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[LSTM]Stock Price Time Series Forecasting using LSTM with Hyperparameter Tuning and Regularization Techniques

In this project, we developed a Long Short-Term Memory (LSTM) model for predicting the closing stock prices of a company. The following were the key steps involved:

- Data Collection and Preprocessing: The data was sourced from Kaggle and preprocessed to clean, transform, and normalize the data.
- Model Building: The LSTM model was built using the Keras library with a specific architecture consisting of multiple layers, neurons, and activation functions.
- Training and Evaluation: The model was trained using the fit() function in Keras, with a specified number of epochs and batch size. The performance of the model was evaluated using metrics such as mean squared error and mean absolute error.
- Prediction: The trained model was used to make predictions on new data.
- Visualization: The predicted and actual stock prices were plotted to visualize the performance of the model.
- Regularization: Regularization techniques such as dropout, weight decay, and batch normalization were applied to further improve the model's performance.
- Interpretability: The model's predictions and decision-making process were understood through interpretability techniques such as SHAP values and LIME.

Tools and Libraries

- Pandas
- Numpy
- Keras
- Matplotlib
- Scikit-learn
- SHAP
- LIME

Models

- Long Short-Term Memory (LSTM)