**STOCK PRICE PREDICTION USING BIDIRECTIONAL LSTM, GRU, RNN**

**ABSTRACT**

This project represents a groundbreaking effort to enhance stock price prediction by integrating advanced deep learning techniques with financial and sentiment data. By leveraging bidirectional neural architectures such as LSTM, GRU, and RNN, the approach aims to capture complex temporal dependencies and contextual patterns in stock price movements. The model incorporates historical stock data alongside sentiment analysis from social media to predict future price trends with improved accuracy. Each model—bidirectional LSTM, bidirectional GRU, and bidirectional RNN—analyzes these data streams to identify nuanced relationships between investor sentiment and market behavior, offering insights that traditional methods may overlook. This multi-faceted approach not only improves predictive accuracy but also enhances model robustness, providing a more comprehensive understanding of market dynamics. Additionally, evaluation metrics such as Mean Absolute Error (MAE) and Root Mean Square Error (RMSE) ensure precise assessment of each model’s performance, guiding further optimization. This project demonstrates the potential of combining financial and social sentiment data in deep learning frameworks, ultimately aiming to provide investors with a powerful tool for informed decision-making in a volatile market environment. Through the innovative application of bidirectional deep learning models, this initiative is poised to contribute to the field of financial forecasting, paving the way for more reliable and insightful stock prediction.

**Keywords:** Stock price prediction, bidirectional LSTM, bidirectional GRU, bidirectional RNN, deep learning, sentiment analysis, financial forecasting, market dynamics, temporal dependencies.