bulbea

Release 0.1.0

May 09, 2017

Contents

> *"Deep Learning based Python library for Stock Market Prediction and Modelling."*

Release: v0.1.0 (*Installation*) **bulbea** is an Open Source Python module (released under the *Apache 2.0 License*) that consists a growing collection of statistical, visualization and modelling tools for financial data analysis and prediction using deep learning.

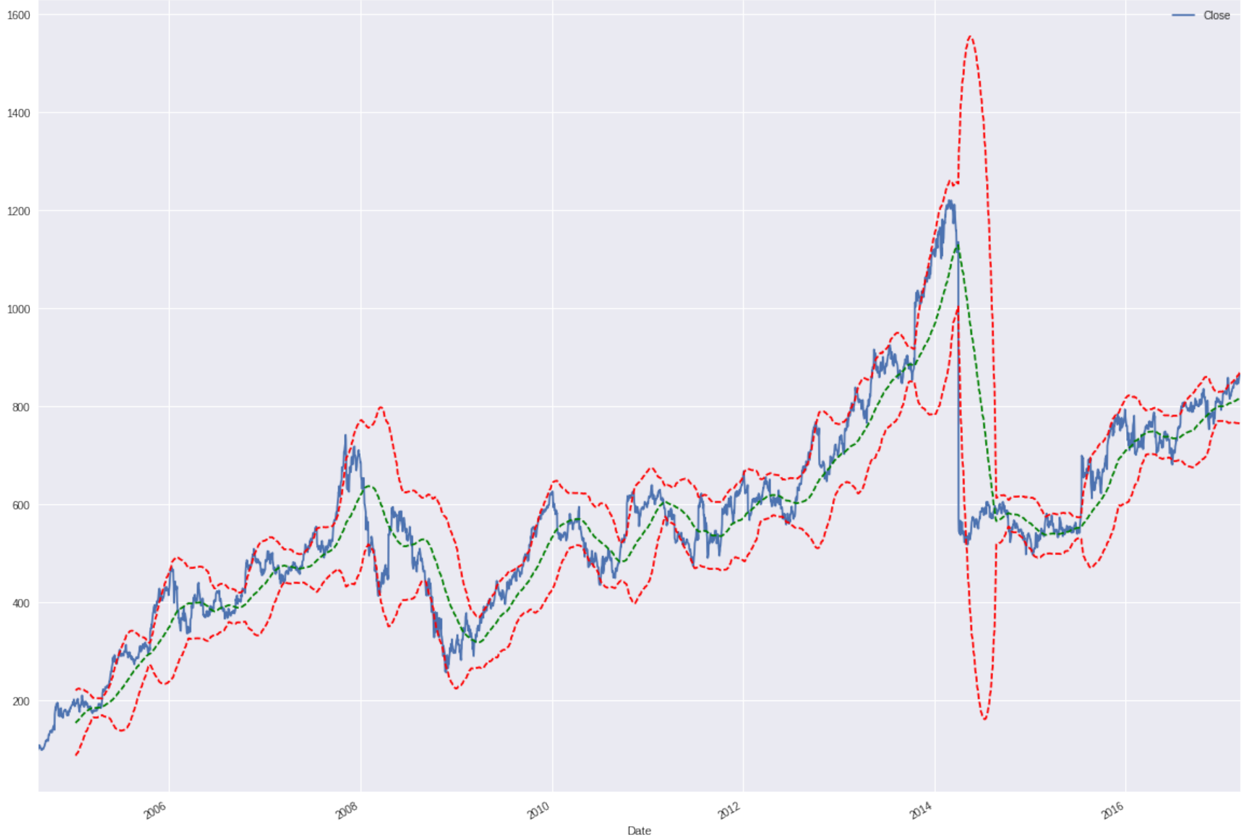
bulbea helps you with

Financial Data Loading

```
>>> import bulbea as bb
>>> share = bb.Share('YAHOO', 'GOOGL') # Get Google's historical data from Yahoo's␣
↪database
>>> share.data
                  Open        High         Low       Close      Volume  Adjusted Close
Date
2004-08-19   99.999999  104.059999   95.959998  100.339998  44659000.0       50.220219
2004-08-20  101.010005  109.079998  100.500002  108.310002  22834300.0       54.209210
2004-08-23  110.750003  113.479998  109.049999  109.399998  18256100.0       54.754754
...
```

Statistical Vizualization

```
>>> share.plot(bollinger_bands = True, period = 100, bandwidth = 2)
```



bulbea is created and currently maintained by Achilles Rasquinha.

bulbea officially supports Python 2.7 and 3.5.

CHAPTER 1

Guide - User

Introduction

What's in the name?

bulbea is a portmanteau of the very nature of a stock market - the bull and the bear. Hence, the name.

License

bulbea is released under the Apache 2.0 License.

```
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distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
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```

Installation

Building from source

bulbea is actively developed on GitHub and is always avaliable.

You can clone the base repository with `git` as follows:

```
$ git clone git@github.com:achillesrasquinha/bulbea.git
```

Optionally, you could download the tarball or zipball as follows:

For Linux Users

```
$ curl -OL https://github.com/achillesrasquinha/tarball/bulbea
```

For Windows Users

```
$ curl -OL https://github.com/achillesrasquinha/zipball/bulbea
```

Install necessary dependencies

```
$ pip install -r requirements.txt
```

bulbea depends on Keras which thereby depends on TensorFlow as a backend. You may have to manually install TensorFlow as follows:

```
$ pip install tensorflow # CPU-only
```

OR

```
$ pip install tensorflow-gpu # GPU-only, requires NVIDIA CUDA and cuDNN
```

Then, go ahead and install **bulbea** in your site-packages as follows:

```
$ python setup.py install
```

Check to see if you've installed **bulbea** correctly.

```
>>> import bulbea as bb
```

Quickstart

Waiting to make some money? We introduce you to a quick way of building your first prediction model.

Create a `Share` object

The canonical way of importing bulbea as follows:

```
>>> import bulbea as bb
```

Go ahead and create a share object.

```
>>> share = bb.Share(source = 'YAHOO', ticker = 'GOOGL')
```

CHAPTER 2

Guide - API

Developer Interface

Entities

class `bulbea.`**`Share`**(*source*, *ticker*, *start=None*, *end=None*, *latest=None*, *cache=False*)

A user-created *`Share`* object.

Parameters

- **`source`** (`str`) – *source* symbol for economic data
- **`ticker`** (`str`) – *ticker* symbol of a share
- **`start`** (`str`) – starting date string in the form YYYY-MM-DD for acquiring historical records, defaults to the earliest available records
- **`end`** (`str`) – ending date string in the form YYYY-MM-DD for acquiring historical records, defaults to the latest available records
- **`latest`** (`int`) – acquires the latest N records

Example

```
>>> import bulbea as bb
>>> share = bb.Share(source = 'YAHOO', ticker = 'GOOGL')
>>> share.data.sample(1)
            Open       High        Low  Close      Volume  Adjusted Close
Date
2003-05-15  18.6  18.849999  18.470001  18.73  71248800.0        1.213325
```

`bollinger_bands`(*attrs='Close'*, *period=50*, *bandwidth=1*)

Returns the Bollinger Bands (R) for each attribute.

Parameters

- **`attrs`** (`str`, `list`) – *str* or *list* of attribute name(s) of a share, defaults to *Close*

- **period** (int) – length of the window to compute moving averages, upper and lower bands
- **bandwidth** (int) – multiple of the standard deviation of upper and lower bands

Example

```
>>> import bulbea as bb
>>> share     = bb.Share(source = 'YAHOO', ticker = 'AAPL')
>>> bollinger = share.bollinger_bands()
>>> bollinger.tail()
            Lower (Close)  Mean (Close)  Upper (Close)
Date
2017-03-07     815.145883    831.694803     848.243724
2017-03-08     816.050821    832.574004     849.097187
2017-03-09     817.067353    833.574805     850.082257
2017-03-10     817.996674    834.604404     851.212135
2017-03-13     819.243360    835.804605     852.365849
```

plot (*attrs='Close'*, *global_mean=False*, *bollinger_bands=False*, *period=50*, *bandwidth=1*, *subplots=False*, **args*, ***kwargs*)

Parameters attrs – *str* or *list* of attribute names of a share to plot, defaults to *Close* attribute

Example

```
>>> import bulbea as bb
>>> share = bb.Share(source = 'YAHOO', ticker = 'AAPL')
>>> share.plot()
```

save (*format_='csv'*, *filename=None*)

Parameters format (str) – type of format to save the Share object, default 'csv'.

update (*start=None*, *end=None*, *latest=None*, *cache=False*)

Update the share with the latest available data.

Example

```
>>> import bulbea as bb
>>> share = bb.Share(source = 'YAHOO', ticker = 'AAPL')
>>> share.update()
```

class bulbea.**Stock**

Modelling

CHAPTER 3

Blog

Data, Data Everywhere

> *"In God we trust, all others must bring data."* - W. Edwards Deming

How data is stored

Data streams itself right from when the gates of a stock exchange open to when it closes. Such data contains vital information that is archived each day. Some of the many types of information recieved after trading hours are - *opening price*, *closing price*, *volumne of shares*, *highest price*, *lowest price*, etc. for each enterprise.

bulbea helps you access such information (both - archived and the latest). Simply create a *Share* with a known `source` and `ticker` as follows:

```
>>> import bulbea as bb
>>> share = bb.Share(source = 'YAHOO', ticker = 'GOOGL')
>>> share.data
                  Open        High         Low       Close      Volume  Adjusted Close
Date
2004-08-19   99.999999  104.059999   95.959998  100.339998  44659000.0       50.220219
2004-08-20  101.010005  109.079998  100.500002  108.310002  22834300.0       54.209210
2004-08-23  110.750003  113.479998  109.049999  109.399998  18256100.0       54.754754
...
```

Data is accessed through the `Quandl` API stored remotely at sources in the form of CSV (Comma-Seperated Values) files. Information retrieved from such a CSV file is then wrapped around a `pandas.DataFrame` object.

Comma, Seperated, Value?

CSV files store tabular data in simple plain text (well, fits the need). Each row containing values associated to each attribute of a table are stored in a single line, where each value is seperated by a delimiter, you guessed it right, a comma. For instance, a data set containing the weight (in kilograms) and height (in inches) of members of my family would look something like the following:

```
weight,height
87,6.2
51,5.8
68,5.9
...
```

Almost always, the top-most line (also called as *the header*) should denote the attribute names seperated by the delimiter.

You can save a share object in a CSV format as follows:

```
>>> share.save()
```

By default, the *`save`* method saves a share as a CSV file in the working directory with a file name of the format - `<source>_<ticker>_<start>_<end>.csv`. You could also name the file anything you like as follows:

```
>>> share.save(filename = 'mycsvfile.csv')
```

`pandas.DataFrame`

Vizualizing the Market

Artificial Neural Networks

> *"All models are wrong, but some are useful."* - George E. P. Box

Recurrent Neural Networks

A vanilla Recurrent Neural Network (hereby, RNN) is a kind of an Artificial Neural Network that considers a scenario - *at which time-step did you feed the input?*

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