Financial_Sentiment_Analysis

April 3, 2019

```
In [1]: import nltk
        import warnings
        warnings.filterwarnings('ignore')
        from nltk.sentiment.vader import SentimentIntensityAnalyzer

        nltk.download('vader_lexicon')

        sia = SentimentIntensityAnalyzer()

[nltk_data] Downloading package vader_lexicon to /root/nltk_data...


In [2]: from urllib.request import urlopen
        from bs4 import BeautifulSoup
        from datetime import datetime, timedelta
        import time
        import pprint

        date_sentiments = {}

        for i in range(1,11):
            page = urlopen('https://www.businesstimes.com.sg/search/google?page='+str(i)).read
            soup = BeautifulSoup(page, features="html.parser")
            posts = soup.findAll("div", {"class": "media-body"})
            for post in posts:
                time.sleep(1)
                url = post.a['href']
                date = post.time.text
                print(date, url)
                try:

                    link_page = urlopen(url).read()

                except:
                    break

        #           url = url[:-2]
```

1

```python
#               print(url)
            link_page = urlopen(url).read()
        link_soup = BeautifulSoup(link_page)
        sentences = link_soup.findAll("p")
        passage = ""
        for sentence in sentences:
            passage += sentence.text
        sentiment = sia.polarity_scores(passage)['compound']
        date_sentiments.setdefault(date, []).append(sentiment)


    date_sentiment = {}

    for k,v in date_sentiments.items():
        date_sentiment[datetime.strptime(k, '%d %b %Y').date() + timedelta(days=1)] = round

    earliest_date = min(date_sentiment.keys())


    print(date_sentiment)
```

02 Apr 2019 https://www.businesstimes.com.sg/consumer/walmart-unveils-voice-activated-google-po
02 Apr 2019 https://www.businesstimes.com.sg/technology/google-huawei-in-ai-collaboration-despi
28 Mar 2019 https://www.businesstimes.com.sg/government-economy/trump-says-google-ceo-committed
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13 Mar 2019 https://www.businesstimes.com.sg/technology/uk-needs-to-meet-facebook-google-compet
13 Mar 2019 https://www.businesstimes.com.sg/consumer/murdochs-news-corp-wants-australia-to-bre
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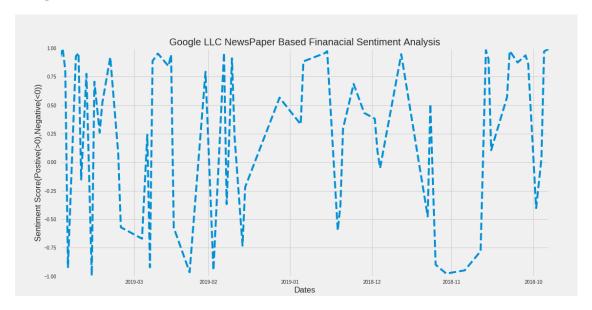
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22 Feb 2019 https://www.businesstimes.com.sg/technology/google-moves-to-fix-youtube-glitch-expl
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25 Jan 2019 https://www.businesstimes.com.sg/consumer/googles-bid-to-battle-amazon-suffers-blo
24 Jan 2019 https://www.businesstimes.com.sg/technology/google%E2%80%99s%C2%A0proposal-for-chro
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17 Jan 2019 https://www.businesstimes.com.sg/technology/google-sends-tourists-on-outback-walka
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16 Oct 2018 https://www.businesstimes.com.sg/technology/google-ceo-says-important-to-explore-cl
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26 Sep 2018 https://www.businesstimes.com.sg/technology/google-to-acknowledge-privacy-mistakes-
26 Sep 2018 https://www.businesstimes.com.sg/technology/google-tunes-search-for-prescience-pict
25 Sep 2018 https://www.businesstimes.com.sg/technology/google-tunes-search-for-prescience-and-
{datetime.date(2019, 4, 3): 0.077, datetime.date(2019, 3, 29): 0.921, datetime.date(2019, 3, 28
```

```python
In [0]: %matplotlib inline

        %config InlineBackend.print_figure_kwargs = {'bbox_inches':None}
        plt.style.use('fivethirtyeight')
        %config InlineBackend.rc = {'font.size': 5, 'figure.figsize': (16.0, 8.0), 'figure.face
        import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt

In [0]: print(type(date_sentiment))

<class 'dict'>


In [0]: Date=list(date_sentiment.keys())
        Sentiment_values=list(date_sentiment.values())

In [0]: print(Date[:10],Sentiment_values[:10])

[datetime.date(2019, 3, 29), datetime.date(2019, 3, 28), datetime.date(2019, 3, 27), datetime.d


In [0]: plt.plot(Date, Sentiment_values, '--')
        plt.axis([Date[0], Date[-1],-1,1])
```

```
plt.title("Google LLC NewsPaper Based Finanacial Sentiment Analysis")
plt.xlabel("Dates")
plt.ylabel("Sentiment Score(Postive(>0),Negative(<0))")
plt.show()
```

```
In [0]: from urllib.request import urlopen
        from bs4 import BeautifulSoup
        from datetime import datetime, timedelta
        import time
        import pprint

        date_sentiments = {}

        for i in range(1,11):
            page = urlopen('https://www.businesstimes.com.sg/search/reliance?page='+str(i)).rea
            soup = BeautifulSoup(page, features="html.parser")
            posts = soup.findAll("div", {"class": "media-body"})
            for post in posts:
                time.sleep(1)
                url = post.a['href']
                date = post.time.text
                print(date, url)
                try:

                    link_page = urlopen(url).read()

                except:
```

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```python
#               url = url[:-2]
#                 print(url)
                link_page = urlopen(url).read()
            link_soup = BeautifulSoup(link_page)
            sentences = link_soup.findAll("p")
            passage = ""
            for sentence in sentences:
                passage += sentence.text
            sentiment = sia.polarity_scores(passage)['compound']
            date_sentiments.setdefault(date, []).append(sentiment)

    date_sentiment = {}

    for k,v in date_sentiments.items():
        date_sentiment[datetime.strptime(k, '%d %b %Y').date() + timedelta(days=1)] = round

    earliest_date = min(date_sentiment.keys())

    print(date_sentiment)
```

```
05 Feb 2019 https://www.businesstimes.com.sg/banking-finance/anil-ambanis-reliance-comm-seeks-
18 Jan 2019 https://www.businesstimes.com.sg/consumer/indias-reliance-posts-88-rise-in-q3-prof:
08 Jan 2019 https://www.businesstimes.com.sg/technology/huawei-launches-server-chipset-as-chin:
03 Jan 2019 https://www.businesstimes.com.sg/real-estate/china-warns-cities-to-cut-reliance-on-
02 Jan 2019 https://www.businesstimes.com.sg/real-estate/chinese-city-economies-need-to-cut-rel
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07 Mar 2017 http://www.businesstimes.com.sg/technology/indias-reliance-capital-sells-stake-in-;
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17 Feb 2014 http://www.businesstimes.com.sg/technology/ip-reliance-signals-need-for-intelligen
{datetime.date(2019, 2, 6): 0.077, datetime.date(2019, 1, 19): 0.975, datetime.date(2019, 1, 9
```

```python
In [0]: Date=list(date_sentiment.keys())
        Sentiment_values=list(date_sentiment.values())

In [0]:

In [0]: font = {'family': 'serif',
                'color':  'darkred',
                'weight': 'normal',
                'size': 16,
                }
        plt.plot(Date, Sentiment_values, '--')
        plt.axis([Date[0], Date[-1],-1,1])


        plt.title("Reliance Comm NewsPaper Based Finanacial Sentiment Analysis")
        plt.text(2, 0.65,"If sentiment increasing it is good to invest ", fontdict=font)
        plt.xlabel("Dates")
        plt.ylabel("Sentiment Score(Postive(>0),Negative(<0))")
        plt.show()
```

Reliance Comm NewsPaper Based Finanacial Sentiment Analysis

```
In [0]:  # Importing the libraries
         import numpy as np
         import matplotlib.pyplot as plt
         import pandas as pd
         !pip install pandas-datareader
         from pandas_datareader import data as pdr
         !pip install fix-yahoo-finance
         import fix_yahoo_finance as yf
```

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Requirement already satisfied: pandas-datareader in /usr/local/lib/python3.6/dist-packages (0.7
Requirement already satisfied: pandas>=0.19.2 in /usr/local/lib/python3.6/dist-packages (from p
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Requirement already satisfied: pytz>=2011k in /usr/local/lib/python3.6/dist-packages (from pand
Requirement already satisfied: numpy>=1.9.0 in /usr/local/lib/python3.6/dist-packages (from pan
Requirement already satisfied: python-dateutil>=2 in /usr/local/lib/python3.6/dist-packages (fr
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.6/dist-packages (fr
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Requirement already satisfied: chardet<3.1.0,>=3.0.2 in /usr/local/lib/python3.6/dist-packages
Requirement already satisfied: urllib3<1.23,>=1.21.1 in /usr/local/lib/python3.6/dist-packages
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Requirement already satisfied: multitasking in /usr/local/lib/python3.6/dist-packages (from fix
Requirement already satisfied: pytz>=2011k in /usr/local/lib/python3.6/dist-packages (from pand
Requirement already satisfied: python-dateutil>=2 in /usr/local/lib/python3.6/dist-packages (fr
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Requirement already satisfied: chardet<3.1.0,>=3.0.2 in /usr/local/lib/python3.6/dist-packages
Requirement already satisfied: urllib3<1.23,>=1.21.1 in /usr/local/lib/python3.6/dist-packages
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.6/dist-packages (fi
Requirement already satisfied: idna<2.7,>=2.5 in /usr/local/lib/python3.6/dist-packages (from i
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.6/dist-packages (from python-
```

```
In [0]: share = "GOOGL"
        dataset = pdr.get_data_yahoo(share)
        dataset = dataset.dropna() # removing missing value rows
        dataset
```

```
Out[0]:                    High           Low          Open         Close       Volume  \
        Date
        2010-01-04   315.070068    312.432434    313.788788    313.688690    3908400.0
        2010-01-05   314.234222    311.081085    313.903900    312.307312    6003300.0
        2010-01-06   313.243256    303.483490    313.243256    304.434448    7949400.0
        2010-01-07   305.305298    296.621613    305.005005    297.347351   12815700.0
        2010-01-08   301.926941    294.849854    296.296295    301.311310    9439100.0
        2010-01-11   302.532532    297.317322    302.532532    300.855865   14411300.0
        2010-01-12   299.379395    294.294281    299.124115    295.535522    9696800.0
        2010-01-13   294.484497    287.237244    288.533539    293.838837   12980200.0
        2010-01-14   297.397400    291.696686    292.242249    295.220215    8471700.0
        2010-01-15   297.077087    289.309296    296.966980    290.290283   10858100.0
        2010-01-19   295.505493    288.433441    290.890900    294.104095    8624700.0
        2010-01-20   293.283295    287.932922    293.283295    290.495483    6494800.0
        2010-01-21   293.703705    286.411407    292.012024    291.781769   12602700.0
        2010-01-22   285.585571    267.697693    282.532532    275.280273   13587100.0
        2010-01-25   275.215210    268.023010    273.568573    270.270264    8830900.0
        2010-01-26   275.075073    268.413422    269.254242    271.481476    8702200.0
        2010-01-27   274.099091    267.922913    270.905914    271.321320    7920800.0
        2010-01-28   273.773773    265.565552    272.517517    267.412415    6451700.0
        2010-01-29   270.765778    263.068054    269.514526    265.235229    8272700.0
        2010-02-01   268.173187    265.415405    267.567566    266.776764    4497000.0
        2010-02-02   267.747742    264.069061    267.747742    265.825836    8184200.0
        2010-02-03   271.321320    264.379395    264.599609    270.680695    5992200.0
        2010-02-04   269.269257    263.043030    268.768768    263.653656    6748600.0
        2010-02-05   267.017029    261.491486    264.464478    265.910919    6305600.0
        2010-02-08   271.271271    266.031036    266.516510    267.002014    5383200.0
        2010-02-09   271.036041    267.802795    270.040039    268.488495    5633500.0
        2010-02-10   269.164154    264.109100    267.302307    267.492493    5343600.0
        2010-02-11   270.515503    265.015015    266.926941    268.468475    4815100.0
        2010-02-12   268.843842    265.515503    266.751740    266.826813    4554800.0
        2010-02-16   272.337341    267.417419    268.703705    270.920929    7301400.0
        ...                 ...           ...           ...           ...          ...
        2019-02-15  1139.300049   1116.719971   1139.300049   1119.630005    1391300.0
        2019-02-19  1129.640015   1116.640015   1116.640015   1126.510010    1099000.0
        2019-02-20  1130.930054   1111.750000   1128.880005   1120.589966    1204500.0
```

```
2019-02-21   1119.150024   1097.979980   1118.780029   1104.209961   1663600.0
2019-02-22   1117.250000   1100.500000   1109.699951   1116.560059   1471800.0
2019-02-25   1125.400024   1114.109985   1121.930054   1117.329956   1310400.0
2019-02-26   1126.439941   1106.699951   1114.369995   1122.010010   1751300.0
2019-02-27   1125.729980   1108.560059   1114.010010   1122.890015   1104600.0
2019-02-28   1133.989990   1118.410034   1119.000000   1126.550049   1371100.0
2019-03-01   1150.000000   1131.000000   1131.000000   1148.520020   1704300.0
2019-03-04   1165.520020   1138.250000   1154.560059   1153.420044   1774500.0
2019-03-05   1176.489990   1153.020020   1156.000000   1169.189941   2004700.0
2019-03-06   1174.739990   1163.050049   1171.760010   1164.939941   1180100.0
2019-03-07   1163.579956   1141.709961   1160.500000   1150.849976   1504300.0
2019-03-08   1153.449951   1130.199951   1133.900024   1149.969971   1184700.0
2019-03-11   1179.910034   1151.569946   1152.000000   1179.260010   1501600.0
2019-03-12   1205.709961   1182.300049   1182.300049   1197.250000   2111000.0
2019-03-13   1207.119995   1197.910034   1205.930054   1199.060059   1294400.0
2019-03-14   1204.699951   1191.229980   1199.020020   1192.530029   1365100.0
2019-03-15   1201.719971   1187.010010   1198.000000   1190.300049   2594300.0
2019-03-18   1194.949951   1181.479980   1189.689941   1188.550049   1222100.0
2019-03-19   1203.410034   1189.459961   1191.719971   1202.459961   1489400.0
2019-03-20   1229.989990   1199.589966   1201.400024   1226.430054   2075400.0
2019-03-21   1236.439941   1216.579956   1220.000000   1236.130005   1407500.0
2019-03-22   1233.630005   1206.000000   1228.849976   1207.650024   1721100.0
2019-03-25   1209.439941   1190.000000   1199.560059   1197.380005   1378800.0
2019-03-26   1207.650024   1181.760010   1205.189941   1189.839966   1537600.0
2019-03-27   1191.920044   1164.229980   1191.920044   1178.010010   1471400.0
2019-03-28   1177.250000   1163.430054   1175.500000   1172.270020   1120100.0
2019-03-29   1183.969971   1166.380005   1180.180054   1176.890015   1544500.0

                  Adj Close
Date
2010-01-04      313.688690
2010-01-05      312.307312
2010-01-06      304.434448
2010-01-07      297.347351
2010-01-08      301.311310
2010-01-11      300.855865
2010-01-12      295.535522
2010-01-13      293.838837
2010-01-14      295.220215
2010-01-15      290.290283
2010-01-19      294.104095
2010-01-20      290.495483
2010-01-21      291.781769
2010-01-22      275.280273
2010-01-25      270.270264
2010-01-26      271.481476
2010-01-27      271.321320
2010-01-28      267.412415
```

```
2010-01-29     265.235229
2010-02-01     266.776764
2010-02-02     265.825836
2010-02-03     270.680695
2010-02-04     263.653656
2010-02-05     265.910919
2010-02-08     267.002014
2010-02-09     268.488495
2010-02-10     267.492493
2010-02-11     268.468475
2010-02-12     266.826813
2010-02-16     270.920929
...                 ...
2019-02-15    1119.630005
2019-02-19    1126.510010
2019-02-20    1120.589966
2019-02-21    1104.209961
2019-02-22    1116.560059
2019-02-25    1117.329956
2019-02-26    1122.010010
2019-02-27    1122.890015
2019-02-28    1126.550049
2019-03-01    1148.520020
2019-03-04    1153.420044
2019-03-05    1169.189941
2019-03-06    1164.939941
2019-03-07    1150.849976
2019-03-08    1149.969971
2019-03-11    1179.260010
2019-03-12    1197.250000
2019-03-13    1199.060059
2019-03-14    1192.530029
2019-03-15    1190.300049
2019-03-18    1188.550049
2019-03-19    1202.459961
2019-03-20    1226.430054
2019-03-21    1236.130005
2019-03-22    1207.650024
2019-03-25    1197.380005
2019-03-26    1189.839966
2019-03-27    1178.010010
2019-03-28    1172.270020
2019-03-29    1176.890015

[2325 rows x 6 columns]

In [0]: openi=list(dataset['Open'])
        close=list(dataset['Close'])
```

```
          date=(dataset.index.tolist())

In [0]: plt.plot(date, openi, '--')
        plt.plot(date, close, '--')
        plt.axis([date[0], date[-1],int(min(min(openi),min(close))//2),int(max(openi)+max(clos

        plt.legend(["Opening Price","Closing Price"])
        plt.title("Google LLC Stock Prices")
        plt.xlabel("Dates")
        plt.ylabel("Stock Price")
        plt.show()
```



```
In [0]: share = "RCOM.NS"
        dataset = pdr.get_data_yahoo(share)
        dataset = dataset.dropna() # removing missing value rows
        dataset

Out[0]:                  High          Low         Open        Close         Volume  \
        Date
        2010-01-04  175.800003   172.550003   173.000000   175.199997     2418999.0
        2010-01-05  182.000000   175.800003   176.000000   181.350006     6033757.0
        2010-01-06  184.399994   180.800003   182.500000   181.800003     4680776.0
        2010-01-07  185.300003   182.500000   183.699997   183.899994     4255338.0
        2010-01-08  185.149994   180.199997   184.500000   180.850006     3775898.0
        2010-01-11  184.000000   180.199997   184.000000   182.100006     3601269.0
        2010-01-12  182.850006   175.050003   182.100006   175.449997     4834928.0
        2010-01-13  176.600006   173.050003   174.000000   175.550003     3276310.0
        2010-01-14  184.199997   175.649994   177.199997   183.000000     7227593.0
        2010-01-15  193.399994   183.000000   183.000000   191.600006    15459863.0
```

12

```
2010-01-18    193.800003    188.350006    189.899994    190.449997      4710277.0
2010-01-19    192.899994    185.199997    190.000000    186.350006      4458474.0
2010-01-20    190.600006    185.300003    187.000000    186.899994      3581194.0
2010-01-21    189.750000    184.149994    186.850006    185.149994      3673061.0
2010-01-22    184.699997    176.449997    183.699997    181.550003      4194634.0
2010-01-25    183.199997    177.000000    180.100006    179.050003      3673742.0
2010-01-27    182.000000    172.500000    182.000000    174.750000      3886100.0
2010-01-28    178.199997    169.300003    176.500000    171.250000      8467806.0
2010-01-29    171.000000    165.500000    171.000000    169.800003      5167106.0
2010-02-01    175.449997    164.600006    169.000000    173.649994      4849037.0
2010-02-02    175.899994    168.050003    175.000000    168.949997      3493323.0
2010-02-03    172.600006    168.000000    170.100006    171.149994      2885242.0
2010-02-04    171.000000    164.000000    171.000000    164.800003      2698286.0
2010-02-05    165.250000    158.600006    159.800003    163.500000      3810517.0
2010-02-08    170.699997    163.750000    164.949997    169.000000      2874040.0
2010-02-09    170.199997    166.199997    167.500000    168.149994      2136048.0
2010-02-10    170.899994    167.750000    170.500000    168.500000      2337064.0
2010-02-11    171.000000    168.550003    168.550003    169.449997      1693914.0
2010-02-15    172.399994    163.850006    172.399994    164.800003      2433845.0
2010-02-16    168.800003    162.800003    165.300003    167.399994      2507508.0
...                  ...           ...           ...           ...            ...
2019-02-12      5.750000      5.100000      5.350000      5.650000     88569746.0
2019-02-14      5.750000      5.200000      5.750000      5.550000     90978467.0
2019-02-15      5.700000      5.400000      5.500000      5.500000     56200999.0
2019-02-18      6.850000      5.900000      6.050000      6.100000    105009120.0
2019-02-19      6.200000      5.950000      6.200000      6.000000     53952257.0
2019-02-20      6.150000      5.450000      6.100000      5.750000    134464383.0
2019-02-21      6.550000      5.700000      5.850000      6.350000    115064994.0
2019-02-22      7.650000      6.250000      6.350000      6.500000    244157493.0
2019-02-25      6.500000      5.900000      6.500000      6.000000     95247158.0
2019-02-26      6.650000      5.850000      5.900000      6.400000    121674643.0
2019-02-27      6.700000      6.200000      6.450000      6.500000    103565202.0
2019-02-28      6.650000      6.300000      6.500000      6.500000     89537271.0
2019-03-01      6.750000      6.500000      6.550000      6.600000     37810434.0
2019-03-05      6.700000      6.450000      6.600000      6.650000     29368036.0
2019-03-06      6.750000      5.900000      6.700000      6.050000     51975776.0
2019-03-07      6.100000      5.850000      6.100000      5.900000     24126795.0
2019-03-08      6.000000      5.800000      6.000000      5.850000     17747421.0
2019-03-11      5.900000      5.250000      5.850000      5.350000     46595548.0
2019-03-12      5.550000      5.050000      5.450000      5.100000     45161652.0
2019-03-13      5.150000      4.800000      5.150000      4.900000     42631323.0
2019-03-14      4.950000      4.600000      4.900000      4.650000     36928629.0
2019-03-15      4.700000      4.350000      4.700000      4.400000     49090349.0
2019-03-18      4.300000      3.950000      4.300000      4.000000     70109329.0
2019-03-19      4.400000      4.300000      4.400000      4.400000    106963985.0
2019-03-20      4.800000      4.650000      4.800000      4.800000     35449865.0
2019-03-22      5.250000      4.850000      5.250000      5.250000    211154872.0
2019-03-25      5.150000      5.000000      5.150000      5.000000     57980600.0
```

```
2019-03-26      4.850000      4.750000      4.750000      4.750000     20811969.0
2019-03-27      4.550000      4.550000      4.550000      4.550000      4895814.0
2019-03-28      4.350000      4.350000      4.350000      4.350000      6336135.0


                Adj Close
Date
2010-01-04  172.102173
2010-01-05  178.143448
2010-01-06  178.585495
2010-01-07  180.648346
2010-01-08  177.652298
2010-01-11  178.880188
2010-01-12  172.347763
2010-01-13  172.446014
2010-01-14  179.764267
2010-01-15  188.212219
2010-01-18  187.082550
2010-01-19  183.055054
2010-01-20  183.595322
2010-01-21  181.876251
2010-01-22  178.339905
2010-01-25  175.884109
2010-01-27  171.660141
2010-01-28  168.222031
2010-01-29  166.797684
2010-02-01  170.579575
2010-02-02  165.962708
2010-02-03  168.123795
2010-02-04  161.886078
2010-02-05  160.609055
2010-02-08  166.011826
2010-02-09  165.176849
2010-02-10  165.520660
2010-02-11  166.453842
2010-02-15  161.886078
2010-02-16  164.440094
...                ...
2019-02-12    5.650000
2019-02-14    5.550000
2019-02-15    5.500000
2019-02-18    6.100000
2019-02-19    6.000000
2019-02-20    5.750000
2019-02-21    6.350000
2019-02-22    6.500000
2019-02-25    6.000000
2019-02-26    6.400000
2019-02-27    6.500000
```

```
2019-02-28    6.500000
2019-03-01    6.600000
2019-03-05    6.650000
2019-03-06    6.050000
2019-03-07    5.900000
2019-03-08    5.850000
2019-03-11    5.350000
2019-03-12    5.100000
2019-03-13    4.900000
2019-03-14    4.650000
2019-03-15    4.400000
2019-03-18    4.000000
2019-03-19    4.400000
2019-03-20    4.800000
2019-03-22    5.250000
2019-03-25    5.000000
2019-03-26    4.750000
2019-03-27    4.550000
2019-03-28    4.350000

[2279 rows x 6 columns]
```

In [0]:
```python
openi=list(dataset['Open'])
close=list(dataset['Close'])
date=(dataset.index.tolist())
```

In [0]:
```python
plt.plot(date, openi, '--')
plt.plot(date, close, '--')
plt.axis([date[0], date[-1],int(min(min(openi),min(close))//2),int(max(openi)+max(close

plt.legend(["Opening Price","Closing Price"])
plt.title("Reliance Comm Stock Prices")
plt.xlabel("Dates")
plt.ylabel("Stock Price")
plt.show()
```

Reliance Comm Stock Prices