

# PREDICTING THE STOCK MARKET



By - Rohit Grover

# MAG 7 STOCK PRICE PREDICTION THROUGH ML

- The MAG 7 Stocks
  - A combined market capitalization of about \$14 trillion
  - Exposure to high-growth technologies such as high-end software and hardware, cloud computing, and Artificial Intelligence
  - Each of the seven stocks has outperformed the S&P 500 by a huge margin in the past decade
- The ML Approach and Impact
  - Collect and preprocess stock price and Financial Indicators' data.
  - Combine Technical and Fundamental Factors to predict future stock prices.
  - Can be used by portfolio managers of investment funds or individual investors to maximize returns or to balance Risk and Rewards.

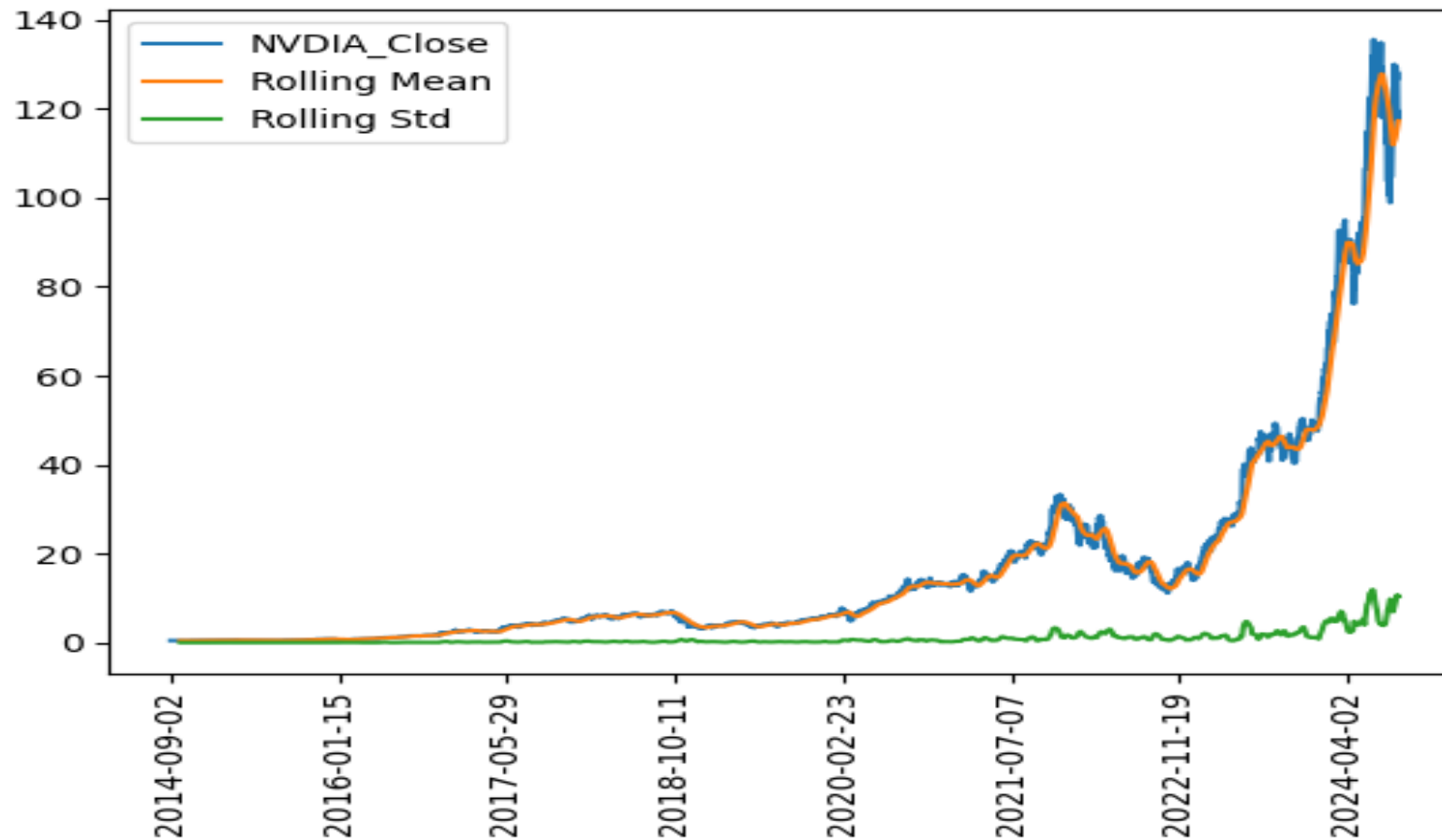


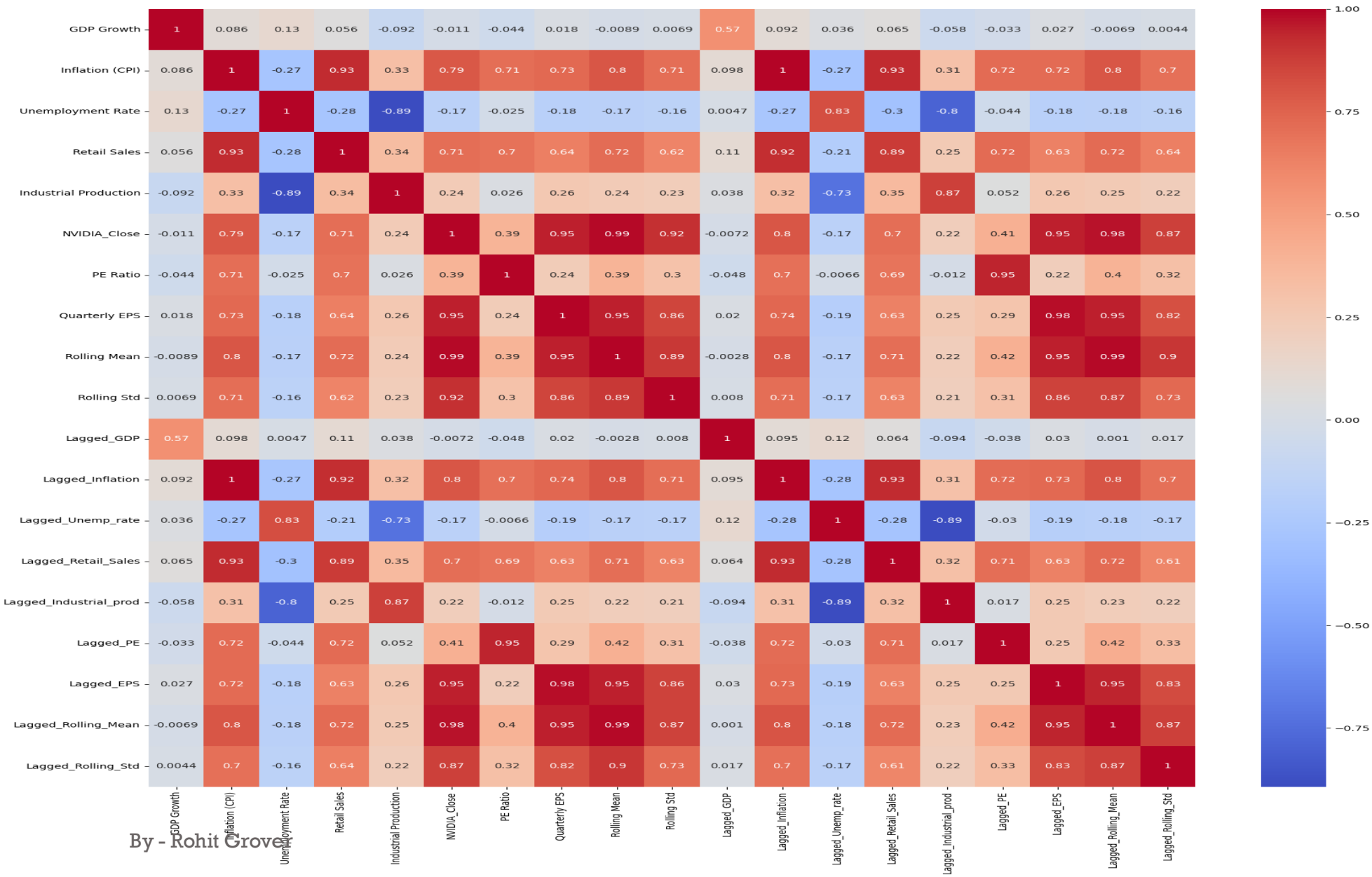
# COLLECTION OF DATA AND PREPROCESSING

- Gathered last 10 years' stock price data from "yfinance" APIs
- Gathered last 10 years' financial indicators' data from "Fred API"
- Financial indicators included "GDP Growth", "Inflation", "Unemployment Rate", "Retail Sales" and "Industrial Production".
- Fundamental Factors included "P/E Ratio" and "EPS"
- Calculated Technical Indicators like Rolling Average
- Forward filled and removed rows containing missing data
- Calculated lagged independent variables



# PRELIMINARY EDA



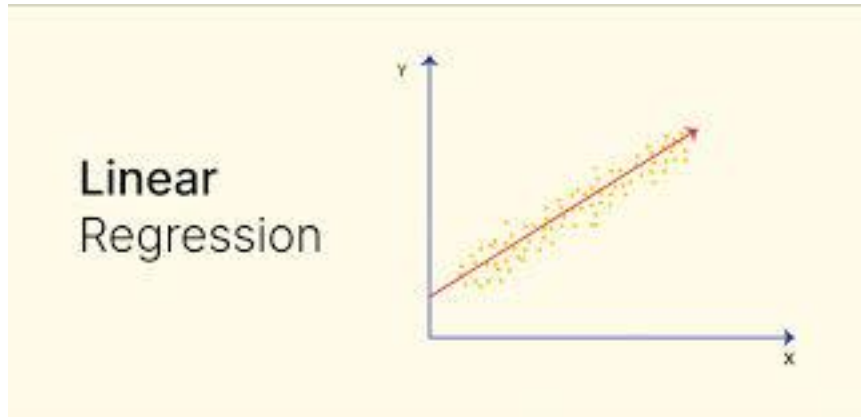


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# BASELINE ML MODEL

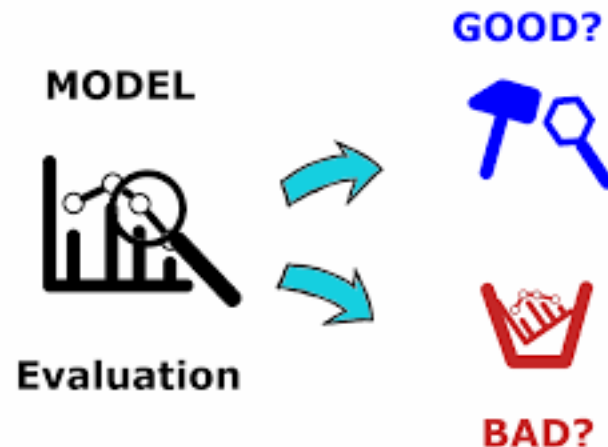


- **Train-Test Split and The Treachery of Data Leakage**
  - Achieved an R-sq of 0.99 😊
- **Split Data by Dates**
  - Fit a Linear Regression Model
  - Got an R-sq of 0.77 after adjusting the model and feature elimination through Recursive Feature Elimination (RFE)



# MODEL EVALUATION

- Mean Absolute Error (MAE)
- Mean Squared Error (MSE) / Root Mean Squared Error (RMSE)
- R-squared ( $R^2$ )
- Directional Accuracy
- Mean Absolute Percentage Error (MAPE)



# NEXT STEPS

- Advanced Modeling with Deep Learning Models
  - Recurrent Neural Networks (RNNs)
  - (Long Short-Term Memory Networks) LSTMs
  - Transformer Models





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**THANK YOU**

