TECHNICAL ANALYSIS USING PYTHON

The use of technical indicators and formulas when trading is what Technical analysis involves. The goal is to map the uptrend, downtrend (Buy) and (Sell) Signals respectively using mathematical relationships.

There are three main tools used for Technical analysis;

# TECHNICAL SIGNALS

## BUYING SIGNAL

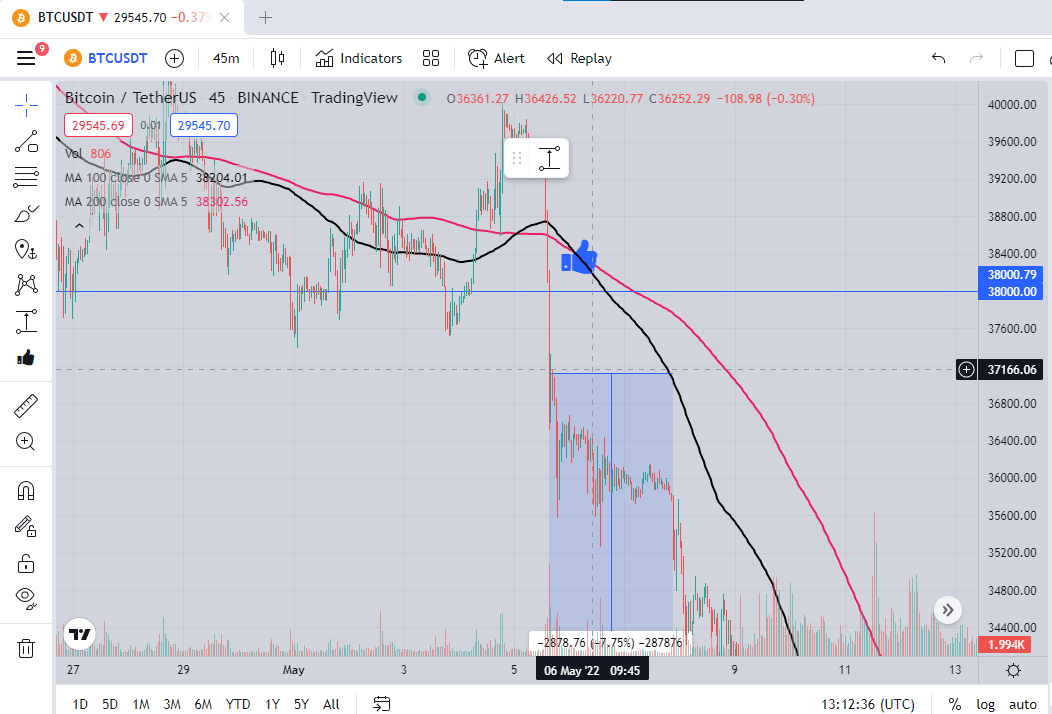
The conditions for a buying signal are as follows:

1. The MACD line is above the signal; when the MACD line crosses above the signal line it shows an upward trend and thus one should buy.

## SELLING SIGNAL

The conditions for a selling signal are as follows;

1. The MACD line is below the signal line; when the MACD line falls below the signal line, it shows that that there is downward trend. This is the best time to sell.
2. SMA (Simple Moving Average) indicator. In the case where the 200-day SMA crosses below 100-day SMA its time to sell. In layman terms it suggests that the 200-trading period is less compared to the 100-day trading period so there is a trend reversing.



*Case 1: When the 200-SMA (in pink) crosses below the 100-SMA (in black).*

|  |  |
| --- | --- |
| Case 1 in summary | |
| **Parameter** | **Value** |
| MA-100 | 29775.77 |
| MA-200 | 29695.27 |



*Case 2: ETH/BUSD Trading in Binance with the MA-100 and MA-200 Indicators*

|  |  |
| --- | --- |
| Case 2 ETH/BUSD Trading Summary with MA-100 and MA-200 | |
| **Parameter** | **Value** |
| MA-100 | 2366.10 |
| MA-200 | 2361.15 |

## MARKET SIGNAL CONDITIONS

### OVERSOLD CONDITIONS

In this scenario there are more sellers than buyers in the market. In technical analysis to identify such a case involves using two indicators;

1. Relative Strength Index (RSI); when its value is approximately equal to 70 or above that value. When the values is in this range the market has an oversold condition.
2. Bollinger Bands (BB). Regardless of this indicator showing the level of volatility, it may still serve as a oversold market condition reference. In this case, the Upper Bollinger band is close enough to the price.

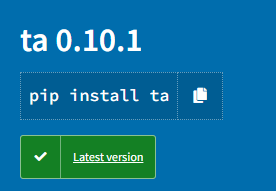
### OVERBOUGHT CONDITION

This market condition shows more users are engaging in the buying procedure, or at least there are more people filling the Buy orderbook. In this case two indicators are;

1. RSI; A value close to around 30 shows an overbought market condition
2. BB; The lower Bollinger band is close enough to the price

# TA library

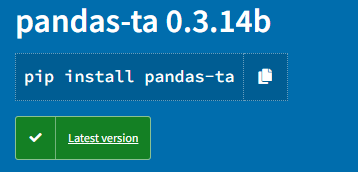
This is a feature engineering library used for financial time-series datasets built upon the pandas’ library.



*Figure showing the ta library installation using Py-PI*

# Pandas\_ta

1. This is an easy to use pandas extension with over 130 technical indicators.



*Figure showing the ta library installation using Py-PI*

# Ta\_lib

## Price Transform.

|  |
| --- |
| AVGPRICE Average Price |
| MEDPRICE Median Price |
| TYPPRICE Typical Price |
| WCLPRICE Weighted Close Price |

## Overlap Study functions

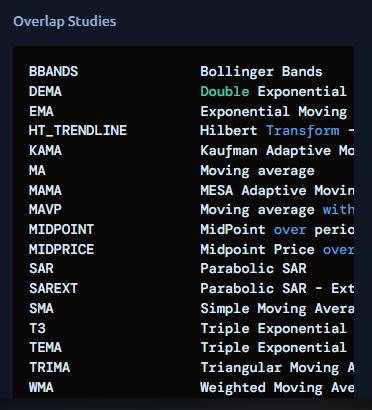


Figure showing the Overlap functions

### BBANDS

Usage: upper

### DEMA

### EMA

### HT\_TRENDLINE

### KAMA

### MA

### MAMA

### MAVP

### MIDPOINT

### MIDPRICE

### SAR

### SAREXT

### SMA

### T3

### TEMA

### TRIMA

### WMA

## STATISTICAL FUNCTIONS

### BETA

### CORREL

### LINEARREG

### LINEARREG\_ANGLE

### LINEARREG\_INTERCEPT

### LINEARREG\_SLOP

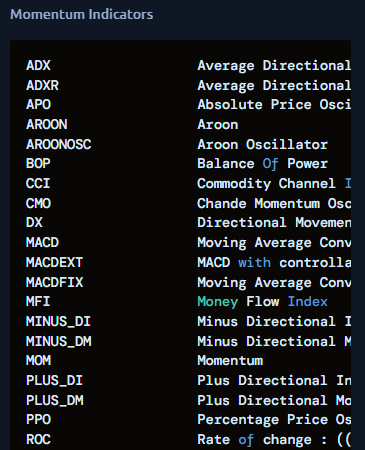
### STDDEV

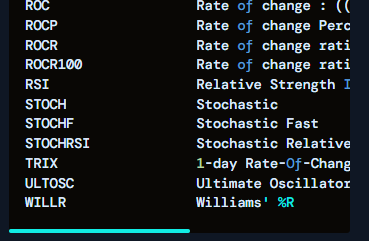
### TSF

### VAR

## Technical Indicators

### Momentum Indicators.





Usage: e.g., talib.MOM(data, timeperiod=5)

### Volatility Indicators.

|  |
| --- |
| ATR Average True Range |
| NATR Normalized Average True Range |
| TRANGE True Range |

### Cycle Indicator.

|  |
| --- |
| HT\_DCPERIOD Hilbert Transform - Dominant Cycle Period |
| HT\_DCPHASE Hilbert Transform - Dominant Cycle Phase |
| HT\_PHASOR Hilbert Transform - Phasor Components |
| HT\_SINE Hilbert Transform - SineWave |
| HT\_TRENDMODE Hilbert Transform - Trend vs Cycle Mode |

### PATTERN RECOGNITION INDICATORS

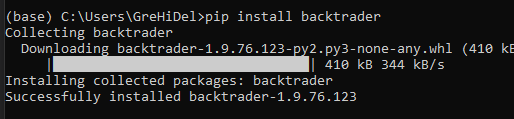
|  |
| --- |
| CDL2CROWS Two Crows |
| CDL3BLACKCROWS Three Black Crows |
| CDL3INSIDE Three Inside Up/Down |
| CDL3LINESTRIKE Three-Line Strike |
| CDL3OUTSIDE Three Outside Up/Down |
| CDL3STARSINSOUTH Three Stars In The South |
| CDL3WHITESOLDIERS Three Advancing White Soldiers |
| CDLABANDONEDBABY Abandoned Baby |
| CDLADVANCEBLOCK Advance Block |
| CDLBELTHOLD Belt-hold |
| CDLBREAKAWAY Breakaway |
| CDLCLOSINGMARUBOZU Closing Marubozu |
| CDLCONCEALBABYSWALL Concealing Baby Swallow |
| CDLCOUNTERATTACK Counterattack |
| CDLDARKCLOUDCOVER Dark Cloud Cover |
| CDLDOJI Doji |
| CDLDOJISTAR Doji Star |
| CDLDRAGONFLYDOJI Dragonfly Doji |
| CDLENGULFING Engulfing Pattern |
| CDLEVENINGDOJISTAR Evening Doji Star |
| CDLEVENINGSTAR Evening Star |
| CDLGAPSIDESIDEWHITE Up/Down-gap side-by-side white lines |
| CDLGRAVESTONEDOJI Gravestone Doji |
| CDLHAMMER Hammer |
| CDLHANGINGMAN Hanging Man |
| CDLHARAMI Harami Pattern |
| CDLHARAMICROSS Harami Cross Pattern |
| CDLHIGHWAVE High-Wave Candle |
| CDLHIKKAKE Hikkake Pattern |
| CDLHIKKAKEMOD Modified Hikkake Pattern |
| CDLHOMINGPIGEON Homing Pigeon |
| CDLIDENTICAL3CROWS Identical Three Crows |
| CDLINNECK In-Neck Pattern |
| CDLINVERTEDHAMMER Inverted Hammer |
| CDLKICKING Kicking |
| CDLKICKINGBYLENGTH Kicking - bull/bear determined by the longer marubozu |
| CDLLADDERBOTTOM Ladder Bottom |
| CDLLONGLEGGEDDOJI Long Legged Doji |
| CDLLONGLINE Long Line Candle |
| CDLMARUBOZU Marubozu |
| CDLMATCHINGLOW Matching Low |
| CDLMATHOLD Mat Hold |
| CDLMORNINGDOJISTAR Morning Doji Star |
| CDLMORNINGSTAR Morning Star |
| CDLONNECK On-Neck Pattern |
| CDLPIERCING Piercing Pattern |
| CDLRICKSHAWMAN Rickshaw Man |
| CDLRISEFALL3METHODS Rising/Falling Three Methods |
| CDLSEPARATINGLINES Separating Lines |
| CDLSHOOTINGSTAR Shooting Star |
| CDLSHORTLINE Short Line Candle |
| CDLSPINNINGTOP Spinning Top |
| CDLSTALLEDPATTERN Stalled Pattern |
| CDLSTICKSANDWICH Stick Sandwich |
| CDLINVERTEDHAMMER Inverted Hammer |
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| CDLSHORTLINE Short Line Candle |
| CDLSPINNINGTOP Spinning Top |
| CDLSTALLEDPATTERN Stalled Pattern |
| CDLSTICKSANDWICH Stick Sandwich |
| CDLTAKURI Takuri (Dragonfly Doji with very long lower shadow) |
| CDLTASUKIGAP Tasuki Gap |
| CDLTHRUSTING Thrusting Pattern |
| CDLTRISTAR Tristar Pattern |
| CDLUNIQUE3RIVER Unique 3 River |
| CDLUPSIDEGAP2CROWS Upside Gap Two Crows |
| CDLXSIDEGAP3METHODS Upside/Downside Gap Three Methods |

## TA-Lib Usage

# BACKTRADER

## Installation

Installation: pip install backtrader



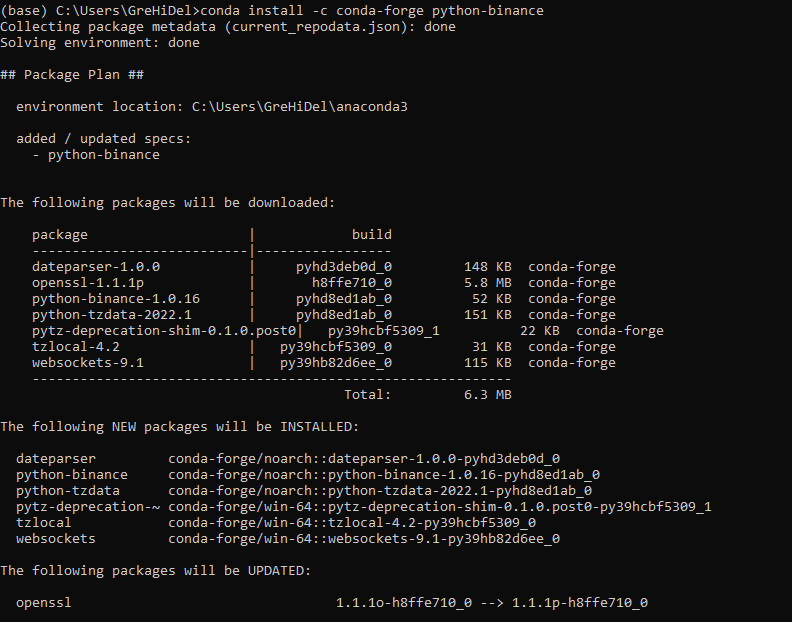
# REFERENCES

Technical analysis. <http://theautomatic.net/2021/02/02/technical-analysis-with-python/>

TA-Lib Library Documentation: Open Base: <https://openbase.com/python/TA-Lib/documentation>

# APPENDIX A: PYTHON BINANCE INSTALLATION

Option 1: Using Anaconda prompt



# APPENDIX B: Binance Historical Klines

import os

import pandas as pd

from binance import Client

api\_key = os.environ.get('BINANCE\_TEST\_API')

api\_secret = os.environ.get('BINANCE\_TEST\_SECRET')

client=client = Client(api\_key, api\_secret)

data=client.get\_historical\_klines("BNBBUSD", Client.KLINE\_INTERVAL\_1DAY, "4 day ago,UTC+3") #https://python-binance.readthedocs.io/en/latest/market\_data.html?highlight=kline%20limit#id6

frame=pd.DataFrame(data)