USER GUIDE
SENTIMENTBAYESLSTM: HYBRID FORECASTING WITH GPT INSIGHTS AND BAYESIAN TUNING

VITHUSHAN JEYAPAHAN

CONTENT

INTRODUCTION

This user guide explains the steps involved in building a hybrid stock forecasting model that integrates sentiment analysis, GPT insights, Bayesian tuning, and LSTM. The case study focuses on Tesla stock data, but the model can be adapted to other stocks by changing the ticker symbol and date ranges.

DATA COLLECTION

## Historical stock and sentiment data

The first step involves collecting historical stock price data and sentiment data from various sources.

Pre-process missing data

Data preprocessing includes handling missing data, normalizing prices, and preparing sentiment scores for use in the model.

Adapt model for different stocks

To adapt the model for different stocks, simply change the stock ticker symbol in the data collection code. Similarly, the date range can be modified to fit your desired time period.
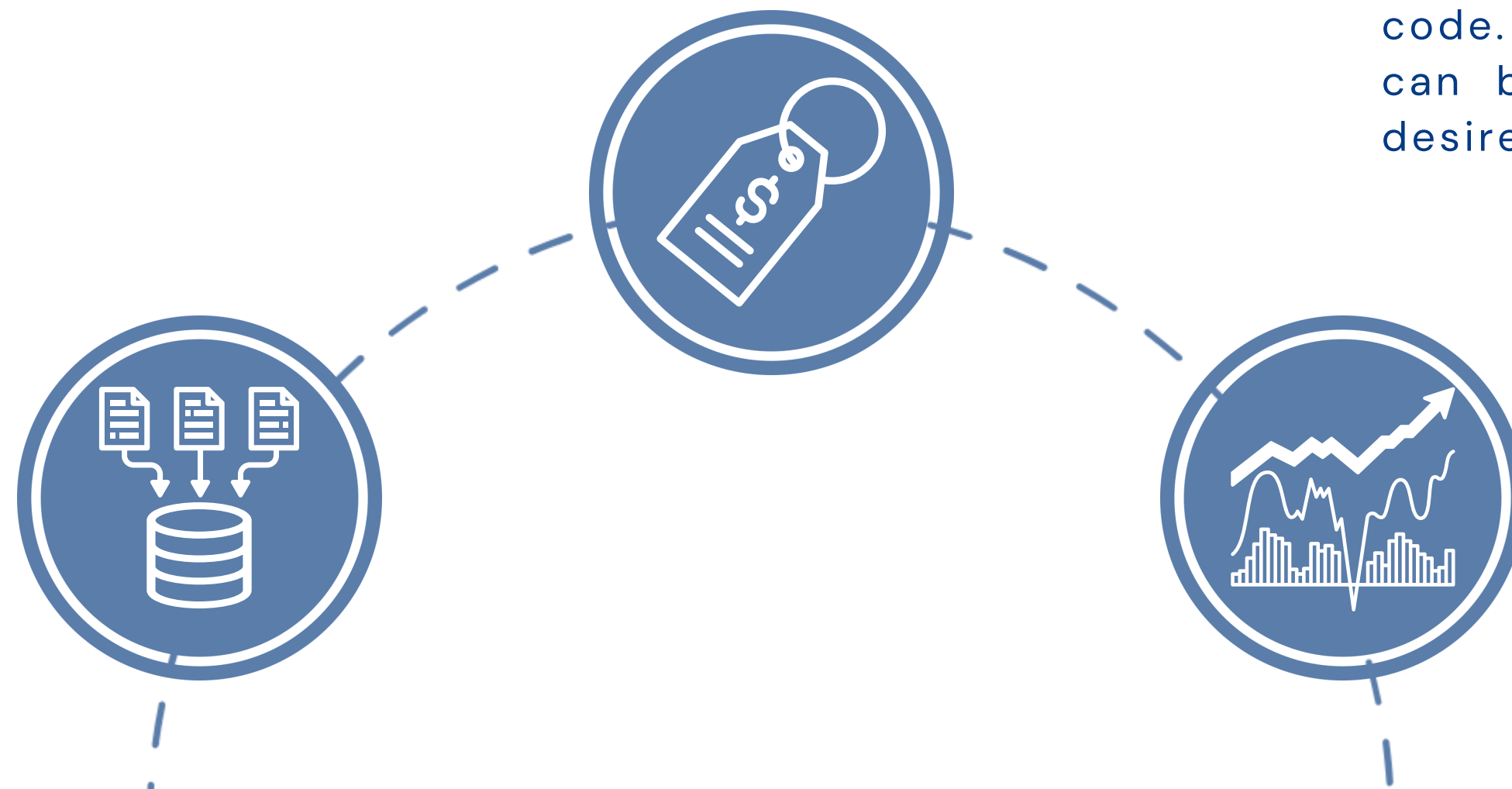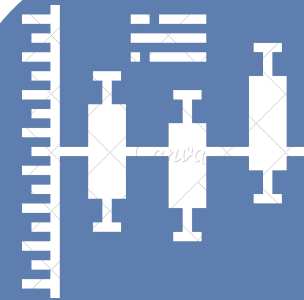
MODEL DESIGN

Sentiment data is used as an additional feature to improve forecasting accuracy.

SENTIMENT ANALYSIS

An LSTM network is used to handle the time series data for stock forecasting.

LSTM MODEL

This is used to fine-tune the hyperparameters of the LSTM model for optimal performance.

BAYESIAN OPTIMIZATION

NOTE: The specific sentiment data may vary depending on the availability and relevance for the new stock ticker.

TRAINING THE MODEL

The training process involves splitting the data into training and testing sets. The LSTM model is designed and trained using the preprocessed data, with hyperparameters optimized using Bayesian methods.

Ensure that the training and testing sets reflect the chosen date range to prevent data leakage between the sets.

Evaluation metrics such as Mean Squared Error (MSE) and Root Mean Squared Error (RMSE) are used to assess the performance of the model.

Predictions are compared with actual values, and visualizations are generated.

These evaluation methods can be applied to any stock ticker and time period.

Adjust the visualizations to align with your new dataset.

CONCLUSION

This hybrid forecasting model demonstrates the potential for improving stock price predictions by integrating sentiment analysis with traditional time series forecasting methods like LSTM, and tuning them using Bayesian optimization. The model can be adapted to different stocks and time periods by adjusting the ticker symbol and date ranges accordingly.