### **Apple Stock Price Prediction for the Next 30 Days**

**The primary objective of this project is to develop a predictive model that forecasts Apple stock prices for the next 30 days using historical stock data from 2012 to 2019. The model will help investors, traders, and financial analysts make informed decisions based on stock trends and potential market movements.**

### **Key Goals:**

**✅ Develop a time series forecasting model to predict Apple’s stock price for the next 30 days.  
✅ Analyze short-term and long-term trends in stock prices.  
✅ Explore the impact of external events (e.g., earnings reports, macroeconomic events, global financial crises) on Apple’s stock.  
✅ Evaluate different machine learning models such as ARIMA, SARIMA, and XGBoost for accurate forecasting.  
✅ Visualize trends, seasonality, and volatility in Apple’s stock prices.  
✅ Deploy the final forecasting model using a Flask/Streamlit web app to allow real-time predictions.**

### **Dataset & Attributes**

**The dataset consists of daily stock market data for Apple from 2012 to 2019, including:**

**📌 Stock Market Indicators:**

* **Date: Trading date**
* **Open: Opening price of Apple stock for the day**
* **High: Highest price reached during the day**
* **Low: Lowest price reached during the day**
* **Close: Closing price of Apple stock for the day**
* **Volume: Number of shares traded on that day**

**📌 Target Variable:**

* **Next 30-Day Close Price Forecast**

### **Modeling Approach:**

**🔹 Data Preprocessing – Handling missing values, normalizing stock price data, and feature engineering (e.g., moving averages, volatility measures).  
🔹 Exploratory Data Analysis (EDA) – Identifying trends, seasonality, and stock price patterns.  
🔹 Feature Engineering – Incorporating external financial indicators (e.g., S&P 500 trends, inflation rates, earnings reports).  
🔹 Model Selection & Evaluation –  
 📌 Statistical Models: ARIMA, SARIMA for trend-based forecasting.  
 📌 Machine Learning: XGBoost, Random Forest for pattern recognition.  
🔹 Hyperparameter Tuning – Using Grid Search & Cross-Validation for optimal model performance.  
🔹 Deployment – Deploying a Flask/Streamlit web app where users can input date ranges and get future stock price forecasts.**

### **Deployment Plan:**

**🚀 Create an interactive web application where users can:**

* **Select a date range and get predicted stock prices for the next 30 days 📈.**
* **View visualizations of historical trends and model predictions.**