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import statistics as stats
from math import *
from pandas import *
from pandas_datareader import data
from matplotlib.pyplot import *
set_option ("display.max_rows", 20000)
set_option ("display.max_columns", 1000)
set_option ("display.width", 1000)

start_date = "2014-01-01"
end_date = "2020-02-22"
google_data = data.DataReader( "GOOG", "yahoo", start_date, end_date )
time_period = 20
stdev_factor = 2 # Beta

history = []
sma_values = []
upper_band = []
lower_band = []

for close_price in google_data ["Adj Close"]:
    history.append(close_price)
    if len (history) > time_period:
        del (history [0])

    sma = stats.mean(history)
    sma_values.append(sma)

    variance = 0

    for hist_price in history:
        variance = variance + ((hist_price - sma) ** 2)

    stdev = sqrt(variance / len(history)) # sigma

    upper_band.append(sma + stdev_factor * stdev)
    lower_band.append(sma - stdev_factor * stdev)

google_data = google_data.assign(MiddleBollingerBand20DaySMA= Series(sma_values,
index=google_data.index))
google_data = google_data.assign(UpperBollingerBand20DaySMA2StdevFactor=
Series(upper_band, index=google_data.index))
google_data = google_data.assign(LowerBollingerBand20DaySMA2StdevFactor=
Series(lower_band, index=google_data.index))

close_price = google_data ["Adj Close"]
mband = google_data['MiddleBollingerBand20DaySMA']
uband = google_data['UpperBollingerBand20DaySMA2StdevFactor']
lband = google_data['LowerBollingerBand20DaySMA2StdevFactor']

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fig = figure()
ax1 = fig.add_subplot(111, ylabel='Google price in $')
close_price.plot(ax=ax1, color='black', lw=2., legend=True)
mband.plot(ax=ax1, color='b', lw=2., legend=True)
uband.plot(ax=ax1, color='g', lw=2., legend=True)
lband.plot(ax=ax1, color='r', lw=2., legend=True)
print (google_data)
legend ()
show()
```