LSTM GAN ARCHITECTURE FOR STOCK PRICE PREDICTION

Mizba Jaffar – 20BCE1004
Dr. Renta Chintala Bhargavi
School of Computer Science and Engineering

VIT ®
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

MOTIVATION / INTRODUCTION

- Stock market prediction is a challenging and popular problem in the field of finance.
- Deep learning models can be used to derive patters in historical data and natural language processing can be used to understand market sentiment.
- Using extensive feature engineering techniques and exploring novel architectures to do so can greatly improve the accuracy of the prediction of price movements.
- Such models can be used by investors and economists to beat the market and understand the dynamics of the system.

OBJECTIVES

- Feature engineering to extract latent space features using variational autoencoders
- Build a cGAN architecture to accurately predict stock prices
- Generating stock specific news sentiment scores to condition the GAN architecture
- Compare the accuracy of the cGAN model with baseline deep learning models namely RNN, LSTM and GAN

SCOPE OF THE PROJECT

The scope of this project is to build a cGAN architecture that analyses historical data and news sentiment for stock price prediction and comparing its performance with baseline deep learning models.

METHODOLOGY

Preprocessing

Preprocessing includes normalizing data, calculating financial technical indicators, performing Fourier transformations, running the XGBoost algorithm for feature analysis and variational autoencoding for latent space feature extraction.

ARCHITECTURE
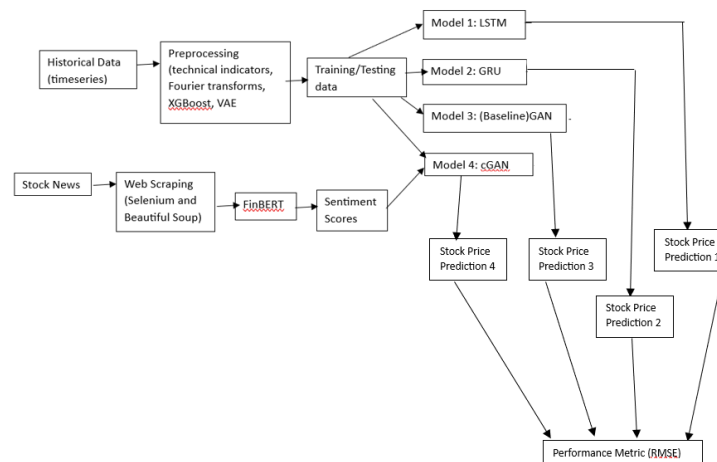
We perform feature engineering and apply deep learning algorithms such as LSTM, GRU, GAN and proposed model: cGAN and then compare the Root Mean Square Score (RMSE) score.

RESULTS

Algorithm	RMSE
LSTM	5.02
GRU	6.31
GAN	4.94
CGAN	4.90

CONCLUSION

The cGAN architecture that trains on both historical data an market sentiment acquired from natural language processing outperforms the other models.

CONTACT DETAILS

MAIL ID: mizba.j2020@vitstudent.a.c.in
MOBILE NO: 7358767859

REFERENCES

- Zhang, K., Zhong, G., Dong, J., Wang, S., & Wang, Y. (2019). Stock market prediction based on generative adversarial network. Procedia computer science, 147, 400-406.
- Fataliyev, K., Chivukula, A., Prasad, M., & Liu, W. (2021). Stock market analysis with text data: A review. arXiv preprint arXiv:2106.12985.