FinSight Matrix: Synchronising News, Fundamental, and Technical Analysis for Precision Forecasting of NiftyBank using R

Introduction

In the dynamic environment of the NiftyBank index, discerning the intricate links between external news events, fundamental indicators, and technical chart movements becomes crucial. This project proposes to amalgamate these three pivotal aspects into an exhaustive predictive model, intending to decipher the optimal trading strategies, especially focusing on significant market-moving events and intraday movements.

Objectives

1. **Triple-Layered Analysis**: To consolidate news analysis, fundamental analysis, and technical analysis, forming an integrative model.
2. **Predictive Modelling**: Develop and optimise a predictive model using R to decipher NiftyBank movements.
3. **Backtesting**:Validate the model using historical data to assess its predictive accuracy and reliability.
4. **Achieving Predictability**: Aim to attain a predictive success rate above 85% through rigorous optimisation and validation.

Data Collection

1. Historical and Technical Data:

- Include data pertaining to previous price movements, volume, and technical indicators of NiftyBank.
- Source: NSE India, Yahoo Finance, etc.

2. Fundamental Data:

- Aggregate economic indicators, policy changes, financial reports, and other relevant metrics.
- Source: RBI, Banks' annual reports, government publications, etc.

3. News Data:

- Curate data from various news portals, bulletins, and financial news agencies.
- Source: APIs like GDELT, NewsAPI, or web scraping from financial news websites.

Methodology

1. Data Preprocessing:

- Employ R's `dplyr` and `tidyr` to clean and organise data for effective utilisation.

2. Exploratory Data Analysis:

- Use `ggplot2` and `corrplot` for visualising patterns, correlations, and understanding data distributions.

3. News Analysis:

- **News Collection**: Utilise web scraping or APIs to collect historical and current news articles.
- **NLP and Sentiment Analysis**: Apply NLP (Natural Language Processing) using R's `text` and `sentimentr` packages to generate sentiment scores from news articles.
- **Score Assignment:** Assign news sentiment scores to corresponding trading days, ensuring a chronological mapping.

4. Fundamental Analysis:

- In-depth analysis using economic indicators, bank financial metrics, and policy changes.
- Leverage R to develop a scoring mechanism that assimilates various fundamental metrics to produce a composite score for each period.

5. Technical Analysis:

- Implement R's `TTR` and `quantmod` to calculate technical indicators.
- Develop a scoring mechanism to evaluate technical setups, considering aspects like moving averages, RSI, MACD, etc.

6. Model Development and Training:

- Utilise machine learning algorithms and amalgamate news, fundamental, and technical scores using R's `caret` and `mlr` packages.
- Employ various algorithms and validate them using historical data.

7. Backtesting:

- Deploy R's `quantmod` for thorough backtesting, assessing the model's reliability and robustness.

8. Optimisation:

- Undertake hyperparameter tuning and feature engineering using `caret` to improve predictive accuracy.

Predictive Modelling and Strategy Development

- Incorporate the insights from news, fundamental, and technical analysis to develop predictive models for establishing potent trading strategies.
- Create a unified score that integrates the scores from all three analyses, serving as a pivotal feature for the predictive model.
- Develop strategic trading positions, identifying potential entry and exit points, whilst incorporating risk management aspects.

Backtesting and Optimisation

- Leverage historical data to backtest the devised strategies and assess performance metrics using R's `quantmod` and `blotter`.
- Ensure risk mitigation, calculating maximum drawdown, and implementing stop-loss and take-profit levels.

Desired Outcome

- Achieve a predictive model that successfully integrates news, fundamental, and technical analysis.
- Attain a prediction accuracy rate above 85%, assuring the model's reliability and robustness through rigorous backtesting and validation.

Conclusion and Future Scope

- Summarise findings, challenges, and insights obtained through the project.
- Evaluate the practicality and applicability of the model in a real-world trading scenario.
- Identify future enhancements and alternative strategies for further research and development.

Ethical and Legal Considerations

- Maintain transparency and ethical adherence in data collection, ensuring compliance with applicable laws and regulations.
- Acknowledge the inherent uncertainties and risks associated with financial trading and predictive modelling.

Technical Requirements

- R and its relevant packages (`dplyr`, `tidyr`, `caret`, `mlr`, `text`, `sentimentr`, `quantmod`, `TTR`, etc.)
- Adequate computational capabilities and data storage facilities.

Timeline

- **Weeks 1-4:** Initiate project, outline objectives, and kickstart data acquisition and preliminary exploration.
- **Weeks 5-8:** Dive into Exploratory Data Analysis, conduct news sentiment analysis, and initialise fundamental and technical analysis.
- **Weeks 9-12:** Develop, train, and initially test predictive models, integrating news, fundamental, and technical scores.
- **Weeks 13-17:** Engage in model optimisation, backtesting, finalise documentation, and prepare for the final presentation and submission.

Note

Considering the complexities and intricacies of financial markets, the project will entail thorough research and analytical endeavours to formulate an effective predictive model. Ethical considerations, reliability, and robustness will remain paramount throughout the project's lifespan.