

Bitcoin Price Prediction System Using Machine Learning

Dr. Srinidhi, Sriram R Menon, Shridhar D T, Prajwal H M, Pratyush Raj Sinha

School of C&IT, REVA University, Bangalore, India

Abstract: *Deep learning and machine learning have become the foundation of bitcoin portfolio optimization in today's age of huge data. The price and volatility of Bitcoin have been predicted using some of the most cutting-edge machine learning methods. Bitcoin values can be predicted better using machine learning models like recurrent neural networks and long short-term memory. For the most part, sequence models with sophisticated feature engineering have not been used in research attempting to forecast future price. In this research, we look at a framework for predicting daily Bitcoin values using a variety of sophisticated machine learning forecasting approaches that include both exogenous and endogenous elements. The foundation mean squared error is used to analyse and compare various techniques (RMSE). The gated recurring unit (GRU) with recurrent dropout performs better than other models. Using our GRU model and training, we demonstrate that fundamental trading methods may be profitable. Bitcoin, AI, neural networks, Statistics, Deep Learning, prediction model, and risk management are examples.*

Keywords: Deep learning and machine learning

REFERENCES

- [1]. Barrdear, John, and Michael Kumhof. 2016. The Macroeconomics of Central Bank Issued Digital Currencies. SSRN Electronic Journal. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2811208 (accessed on 2 February 2020).
- [2]. Baronchelli, Andrea. 2018. The emergence of consensus: A primer. Royal Society Open Science 5: 172189..
- [3]. Bech, Morten L., and Rodney Garratt. 2017. Central Bank Cryptocurrencies. BIS Quarterly Review 2017: 5–70.
- [3]. Blau, Benjamin M. 2017. Price Dynamics and Speculative Trading in Bitcoin. Research in International Business and Finance 41: 493–99.
- [4]. Blundell-Wignall, Adrian. 2014. The Bitcoin Question: Currency versus Trust-less Transfer Technology. OECD Working Papers on Finance, Insurance and Private Pensions 37: 1.
- [5]. Bohme, Rainer, Nicolas Christin, Benjamin Edelman, and Tyler Moore. 2015. Bitcoin: Economics, technology, and governance. Journal of Economic Perspectives (JEP) 29: 213–38.
- [5]. Bouri, Elie, Peter Molnár, Georges Azzi, and David Roubaud. 2017. On the hedge and safe haven properties of Bitcoin: Is it really more than a diversifier? Finance Research Letters 20: 192–98. . Briere,
- [6]. Marie, Kim Oosterlinck, and Ariane Szafarz. 2015. Virtual currency, tangible return: Portfolio diversification with bitcoin. Journal Asset Management 16: 365–73.
- [7]. Cagli, Efe C. 2019. Explosive behavior in the prices of Bitcoin and altcoins. Finance Research Letters 29: 398–403. . Casey, Michael J., and Paul Vigna. 2015. Bitcoin and the digital currency revolution. The Wall Street Journal. Available online: <https://www.wsj.com/articles/the-revolutionary-power-of-digital-currency-1422035061> (accessed on 2 February 2020).
- [8]. Chang, Pei-Chann, Chen-Hao Liu, Chin-Yuan Fan, Jun-Lin Lin, and Chih-Ming Lai. 2009. An Ensemble of Neural Networks for Stock Trading Decision Making. In Emerging Intelligent Computing Technology and Applications. With Aspects of Artificial Intelligence 5755 of Lecture Notes in Computer Science.
- [9]. [9] Berlin/Heidelberg: Springer, pp. 1–10. Available online: https://doi.org/10.1007/978-364204020-7_1 (accessed on 2 February 2020). Cheah, Eng-Tuck, and John Fry. 2015. Speculative bubbles in Bitcoin markets? An empirical investigation into the fundamental value of Bitcoin. Economics Letters 130: 32–36.

- [10]. Chen, Zheshi, Chunhong Li, and Wenjun Sun. 2020. Bitcoin price prediction using machine learning: An approach to sample dimension engineering. *Journal of Computational and Applied Mathematics* 365: 112395.
- [11]. Cho, Kyunghyun, Bart van Merriënboer, Caglar Gulcehre, Dzmitry Bahdanau, Bougares Fethi, Schwenk Holger, and Yoshua Bengio. 2014. Learning Phrase Representations using RNN Encoder–Decoder for Statistical Machine Translation. Available online: <https://arxiv.org/abs/1406.1078.pdf> (accessed on 2 February 2020).
Chollet, Francois. 2015. Keras: Deep Learning for humans. Available online: <https://github.com/keras-team/keras> (accessed on 2 February 2020).
- [12]. Chong, Eunsuk, Chulwoo Han, and Frank C. Park. 2017. Deep learning networks for stock market analysis and prediction: methodology, data representations, and case studies. *Expert System with Applications* 83: 187–205.
. Chung, Junyoung, Caglar Gulcehre, Kyung H. Cho, and Yoshua Bengio. 2014. Empirical Evaluation of Gated Recurrent Neural Networks on Sequence Modeling. Available online: <https://arxiv.org/pdf/1412.3555.pdf> (accessed on 2 February 2020).
- [13]. Ciaian, Pavel, Miroslava Rajcaniova, and d'Artis Kancs. 2016. The economics of Bitcoin price formation. *Applied Economics* 48: 1799–815.
. Corbet, Shaen, Brian Lucey, Maurice Peat, and Samuel Vigne. 2018. Bitcoin Futures—What use are they? *Economics Letters* 172: 23–27.
. Cusumano, Michael A. 2014. The Bitcoin ecosystem. *Communications of the ACM* 57: 22–24.
. Cybenko, George. 1989. Approximation by superpositions of a sigmoidal function. *Math. Control Signals Systems* 2: 303–14.
Diebold, Francis X., and Mariano Roberto S. 1995. Comparing Predictive Accuracy. *Journal of Business and Economic Statistics* 13: 253–63.
Dow, Sheila. 2019.
- [14]. Monetary Reform, Central Banks and Digital Currencies. *International Journal of Political Economy* 48: 153–73.
Dyhrberg, Anne H. 2016. Bitcoin, gold and the dollar-A Garch volatility. *Finance Research Letters* 16: 85–92.
- [15]. Archana C, Savita K, Raj K. Machine Learning Classification Techniques: A Comparative Study. *International Journal on Advanced Computer Theory and Engineering (IJACTE)* (2013);2(4):21-25.
- [16]. Pavlyshenko BM. Machine- Learning Models for Sales Time Series Forecasting. *Data*. (2019) Mar; 4(1):15. DOI:10.3390/data4010015.
- [17]. Nakamoto S. Bitcoin: A Peer- to-Peer Electronic Cash System. Available from: <https://bitcoin.org/bitcoin.pdf>
- [18]. BLOCKCHAIN. [Internet]. Available from: <https://www.blockchain.com/en/charts/market price?timespan=all>
- [19]. Kim JS. A Survey of Crypto currencies based on Blockchain: *Journal of the Korea Society of Computer and Information*. (2019) Feb; 24(2):67-74. DOI: <http://dx.doi.org/10.9708/jksci.2019.24.02.067>
- [20]. Cann O. Artificial Intelligence & Robotics Top List of Technologies in Need of Better Governance. [Internet]. Available from: [https://www.weforum.org/press/\(2016\)/11/artificial-intelligence-robotics-top- listof-technologies-in-need-of-better- governance/](https://www.weforum.org/press/(2016)/11/artificial-intelligence-robotics-top-listof-technologies-in-need-of-better- governance/)
- [21]. Lannquist A. [Internet]. Available from: [https://www.weforum.org/agenda/\(2019\) /04/this-new-form-of-currency- couldtransformthe- way-we-see-money/](https://www.weforum.org/agenda/(2019) /04/this-new-form-of-currency- couldtransformthe- way-we-see-money/)
- [22]. [Internet]. Available from: <https://www.pluralsight.com/guides/blockchainarchitecture>
- [23]. Gola Y. 3 Reasons Bitcoin Price Will Sprint Beyond (2019)-High \$6,000. [Internet]. Available from: <https://www.ccn.com/3reasonsbitcoin- price- will-sprint-beyond2019-high-6000/>