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by

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Project submitted to the Department of Mathematics,

Faculty of Science, University of Mauritius,

as a partial fulfillment of the requirement

for the degree of

M.Sc. Mathematical and Scientific Computing (Part time)

December 2022

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Acknowledgement

First and foremost, I would like to show my deepest gratitude to my supervisor Professor (Dr) M. Bhuruth for his guidance and recommendations throughout the project. Also, I would like to thank my family and friends for their constant support during the coursework.

Lastly, I would like to thank my colleagues for their constant support.

Abstract

Placeholder

Terms and Definitions

α	Learning Rate
η	Reduced Learning Rate
\mathbf{I}	Identity Matrix
\odot	Hadamard Product
NN	Neural Network
MSE	Mean Squared Error
MAE	Mean Absolute Error

Chapter 1

Introduction

Introduction

Chapter 2

Analysis of Bitcoin Price using Deep Learning Models

We ran a different experiment with the limited dataset containing only influencers but did not observe any major improvement from the previous experiment.

Chapter 3

Conclusion and Future Works

Bibliography

Abraham, J., Higdon, D. W., Nelson, J. & Ibarra, J. (2018), Cryptocurrency price prediction using tweet volumes and sentiment analysis.

Asur, S. & Huberman, B. (2010), ‘Predicting the future with social media’, *Proceedings - 2010 IEEE/WIC/ACM International Conference on Web Intelligence, WI 2010* **1**.

Bar-Haim, R., Dinur, E., Feldman, R., Fresko, M. & Goldstein, G. (2011), Identifying and following expert investors in stock microblogs, *in* ‘Proceedings of the 2011 Conference on Empirical Methods in Natural Language Processing’, Association for Computational Linguistics, Edinburgh, Scotland, UK., pp. 1310–1319.

URL: <https://aclanthology.org/D11-1121>

Barbieri, F., Camacho-Collados, J., Neves, L. & Anke, L. E. (2020), ‘Tweeteval: Unified benchmark and comparative evaluation for tweet classification’, *CoRR abs/2010.12421*.

URL: <https://arxiv.org/abs/2010.12421>

Bengio, Y., Simard, P. & Frasconi, P. (1994), ‘Learning long-term dependencies with gradient descent is difficult’, *IEEE Transactions on Neural Networks* **5**(2), 157–166.

Bermingham, A. & Smeaton, A. (2011), On using Twitter to monitor political sentiment and predict election results, *in* ‘Proceedings of the Workshop on Sentiment Analysis where AI meets Psychology (SAAIP 2011)’, Asian Federation of Nat-

ural Language Processing, Chiang Mai, Thailand, pp. 2–10.

URL: <https://aclanthology.org/W11-3702>

Chiorrini, A., Diamantini, C., Mircoli, A. & Potena, D. (2021), Emotion and sentiment analysis of tweets using bert.

Devlin, J., Chang, M., Lee, K. & Toutanova, K. (2018), ‘BERT: pre-training of deep bidirectional transformers for language understanding’, *CoRR* **abs/1810.04805**.

URL: <http://arxiv.org/abs/1810.04805>

Hinton, G. & Tieleman, T. (2012), ‘Lecture 6.5-rmsprop: Divide the gradient by a running average of its recent magnitude.’, COURSE: Neural Networks for Machine Learning, 4, 26-30.

Hochreiter, S. & Schmidhuber, J. (1997), ‘Long Short-Term Memory’, *Neural Computation* **9**(8), 1735–1780.

URL: <https://doi.org/10.1162/neco.1997.9.8.1735>

Kingma, D. P. & Ba, J. (2014), ‘Adam: A method for stochastic optimization’.

URL: <https://arxiv.org/abs/1412.6980>

Kolen, J. F. & Kremer, S. C. (2001), *Gradient Flow in Recurrent Nets: The Difficulty of Learning LongTerm Dependencies*, pp. 237–243.

LeCun, Y., Bengio, Y. & Hinton, G. (2015), ‘Deep learning’, *Nature* **521**(7553), 436–444.

Liu, Y., Ott, M., Goyal, N., Du, J., Joshi, M., Chen, D., Levy, O., Lewis, M., Zettlemoyer, L. & Stoyanov, V. (2019), ‘Roberta: A robustly optimized BERT pretraining approach’, *CoRR* **abs/1907.11692**.

URL: <http://arxiv.org/abs/1907.11692>

McCulloch, W. S. & Pitts, W. (1943), ‘A logical calculus of the ideas immanent in nervous activity’, *The bulletin of mathematical biophysics* **5**(4), 115–133.

Mikolov, T., Chen, K., Corrado, G. & Dean, J. (2013), ‘Efficient estimation of word representations in vector space’.

URL: <https://arxiv.org/abs/1301.3781>

Nakamoto, S. (2009), ‘Bitcoin: A peer-to-peer electronic cash system’, *Cryptography Mailing list* at <https://metzdowd.com> .

Robbins, H. & Monro, S. (1951), ‘A Stochastic Approximation Method’, *The Annals of Mathematical Statistics* **22**(3), 400 – 407.

URL: <https://doi.org/10.1214/aoms/1177729586>

Rosenblatt, F. (1958), ‘The perceptron: a probabilistic model for information storage and organization in the brain.’, *Psychol Rev* **65**(6), 386–408.

Rumelhart, D. E., Hinton, G. E. & Williams, R. J. (1986), ‘Learning representations by back-propagating errors’, *Nature* **323**(6088), 533–536.

Schuster, M. & Paliwal, K. (1997), ‘Bidirectional recurrent neural networks’, *IEEE Transactions on Signal Processing* **45**(11), 2673–2681.

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., Kaiser, L. & Polosukhin, I. (2017), ‘Attention is all you need’.

URL: <https://arxiv.org/abs/1706.03762>

Zhang, X., Fuehres, H. & Gloor, P. A. (2011), ‘Predicting stock market indicators through twitter “i hope it is not as bad as i fear”’, *Procedia - Social and Behavioral Sciences* **26**, 55–62. The 2nd Collaborative Innovation Networks Conference - COINs2010.

URL: <https://www.sciencedirect.com/science/article/pii/S1877042811023895>