

DAFTAR PUSTAKA

- [1] M. Sharaf, E. E.-D. Hemdan, A. El-Sayed, and N. A. El-Bahnasawy, "StockPred: a framework for stock Price prediction," *Multimed. Tools Appl.*, vol. 80, no. 12, pp. 17923–17954, 2021, doi: 10.1007/s11042-021-10579-8.
- [2] W. Budiharto, "Data science approach to stock prices forecasting in Indonesia during Covid - 19 using Long Short - Term Memory (LSTM)," *J. Big Data*, 2021, doi: 10.1186/s40537-021-00430-0.
- [3] M. Diqi, M. Endah, H. Adri, and S. Nur, "StockGAN : robust stock price prediction using GAN algorithm," *Int. J. Inf. Technol.*, vol. 14, no. 5, pp. 2309–2315, 2022, doi: 10.1007/s41870-022-00929-6.
- [4] C. Zhao *et al.*, "Progress and prospects of data-driven stock price forecasting research," *Int. J. Cogn. Comput. Eng.*, vol. 4, pp. 100–108, 2023, doi: <https://doi.org/10.1016/j.ijcce.2023.03.001>.
- [5] W. Lu, "A CNN-BiLSTM-AM method for stock price prediction," *Neural Comput. Appl.*, vol. 0123456789, 2020, doi: 10.1007/s00521-020-05532-z.
- [6] M. M. Akhtar, A. S. Zamani, S. Khan, A. S. A. Shatat, S. Dilshad, and F. Samdani, "Stock market prediction based on statistical data using machine learning algorithms," *J. King Saud Univ. - Sci.*, vol. 34, no. 4, p. 101940, 2022, doi: <https://doi.org/10.1016/j.jksus.2022.101940>.
- [7] M. Haddouchi and A. Berrado, "A Survey and Taxonomy of Methods Interpreting Random Forest Models," *J. Intell. Inf. Syst.*, vol. 62, no. 2, pp. 679–715, 2024, doi: 10.1007/s10844-023-00838-y.
- [8] P. S. Sisodia, A. Gupta, Y. Kumar, and G. K. Ameta, "Stock Market Analysis and Prediction for Nifty50 using LSTM Deep Learning Approach," in *2022 2nd International Conference on Innovative Practices in Technology and Management (ICIPTM)*, 2022, pp. 156–161. doi: 10.1109/ICIPTM54933.2022.9754148.
- [9] F. P. Simamora, R. Purba, and M. F. Pasha, "Optimisasi Hyperparameter BiLSTM Menggunakan Bayesian Optimization untuk Prediksi Harga Saham," *Jambura J. Math.*, vol. 7, no. 1, pp. 8–13, 2025, doi: 10.37905/jjom.v7i1.27166.
- [10] K. Chen, R. Purba, and A. Halim, "Stock Price Prediction Using XCEEMDAN-Bidirectional LSTM -Spline," *Indones. J. Artif. Intell. Data Min.*, vol. 5, no. 1, p. 1, 2022, doi: 10.24014/ijaidm.v5i1.14424.

- [11] Y. Jiang, "Emotion Algorithm Analysis and Expression Optimization of Film and Television Drama Lines," *Appl. Math. Nonlinear Sci.*, vol. 9, no. 1, pp. 1–17, 2024, doi: 10.2478/amns-2024-1930.
- [12] R. L. Abduljabbar, H. Dia, and P.-W. Tsai, "Unidirectional and Bidirectional LSTM Models for Short-Term Traffic Prediction," *J. Adv. Transp.*, vol. 2021, no. 1, p. 5589075, 2021, doi: <https://doi.org/10.1155/2021/5589075>.
- [13] M. Yang and J. Wang, "Adaptability of Financial Time Series Prediction Based on BiLSTM," *Procedia Comput. Sci.*, vol. 199, pp. 18–25, 2022, doi: <https://doi.org/10.1016/j.procs.2022.01.003>.
- [14] D. I. Puteri, "Implementasi Long Short Term Memory (LSTM) dan Bidirectional Long Short Term Memory (BiLSTM) dalam Prediksi Harga Saham Syariah," *EULER J. Ilm. Mat. Sains dan Teknol.*, vol. 11, no. 1, pp. 35–43, Jun. 2023, doi: 10.34312/euler.v11i1.19791.
- [15] H. Dhake, Y. Kashyap, and P. Kosmopoulos, "Algorithms for Hyperparameter Tuning of LSTMs for Time Series Forecasting," *Remote Sens.*, vol. 15, no. 8, 2023, doi: 10.3390/rs15082076.
- [16] B. Gülmez, "Stock price prediction with optimized deep LSTM network with artificial rabbits optimization algorithm," *Expert Syst. Appl.*, vol. 227, p. 120346, 2023, doi: <https://doi.org/10.1016/j.eswa.2023.120346>.
- [17] M. Ulina, R. Purba, and A. Halim, "Foreign Exchange Prediction using CEEMDAN and Improved FA-LSTM," *2020 5th Int. Conf. Informatics Comput. ICIC 2020*, 2020, doi: 10.1109/ICIC50835.2020.9288615.
- [18] H. Xing, H. Wu, Y. Chen, and K. Wang, "A cooperative interference resource allocation method based on improved fire fly algorithm," *Def. Technol.*, vol. 17, no. 4, pp. 1352–1360, 2021, doi: 10.1016/j.dt.2020.07.006.
- [19] A. Pratama, "Bitcoin Cryptocurrency Price Prediction Using IFA-BiLSTM," in *Proceedings - 2024 2nd International Conference on Technology Innovation and Its Applications, ICTIIA 2024*, 2024, pp. 1–6. doi: 10.1109/ICTIIA61827.2024.10761776.
- [20] A. Lawi, H. Mesra, and S. Amir, "Implementation of Long Short-Term Memory and Gated Recurrent Units on grouped time-series data to predict stock prices accurately," *J. Big Data*, vol. 9, no. 1, 2022, doi: 10.1186/s40537-022-00597-0.
- [21] X. Ji, J. Wang, and Z. Yan, "A stock price prediction method based on deep learning technology," *Int. J. Crowd Sci.*, vol. 5, no. 1, pp. 55–72, 2021, doi: 10.1108/IJCS-05-

2020-0012.

- [22] N. Afrianto, D. H. Fudholi, and S. Rani, "Prediksi Harga Saham Menggunakan BiLSTM dengan Faktor Sentimen Publik," *J. RESTI (Rekayasa Sist. dan Teknol. Informasi)*, vol. 6, no. 1, pp. 41–46, 2022, doi: 10.29207/resti.v6i1.3676.
- [23] A. Nilsen, "Perbandingan Model RNN, Model LSTM, dan Model GRU dalam Memprediksi Harga Saham-Saham LQ45," *J. Stat. dan Apl.*, vol. 6, no. 1, pp. 137–147, 2022, doi: 10.21009/jsa.06113.
- [24] F. H. Sezgin, Ö. Algorabi, G. Sart, and M. Güler, "Hyperparameter-Optimized RNN, LSTM, and GRU Models for Airline Stock Price Prediction: A Comparative Study on THYAO and PGSUS," *Symmetry (Basel)*, vol. 17, no. 11, 2025, doi: 10.3390/sym17111905.
- [25] T. Phuoc, P. T. K. Anh, P. H. Tam, and C. V. Nguyen, "Applying machine learning algorithms to predict the stock price trend in the stock market – The case of Vietnam," *Humanit. Soc. Sci. Commun.*, vol. 11, no. 1, pp. 1–18, 2024, doi: 10.1057/s41599-024-02807-x.
- [26] G. Li, A. Zhang, Q. Zhang, D. Wu, and C. Zhan, "Pearson Correlation Coefficient-Based Performance Enhancement of Broad Learning System for Stock Price Prediction," *IEEE Trans. Circuits Syst. II Express Briefs*, vol. 69, no. 5, pp. 2413–2417, 2022, doi: 10.1109/TCSII.2022.3160266.
- [27] A. Chatterjee, H. Bhowmick, and J. Sen, "Stock Price Prediction Using Time Series, Econometric, Machine Learning, and Deep Learning Models," *2021 IEEE Mysore Sub Sect. Int. Conf. MysuruCon 2021*, pp. 289–296, 2021, doi: 10.1109/MysuruCon52639.2021.9641610.
- [28] P. M. Tambe, S. D. Rasal, P. A. Sangle, and K. B. Gorane, "Machine Learning Cryptocurrency Price Prediction," *Int. J. Creat. Res. Thoughts*, vol. 12, no. 6, pp. a860--a867, Jun. 2024.
- [29] M. A. K. September, F. Sanna Passino, L. Goldmann, and A. Hinel, "Extended Deep Adaptive Input Normalization for Preprocessing Time Series Data for Neural Networks," in *Proceedings of The 27th International Conference on Artificial Intelligence and Statistics*, S. Dasgupta, S. Mandt, and Y. Li, Eds., in *Proceedings of Machine Learning Research*, vol. 238. PMLR, 2024, pp. 1891–1899. [Online]. Available: <https://proceedings.mlr.press/v238/september24a.html>
- [30] A. Yunizar, T. Rismawan, and D. M. Midyanti, "Penerapan Metode Recurrent Neural Network Model Gated Recurrent Unit Untuk Prediksi Harga Cryptocurrency,"

Coding J. Komput. dan Apl., vol. 11, no. 1, p. 32, 2023, doi: 10.26418/coding.v11i1.58073.

- [31] N. Fitriani A.J and Ghuftron, “Perbandingan Metode Reccurent Neural Network dan Long Short Term Memory Untuk Prediksi Harga Saham Bank Mandiri,” *J. Nusantara Eng.*, vol. 8, no. 2, pp. 465–471, Oct. 2025, doi: 10.29407/noe.v8i02.24661.
- [32] M. Barua, T. Kumar, K. Raj, and A. M. Roy, “Comparative Analysis of Deep Learning Models for Stock Price Prediction in the Indian Market,” *FinTech*, vol. 3, no. 4, pp. 551–568, 2024, doi: 10.3390/fintech3040029.
- [33] M. Goldblum, M. Finzi, K. Rowan, and A. G. Wilson, “The No Free Lunch Theorem, Kolmogorov Complexity, and the Role of Inductive Biases in Machine Learning,” 2024. [Online]. Available: <https://arxiv.org/abs/2304.05366>
- [34] Z. Fathali, Z. Kodia, and L. Ben Said, “Stock Market Prediction of NIFTY 50 Index Applying Machine Learning Techniques Stock Market Prediction of NIFTY 50 Index Applying Machine,” *Appl. Artif. Intell.*, vol. 36, no. 1, 2022, doi: 10.1080/08839514.2022.2111134.
- [35] D. M. Teixeira and R. S. Barbosa, “Stock Price Prediction in the Financial Market Using Machine Learning Models,” *Computation*, vol. 13, no. 1, 2025, doi: 10.3390/computation13010003.
- [36] Z. Hu, Y. Zhao, and M. Khushi, “A Survey of Forex and Stock Price Prediction Using Deep Learning,” *Appl. Syst. Innov.*, vol. 4, no. 1, p. 9, Feb. 2021, doi: 10.3390/asi4010009.
- [37] S. Jurnal Pipin and H. Kurniawan, “Analisis Sentimen Kebijakan MBKM Berdasarkan Opini Masyarakat di Twitter Menggunakan LSTM,” *J. SIFO Mikroskil*, vol. 23, no. 2, pp. 197–208, 2022, doi: 10.55601/jsm.v23i2.900.
- [38] C. Wang and J. Qiao, “Construction Project Cost Prediction Method Based on Improved BiLSTM,” *Appl. Sci.*, vol. 14, no. 3, 2024, doi: 10.3390/app14030978.
- [39] P. L. Seabe, C. R. B. Moutsinga, and E. Pindza, “Forecasting Cryptocurrency Prices Using LSTM, GRU, and Bi-Directional LSTM: A Deep Learning Approach,” *Fractal Fract.*, vol. 7, no. 2, 2023, doi: 10.3390/fractalfract7020203.
- [40] F. García, F. Guijarro, J. Oliver, and R. Tamošiūnienė, “Foreign Exchange Forecasting Models: LSTM and BiLSTM Comparison,” *Eng. Proc.*, vol. 68, no. 1, 2024, doi: 10.3390/engproc2024068019.
- [41] M. Khan, H. Wang, A. Riaz, A. Elfatyany, and S. Karim, “Bidirectional LSTM - RNN - based hybrid deep learning frameworks for univariate time series classification,” *J.*

- Supercomput.*, no. 0123456789, 2021, doi: 10.1007/s11227-020-03560-z.
- [42] M. Ghasemi, S. kadhoda Mohammadi, M. Zare, S. Mirjalili, M. Gil, and R. Hemmati, "A new firefly algorithm with improved global exploration and convergence with application to engineering optimization," *Decis. Anal. J.*, vol. 5, no. September, p. 100125, 2022, doi: 10.1016/j.dajour.2022.100125.
- [43] A. Abbaszadeh Shahri, M. Khorsand Zak, and H. Abbaszadeh Shahri, "A modified firefly algorithm applying on multi-objective radial-based function for blasting," *Neural Comput. Appl.*, vol. 34, no. 3, pp. 2455–2471, 2022, doi: 10.1007/s00521-021-06544-z.
- [44] N. Bacanin, T. Bezdan, K. Venkatachalam, and F. Al-Turjman, "Optimized convolutional neural network by firefly algorithm for magnetic resonance image classification of glioma brain tumor grade," *J. Real-Time Image Process.*, vol. 18, no. 4, pp. 1085–1098, 2021, doi: 10.1007/s11554-021-01106-x.
- [45] D. Jovanovic, M. Antonijevic, M. Stankovic, M. Zivkovic, M. Tanaskovic, and N. Bacanin, "Tuning Machine Learning Models Using a Group Search Firefly Algorithm for Credit Card Fraud Detection," *Mathematics*, vol. 10, no. 13, pp. 1–30, 2022, doi: 10.3390/math10132272.
- [46] N. Bacanin, R. Stoean, M. Zivkovic, A. Petrovic, T. A. Rashid, and T. Bezdan, "Performance of a novel chaotic firefly algorithm with enhanced exploration for tackling global optimization problems: Application for dropout regularization," *Mathematics*, vol. 9, no. 21, 2021, doi: 10.3390/math9212705.
- [47] S. Yu, X. Zuo, X. Fan, Z. Liu, and M. Pei, "An improved firefly algorithm based on personalized step strategy," *Computing*, vol. 103, no. 4, pp. 735–748, 2021, doi: 10.1007/s00607-021-00919-9.
- [48] S. Bazi, R. Benzid, Y. Bazi, and M. M. Al Rahhal, "A fast firefly algorithm for function optimization: Application to the control of bldc motor," *Sensors*, vol. 21, no. 16, 2021, doi: 10.3390/s21165267.
- [49] B. A. Hassan, "CSCF: a chaotic sine cosine firefly algorithm for practical application problems," *Neural Comput. Appl.*, vol. 33, no. 12, pp. 7011–7030, 2021, doi: 10.1007/s00521-020-05474-6.
- [50] A. Liu, P. Li, X. Deng, and L. Ren, "A sigmoid attractiveness based improved firefly algorithm and its applications in IIR filter design," *Conn. Sci.*, vol. 33, no. 1, pp. 1–25, 2021, doi: 10.1080/09540091.2020.1742660.
- [51] J. Cahyani, S. Mujahidin, and T. P. Fiqar, "Implementasi Metode Long Short Term

Memory (LSTM) untuk Memprediksi Harga Bahan Pokok Nasional,” *J. Sist. dan Teknol. Inf.*, vol. 11, no. 2, p. 346, 2023, doi: 10.26418/justin.v11i2.57395.

- [52] H. Rezaei, H. Faaljou, and G. Mansourfar, “Stock Price Prediction using Deep Learning and Frequency,” *Expert Syst. Appl.*, p. 114332, 2020, doi: 10.1016/j.eswa.2020.114332.

