

# **Project Proposal: Time Series Forecasting of Stock Prices Using ARIMA, LSTM, and Prophet Models**

## **Introduction**

The stock market is a critical aspect of the global economy, influencing investment decisions and economic policies. Accurate prediction of stock prices can lead to significant financial gains and informed decision-making. This project aims to develop and evaluate various time series forecasting models to predict stock prices. We will utilize historical stock price data from Yahoo Finance and apply ARIMA, LSTM, and Prophet models. The performance of these models will be compared based on various metrics, and the best-performing model will be selected.

## **Project Architecture**

### **1.Data Collection**

**Data Source:** We will use yahoo Finance to fetch historical stock price data for selected companies.

### **2.Data Preprocessing**

**Data Cleaning: Handling Missing Values:** We will address any missing values using appropriate imputation methods.

**Outliers:** Detection and treatment of outliers to ensure data quality.

**Data Quality Issues:** Resolving any other data quality issues that may arise.

### **3.Feature Engineering**

**Additional Features:** Creation of new features such as moving averages etc., to enhance the predictive power of the models.

### **4. Data Splitting**

**Training and Testing Sets:** The data will be split into training and testing sets to evaluate the models' performance on unseen data.

### **5. Exploratory Data Analysis (EDA)**

**Time Series Plots:** Visualization of the time series data to identify trends, seasonality, and patterns.

**Feature Plots:** Visual representation of the engineered features to understand their relationships with the stock prices.

### **5.Modeling**

#### **ARIMA Model**

Building and training an ARIMA model to capture the linear components of the time series data.

#### **LSTM Model**

Development and training of an LSTM neural network to capture the non-linear dependencies in the time series data.

#### **Prophet Model**

Utilizing the Prophet library to build and train a forecasting model that can handle seasonality and holidays.

## **6.Model Evaluation**

### **Performance Metrics**

Evaluation of models using Root Mean Square Error (RMSE).

### **Conclusion**

This project will leverage advanced time series forecasting techniques to predict stock prices, providing valuable insights and potential financial benefits. By comparing the performance of ARIMA, LSTM, and Prophet models, we aim to identify the most effective approach for stock price prediction.

### **References**

1.[https://www.researchgate.net/publication/379050041\\_Time\\_series\\_forecasting\\_of\\_stock\\_market\\_using\\_ARIMA\\_LSTM\\_and\\_FB\\_prophet#fullTextFileContent](https://www.researchgate.net/publication/379050041_Time_series_forecasting_of_stock_market_using_ARIMA_LSTM_and_FB_prophet#fullTextFileContent).