

Task 1 Report: Data Preprocessing and Technical Indicator Engineering

Objective:

To collect and preprocess historical stock data for Apple Inc. (AAPL) from January 2021 to January 2024, engineer relevant technical indicators, and perform initial exploratory data analysis through visualizations.

Key Steps and Methods Used:

1. Data Collection:

- Downloaded historical price and volume data for AAPL using the `yfinance` API.
- Time range: **2021-01-01 to 2024-01-01**
- Ensured data quality by dropping missing values.

2. Technical Indicator Engineering:

Used the `ta` library to compute commonly used indicators:

- **Trend Indicators:**
 - Simple Moving Average (SMA-20)
 - Exponential Moving Average (EMA-20)
- **Momentum Indicators:**
 - Relative Strength Index (RSI-14)
 - Moving Average Convergence Divergence (MACD + Signal + Histogram)
- **Volatility Indicator:**
 - Average True Range (ATR-14)
- **Volume-Based Indicator:**

■ On-Balance Volume (OBV)

3. Return Features:

- Computed **Daily Return** using percentage change.
- Computed **Log Return** using natural logarithmic differences.

VISUALIZATION:



