**Project: Stock Market Insights & Analytics:**

### **Abstract:**

This project presents a comprehensive stock market analysis framework, integrating SEC company ticker data with Yahoo Finance to extract, preprocess, analyze, and forecast stock market trends. The workflow begins with retrieving historical stock data (Open, High, Low, Close, and Volume) for the past six months, ensuring data integrity through advanced preprocessing techniques, such as duplicate removal, missing value handling via forward-filling, and uniform structuring. To enhance analytical depth, we implement feature engineering, introducing daily returns to measure stock price volatility and moving averages (7-day & 30-day) to capture short- and long-term trends.

The framework further incorporates Exploratory Data Analysis by visualizing price trends across multiple companies, comparing volatility between high-growth and stable stocks, and constructing a correlation matrix to identify interdependencies between stock movements. Additionally, volume analysis is used to detect unusual spikes, potentially signaling insider trading activities. Moving beyond analysis, the project integrates predictive modeling, utilizing Linear Regression for trend-based price predictions, Random Forests to capture nonlinear stock behaviors, and LSTMs (Long Short-Term Memory Networks) for deep learning-based forecasting.

To bridge the gap between historical analysis and real-time decision-making, we establish Yahoo Finance live data integration, fetching real-time price updates every five minutes and enabling automated alerts for high-volume or unusual price movements. The system is also designed to facilitate automated buy/sell signal generation, enhancing its applicability for traders and investors seeking data-driven trading strategies. The structured pipeline, with separate, well-organized CSV files, ensures scalability and adaptability, making this project a powerful foundation for market trend analysis, financial forecasting, and algorithmic trading applications.