**Moving Averages (MA)**

* **What It Does**: Averages out the price of a stock over a set period to show its trend.
* **Types**:
  + **Simple Moving Average (SMA)**: Straightforward average of prices over time.
  + **Exponential Moving Average (EMA)**: Gives more weight to recent prices, reacting faster to price changes.
* **Use**: Helps spot trends and support/resistance levels in stock prices.

**Relative Strength Index (RSI)**

* **What It Does**: Measures how fast and how much a stock's price has changed recently.
* **Range**: Goes from 0 to 100.
* **Use**: Tells if a stock is overbought (above 70) or oversold (below 30), which can signal potential price reversals.

**Moving Average Convergence Divergence (MACD)**

* **What It Does**: Shows the relationship between two moving averages of a stock's price.
* **Components**:
  + **MACD Line**: Difference between a short-term (12-day) and a long-term (26-day) moving average.
  + **Signal Line**: A smoothed average (9-day EMA) of the MACD Line.
  + **Histogram**: Visualizes the difference between the MACD Line and the Signal Line.
* MACD Line Crossing Signal Line: Provides buy or sell signals.
* MACD Histogram: Visualizes the difference between the MACD line and the signal line, indicating increasing or decreasing momentum.
* **Use**: Helps spot changes in trends and gives buy/sell signals when the MACD Line crosses the Signal Line.

**Simplified Purpose:**

* **Moving Averages**: Smooths out price fluctuations to show trends.
* **RSI**: Indicates if a stock is likely overbought or oversold.
* **MACD**: Shows momentum and trend changes, providing signals for buying or selling stocks.

These tools are essential for traders to understand market trends, momentum shifts, and potential entry/exit points in stock trading.

**Ichimoku Cloud**

* **Components**:
  + **Tenkan-sen and Kijun-sen**: Short-term and long-term moving averages.
  + **Senkou Span A and B**: Leading and future span lines forming the cloud.
  + **Chikou Span**: Lagging line showing current price relative to past prices.

**Advantages:**

* **Comprehensive Analysis**: Integrates trend, momentum, and support/resistance into one visual framework.
* **Clear Signals**: Provides straightforward signals for trend direction, entries, and exits.
* **Japanese Technique**: Developed to provide a holistic view of market conditions.

**Feature Selection Techniques**

1. **Correlation Analysis**:
   * **Definition**: Measures the statistical relationship between variables (features) in your dataset.
   * **Process**: Calculate correlations (typically Pearson correlation coefficient) between each feature and the target variable (stock prices). Features with higher absolute correlation values (positive or negative) are considered more relevant.
   * **Implementation**: Use tools like Pandas for calculating correlations and visualize them using heatmap plots.
2. **Feature Importance Ranking**:
   * **Definition**: Determines which features have the most significant impact on predicting the target variable.
   * **Methods**:
     + **Tree-based Models**: Decision trees and ensemble methods (like Random Forests) can provide feature importance scores based on how much they reduce impurity (e.g., Gini impurity).
     + **Permutation Importance**: Measures the drop in model performance when a feature's values are randomly shuffled.
     + **Linear Models**: Coefficients in linear regression models indicate feature importance.
   * **Implementation**: Sklearn provides tools for calculating feature importance scores after fitting models.
3. **Principal Component Analysis (PCA)**:
   * **Definition**: Reduces the dimensionality of the dataset while retaining as much variance as possible.
   * **Process**: PCA transforms the original features into a set of orthogonal components. These components are ordered by the amount of variance they explain.
   * **Implementation**: Use Sklearn's PCA module to perform dimensionality reduction. Select components that explain a significant portion of variance in the data.