## Nairobi Stock Exchange (NSE) Time Series Analysis

Group Project Summary (2021–2024)

Presented by Predictive Powerhouse.

### **Understanding the NSE**

The Nairobi Stock Exchange (NSE) is vital to Kenya's economy. Our analysis helps understand stock behavior, sector performance, and market volatility for smarter investment decisions.

1

#### **Stock Price Behavior**

How prices move over time.

2

#### **Sector Performance**

Identifying well-performing or struggling sectors.

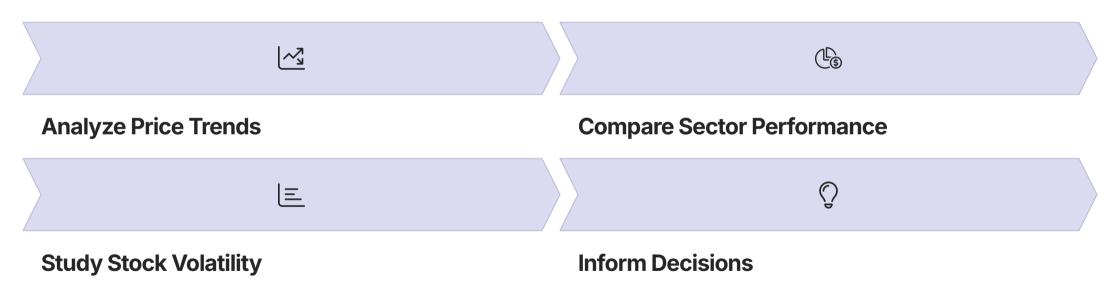
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### **Stock Volatility**

Assessing stability and risk.

### **Project Objectives**

Our goal is to uncover patterns and trends from historical stock data (2021–2024) to support informed investment decisions and economic understanding.



### **Dataset Overview**

- Source: Scraped from official NSE website
- Time Range: Data covers 2021
- Entries: 64,688 daily records

#### **Key Features:**

- Date, Stock Code, Name
- 12-month High/Low
- Daily High/Low, Closing Price
- Price Change & Percentage
  Change
- Volume Traded, Adjusted Price



### **Data Preparation**

We meticulously prepared the raw data for accurate time series analysis.

1

#### **Format Conversion**

Numeric columns converted to proper formats.

2

### **Data Cleaning**

Duplicates removed, missing values handled.

3

### **Date Formatting**

Date column prepared for time series use.

4

### **Data Grouping**

Stocks grouped by name and date for easier analysis.

# **Exploratory Data Analysis** (EDA)

Our EDA revealed key trends and patterns within the NSE data.

- Plotted stock prices over time to spot trends.
- Focused on active stocks like Safaricom and Equity Bank.
- Grouped data by sector to compare performance.

- Calculated daily returns and identified most volatile stocks.
- Compared price movement patterns across companies.





### **Forecasting and Modeling**

We applied two advanced models to forecast future stock prices.

### **Prophet**

- Visual, intuitive model for business forecasting.
- Captures holidays, seasonal changes, and long-term trends.

### LSTM (Long Short-Term Memory)

- Deep learning model for sequence prediction.
- Excellent at learning complex time series patterns.
- Remembers information over long periods.

### **Key Insights**

Our analysis yielded valuable insights into NSE market behavior.

### **Upward Trends**

Certain stocks (e.g., Safaricom) show strong long-term growth.

### **Forecasting Accuracy**

Prophet modeling provides good short-term forecasts.

### **Banking Volatility**

Banking sector displayed high volatility during market shocks.

### **Risk Management**

Understanding price swings guides portfolio risk management.

### Conclusion

This analysis provided a clear view of NSE stock and market behavior, benefiting various stakeholders.

### **Benefits for Non-Technical Stakeholders:**



#### **Investors**

Guidance on when and where to invest.



Monitor stock performance effectively.





Assess financial stability.



### **Analysts**

Build smarter strategies.



### Recommendations

To enhance future analyses and forecasting accuracy:

- Regularly update data for improved accuracy.
- Include performance metrics (e.g., RMSE) for model evaluation.
- Consider advanced models like LSTM for deeper forecasting.
- Visualize sector comparisons interactively in dashboards.