



Ruslan Korniichuk

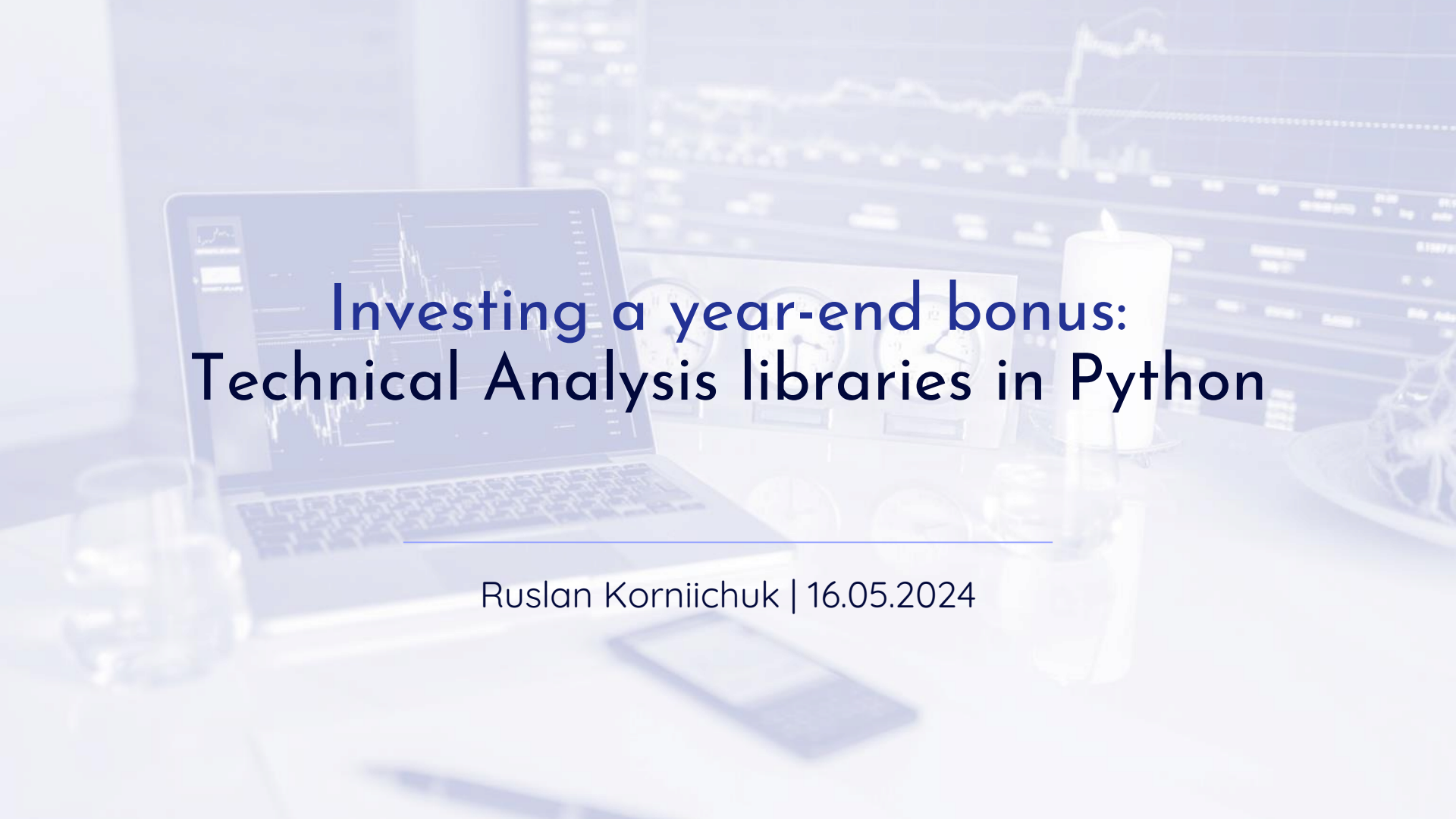
**Investing a year-end bonus:
Technical Analysis libraries in Python**



**Pytech
Summit**
All about Python **2024**

16

Maja 2024



Investing a year-end bonus: Technical Analysis libraries in Python

Ruslan Kornichuk | 16.05.2024



Technical Analysis

Search term



Technical analysis

Topic



+ Add comparison

United States ▾

Past 5 years ▾

All categories ▾

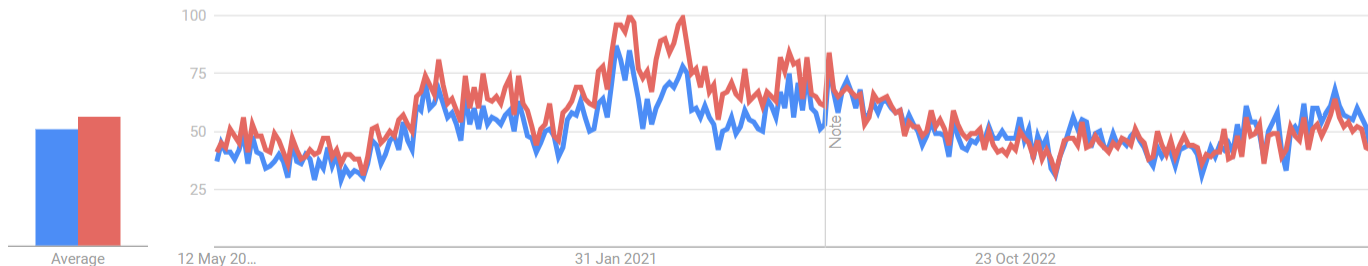
Web Search ▾

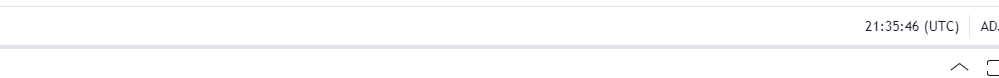


Note: This comparison contains both Search terms and Topics, which are measured differently.

[LEARN MORE](#)

Interest over time ?





Watchlist

Symbol

Last

Chg

Chg%

INDICES

SPX

5308.14

61.45

1.17%

NDQ

18596.64

273.87

1.49%

DJI

39908.01

349.89

0.88%

VIX

12.45

-0.97

-7.23%

DXY

104.306

-0.715

-0.68%

STOCKS

AAPL

189.72

2.29

1.22%

TSLA

173.99

-3.56

-2.01%

NFLX

613.52

-0.14

-0.02%

FUTURES

USOIL

78.80

0.44

0.56%

GOLD

2385.70

27.90

1.18%

SILVER

29.66

1.050

3.67%

PKO

PKOBP

GPW

Finance • Major Banks

57.60

PLN

-0.08

-0.14%

MARKET CLOSED MAY 15 19:12 UTC+2

yesterday • PKO BP Recommends FY 2023 Dividend Of 2.59 Zlotys/Shr

Key stats

Next earnings report

In 99 days

Volume

3.44 M

Average Volume (30D)

2.81 M

Market capitalization

72.10 B

Earnings

99

2.40

1.80

1.20

TABLE OF CONTENTS

01

Disclaimer

02

Technical Analysis

03

Data

04

Data may differ

05

Python libraries

06

Learning materials

01

Disclaimer

NO investment advice

The content is for **informational purposes only**. You should NOT interpret any such information or other material as investment, financial, legal, tax, or other advice.

02

Technical Analysis

Technical Analysis (TA)

TA is a **trading discipline** used to identify trading opportunities in price trends and patterns seen on charts.

A method of analyzing and **predicting stock movements** based on past market data, primarily price and volume [src].

Technical Analysis vs Fundamental Analysis

Technical Analysis

pros

- timely
- simplicity
- risk management
- psychological insights
- disciplined trading (less emotion)
- adaptable

Fundamental Analysis

pros

- in-depth understanding
- long-term focus
- risk mitigation
- qualitative factors
- adaptable

Technical Analysis vs Fundamental Analysis

Technical Analysis

cons

- self-fulfilling
- noise (false signals)
- lack of fundamentals
- subjectivity
- information overload

Fundamental Analysis

cons

- time-consuming
- short-term inefficiency
- market irrationality
- subjectivity
- information overload

03

Data

Data

- yfinance Python lib
- EODHD Financial Data APIs
- Stooq Historical data (.CSV, scraping), e.g.:
 - stooq.com/q/d/?s=pko
 - stooq.com/q/d/?s=pzu
- GPW Price archive (.XLS, scraping)

yfinance

Public

Sponsor

Watch 238

Fork 2.2k

Starred 12k

main

14 Branches

89 Tags

Go to file

Add file

Code

ValueRaider

Merge pull request #1919 from ranaroussi/feature/readme-table-of-con...

e238ac1 · 3 weeks ago

1,194 Commits

.github	Update issue form - more emphasis on following instructions	3 months ago
tests	Move price history+repair logic into new file	3 months ago
yfinance	Version 0.2.38	last month
.gitignore	fix: start year on history	last year
.travis.yml	removed python 3.5 support	3 years ago
CHANGELOG.rst	Version 0.2.38	last month
CODE_OF_CONDUCT.md	Create CODE_OF_CONDUCT.md	6 months ago
LICENSE.txt	new license	5 years ago
MANIFEST.in	first commit	7 years ago
README.md	Add table-of-contents to README	3 weeks ago
meta.yaml	Version 0.2.38	last month
mkdocs.yml	CI stuff	3 years ago
requirements.txt	Revert adding explicit requirements	4 months ago
setup.cfg	renamed file	5 years ago
setup.py	Set sensible min versions for optional 'nospam' reqs	5 months ago

README

Code of conduct

Apache-2.0 license

Download market data from Yahoo! Finance's API

About

Download market data from Yahoo! Finance's API

[aroussi.com/post/python-yahoo-finance](#)

- python

pandas

yahoo-finance-api

market-data

stock-data

financial-data

yahoo-finance

fix-yahoo-finance

- Readme

Apache-2.0 license

Code of conduct

Activity

12k stars

238 watching

2.2k forks

Report repository

Releases 75

0.2.38

Latest

last month

+ 74 releases

Sponsor this project

[patreon.com/ranaroussi](#)

[https://paypal.me/ranaroussi](#)

Packages

No packages published

Symbol np: [^SPX](#)

Kwotuj

Login i [hasło](#)

[zapisz](#)

[Loguj](#)

Historical data: Powszechna Kasa Oszczędności Bank Polski SA (PKO)

15 May, 17:01 **57.60** -0.08 (-0.14%)

More On PKO

[Summary](#)

[Chart](#)

[Chart HTML5](#)

[Technical Analysis](#)

Historical data

[News](#)

[Calendar](#)

[Profile](#)

[Shareholders](#)

[Operations](#)

[Ulubione](#)

[GPW, WIG20, Akcje](#)

[Indeksy, Azja, Europa, Ameryka, Futures](#)

[Towary, Obligacje](#)

[Waluty, €, \\$, ¥, zł](#)

[Statystyka sesji](#)

[Market On-line](#)

Start date:

eg. Jan 15 2008

May

10

2024

End date:

May

15

2024

[Default date range](#)

Show

Interval:

☒

Daily

☐

Weekly

☐

Monthly

☐

Quarterly

☐

Yearly

Skip:

☐

splits

☒

dividends

☐

preemptive rights

☐

prepurchase rights

☐

preaccession rights

☐

denominations

☐

others

Easier access to the data PKO

On the ticker field set "**d:pk0**", and Stooq instantly take you to the site with historical data.

English

[polski](#)

Historical values of PKO

No.	Date	Open	High	Low	Close	Change		Volume
4	15 May 2024	57.56	57.88	56.84	57.6	-0.14%	-0.08	3,436,021
3	14 May 2024	57.96	58.2	56.64	57.68	-0.65%	-0.38	3,092,146
2	13 May 2024	57.72	58.46	57.28	58.06	+0.87%	+0.50	1,832,523
1	10 May 2024	61.2	61.26	57.56	57.56			3,682,111

Download data in csv file...

Downloaded data separator: **comma** | [semicolon](#)

Archived prices

Use GPW historical data. Note that you also can browse through historical data in individual instrument sheets.

Select the category of instrument

Equities



Select the instrument (optional)

-- select --



Select the date

15-05-2024



Show results



Download (XLS)

Full version of the table

Name ...	Currency ...	Opening price ...	Maximum price ...	Minimum price ...	Closing price ...	% price change ...	Turnover value (thou.) ...
06MAGNA	PLN	3.3750	3.3750	3.2900	3.2900	-2.66	41.79
08OCTAVA	PLN	0.9550	0.9550	0.9550	0.9550	0.00	0.10
11BIT	PLN	585.0000	595.0000	582.0000	590.0000	0.85	1,668.68
3RGAMES	PLN	0.2700	0.2970	0.2650	0.2840	6.37	100.21
ABPL	PLN	97.6000	100.0000	97.0000	99.8000	2.05	2,739.04

04

Data may differ

Archiwum notowań

Skorzystaj z archiwalnych danych giełdowych GPW. Pamiętaj, że na kartach poszczególnych Instrumentów również możesz przeszukać archiwalne dane.

Wybierz kategorię instrumentu

akcje



Wybierz instrument (opcjonalnie)

-- wybierz --



Wybierz dzień

15-05-2023



Pokaż wyniki



Pobierz (XLS)

Pełna wersja tabeli

Nazwa ---	Waluta ---	Kurs otwarcia ---	Kurs maksymalny ---	Kurs minimalny ---	Kurs zamknięcia ---	Zmiana kursu % ---	Wartość obrotu (w tys.) ---
PKOBP	PLN	31,6300	31,6700	31,0600	31,3700	0,06	46 996,85

Dane historyczne: Powszechna Kasa Oszczędności Bank Polski SA (PKO)

15 maj, 17:01 57.60 -0.08 (-0.14%)

[PZU](#) +1.81% | [PKN](#) +0.04% | [WIG20](#) -0.07%

Menu symbolu PKO

[Ogólnie](#)
[Wykres](#)
[Wykres HTML5](#)
[Analiza techniczna](#)
▶ **Dane historyczne**
[Wiadomości](#)
[Kalendarium](#)
[Profil](#)
[Akcjonariat](#)
[Operacje](#)

[Ulubione](#)

Data początku:
np. 15 Sty 2008

Data końca:

[Domyślny zakres czasowy](#)

Interwał:
☒ Dzienny
☐ Tygodniowy
☐ Miesięczny
☐ Kwartalny
☐ Roczny

Pomijaj:
☐ splity
☐ dywidendy
☐ prawa poboru
☐ prawa nabycia
☐ prawa objęcia
☐ denominacje
☐ inne

Prostszy dostęp do danych PKO

W polu podawania nazwy tikera wpisz "d:pko", a Stooq od razu przeniesie Cię na stronę z danymi historycznymi.

[English](#)
[polski](#)

Wartości historyczne PKO							
<< < > >>							
Nr.	Data	Otwarcie	Najwyższy	Najniższy	Zamknięcie	Zmiana	Wolumen
1	15 maj 2023	30.8141	30.853	30.2588	30.5608		1,539,667

Nazwa ***	Waluta ***	Kurs otwarcia ***	Kurs maksymalny ***	Kurs minimalny ***	Kurs zamknięcia ***	Zmiana kursu % ***	Wartość obrotu (w tys.) ***
PKOBP	PLN	31,6300	31,6700	31,0600	31,3700	0,06	46 996,85

Dane historyczne: Powszechna Kasa Oszczędności Bank Polski SA (PKO)

15 maj, 17:01 57.60 -0.08 (-0.14%)

[PZU](#) +1.81% | [PKN](#) +0.04% | [WIG20](#) -0.07%

Menu symbolu PKO

[Ogólnie](#)
[Wykres](#)
[Wykres HTML5](#)
[Analiza techniczna](#)
► **Dane historyczne**
[Wiadomości](#)
[Kalendarium](#)
[Profil](#)
[Akcjonariat](#)
[Operacje](#)

[Ulubione](#)

Data początku:
np. 15 Sty 2008

Data końca:

[Domyślny zakres czasowy](#)
[Pokaż](#)

Interwał:
☒ Dzienny
☐ Tygodniowy
☐ Miesięczny
☐ Kwartalny
☐ Roczny

Pomijaj:
☐ splity
☒ dywidendy
☐ prawa poboru
☐ prawa nabycia
☐ prawa objęcia
☐ denominacje
☐ inne

Prostszy dostęp do danych PKO

W polu podawania nazwy tiktora wpisz "d:pkco", a Stooq od razu przeniesie Cię na stronę z danymi historycznymi.

[English](#)
[polski](#)

Wartości historyczne PKO							
<< < > >>							
Nr.	Data	Otwarcie	Najwyższy	Najniższy	Zamknięcie	Zmiana	Wolumen
1	15 maj 2023	31.630029829439	31.669959866674	31.06002598171	31.370022671813		1,499,950

Nazwa ***	Waluta ***	Kurs otwarcia ***	Kurs maksymalny ***	Kurs minimalny ***	Kurs zamknięcia ***	Zmiana kursu % ***	Wartość obrotu (w tys.) ***
PKOBP	PLN	31,6300	31,6700	31,0600	31,3700	0,06	46 996,85

05

Python libraries

Go to file t Add file

<> Code ▾

Python wrapper for TA-Lib (<http://ta-lib.org/>).

python finance pattern-recognition
quantitative-finance technical-analysis
ta-lib

-  [Readme](#)
-  [View license](#)
-  [Cite this repository](#)
-  [Activity](#)
-  [Custom properties](#)

☆ 9.1k stars
👁 331 watching
🔗 1.7k forks
[Report repository](#)

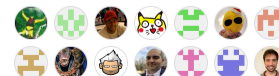
Releases

25 tags

Packages

No packages published

Contributors 29



+ 15 contributors

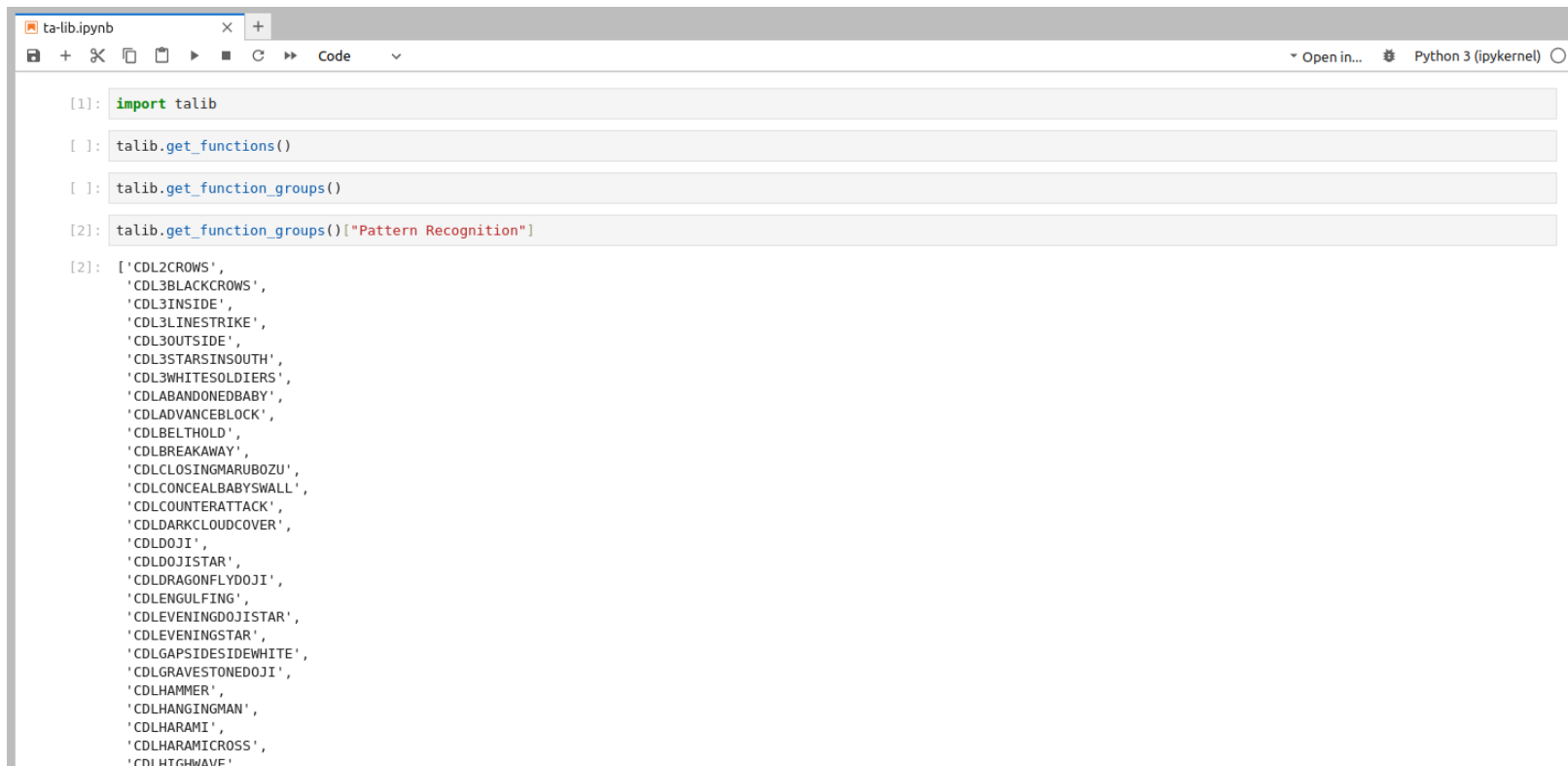
mrjbq7

Update cython to 3.0.10 and silent some const pointer warnings

e829cda · last week

615 Commits

TA-Lib: Supported indicators



The screenshot shows a Jupyter Notebook interface with a single cell containing the following code:

```
[1]: import talib

[ ]: talib.get_functions()

[ ]: talib.get_function_groups()

[2]: talib.get_function_groups()["Pattern Recognition"]
```

The output of the last cell is a list of 35 candlestick pattern indicators:

```
[2]: ['CDL2CROWS',
      'CDL3BLACKCROWS',
      'CDL3INSIDE',
      'CDL3LINESTRIKE',
      'CDL3OUTSIDE',
      'CDL3STARSINSOUTH',
      'CDL3WHITESOLDIERS',
      'CDLABANDONEDBABY',
      'CDLADVANCEBLOCK',
      'CDLBELTHOLD',
      'CDLBREAKAWAY',
      'CDLCLOSINGMARUBOZU',
      'CDLCONCEALBABYSWALL',
      'CDLCOUNTERATTACK',
      'CDLDARKCLOUDCOVER',
      'CDLDOJI',
      'CDLDOJISTAR',
      'CDLDragonFLYDOJI',
      'CDLENGULFING',
      'CDLEVENINGDOJISTAR',
      'CDLEVENINGSTAR',
      'CDLGAPSIDESIDEWHITE',
      'CDLGRAVESTONEDOJI',
      'CDLHAMMER',
      'CDLHANGINGMAN',
      'CDLHARAMI',
      'CDLHARAMICROSS',
      'CDLHIGHWAVE']
```

Aroon Oscillator (AROONOSC)

The **Aroon Oscillator** is a trend-following indicator that uses aspects of the Aroon Indicator (Aroon Up and Aroon Down) to gauge the strength of a current trend and the likelihood that it will continue.

The oscillator moves between -100 and 100. A high oscillator value is an indication of an uptrend while a low oscillator value is an indication of a downtrend [[src](#)].



TA-Lib: Momentum Indicators

```
ta-lib.ipynb
+
Python 3 (ipykernel)

[1]: import pandas as pd
import talib
import yfinance as yf

[2]: pd.options.plotting.backend = "plotly"

[3]: df = yf.download("AAPL", start="2024-03-01", end="2024-05-15")

[*****100%*****] 1 of 1 completed

[4]: df["aroon"] = talib.AROONOSC(df.High, df.Low)

[5]: df.aroon.tail(20)

[5]: Date
2024-04-17    14.285714
2024-04-18   -28.571429
2024-04-19   -35.714286
2024-04-22   -35.714286
2024-04-23   -35.714286
2024-04-24   -35.714286
2024-04-25   -35.714286
2024-04-26   -35.714286
2024-04-29   -35.714286
2024-04-30   -35.714286
2024-05-01   -35.714286
2024-05-02   -35.714286
2024-05-03    71.428571
2024-05-06    71.428571
2024-05-07    71.428571
2024-05-08    71.428571
2024-05-09    71.428571
2024-05-10    64.285714
2024-05-13   100.000000
2024-05-14   100.000000
Name: aroon, dtype: float64
```



Hammer Candlestick

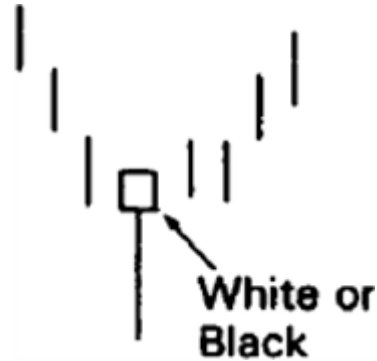
The **hammer** can be recognized by three criteria:

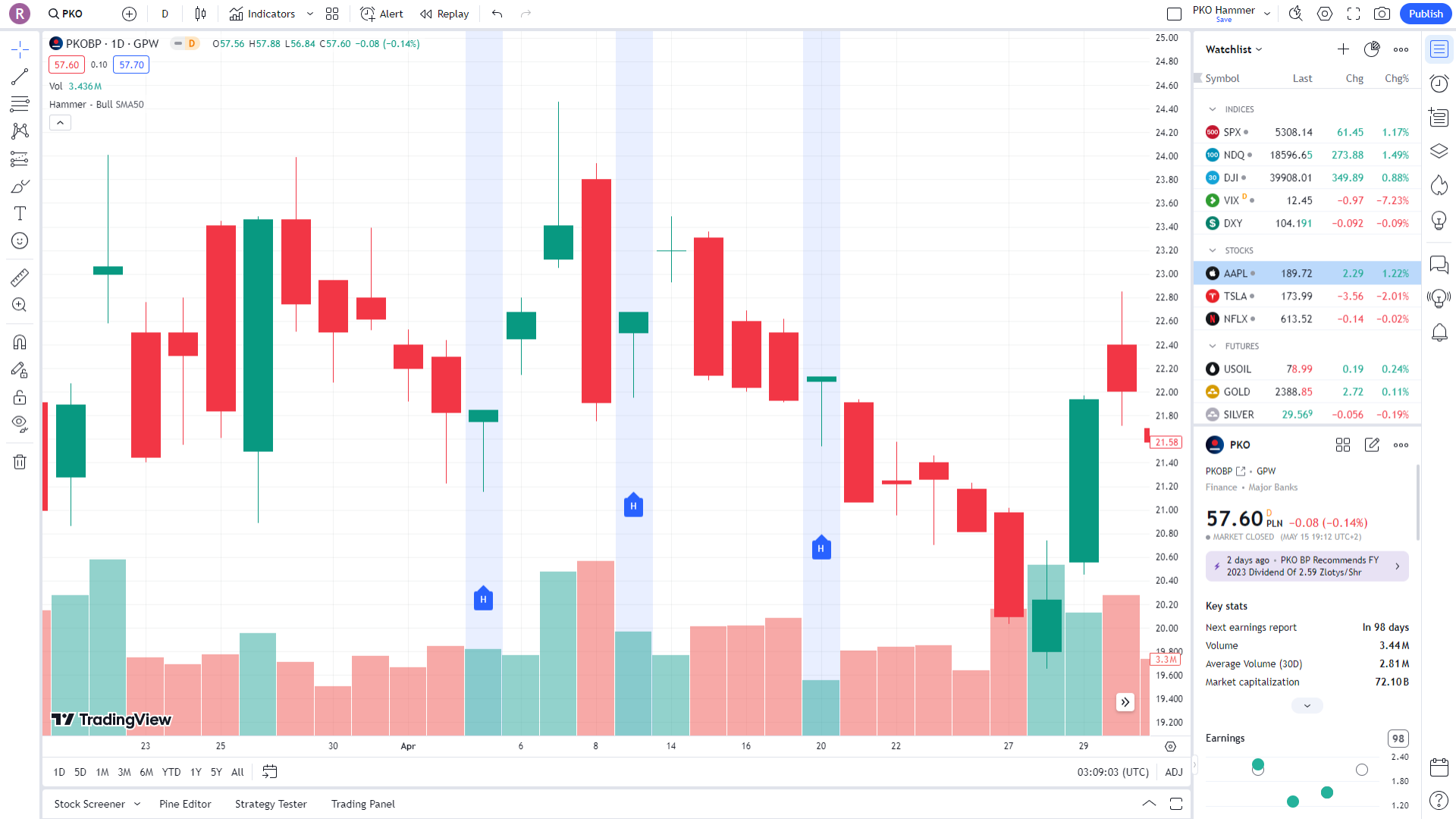
1. The real body is at the upper end of the trading range. The color of the real body is not important.
2. It has a long lower shadow that should be at least twice the height of the real body.
3. It should have no, or a very short, upper shadow [[src](#)].



Hammer Candlestick

Trend: A hammer must come after a decline [[src](#)].





TA-Lib: Abstract API



```
[1]: API_TOKEN = "REDACTED"

[2]: import pandas as pd
import requests
from talib import abstract

[3]: url = f'https://eodhd.com/api/eod/PKO.WAR?api_token={API_TOKEN}&fmt=json'
data = requests.get(url).json()

[4]: df = pd.json_normalize(data)
df.columns

[4]: Index(['date', 'open', 'high', 'low', 'close', 'adjusted_close', 'volume'], dtype='object')

[5]: df = df.drop('close', axis=1)
df = df.rename(columns={"adjusted_close": "close"})

[6]: df["hammer"] = abstract.CDLHAMMER(df)

[7]: df.hammer

0      0
1      0
2      0
3      0
4      0
..
247    0
248    0
249    0
250    0
251    0
Name: hammer, Length: 252, dtype: int32
```

twopirllc pandas-ta Public

Watch 100

Fork 935

Starred 4.8k

main

2 Branches 6 Tags

Go to file

Add file

<> Code

About

Technical Analysis Indicators - Pandas TA is an easy to use Python 3 Pandas Extension with 150+ Indicators

twopirllc.github.io/pandas-ta/

finance technical trading jupyter-notebook pandas python3 stock-market trading-algorithms technical-analysis dataframe technical-indicators fundamental-analysis technical-analysis-library technical-analysis-indicators pandas-dataframe-extension pandas-extension pandas-ta

Readme MIT license Code of conduct Activity 4.8k stars 100 watching 935 forks Report repository

Releases 5

PandasTA-v0.3.14b Latest on Jul 28, 2021

+ 4 releases

Packages

twopirllc Update bug report

084dbe1 · 2 years ago 585 Commits

.github/ISSUE_TEMPLATE	Update bug report	2 years ago
data	ENH strategy method params and col_numbers kwargs MAI...	4 years ago
docs	formatting fixes, PEP8 etc	4 years ago
examples	Removed the need to call bind explicitly	3 years ago
images	ENH logo MAINT gitignore + update example notebooks	3 years ago
pandas_ta	MAINT custom minor refactoring	3 years ago
tests	ENH #342 jma indicator MAINT jma ext TST DOC	3 years ago
.gitignore	MAINT hwc colum renaming and reqs update	3 years ago
CODE_OF_CONDUCT.md	Create CODE_OF_CONDUCT.md	4 years ago
LICENSE	LICENSE update	3 years ago
Makefile	ENH BUG #38 vwap anchor argument fix	3 years ago
README.md	DOC pypi version bump	3 years ago
init.py	Add 2 T1 : Heikin-Ashi and supertrend	4 years ago
_config.yml	Set theme jekyll-theme-slate	5 years ago
requirements.txt	Bump numpy from 1.19.5 to 1.22.0	2 years ago
setup.py	MAINT custom minor refactoring	3 years ago

README Code of conduct MIT license

Pandas TA: Supported indicators

```
pandas_ta.ipynb x +
+ ⌂ 📄 ▶ ■ ↻ ⏪ Code ⌵
~ Open in... 🛡 Python 3 (ipykernel) ○
```

```
[1]: import pandas as pd
import pandas_ta as ta

[2]: df = pd.DataFrame()

[3]: # List of all indicators
df.ta.indicators()

Pandas TA - Technical Analysis Indicators - v0.3.14b0
Total Indicators & Utilities: 205
Abbreviations:
    aberration, above, above_value, accbands, ad, adosc, adx, alma, amat, ao, aobv, apo, aroon, atr, bbands, below, below_value, bias, bop, brar, cci, cdl_pattern, cdl_z,
    cfo, cg, chop, cksp, cmf, cmo, coppock, cross, cross_value, cti, decay, decreasing, dema, dm, donchian, dpo, ebsw, efi, ema, entropy, eom, er, eri, fisher, fwma, ha, hilo,
    hl2, hlc3, hma, hwc, hwma, ichimoku, increasing, inertia, jma, kama, kc, kdj, kst, kurtosis, kvo, linreg, log_return, long_run, macd, mad, massi, mcgd, median, mfi, midpoi
    nt, midprice, mom, natr, nvi, obv, ohlc4, pdist, percent_return, pgo, ppo, psar, psl, pvi, pvo, pvol, pvr, pvt, pwma, qqe, qstick, quantile, rma, roc, rsi, rsx, rvgi, rvi,
    short_run, sinwma, skew, slope, sma, smi, squeeze, squeeze_pro, ssf, stc, stdev, stoch, stochrsi, supertrend, swma, t3, td_seq, tema, thermo, tos_stdevall, trima, trix, tr
    ue_range, tsi, tsignals, ttm_trend, ui, uo, variance, vhf, vidya, vortex, vp, vwap, vwma, wcp, willr, wma, xsignals, zlma, zscore

Candle Patterns:
    2crows, 3blackcrows, 3inside, 3linestrike, 3outside, 3starsinsouth, 3whitesoldiers, abandonedbaby, advanceblock, belthold, breakaway, closingmarubozu, concealbabyswal
    l, counterattack, darkcloudcover, doji, dojistar, dragonflydoji, engulfing, eveningdojistar, eveningstar, gapsidesidewhite, gravestonedoji, hammer, hangingman, harami, har
    amicross, highwave, hikkake, hikkakemod, homingpigeon, identical3crows, inneck, inside, invertedhammer, kicking, kickingbylength, ladderbottom, longleggeddoji, longline, m
    arubozu, matchinglow, mathold, morningdojistar, morningstar, onneck, piercing, rickshawman, riseall3methods, separatinglines, shootingstar, shortline, spinningtop, stalle
    dpattern, sticksandwich, takuri, tasukigap, thrusting, tristar, unique3river, upsidegap2crows, xsidegap3methods
```

Average Directional Index (ADX)

The **Average Directional Index (ADX)** is a technical analysis indicator used by some traders to determine the strength of a trend.

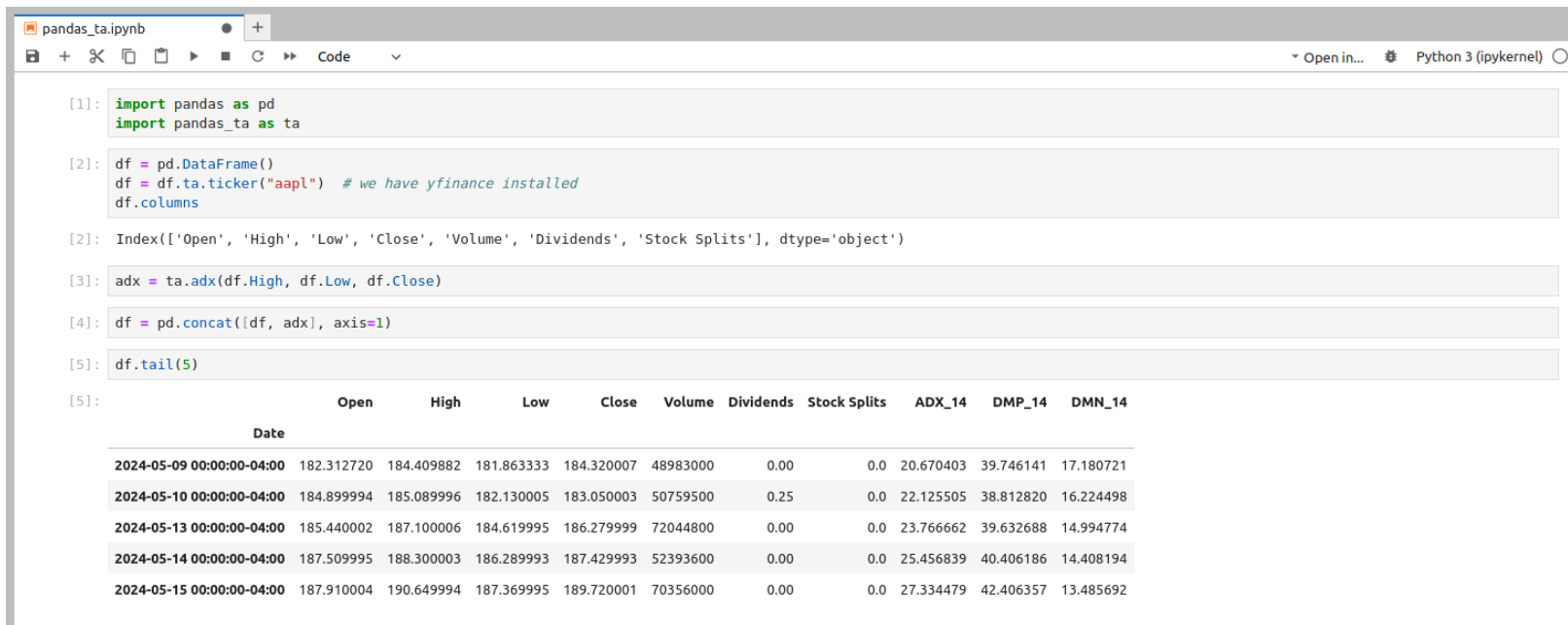
The trend can be either up or down, and this is shown by two accompanying indicators, the negative directional indicator (-DI) and the positive directional indicator (+DI) [[src](#)] .

Average Directional Index (ADX)

ADX value	trend strength
0-25	Absent or weak trend
25-50	Strong trend
50-75	Very strong trend
75-100	Extremely strong trend



Pandas TA: Trend



The screenshot shows a Jupyter Notebook interface with a file named 'pandas_ta.ipynb'. The notebook contains five code cells. The first cell imports 'pandas' as 'pd' and 'pandas_ta' as 'ta'. The second cell creates a DataFrame 'df' from 'df.ta.ticker("aapl")' and displays its columns. The third cell calculates 'adx' using 'ta.adx(df.High, df.Low, df.Close)'. The fourth cell concatenates 'df' and 'adx' along axis 1. The fifth cell displays the tail of the DataFrame, showing the last five rows of data with columns: Date, Open, High, Low, Close, Volume, Dividends, Stock Splits, ADX_14, DMP_14, and DMN_14.

```
[1]: import pandas as pd
import pandas_ta as ta

[2]: df = pd.DataFrame()
df = df.ta.ticker("aapl") # we have yfinance installed
df.columns

[2]: Index(['Open', 'High', 'Low', 'Close', 'Volume', 'Dividends', 'Stock Splits'], dtype='object')

[3]: adx = ta.adx(df.High, df.Low, df.Close)

[4]: df = pd.concat([df, adx], axis=1)

[5]: df.tail(5)
```

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits	ADX_14	DMP_14	DMN_14
	2024-05-09 00:00:00-04:00	182.312720	184.409882	181.863333	184.320007	48983000	0.00	0.0	20.670403	39.746141	17.180721
	2024-05-10 00:00:00-04:00	184.899994	185.089996	182.130005	183.050003	50759500	0.25	0.0	22.125505	38.812820	16.224498
	2024-05-13 00:00:00-04:00	185.440002	187.100006	184.619995	186.279999	72044800	0.00	0.0	23.766662	39.632688	14.994774
	2024-05-14 00:00:00-04:00	187.509995	188.300003	186.289993	187.429993	52393600	0.00	0.0	25.456839	40.406186	14.408194
	2024-05-15 00:00:00-04:00	187.910004	190.649994	187.369995	189.720001	70356000	0.00	0.0	27.334479	42.406357	13.485692

Pandas TA: DataFrame Extension

```
pandas_ta.ipynb
```

```
[1]: import pandas as pd
import pandas_ta as ta

[2]: df = pd.DataFrame()
df = df.ta.ticker("aapl") # we have yfinance installed
df.columns

[2]: Index(['Open', 'High', 'Low', 'Close', 'Volume', 'Dividends', 'Stock Splits'], dtype='object')

[3]: adx = df.ta.adx() # no docstring

[4]: df = pd.concat([df, adx], axis=1)

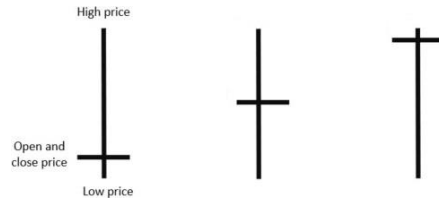
[5]: df.tail(5)
```

	Open	High	Low	Close	Volume	Dividends	Stock Splits	ADX_14	DMP_14	DMN_14
2024-05-09 00:00:00-04:00	182.312720	184.409882	181.863333	184.320007	48983000	0.00	0.0	20.670404	39.746141	17.180721
2024-05-10 00:00:00-04:00	184.899994	185.089996	182.130005	183.050003	50759500	0.25	0.0	22.125506	38.812820	16.224497
2024-05-13 00:00:00-04:00	185.440002	187.100006	184.619995	186.279999	72044800	0.00	0.0	23.766663	39.632687	14.994774
2024-05-14 00:00:00-04:00	187.509995	188.300003	186.289993	187.429993	52393600	0.00	0.0	25.456840	40.406186	14.408193
2024-05-15 00:00:00-04:00	187.910004	190.649994	187.369995	189.720001	70356000	0.00	0.0	27.334479	42.406357	13.485692

Engulfing Pattern

There are three criteria for an engulfing pattern:

1. The market has to be in a clearly definable trend.
2. Two candles comprise the engulfing pattern. The second real body must engulf the prior real body.
3. The second real body of the engulfing pattern should be the opposite color of the first real body (exception to this rule is if the first real body is a doji) [[src](#)].



Engulfing Pattern

The market has to be in a clearly definable **uptrend** (for a **bearish** engulfing pattern) or **downtrend** (for a **bullish** engulfing pattern), even if the trend is short term [[src](#)].





Pandas TA: Candle Patterns

```
pandas_ta.ipynb
```

```
[1]: import pandas as pd
import pandas_ta as ta

[2]: df = pd.read_csv("pko_d.csv") # https://stoq.com/q/d/l/?s=pko&i=d&o=0100000

[3]: df.columns

[3]: Index(['Date', 'Open', 'High', 'Low', 'Close', 'Volume'], dtype='object')

[4]: df["engulfing"] = df.ta.cdl_pattern(name="engulfing")

[5]: df[df.engulfing != 0]
```

	Date	Open	High	Low	Close	Volume	engulfing
6	2004-11-19	14.1082	14.1082	13.9376	13.9376	5.269801e+06	-100.0
49	2005-01-19	14.9671	15.4858	14.7975	15.4858	4.422310e+06	100.0
52	2005-01-24	14.9108	15.2010	14.9108	15.2010	1.448239e+06	100.0
77	2005-02-28	16.3456	16.4580	15.8268	16.0598	1.889497e+06	-100.0
124	2005-05-10	15.1439	15.1439	14.6841	14.7975	1.271948e+06	-100.0
...	...	...	...	...	...	...	...
4772	2023-12-01	46.1675	48.5154	46.1675	48.2718	3.108177e+06	100.0
4783	2023-12-18	47.6873	49.1583	47.5119	49.0999	2.286195e+06	100.0
4833	2024-02-29	54.4200	56.1000	54.4200	55.5600	4.304469e+06	100.0
4851	2024-03-26	57.0800	58.4000	56.6200	58.2000	2.748627e+06	100.0
4859	2024-04-09	61.0600	61.1200	59.0200	59.2000	2.698271e+06	-100.0

342 rows x 7 columns

👤 ta

Public

💖 Sponsor

👁 Watch 150 ▾

🍴 Fork 845 ▾

☆ Star 4.1k ▾

🔗 master ▾

🌿 18 Branches

🏷 65 Tags

🔍 Go to file

🔍

Add file ▾

<> Code ▾

👤 bukosabino	Merge pull request #330 from bukosabino/develop-linter-vpt	🔒 🔴	5654782 · 7 months ago	🕒 662 Commits
📁 .circleci	fix circle ci config			7 months ago
📁 .github	Update FUNDING.yml			4 years ago
📁 docs	Create index.rst			3 years ago
📁 examples_to_use	update example notebooks/scripts			4 years ago
📁 static	refactor doc folder			4 years ago
📁 ta	fixing linter details			7 months ago
📁 test	fixing linter details			7 months ago
📄 .coveragerc	cleaning test folder structure			4 years ago
📄 .coveralls.yml	coverage			5 years ago
📄 .gitignore	clean code			5 years ago
📄 .prospector.yaml	cleaning code (prospector, black)			4 years ago
📄 LICENSE	Update LICENSE			4 years ago
📄 MANIFEST	update version			5 years ago
📄 Makefile	Fixing linter			7 months ago
📄 README.md	Improve README			last year
📄 RELEASE.md	update release and setup.py			7 months ago
📄 pylintrc	cleaning code (prospector, black)			4 years ago
📄 requirements-core.txt	Bumping numpy because of vulnerability issue			3 years ago
📄 requirements-coverage.txt	refactor names requirements files			5 years ago

About

Technical Analysis Library using Pandas and Numpy

🔗 [technical-analysis-library-in-python.read...](#)

- python

trading

numpy

financial

pandas

python3

volume

momentum

technical-analysis

oscillator

trend

volatility

fundamental-analysis

trend-analysis

technical-analysis-library

series-datasets

- 📖 Readme

📄 MIT license

🔄 Activity

☆ 4.1k stars

👁 150 watching

🍴 845 forks

Report repository

Releases

🏷 65 tags

Sponsor this project

👤 bukosabino

Dario López Padial

💖

🏠

tidelift.com/funding/github/pypi/ta

Learn more about GitHub Sponsors

Packages

No packages published

TA: Trend



```
[1]: import ta
import yfinance as yf

[2]: df = yf.download("AAPL", start="2024-03-01", end="2024-05-15")
df.columns

[*****100%*****] 1 of 1 completed

[2]: Index(['Open', 'High', 'Low', 'Close', 'Adj Close', 'Volume'], dtype='object')

[3]: df["adx"] = ta.trend.adx(df.High, df.Low, df["Adj Close"])
df["adx_pos"] = ta.trend.adx_pos(df.High, df.Low, df["Adj Close"])
df["adx_neg"] = ta.trend.adx_neg(df.High, df.Low, df["Adj Close"])

# df["adx"] = ta.trend.ADXIndicator(df.High, df.Low, df["Adj Close"]).adx()
# df["adx_pos"] = ta.trend.ADXIndicator(df.High, df.Low, df["Adj Close"]).adx_pos()
# df["adx_neg"] = ta.trend.ADXIndicator(df.High, df.Low, df["Adj Close"]).adx_neg()

[4]: df.tail(5)
```

[4]:

	Open	High	Low	Close	Adj Close	Volume	adx	adx_pos	adx_neg
2024-05-08	182.850006	183.070007	181.449997	182.740005	182.492477	45057100	17.932975	38.336015	18.097967
2024-05-09	182.559998	184.660004	182.110001	184.570007	184.320007	48983000	19.448107	39.454201	17.255349
2024-05-10	184.899994	185.089996	182.130005	183.050003	183.050003	50759500	20.918870	38.083183	16.306297
2024-05-13	185.440002	187.100006	184.619995	186.279999	186.279999	72044800	22.579496	38.948807	15.083854
2024-05-14	187.509995	188.300003	186.289993	187.429993	187.429993	52393600	24.290578	39.740667	14.499976

TA-Lib vs Pandas TA vs TA (as of 16.05.2024)

TA-Lib (talib)

pros

- 9.1K stars
- 29 contributors
- 397 closed issues
- actively developing
- supports Polars
- speed

Pandas TA

pros

- 4.8K stars
- 39 contributors
- 454 closed issues
- supports strategies

cons

- no docstring for `df.ta`

TA (ta)

pros

- 4.1K stars
- 31 contributors
- 104 closed issues

cons

- no candlestick

06

Learning materials



Yale

Financial Markets

🗻 Taught in English | [22 languages available](#) | Some content may not be translated

Enroll for Free
Starts May 16

Financial aid available

1,881,815 already enrolled

Course

Gain insight into a topic and learn the fundamentals



Instructor: [Robert Shiller](#)

Top Instructor

PLUS [Included with Coursera Plus](#)

4.8 ★

(27,034 reviews)

Beginner level

No prior experience required

33 hours to complete

3 weeks at 11 hours a week

Flexible schedule

Learn at your own pace

About

Modules

Recommendations

Testimonials

Reviews

Skills you'll gain

Behavioral Finance

Financial Markets

Finance

Behavioral Economics

Details to know



Shareable certificate

Add to your LinkedIn profile



Assessments

25 quizzes

[Co powinieliś wiedzieć](#)[Informacje ogólne](#)[Często zadawane pytania](#)[Kontakt](#)

Szkolenie Santander

Szkoła Giełdowa GPW & SGH 2024



Szkoła Główna Handlowa w Warszawie

Zdrowie finansowe

Umiejętności

Online

● Proces naboru zakończony



Co potrzebujesz wiedzieć



SKIEROWANY DO

Wszystkich

Streszczenie

Rozpocznij przygodę ze światem giełdy! Mamy 1000 miejsc i dwa poziomy zaawansowania — możesz uczestniczyć w obu! Otrzymasz dostęp do platformy na 3 miesiące. Dla 300 naliczonych uczestników.

[Przeczytaj więcej](#)

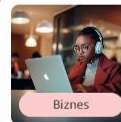
Inni użytkownicy zauważyli

1 2 3



● Otwarte do 11/06/2024
Santander Open Academy
Learn ChatGPT - 2024
Udemy

Umiejętności



● Otwarte do 10/06/2024
Santander Open Academy
**Business for All 2024 -
Harvard Business...**
Harvard Business School
Publishing

Biznes

[Zobacz wszystkie programy](#)

Co powinieliś wiedzieć

Informacje ogólne

Często zadawane pytania

Kontakt

Szkolenie Santander

Inwestowanie na giełdzie SGH & GPW 2023



Szkola Główna Handlowa w Warszawie

Umiejętności

Online

● Proces naboru zakończony



Co potrzebujesz wiedzieć



SKIEROWANY DO

Wszystkich

Streszczenie

Poznaj świat giełdy i zdobądź certyfikat Szkoły Głównej Handlowej w Warszawie, Giełdy Papierów Wartościowych i Santander Universidades!

[Przeczytaj więcej](#)

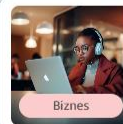
Inni użytkownicy zauważyli

1 2 3



● Otwarte do 11/06/2024
Santander Open Academy
Learn ChatGPT - 2024
Udemy

Umiejętności



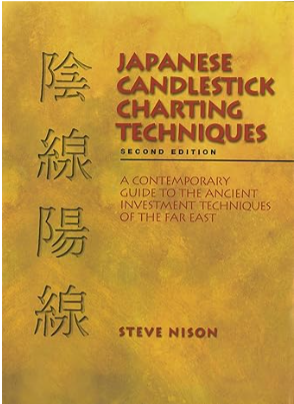
● Otwarte do 10/06/2024
Santander Open Academy
**Business for All 2024 -
Harvard Business...**
Harvard Business School
Publishing

Biznes

[Zobacz wszystkie programy](#)



Kindle Store > Kindle eBooks > Business & Money



Roll over image to zoom in

Read sample

Follow the author



Steve Nison

Follow

Japanese Candlestick Charting Techniques: A Contemporary Guide to the Ancient Investment Techniques of the Far East, Second Edition 2nd Edition, Kindle Edition

by [Steve Nison](#) (Author) | Format: Kindle Edition

4.7 ★★★★★ 2,182 ratings

[See all formats and editions](#)

A form of technical analysis, Japanese candlestick charts are a versatile tool that can be fused with any other technical tool, and will help improve any technician's market analysis. They can be used for speculation and hedging, for futures, equities or anywhere technical analysis is applied. Seasoned technicians will discover how joining Japanese candlesticks with other technical tools can create a powerful synergy of techniques; amateurs will find out how effective candlestick charts are as a stand-alone charting method. In easy-to-understand language, this title delivers to the reader the author's years of study, research and practical experience in this increasingly popular and dynamic approach to market analysis. The comprehensive coverage includes everything from the basics, with hundreds of examples showing how candlestick charting techniques can be used in almost any market.

ISBN-13	Edition	Sticky notes	Publisher	Publication date
	#			
978-0735201811	2nd	On Kindle Scribe	Prentice Hall Press	November 1, 2001

Due to its large file size, this book may take longer to download

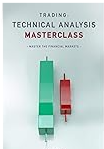
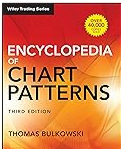
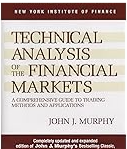
[Report an issue with this product or seller](#)

Read with the free Kindle apps (available on iOS, Android, PC & Mac), Kindle E-readers and on Fire Tablet devices.

[See all supported devices](#)

Customers who read this book also read

Page 1 of 10



Kindle

\$13.99

Available instantly

Hardcover

\$28.56 - \$33.45

Other Used and New from \$17.95

Print List Price: ~~\$110.00~~

Kindle Price: **\$13.99**

Save \$96.01 (87%)

Sold by: Penguin Group (USA) LLC

Price set by seller.

Buy now with 1-Click

eBook features:

- Highlight, take notes, and search in the book
- In this edition, page numbers are just like the physical edition

Read with our free app

Deliver to your Kindle Library

Buy for others

Give as a gift or purchase for a team or group.

[Learn more](#)

Buy for others

Send a free sample

Deliver to your Kindle Library

Add to List

READ ON ANY DEVICE

> Get free Kindle app



RUSLAN KORNIICHUK

Software and Artificial Intelligence Engineer in Poland

 Hire me

I'm Ruslan, a Python Developer and certified Artificial Intelligence Engineer living in Poland.

I have a solid experience of 9+ years in IT. I'm also interested in freelancing. Click the button above to hire me.



DONATE TO UKRAINE ARMY FUNDRAISER

The Charity Foundation "Come Back Alive" regularly and timely reports on its activities to all benefactors, state bodies and Ukrainian society.

READ THE REPORTS

Select the destination of your assistance

ARMY ASSISTANCE

SUPPORT THE FUND

All funds raised to help the army will be spent exclusively on purchases for the Armed Forces of Ukraine and other special forces in order to increase Ukraine's defense capabilities.

Payment method

PAYMENT BY CARD

SWIFT TRANSFERS

CRYPTOCURRENCY

Regularity

SUBSCRIPTION

ONE TIME

Payment currency

UAH, ₴

USD, \$

EUR, €

Amount of donation*

€ 10

Email*

name@surname.com

☐ I consent to the processing of my email address to receive email newsletters (twice a month), invitations and receipts.

PAY

FAQ

tinyurl.com/PYTECHTA



07

Q&A session
