Practical Exam (13/11/2021)

Practical 2

Aim:

To develop a Map Reduce application and implement a program that analyzes electrical consumption data.

Input:

sample.txt file

```
1979  23  23  2  43  24  25  26  26  26  26  25  26  25
1980  26  27  28  28  28  30  31  31  31  30  30  30  29
1981  31  32  32  32  33  34  35  36  36  34  34  34  34
1984  39  38  39  39  39  41  42  43  40  39  38  38  40
1985  38  39  39  39  39  41  41  41  00  40  39  39  45
```

Code:

```
package hadoop;


import java.util.*;

import java.io.IOException;

import java.io.IOException;

import org.apache.hadoop.fs.Path;

import org.apache.hadoop.conf.*;

import org.apache.hadoop.io.*;

import org.apache.hadoop.mapred.*;

import org.apache.hadoop.util.*;


public class ProcessUnits {

  //Mapper class

  public static class E_EMapper extends MapReduceBase implements

  Mapper<LongWritable ,/*Input key Type */
```

```
  Text,            /*Input value Type*/
  Text,            /*Output key Type*/
  IntWritable>     /*Output value Type*/
  {
    //Map function
    public void map(LongWritable key, Text value,
    OutputCollector<Text, IntWritable> output,

    Reporter reporter) throws IOException {
      String line = value.toString();
      String lasttoken = null;
      StringTokenizer s = new StringTokenizer(line,"\t");
      String year = s.nextToken();

      while(s.hasMoreTokens()) {
        lasttoken = s.nextToken();
      }
      int avgprice = Integer.parseInt(lasttoken);
      output.collect(new Text(year), new IntWritable(avgprice));
    }
  }

  //Reducer class
  public static class E_EReduce extends MapReduceBase implements Reducer< Text,
IntWritable, Text, IntWritable > {

    //Reduce function
    public void reduce( Text key, Iterator <IntWritable> values,
    OutputCollector<Text, IntWritable> output, Reporter reporter) throws IOException {
```

```
      int maxavg = 30;
      int val = Integer.MIN_VALUE;

      while (values.hasNext()) {
        if((val = values.next().get())>maxavg) {
          output.collect(key, new IntWritable(val));
        }
      }
    }
  }

  //Main function
  public static void main(String args[])throws Exception {
    JobConf conf = new JobConf(ProcessUnits.class);

    conf.setJobName("max_eletricityunits");
    conf.setOutputKeyClass(Text.class);
    conf.setOutputValueClass(IntWritable.class);
    conf.setMapperClass(E_EMapper.class);
    conf.setCombinerClass(E_EReduce.class);
    conf.setReducerClass(E_EReduce.class);
    conf.setInputFormat(TextInputFormat.class);
    conf.setOutputFormat(TextOutputFormat.class);

    FileInputFormat.setInputPaths(conf, new Path(args[0]));
    FileOutputFormat.setOutputPath(conf, new Path(args[1]));

    JobClient.runJob(conf);
```

```
  }
}
```

The following command is used to run the Eleunit_max application by taking the input files from the input directory.

$HADOOP_HOME/bin/hadoop jar units.jar hadoop.ProcessUnits input_dir output_dir

Wait for a while until the file is executed. After execution, as shown below, the output will contain the number of input splits, the number of Map tasks, the number of reducer tasks, etc.

```
INFO mapreduce.Job: Job job_1414748220717_0002
completed successfully
14/10/31 06:02:52
INFO mapreduce.Job: Counters: 49
  File System Counters

FILE: Number of bytes read = 61
FILE: Number of bytes written = 279400
FILE: Number of read operations = 0
FILE: Number of large read operations = 0
FILE: Number of write operations = 0
HDFS: Number of bytes read = 546
HDFS: Number of bytes written = 40
HDFS: Number of read operations = 9
HDFS: Number of large read operations = 0
HDFS: Number of write operations = 2 Job Counters


  Launched map tasks = 2
  Launched reduce tasks = 1
  Data-local map tasks = 2
  Total time spent by all maps in occupied slots (ms) = 146137
  Total time spent by all reduces in occupied slots (ms) = 441
  Total time spent by all map tasks (ms) = 14613
  Total time spent by all reduce tasks (ms) = 44120
  Total vcore-seconds taken by all map tasks = 146137
  Total vcore-seconds taken by all reduce tasks = 44120
  Total megabyte-seconds taken by all map tasks = 149644288
  Total megabyte-seconds taken by all reduce tasks = 45178880

Map-Reduce Framework

  Map input records = 5
  Map output records = 5
  Map output bytes = 45
  Map output materialized bytes = 67
  Input split bytes = 208
```

Combine input records = 5
Combine output records = 5
Reduce input groups = 5
Reduce shuffle bytes = 6
Reduce input records = 5
Reduce output records = 5
Spilled Records = 10
Shuffled Maps = 2
Failed Shuffles = 0
Merged Map outputs = 2
GC time elapsed (ms) = 948
CPU time spent (ms) = 5160
Physical memory (bytes) snapshot = 47749120
Virtual memory (bytes) snapshot = 2899349504
Total committed heap usage (bytes) = 277684224

File Output Format Counters

Bytes Written = 40

The following command is used to see the output in **Part-00000** file. This file is generated by HDFS.

$HADOOP_HOME/bin/hadoop fs -cat output_dir/part-00000

OUTPUT:

1981 34
1984 40
1985 45

PRACTICAL 3

Aim:

Plot a live graph of a sentimental analysis in twitter

CODE:

```
import dash
from dash.dependencies import Output, Event
import dash_core_components as dcc
import dash_html_components as html
import plotly
import random
import plotly.graph_objs as go
from collections import deque

X = deque(maxlen=20)
X.append(1)
Y = deque(maxlen=20)
Y.append(1)

app = dash.Dash(__name__)
app.layout = html.Div(
    [
        dcc.Graph(id='live-graph', animate=True),
        dcc.Interval(
            id='graph-update',
            interval=1*1000
        ),
```

```
    ]
)

@app.callback(Output('live-graph', 'figure'),
              events=[Event('graph-update', 'interval')])
def update_graph_scatter():
    X.append(X[-1]+1)
    Y.append(Y[-1]+Y[-1]*random.uniform(-0.1,0.1))

    data = plotly.graph_objs.Scatter(
            x=list(X),
            y=list(Y),
            name='Scatter',
            mode= 'lines+markers'
            )

    return {'data': [data],'layout' : go.Layout(xaxis=dict(range=[min(X),max(X)]),
                                                yaxis=dict(range=[min(Y),max(Y)]),)}

if __name__ == '__main__':
    app.run_server(debug=True)

import sqlite3
import pandas as pd

conn = sqlite3.connect('twitter.db')
c = conn.cursor()
df = pd.read_sql("SELECT * FROM sentiment WHERE tweet LIKE '%olympic%' ORDER BY
unix DESC LIMIT 1000", conn)
```

```
df.sort_values('unix', inplace=True)
df['sentiment_smoothed'] = df['sentiment'].rolling(int(len(df)/5)).mean()
df.dropna(inplace=True)

X = df.unix.values[-100:]
Y = df.sentiment_smoothed.values[-100:]



import dash
from dash.dependencies import Output, Event
import dash_core_components as dcc
import dash_html_components as html
import plotly
import random
import plotly.graph_objs as go
from collections import deque
import sqlite3
import pandas as pd

#popular topics: google, olympics, trump, gun, usa

app = dash.Dash(__name__)
app.layout = html.Div(
    [   html.H2('Live Twitter Sentiment'),
        dcc.Graph(id='live-graph', animate=True),
        dcc.Interval(
            id='graph-update',
            interval=1*1000
```

```
        ),
    ]
)


@app.callback(Output('live-graph', 'figure'),
              events=[Event('graph-update', 'interval')])
def update_graph_scatter():
    try:
        conn = sqlite3.connect('twitter.db')
        c = conn.cursor()
        df = pd.read_sql("SELECT * FROM sentiment WHERE tweet LIKE '%olympic%' ORDER BY unix DESC LIMIT 1000", conn)
        df.sort_values('unix', inplace=True)
        df['sentiment_smoothed'] = df['sentiment'].rolling(int(len(df)/5)).mean()
        df.dropna(inplace=True)


        X = df.unix.values[-100:]
        Y = df.sentiment_smoothed.values[-100:]


        data = plotly.graph_objs.Scatter(
                x=X,
                y=Y,
                name='Scatter',
                mode= 'lines+markers'
                )


        return {'data': [data],'layout' : go.Layout(xaxis=dict(range=[min(X),max(X)]),
                                                    yaxis=dict(range=[min(Y),max(Y)]),)}
```

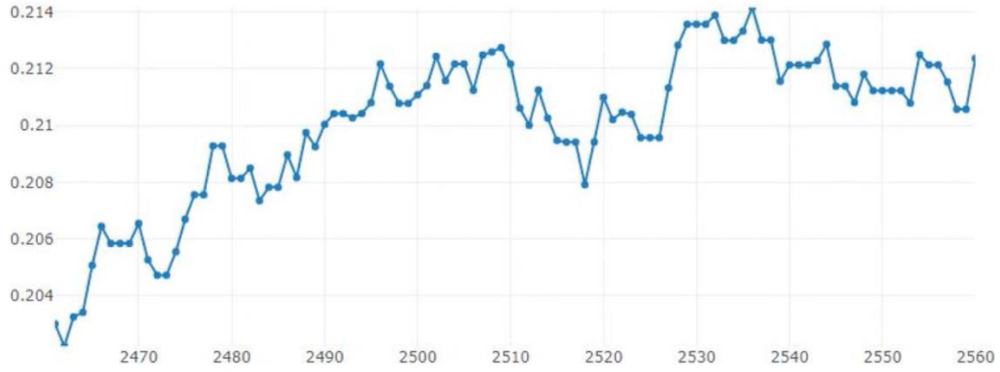
```
    except Exception as e:
        with open('errors.txt','a') as f:
            f.write(str(e))
            f.write('\n')

if __name__ == '__main__':
    app.run_server(debug=True)



from tweepy import Stream
from tweepy import OAuthHandler
from tweepy.streaming import StreamListener
import json
import sqlite3
from vaderSentiment.vaderSentiment import SentimentIntensityAnalyzer
from unidecode import unidecode
import time

analyzer = SentimentIntensityAnalyzer()

conn = sqlite3.connect('twitter.db')
c = conn.cursor()

def create_table():
    try:
        c.execute("CREATE TABLE IF NOT EXISTS sentiment(unix REAL, tweet TEXT,
sentiment REAL)")
        c.execute("CREATE INDEX fast_unix ON sentiment(unix)")
```

```
        c.execute("CREATE INDEX fast_tweet ON sentiment(tweet)")
        c.execute("CREATE INDEX fast_sentiment ON sentiment(sentiment)")
        conn.commit()
    except Exception as e:
        print(str(e))
create_table()

#consumer key, consumer secret, access token, access secret.
ckey=""
csecret=""
atoken=""
asecret=""

class listener(StreamListener):

    def on_data(self, data):
        try:
            data = json.loads(data)
            tweet = unidecode(data['text'])
            time_ms = data['timestamp_ms']
            vs = analyzer.polarity_scores(tweet)
            sentiment = vs['compound']
            print(time_ms, tweet, sentiment)
            c.execute("INSERT INTO sentiment (unix, tweet, sentiment) VALUES (?, ?, ?)",
                (time_ms, tweet, sentiment))
            conn.commit()

        except KeyError as e:
```

```
            print(str(e))
        return(True)

    def on_error(self, status):
        print(status)

while True:

    try:
        auth = OAuthHandler(ckey, csecret)
        auth.set_access_token(atoken, asecret)
        twitterStream = Stream(auth, listener())
        twitterStream.filter(track=["a","e","i","o","u"])
    except Exception as e:
        print(str(e))
        time.sleep(5)
```

OUTPUT:

Live Twitter Sentiment



Live Twitter Sentiment