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Algorithmic trading essentials

AN INTRODUCTION TO THE BASIC TERMINOLOGY AND CONCEPTS OF ALGORITHMIC TRADING

VICTOR GUILLET

Contents

Glossary:

Basic terminology:

The Trading world uses a colourful trading lingo, a number of basic terms and concepts need to be understood to ease understanding of the world of trading;

Financial Market:

The financial market is a broad term describing any marketplace where trading of securities including equities, bonds, currencies and derivatives occur. Some financial markets are small with little activity, while some financial markets like the New York Stock Exchange (NYSE) trade trillions of dollars of securities daily.

https://www.investopedia.com/terms/f/financial-market.asp

A Bull (or Bullish behaviour) is the opposite of a Bear (or Bearish behaviour):

Bull:

A bull is an investor who thinks the market, a specific security or an industry is poised to rise. Investors who adopt a bull approach purchase securities under the assumption that they can sell them later at a higher price. Bulls are optimistic investors who are attempting to profit from the upward movement of stocks.

https://www.investopedia.com/terms/b/bull.asp

Bear:

A bear is an investor who believes that a particular security or market is headed downward and attempts to profit from a decline in stock prices. Bears are typically pessimistic about the state of a given market.

https://www.investopedia.com/terms/b/bear.asp

A long position is the opposite of a short (or short position):

Long (or Long Position):

A long (or long position) is the buying of a security such as a stock, commodity or currency with the expectation that the asset will rise in value. In the context of options, long is the buying of an options contract. An investor that expects an asset's price to fall will go long on a put option, and an investor that hopes to benefit from an upward price movement will be long a call option.

https://www.investopedia.com/terms/l/long.asp

Short (or Short Position):

A short, or short position, is selling first and then buying later. The trader's expectation is that the price will drop; the price they sell at is higher than the price they buy it at later. The difference between the sale price and the buy price produces a profit or loss.

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

Market types:

There are two main types of markets and market trends;

Trending Market:

A trending market is a market that is trending in a specific direction. Markets can have bullish, bearish or sideways trends. Trending markets are of primary interest in technical analysis. Technical analysts believe that trending markets occur with some degree of regularity and predictability. The ability to correctly discern these trends can have a substantial impact on investment returns.

https://www.investopedia.com/terms/t/trending-market.asp

Sideways Market/Sideways Drift:

A sideways market or sideways drift occurs where the price of a security trades within a range without forming any distinct trends. Price action oscillates in a horizontal range or channel, with neither the bulls or bears taking control of prices.

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

Analysis methods:

There are two branches of analysis in stock research: fundamental analysis and technical analysis. Fundamental analysis is used to determine what to buy, while technical analysis is used to determine when to buy;

Fundamental Analysis:

Fundamental analysis is a method of evaluating a security to assess its intrinsic value, by examining related economic, financial, and other qualitative and quantitative factors. The end goal of fundamental analysis is to produce a quantitative value that can be compared with a security's current price, thus indicating whether the security is undervalued or overvalued.

https://www.investopedia.com/terms/f/fundamentalanalysis.asp

Technical Analysis:

Technical analysis is a trading discipline employed to evaluate investments and identify trading opportunities by analysing statistical trends gathered from trading activity, such as price movement and volume. Unlike fundamental analysts, who attempt to evaluate a security's intrinsic value, technical analysts focus on patterns of price movements, trading signals and various other analytical charting tools to evaluate a security's strength or weakness.

https://www.investopedia.com/terms/t/technicalanalysis.asp

Trading Strategies/Methods:

Algorithmic trading:

Algorithmic trading is a type of trading done with the use of mathematical formulas run by powerful computers. Algorithmic trading makes use of much more complex formulas, combined with mathematical models and human oversight, to make decisions to buy or sell financial securities on an exchange.

https://www.investopedia.com/terms/a/algorithmictrading.asp

High-frequency trading - HFT:

High-frequency trading is a program trading platform that uses powerful computers to transact a large number of orders at fractions of a second. It uses complex algorithms to analyse multiple markets and execute orders based on market conditions. *Typically, the traders with the fastest execution speeds are more profitable than traders with slower execution speeds.*

https://www.investopedia.com/terms/h/high-frequency-trading.asp

Momentum Investing:

Momentum investing involves a strategy to capitalize on the continuance of an existing market trend. It involves going long stocks, futures, or market ETFs showing upward-trending prices and short the respective assets with downward-trending prices. Momentum investing will make use of quantitative methods or technical indicators (such as Trendlines).

https://www.investopedia.com/terms/m/momentum_investing.asp

Mean reversion:

Mean reversion is financial theory suggesting that asset prices and returns eventually return back to the long-run mean or average of the entire dataset. This mean or average can be the historical average of the price or return, or another relevant average such as the growth in the economy or the average return of an industry. Mean reversion will make use of the Relative Strength Index to make decisions.

https://www.investopedia.com/terms/m/meanreversion.asp

Sentiment based:

Market sentiment is the overall attitude of investors toward a particular security or financial market. Market sentiment is the feeling or tone of a market, or its crowd psychology, as revealed through the activity and price movement of the securities traded in that market. In broadest terms, rising prices would indicate bullish market sentiment, while falling prices would indicate bearish market sentiment. Making trade decisions on the basis of the market sentiment is referred to a sentiment-based trading.

https://www.investopedia.com/terms/m/marketsentiment.asp

Trading tools and indicators:

Trendlines:

- (Technical indicator)

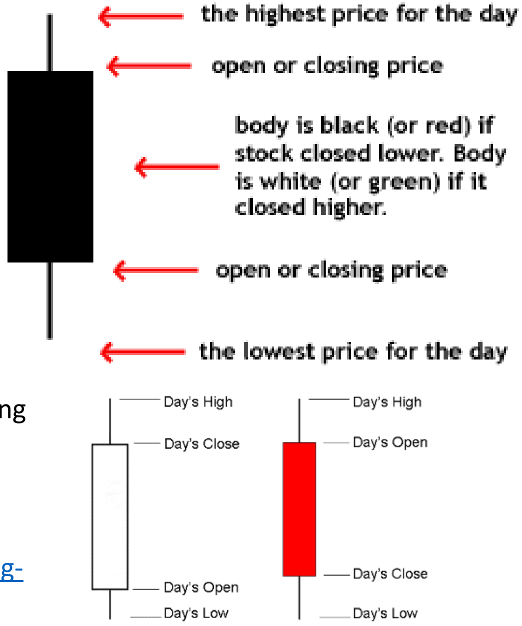
A trendline is a line drawn over pivot highs or under pivot lows to show the prevailing direction of price. Trendlines are a visual representation of support and resistance in any timeframe. They show direction and speed of price, and describe patterns during periods of price contraction. Trendlines falls under the category of Technical indicators.

https://www.investopedia.com/terms/t/trendline.asp

Candlestick:

- (Technical indicator)

A candlestick is a type of price chart that displays the high, low, open and closing prices of a security for a specific period. The wide part of the candlestick is called the "real body" and tells investors whether the closing price was higher or lower than the opening price (black/red if the stock closed lower, white/green if the stock closed higher). The candlestick's shadows show the day's high and low and how they compare to the open and close. A candlestick's shape varies based on the relationship between the day's high, low, opening and closing prices.



https://www.investopedia.com/terms/c/candlestick.asp

https://www.investopedia.com/trading/candlestick-charting-what-is-it/

Relative Strength Index – RSI:

- (Technical indicator)

The Relative Strength Index - RSI is a momentum indicator that measures the magnitude of recent price changes to analyse overbought or oversold conditions. It is primarily used to attempt to identify overbought or oversold conditions in the trading of an asset. The relative strength index (RSI) is calculated using the following formula:

$RSI = 100 - 100 / (1 + RS)$

Where RS = Average gain of up periods during the specified time frame / Average loss of down periods during the specified time frame

Traditional interpretation and usage of the RSI is that RSI values of 70 or above indicate that a security is becoming overbought or overvalued, and therefore, may be primed for a trend reversal or corrective pullback in price. An RSI reading of 30 or below is commonly interpreted as indicating an oversold or undervalued condition that may signal a trend change or corrective price reversal to the upside.

https://www.investopedia.com/terms/r/rsi.asp

Moving Average Convergence Divergence – MACD:
- (Technical indicator)

The Moving Average Convergence Divergence (MACD) is a trend-following momentum indicator that shows the relationship between two moving averages of a security's price. The MACD is calculated by subtracting the 26-period Exponential Moving Average (EMA) from the 12-period EMA. The result of that calculation is the MACD line. A nine-day EMA of the MACD, called the "signal line", is then plotted on top of the MACD line which can function as a trigger for buy and sell signals. Traders may buy the security when the MACD crosses above its signal line and sell, or short, the security when the MACD crosses below the signal line.

If the 12-period EMA is above the 26-period EMA, the MACD will be above its "baseline" of zero. If the shorter EMA is below the longer EMA, the MACD will be below its baseline. The more distant the MACD is above or below its baseline indicates that the distance between the two EMAs is growing. In the following chart, you can see how the two EMAs applied to the price chart correspond to the MACD (blue) crossing above or below its baseline (red dashed) in the indicator below the price chart.

The MACD is often displayed with a histogram which graphs the distance between the MACD and its signal line. If the MACD is above the signal line, the histogram will be above the MACD's baseline. If the MACD is below its signal line, the histogram will be below the MACD's baseline. Traders use the MACD's histogram to identify when bullish or bearish momentum is high.

https://www.investopedia.com/terms/r/rsi.asp

Resources and references:

YouTube:

Types of Algorithmic Trading Strategies: https://www.youtube.com/watch?v=4Ae2_i5nMxs

Five Technical Indicators for Profitable Trading: https://www.youtube.com/watch?v=C-770uuFILM