## ****Project Report: Apple Stock Market Analysis****

### ****1. Objective****

The objective of this project is to analyze Apple Inc. (AAPL) stock market trends, study historical price movements, and investigate the effect of significant events on stock performance. The analysis also includes calculating technical indicators to guide potential investment decisions and risk management strategies.

### ****2. Data Source****

* **Dataset**: Historical stock price data retrieved from the **Yahoo Finance API** using the Python yfinance library.
* **Timeframe**: 5 years of Apple stock price data.
* **Data Attributes**:
  + Date
  + Open, High, Low, Close Prices
  + Adjusted Close Price
  + Volume

### ****3. Methodology****

#### **Step 1: Data Collection**

* Fetched historical Apple stock price data using yfinance.
* Defined the stock ticker symbol (AAPL) and selected a 5-year timeframe.

#### **Step 2: Data Exploration**

* Examined historical trends in Apple’s stock prices.
* Selected a **major event** for focused analysis — **AI Boom (Jan 2023 - Jun 2023)** — and studied its effect on stock prices.

#### **Step 3: Data Preprocessing**

* Converted date formats to datetime for proper time-series analysis.
* Checked for missing data and handled it using interpolation.

#### **Step 4: Exploratory Data Analysis (EDA)**

* Created line charts showing Apple’s stock price trends over time.
* Highlighted the **AI Boom** period in the chart using shaded regions for better visualization.
* Calculated moving averages and volatility metrics to identify price trends.

#### **Step 5: Feature Selection**

* Calculated technical indicators:
  + **RSI (Relative Strength Index)** — measures momentum and overbought/oversold conditions.
  + **MACD (Moving Average Convergence Divergence)** — detects trend changes and momentum.
  + **Moving Averages** — smoothens price fluctuations for clearer trend identification.

### ****4. Key Findings****

#### **Impact of AI Boom (Jan 2023 – Jun 2023)**

* **Average Closing Price Before AI Boom:** $121
* **Average Closing Price After AI Boom:** $200

#### **Trend Observations:**

* The AI Boom coincided with an upward movement in Apple’s stock price, indicating positive market sentiment during technological advancements.
* RSI values during the boom period suggested strong buying momentum.
* MACD analysis indicated bullish signals in early 2023.

### ****5. Conclusion & Recommendations****

* Apple stock showed significant positive movement during the AI Boom in early 2023.
* Technical indicators such as RSI and MACD confirmed the bullish trend.
* **Recommendation for Investors:** In future, similar technological breakthroughs or market hype periods could be leveraged for short-term gains, but caution is advised to avoid entering at overbought conditions (RSI > 70).
* **Risk Management:** Diversification and stop-loss orders are suggested to mitigate sudden downturns.