



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.

3

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.



Analyze Price Trends



Compare Sector Performance



Study Stock Volatility



Inform Decisions

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.

Banking Volatility

Banking sector displayed high volatility during market shocks.

Forecasting Accuracy

Prophet modeling provides good short-term forecasts.

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.



Companies

Monitor stock performance effectively.



Policymakers

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.