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DISCUSS ON STUDENT HUB

Breakout Strategy

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The function get_long_short computes long and short signals using a breakout strategy.	ne function get_long_short computes long and short signals using a breakout strategy.	
Long and short signals using a breakout strategy are correctly calculated. Nice use of data type using the astype function to implement get_long_short() correctly	ong and short signals using a breakout strategy are correctly calculated. Nice use of data type using the astype function to implement <code>get_long_short()</code> correctly 👌	

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Congratulations!

SUGGESTION

An alternative way to compute long and short signals using pandas would be as follows:

```
long_short = pd.DataFrame(0,index = close.index, columns = close.columns)
long\_short[lookback\_low > close] = -1
long_short[lookback_high < close] = 1</pre>
return long_short
```

ADDITIONAL RESOURCES

Below are a few resources to help understand some of the pandas and numpy functionality:

Pandas DataFrame astype

Change data type of columns in Pandas

Numpy Array types and conversions between types

Difference between np.int, np.int_, int, and np.int_t in cython

The function filter_signals filters out repeated long or short signals.

filter_signals has been implemented correctly



Tests Passed

Congratulations!

SUGGESTION

You may also use iterrows over each column as recommended. iterrows() method is optimized to work with Pandas dataframes, hence a significant improvement over crude

filter_signals can also be implemented using lambda function like this:

```
pos_signal = signal[signal == 1].fillna(0)
neg_signal = signal[signal == -1].fillna(0)
pos_signal = pos_signal.apply(lambda signals: clear_signals(signals, lookahead_days))
neg_signal = neg_signal.apply(lambda signals: clear_signals(signals, lookahead_days))
return pos_signal + neg_signal
```

filter_signals can be implemented in one line as follows as well:

return signal.replace(-1, 0).apply(lambda x: clear_signals(x, lookahead_days), axis=0) + signal.replace(1, 0).apply(lambda x: clear_signals(x, lookahead_days), ax filter_signals can also be implemented without lambda function as follows:

return (signal == 1).replace({True: 1, False: 0}).apply(clear_signals, args=(lookahead_days,)) + (signal == -1).replace({True: -1, False: 0}).apply(clear_signals,

ADDITIONAL RESOURCES

You may refer on the following links below to deepen your understanding on how to access a group of rows and columns by label(s) or a boolean array using Pandas Dataframe functions:

Pandas DataFrame .loc

Using iloc, loc, & ix to select rows and columns in Pandas DataFrames

Selection with .loc in python

The difference between iloc and loc in Pandas

Looping with iterrows

The function <code>get_lookahead_prices</code> gets the close price days ahead in time.

Good job implementing <code>get_lookahead_prices</code> to get the close price days ahead in time 👍



Tests Passed

Congratulations!

ADDITIONAL RESOURCES

Please find a few resources below on shift function in a pandas DataFrame:

How to shift several rows in a pandas DataFrame

Shifting or lagging values in a dataframe Shift Pandas DataFrame with a multiindex

The function <code>get_return_tookahead</code> generates the log price return between the closing price and the lookahead price.

The log price return between the closing price and the lookahead prices are correctly calculated for 5, 10 and 20 days. Good use of Natural logarithm or np.log to implement this function 📉

Tests Passed

Congratulations!

ADDITIONAL RESOURCES

Please check the following links to know more about natural logarithm:

NumPy: Logarithm with base n

numpy.log() in Python

log(x) vs ln(x):The curse of scientific computing

The function get_signal_return generates the signal returns.

get_signal_return has been implemented correctly 👌



Tests Passed

Congratulations!

Evaluate Signal

Correctly answers the question "What do the histograms tell you about the signal returns?"

Here is a detailed explanation for each histogram:

- 5 Days
- Resembles normal distribution that is slightly fatter tailed.
- Somewhat resembles a log-normal distribution.
- 20 days
- Resembles a normal distribution with fatter tails, plus a peak of outliers visible on the right edge that breaks the sy mmetricity.
- Has a higher spread than the previous two distributions.

The following are a few documents one can read to understand histograms better :

 $https://www.researchgate.net/publication/228315820_The_Impact_of_Skewness_and_Fat_Tails_on_the_Asset_Allocation_Decision_Options and the property of the pro$

https://www.investopedia.com/terms/s/skewness.asp

Typical Histogram Shapes and What They Mean

Common shapes of distributions

Data Visualization in Python—Histogram in Matplotlib

How to Analyze a Histogram

Interpreting a Histogram

3 Things a Histogram Can Tell You

How to interpret the shape of statistical data in a Histogram

Outliers

The function calculate_kstest calculates the ks and p values.

calculate_kstest has been implemented correctly 👍

Tests Passed

Congratulations!

An alternative implementation for this method can be as follows:

```
g_mu,g_std = long_short_signal_returns.mean(), long_short_signal_returns.std(ddof=0)

grp = pd.DataFrame(long_short_signal_returns.groupby('ticker')['signal_return'].apply(list))

rzlt = pd.DataFrame(grp['signal_return'].map(lambda x: kstest(x, 'norm', args=(g_mu,g_std))))

rzlt['k'] = rzlt['signal_return'].map(lambda x: x[0])

rzlt['p'] = rzlt['signal_return'].map(lambda x: x[1])
return rzlt['k'], rzlt['p']
```

ADDITIONAL RESOURCES

What is a Kolmogorov-Smirnov normality test?

How to use a proper normalization to have the right p_values and ks_values from Kolmogorov-Smirnov test (KS test)?

numpy.mean can be used to compute the arithmetic mean along the specified axis.

numpy.std can be used to compute the standard deviation along the specified axis.

What are the differences between np.mean and np.average?

Summarising, Aggregating, and Grouping data in Python Pandas

The function find_outliers returns the list of outlying symbols.

The function find_outliers implemented correctly to return the list of outlying symbols.

Tests Passed

Congratulations!

find_outliers | function correctly returns 24 outliers 👍

find_outliers can also be implemented in one line as follows:

return set(ks_values[ks_values > ks_threshold].index).intersection(p_values[p_values < pvalue_threshold].index)

return set(ks_values[ks_values > ks_threshold][p_values < pvalue_threshold].index.values)</pre>

ADDITIONAL RESOURCES

Python Set intersection

You may use numpy.logical_and to compute the truth value of x1 AND x2 element-wise.

numpy.logical_and Parameters

Difference between numpy.logical_and and &

Logical operations on boolean arrays

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