

MarketX

Abstract

MARKETX is an end-to-end market intelligence and analytics platform designed to analyze stock market behavior by integrating price data, news-based sentiment, and machine learning predictions into a unified data pipeline and visualization system.

The primary objective of MARKETX is to move beyond isolated market indicators and instead provide a holistic view of market movement by combining quantitative price signals with qualitative sentiment signals derived from financial news. This enables better understanding of market trends, volatility, and potential future price direction.

Data Collection & Processing

MARKETX follows a **multi-stage data engineering workflow**:

- **Market Price Data**

Historical and recent stock price data (Open, High, Low, Close, Volume) is collected and stored in a structured format. This data serves as the quantitative backbone of the system.

- **News Data Extraction**

Financial news articles related to the stock market are scraped from online sources. The raw text is cleaned, normalized, and stored for further analysis.

- **Sentiment Analysis**

Natural Language Processing (NLP) techniques are applied to the cleaned news text to compute **sentiment scores**, representing the market's emotional tone (positive, neutral, or negative).

Even in the absence of explicit sentiment labels, sentiment polarity is inferred numerically using sentiment scoring models.

Feature Engineering & Machine Learning

To enable predictive analysis:

- Price-based indicators such as **returns, rolling averages, and volatility measures** are derived from raw market data.
- Sentiment scores are aligned with corresponding market data to enrich the feature set.
- A **machine learning model** is trained on engineered features to learn patterns in historical market behavior and generate **future price movement or trend predictions**.

Visualization & Business Intelligence

MARKETX leverages **Power BI** to convert processed data into **interactive dashboards**, making complex market insights accessible and intuitive.

The dashboards provide:

- Market overview with price trends and volume analysis
- Sentiment distribution and news impact visualization
- Machine learning prediction outputs
- Comparative views between price movement and sentiment behavior

This visualization layer transforms raw analytics into **decision-support insights**, suitable for analysts and non-technical users alike.

System Architecture & Design

MARKETX is built with a **layered and scalable architecture**:

1. **Data Layer** – Raw and processed datasets
2. **Processing Layer** – Cleaning, sentiment analysis, feature engineering
3. **ML Layer** – Predictive modeling
4. **Visualization Layer** – Power BI dashboards