International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 05 | May - 2022 Impact Factor: 7.185 ISSN: 2582-3930

BITCOIN PRICE PREDICTION USING MACHINE LEARNING

Devansh Deshwal

B-tech (CSE) , Lovely professional university , Phagwara , Punjab , India.

ABSTRACT

After the boom and bust in cryptocurrencies' prices in recent years, Bitcoin has been totally regarded as an investment asset. As it is highly volatile in nature, there has been a need for good predictions for carrying base investment decisions. Although current study has used machine learning for more accurate Bitcoin price prediction, some of them did focused on the feasibility of applying different modeling techniques to the samples that has different data structures and dimension features. To predict Bitcoin price on different frequencies after using machine learning techniques, firstly we have to classify the Bitcoin price with daily price and high-frequency price. Here, we attempt to predict Bitcoin price as accurately as possible by taking into consideration various protocols that affect the Bitcoin value. Using the provided data we would predict the sign of daily price change with highest possible accuracy. We have used Random Forest Classifier and compared with benchmark results as daily price prediction, we achieve a better performance, with the highest accuracies of the statistical methods and machine learning algorithms of 99%. my investigation in Bitcoin price prediction can be considered as a pilot study for the importance of the sample dimension in the machine learning techniques.

Keywords

Bitcoin, Crypto Currency, Machine Learning, Blockchain, Long Short Term Memory(LSTM), Recurrent Neural Network(RNN), Prediction .

INTRODUCTION

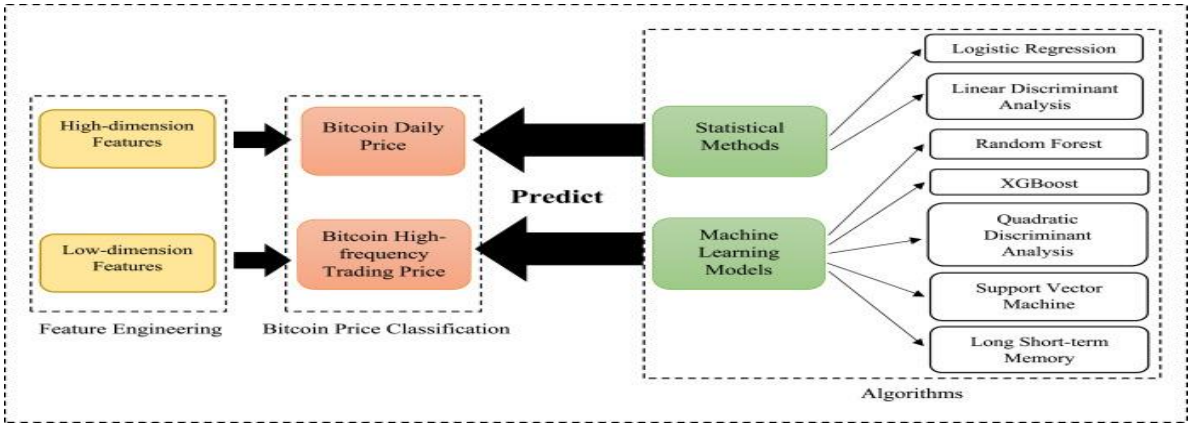
With the appearance of Bitcoin 10 years ago the globe economist, albeit in small numbers, is flexible and responsive. Bitcoin introduced itself as a program that solved the Double Spend problem (Nakamoto & Shah of Iran , 2017) , a preferred issue with Digital Cash systems. However, the impact in the coming years was great. Distributed Ledger Technologies (DLT), Intelligent Agreements, Cryptocurrencies, etc. it's all supported by the thought of "Bitcoin". This was known, throughout a separate power division mixed with intuitive motive. On the opposite side of the spectrum, and data is taken into account nowadays, over time with a major increase in hardware efficiency, Machine learning continues to be used. As a result, we tend to predict the price and importance of Bitcoin, whereas the dynamic is not solely on Bitcoin exchanges however conjointly on finance markets generally.

Cryptocurrency is the encrypted data string that basically denotes a unit of currency. It has been monitored and organized by a peer-to-peer network called the blockchain , Which also serves as a secure ledger of transactions , e.g., buying , selling and transferring. Unlike the actual money , cryptocurrencies are decentralized , which actually means they are being issued by the governments or any other financial institutions. They are being created through the cryptographic algorithms that are maintained and confirmed in a process called mining.

Types of cryptocurrencies:-

1 Bitcoin (BTC) with a total market value of $749 billion.
2 Ethereum (ETH) with a total market value of $ 313 billion.
3 Tether (USDT) with a total market value of $ 79.5 billion.
4 Binance coin (BNB) with a total market value of $ 62.6 billion.
5 USD coin (USDC) with a total market value of $ 53.2 billion.
6 XRP (XRP) with a total market value of $ 34.4 billion.
7 Terra (LUNA) with a total market value of $ of 32.9 billion.
8 Solana (SOL) with a total market value of $ 28.5 billion.
9 Cardona (ADA) with a total market value of 28.4 billion.
10 Avalanche (AVAX) with a total market value of $ 20.6 billion.

In this project we will see how to calculate the price of bitcoin on the basis of day , month and year and will also see the results of bitcoin using ML algorithms. Which will eventually show us the decision boundaries and will also show the mean squared error for different algorithms we will submit along with the bitcoin and lastly it will also show us the original bitcoin price value along with its predicted bitcoin price value. Bitcoin is therefore regarded as the first decentralized cryptocurrency using the blockchain technology to facilitate payments and also the digital transactions.



LITERATURE SURVEY

1) Automated bitcoin trading via machine learning algorithms

AUTHORS: I. Madan, S. Saluja, A. Zhao

In this project, we will attempt to apply the machine-learning algorithms to predict the Bitcoin price. For the first phase of our investigation, we have aimed to understand and identify daily trends in Bitcoin market while gaining the insight into some optimal features surrounding the Bitcoin price. The data set hereby consists of over 25 features relating to the Bitcoin price and also the payment network over the period of 5 years, as recorded daily. During the second phase of my investigation, i focused on the Bitcoin price data and then leveraged the data, as i saw an opportunity to evaluate the price predictions at varying levels of granularity and noisiness. Hereby by predicting the sign of the future change in price, I am modeling the problem of price prediction as an binomial classification task, experimenting with the custom algorithm which leverages both the random forests and also the generalized linear models. These results had 50-55% accuracy in predicting the sign for the future price change.

2) Deep learning-based feature engineering for stock price movement prediction

AUTHORS: W. Long, Z. Lu, and L. Cui

Stock price modeling and price prediction have been really challenging objectives for the researchers and also the speculators because of the noisy and non-stationary characteristics of these samples. With growth in deep learning, the task of feature learning can now be performed more effectively by using purposely designed network. In this paper, we propose a novel named multi-filters neural network (MFNN) specifically for extractions of features on financial time series samples and price movement prediction task. Both of the convolutional and also the recurrent neurons are being integrated to build a multi-filters structure, so that the information that be need can be obtained from different feature spaces and market. We will apply our MFNN for the extreme market prediction and also the signal-based simulation tasks on the Chinese stock market index CSI 300. Therefore , the experimental result shows that our network outperforms traditional machine learning models, statistical models, and single-structure networks in terms of the accuracy, profitability, and the stability.

3) Evaluation of the effect of the investor psychology on artificial stock market through the degree of efficiency

AUTHORS: J. B. Duarte Duarte, L. H. Talero Sarmiento, and K. J. Sierra Juárez

The major objective of this article is to develop the Cellular Automaton Model in which more than a single type of stockbroker can interact, and also where the use and the exchange of information between all the investors describe the complexity measured through estimation of Hurst exponent. This exponent hereby represents a efficient or a random market when it have a value equal to 0.5. Thanks to all the various proposals, it can be easily determined in this investigation that the rational component might exist in the simulator in order to generate the efficient behavior.

4) A fusion model of HMM, ANN and GA for the stock market forecasting

AUTHORS: M. R. Hassan, B. Nath, and M. Kirley

In this paper we did propose and implement a fusion model by combining the Hidden Markov Model (HMM), Artificial Neural Networks (ANN) and Genetic Algorithms (GA) to forecast the financial market behaviour. Here, the developed tool could be used for in depth analysis of stock market. Using the ANN, the daily stock prices have been transformed to the independent set of values that become input to HMM. We then draw on GA to simply optimize the initial parameters of HMM. The trained HMM hereby is used to identify and also to locate similar patterns in the historical data. Then the price differences between the matched day and the respective next day is calculated. Lastly, a weighted average of price differences for similar patterns is obtained for preparing a forecast for the next day. Forecasts are been obtained for a number of securities in the IT sector and are also being compared with an conventional forecast method.

5) Forecasting stock market movement direction with the support vector machine

AUTHORS: W. Huang, Y. Nakamori, and S.-Y. Wang

Support vector machine (SVM) is a specific type of learning algorithms characterized by the capacity control of decision function, the use of kernel functions and also the sparsity of the solution. In this paper, we had investigated the predictability of financial movement direction with SVM by forecasting weekly movement direction of NIKKEI 225 index. To evaluate forecasting ability of SVM, we will compare its performance with those of Linear Discriminant Analysis, Quadratic Discriminant Analysis and Elman Backpropagation Neural Networks. Thus, the experiment results show that SVM easily outperforms the other classification methods. Further, we did propose a combining model by integrating SVM along with the other

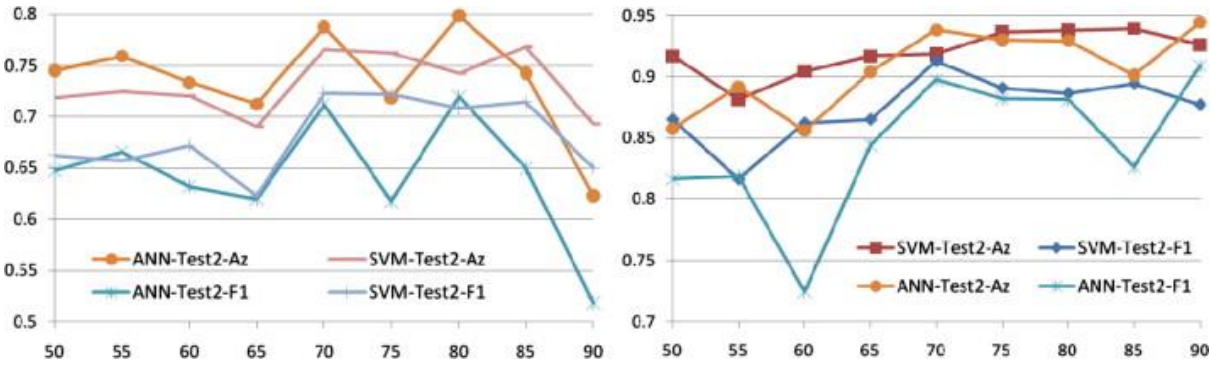
classification methods. The combining model performs best among all these forecasting methods.

Proposed Methodology

The proposed methodology considers of two different machine learning-based prediction models to forecast the daily price of the bitcoin by simply identifying and evaluating relevant features by the model. After applying both of these models for bitcoin prediction, we can determine which model is much more accurate for the future completion of our target and also to select appropriate parameters to obtain a much more better performance. In this work, we have proposed machine learning mechanisms such as SVM and ANN which are the latest and efficient techniques for the forecasting of bitcoin price. As bitcoin is the most popular cryptocurrency worldwide, So, the price volatility issue should be handled in a small amount of time.

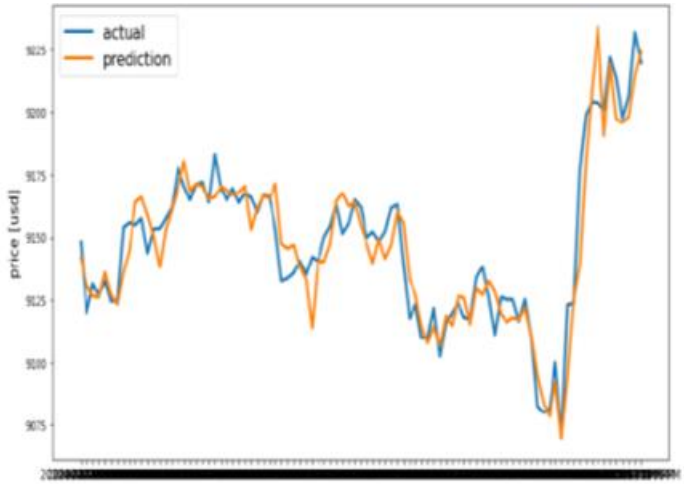
Major differences between SVM & ANN -:

The difference is mainly on how the non-linear data is classified. Basically, SVM utilizes the nonlinear mapping to make the linear data separable, hence here the kernel function is the major key. However, ANN employs the multi-layer connection and also the numerous activation functions to deal with the nonlinear problems.



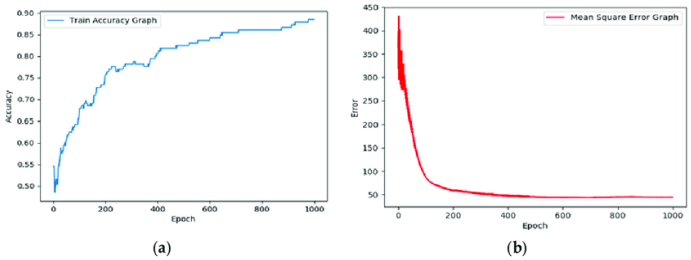
Performance measures

One of the most common way to compare the time series models is just to measure their performances for short and long-term predictions . To validate the performances of these 2 models, I have used MAPE (Mean Absolute Percentage Error) and RMSE (Root Mean Square Error) as performance measure .Hereby , These error values are been obtained using SVM and ANN.

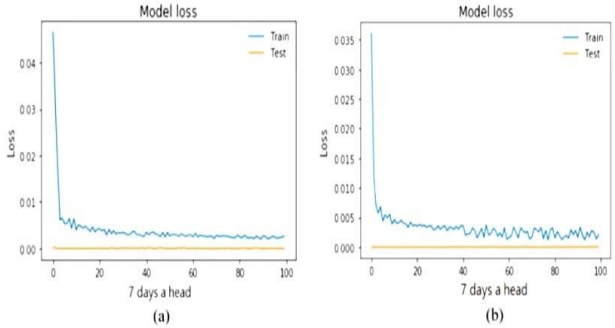


Results and Discussion

The proposed model of SVM and ANN price prediction of bitcoin was trained, and the predictions were carried out for popular cryptocurrency bitcoin (BTC). The accuracy of the proposed SVM as well as ANN model is investigated by finding out the root mean square error (RMSE) and mean absolute percentage error (MAPE) to determine which model has the better accuracy. I observed from the results that SVM takes greater compilation time than ANN model. The MSE value obtained for 7 days ahead from both the models is plotted in the figure below, and it is clearly observed that ANN is converging faster and steady than the SVM model. From Figure below, it is clear that the variation of actual price and predicted price is more in SVM than the ANN.



(a) (b)



(a) (b)

References

1.D. Shah and K. Zhang, "Bayesian regression and Bitcoin", *52nd Annual Allerton Conference on Communication Control and Computing (Allerton)*,

(Deals with daily time series data , 10-minute and 10-second time interval data)

2.Huisu Jang and Jaewook Lee, "An Empirical Study on Modelling and on the Prediction of the Bitcoin Prices with Bayesian Neural Networks based on the Blockchain Information",

(According to [2] the author is analysing what has been done to predict the U)

3.F. Andrade, de Oliveira, L. Enrique Zarate, M. de Azevedo Reis and C. Neri Nobre, "The use of artificial neural networks in the analysis and prediction of stock prices"

(Instead of directly forecasting the future price of the stock , the authors predict trend of the stock)

4.M. Daniela and A. BUTOI, "Data mining on Romanian stock market using neural networks for price prediction"

(A comparison between multi-layer perception (MLP) and non-linear autoregressive exogenous (NARX) model is made.