide tools to query the storage layer and retrieve relevant information for the user. Two Python programs are provided as a part of this application. The finalresults.py program provides the user with a list counts for one or all words in the Tweetwordcount table. The histogram.py program provides the user with a list of words and their corresponding counts for a range of counts specified by the user.

Architecture Diagram



Directory File Structure

File Name	Location	Description
extweetwordcount.clj	exercise_2/extweetwordcount/ topologies/	Topology for the Apache Storm application
tweets.py	exercise_2/extweetwordcount/ src/spouts/	Creates Twitter feed; tweet-spout in topology
parse.py	exercise_2/extweetwordcount/ src/bolts/	Parses and cleans Tweets from tweet-spout; parse-tweet-bolt in topology
wordcount.py	exercise_2/extweetwordcount/ src/bolts/	Counts and stores words from parse-tweet-bolt into Postgres database; count-bolt in topology
screenshot-twitterStream.png	exercise_2/screenshots/	Screenshot of activated Apache Storm application
finalresults.py	exercise_2/scripts/	Returns word count for one or all words; optional input <word>

screenshot-finalResults.png	exercise_2/screenshots/	Screenshot of running finalresults.py program
histogram.py	exercise_2/scripts/	Returns the word counts for words within a specified count range; requires inputs <min_count>, <max_count>
screenshot-histogram.png	exercise_2/screenshots/	Screenshot of running histogram.py program
readme.txt	exercise_2/	Contains instructions on setup and running the application
Plot.png	exercise_2/	Bar plot of 20 most common words

File Dependencies

tweets.py	Stores Twitter Credentials

Database Structure

Database	tcount
User	postgres
Password	pass
Table	tweetwordcount (word TEXT, count INT)

GitHub Repository

git@github.com:keriwheatley/w205-spring-17-labs-exercises.git

Required packages:

Apache Storm, Amazon EC2, Python, Twitter API, Streamparse, Postgres, PsycoPG, Tweepy

How to Run Application:

1. Run Storm program:
```
cd w205-spring-17-labs-exercises/exercise_2/extweetwordcount
sparse run
```

2. Exit Storm program:
```
ctrl + c
```

3. Run program to return counts for all words:
```
cd ~ && cd w205-spring-17-labs-exercises/exercise_2/scripts
python finalresults.py
```

4. Run program to return count for one word:
```
cd ~ && cd w205-spring-17-labs-exercises/exercise_2/scripts
python finalresults.py <word>
```

5. Run program to return word counts in a specified range:
```
cd ~ && cd w205-spring-17-labs-exercises/exercise_2/scripts
python histogram.py <min_count> , <max_count>
```