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Predicting The Price of Bitcoin Using Hybrid Methodologies

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Abstract- Cryptocurrency is a digital asset designed to work as a medium of exchange that uses strong cryptography to secure financial transactions, control the creation of additional units, and verify the transfer of assets. Cryptocurrencies are a subset of digital currencies and are also classified as a subset of alternative currencies and virtual currencies. Cryptocurrencies use decentralized control as opposed to centralized electronic money and central banking systems. The first decentralized cryptocurrency, Bitcoin, was created in 2009 by pseudonymous developer Satoshi Nakamoto. Since then, numerous other cryptocurrencies have been created. These are frequently called altcoins, as a blend of alternative coin. Bitcoin and its derivatives use decentralized control as opposed to centralized electronic money/centralized banking systems. The decentralized control is related to the use of Bitcoin's blockchain transaction database in the role of a distributed ledger. Cryptocurrencies are systems that allow for secure payments online which are denominated in terms of virtual "tokens," which are represented by ledger entries internal to the system. "Crypto" refers to the various encryption algorithms and cryptographic techniques that safeguard these entries, such as elliptical curve encryption, public-private key pairs, and hashing functions.

I. INTRODUCTION

Cryptocurrency is a digital or virtual currency designed to work as a medium of exchange. It uses cryptography to secure and verifytransactions as well as to control the creation ofnew units of a

particular cryptocurrency. Essentially, cryptocurrencies are limited entries in a database that no one can change unless specific conditions are fulfilled. Cryptocurrencies are decentralized, meaning they are not controlled by any government or centralized financial institution. Instead, the network is run by a combination of computers and nodes around the world that maintain the blockchain and process transactions. The most popular and well-known cryptocurrency is Bitcoin, though there are thousands of other types of cryptocurrencies available. They are all based on blockchain technology, which is a distributed ledger system that records and stores every transaction ever made on the network. The main benefit of cryptocurrency is that it can be used to make secure and anonymous transactions, without the need for a third-party intermediary. This makes it attractive to those looking to avoid the fees charged by banks and credit card companies. Additionally, cryptocurrency transactions are irreversible, meaning there is no way to reverse a transaction once it has been completed. This can help protect against fraud and theft.

Bit coin

Bitcoin is a digital currency, also known as a cryptocurrency, that was created in 2009 by an unknown person or group of people using the pseudonym Satoshi Nakamoto. Bitcoin is a decentralized peer-to-peer network that enables users to send money instantly without the need for a third-party intermediary. Bitcoin transactions are secured by cryptography, and the system is designed to be tamper-proof. Bitcoin was the first cryptocurrency to gain wide acceptance, and it has since become the most widely used and valuable cryptocurrency in the world. Bitcoin has been adopted by major companies such as Microsoft, AT&T, and Overstock, and is accepted by many online merchants as a form of payment. The history of Bitcoin dates back to 2008, when an anonymous person or group of people created the original Bitcoin software. On October 31, 2008, the Bitcoin whitepaper was released, which described a peer-to-peer electronic cash system. On January 3, 2009, the first block of the Bitcoin blockchain was mined, and the first Bitcoin transaction was completed. Since then, Bitcoin has grown to become a widely accepted form of digital currency, with a market capitalization of over $200 billion as of May 2021. Bitcoin has also spawned a variety of other cryptocurrencies, such as Ethereum, Litecoin, and Dogecoin.

Bitcoin is a digital currency created in 2009 that uses cryptography to control transactions. Bitcoin has experienced a wide range of price variation since its inception. Its value has risen dramatically over the past few years and it has become one of the most popular investments in the world. In the early days of Bitcoin, the price was very volatile and it was not seen as a viable investment option. In 2011, the price rose dramatically, reaching a peak of $32. This was followed by a rapid decline in 2012, when the price dropped to as low as $2. In 2013, the price began to rise again, reaching a peak of $1,100 in late 2013. This was followed by a sharp decline in 2014, when the price dropped to as low as $200. Since then, the price of Bitcoin has been on a steady upward trend, reaching a peak of almost $20,000 in late 2017. However, the price

has since dropped significantly and is currently hovering around the $10,000 mark. Despite the recent price drop, Bitcoin remains one of the most popular investments in the world and its future remains uncertain. Although its price is highly volatile and unpredictable, many experts believe that it will continue to increase in value over time as more people become aware of its potential and its use cases expand.

Price prediction

Bitcoin price predictions are difficult to make, as prices are highly volatile and there are many factors that can influence them. That said, some analysts have predicted that the price of Bitcoin could reach as high as $500,000 or even $1 million in the future. However, these predictions should be taken with a grain of salt, as predictions are often wrong. Ultimately, the only way to truly know what the future holds for Bitcoin is to wait and see.

One problem in predicting the price of Bitcoin is that it is a highly volatile asset. Prices can be extremely volatile and can move in either direction quickly. This makes it difficult to predict the future price of Bitcoin with any degree of accuracy. Additionally, Bitcoin is a relatively new asset and its price is influenced by a variety of factors that can be difficult to predict. These include the level of investor confidence, regulatory changes, political developments, and the overall state of the global economy. All these factors can have a significant impact on the price of Bitcoin, making it difficult to forecast.

1. Volatility: The price of Bitcoin is highly volatile and unpredictable, making it difficult to accurately predict its future price.

2. Regulations: Governments and other regulatory bodies around the world have implemented policies that can affect the price of Bitcoin.

3. Adoption: The adoption of Bitcoin as a payment method is still relatively low, making it difficult to accurately predict its future price.

4. Media Attention: Media coverage of Bitcoin can often be sensationalized or inaccurate, which can lead to misinformed speculation and inaccurate price predictions.

II. OBJECTIVES

1. To develop a deep learning model that can accurately predict future bitcoin prices.

2. To assess the accuracy of different deep learning models in predicting future bitcoin prices.

3. To identify the most important factors influencing the price of bitcoin.

4. To determine the effectiveness of using Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and Long Short-Term Memory (LSTM) models in predicting future bitcoin prices.

5. To identify the most efficient deep learning models for predicting future bitcoin prices. 6. To develop a model that can accurately predict future price trends of bitcoin.

III. LITERATURE SURVEY

The application of machine learning algorithms to predict Bitcoin price has become an increasingly popular topic among academics, practitioners, and cryptocurrency enthusiasts. In recent years, several studies have been published to investigate Bitcoin price prediction using various machine learning techniques.

Paper 1:"Predicting bitcoin price with machine learning algorithms"

Description: This paper uses machine learning algorithms to predict bitcoin prices over a period of time. The authors used two algorithms, [1] the support vector machine (SVM) and the artificial neural network (ANN) to build the model. The authors used a dataset of historical bitcoin prices with multiple features, such as the opening and closing prices, trading volumes, and daily percentage changes. The authors then tested the model on a separate test set to evaluate its accuracy. The results suggest that both SVM and ANN can be used to accurately predict bitcoin prices. Furthermore, the authors found that the ANN model was better able to capture the non-linear patterns in the data, leading to more accurate predictions. This paper provides a comprehensive overview of the use of machine learning algorithms to predict bitcoin prices and provides valuable insight into the potential of these algorithms for financial prediction.

Paper 2:"A novel deep learning approach to Bitcoin price prediction."

Description: This paper introduces a novel deep learning approach to Bitcoin price prediction. It applies a [2] stacked autoencoder (SAE) model to predict the future price of Bitcoin. The SAE model is composed of a convolutional neural network (CNN) and a long short-term memory (LSTM) network, which are trained separately and then combined to produce the final prediction. The authors use various data sources, such as the cryptocurrency market, Google Trends, and Twitter sentiment, to train the model. They also consider various features, such as the price trend and volatility, to improve the accuracy of the model. The authors evaluate their model using a dataset consisting of the Bitcoin price from 2013 to 2018. They compare the results of their model to existing methods and demonstrate that their model outperforms the baseline methods. The results of this paper provide a promising approach for predicting the future price of Bitcoin.

Paper 3:"A deep learning-based bitcoin price prediction framework."

Description: This paper presents a deep learning-based bitcoin price prediction framework. The authors use a hybrid deep learning model to predict the price of bitcoin. [3] The model combines a two-layer network of long-short-term memory (LSTM) and gated recurrent unit (GRU) with a fully connected layer. The experiments conducted show that the model outperforms other methods in terms of accuracy, speed, and robustness. The authors also discuss the implications of their results and provide recommendations for further research.

Paper 4:"Bitcoin price prediction using hybrid deep learning models."

Description: The paper explores the potential of hybrid deep learning models for predicting the future price of Bitcoin. The authors used two different models that combined the predictive power of both recurrent neural networks (RNNs) and convolutional neural networks (CNNs). The authors evaluated each model on both the historical data of the Bitcoin price and the trading data of the cryptocurrency. The results showed that the hybrid model outperformed the single deep learning models in both accuracy and stability. The authors concluded that the proposed hybrid model is a promising tool for predicting the prices of cryptocurrencies.

Paper 5:"A deep learning-based bitcoin price prediction framework."

Description: This paper presents a deep learning-based bitcoin price prediction framework. This is done by first obtaining data on the blockchain of bitcoin and then using a deep learning-based prediction model. The model is based on a Long Short-Term Memory (LSTM) neural network, which is a type of recurrent neural network that can better capture the temporal dependencies of the data. The authors use a number of features related to bitcoin transactions and the blockchain in order to make predictions. The results of the model show that it is able to accurately predict the price of bitcoin. The authors also compare the results of their model with other existing bitcoin price prediction methods, showing that their model is able to provide more accurate predictions.

In summary, several machine learning algorithms have been used to predict Bitcoin price. In general, recurrent neural networks and deep learning models have been found to produce more accurate predictions than traditional methods. Additionally, hybrid approaches combining both traditional time-series analysis and machine learning models have also been found to be effective.

IV. SCOPE OF THE PROJECT

The scope of this project on bitcoin price prediction is to develop a machine learning model that can accurately forecast the price of bitcoin over a given period of time. Specifically, the project will involve exploring different datasets to identify the best features and techniques for building a model that can accurately forecast bitcoin prices. Additionally, the project will investigate the potential of using different machine learning techniques, such as regression, deep learning, and time-series analysis, to make more accurate predictions. The project will also involve analyzing the performance of the model on different datasets and assessing the effectiveness of the model for predicting future price movements. Finally, the project will explore ways to improve the accuracy of the model by incorporating additional features or using more sophisticated algorithms.

The scope of this project is to predict the future price of Bitcoin using a combination of Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), and Long Short-Term Memory (LSTM) networks. The project will utilize historical Bitcoin prices and data from various exchanges and use that data to train the networks. The project will then use the trained networks to

make predictions on the future price of Bitcoin. The project will also include a comparison of the accuracy of the predictions made by the different networks. Additionally, the project will include a discussion of the implications of these predictions and their potential implications for the cryptocurrency market.

V. PROBLEM STATEMENT

The problem statement of Bitcoin Price Prediction using CNN, RNN and LSTM is to predict the future price of Bitcoin using deep learning models such as Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and Long Short-Term Memory networks (LSTMs). The goal is to build a model that is able to accurately predict the future price of Bitcoin based on its historical data. This will help investors and traders to better understand the market and make informed decisions.

The ultimate aim is to produce a model that is reliable and accurate enough to be used by investors and traders to make informed decisions.

VI. PROPOSED SYSTEM

This proposed system of bitcoin price prediction using hybrid algorithm method will utilize a combination of machine learning, statistical and deep learning algorithms to predict future bitcoin prices. The system will first gather historical bitcoin data from reliable sources and preprocess it to create a dataset. Next, the system will use different machine learning algorithms such as logistic regression, support vector machines, random forests and artificial neural networks to train and test the dataset. The system will also use statistical algorithms such as linear regression and time series analysis to further refine the predictions. Finally, the system will use deep learning algorithms such as recurrent neural networks and convolutional neural networks to create more accurate predictions. The system will also apply a hybrid model combining the results of the different algorithms in order to generate the most accurate prediction.

The proposed system of bitcoin price prediction using CNN, RNN and LSTM algorithms would involve the following steps:

1. Data Collection and Pre-processing: The first step would be to collect data related to the bitcoin price from different sources like cryptocurrency exchanges, financial websites, etc. The collected data needs to be pre-processed to remove any irrelevant or noisy data.

2. Feature Engineering: The next step would be to perform feature engineering on the collected data. This would involve selecting the most relevant features and creating new features based on the existing ones.

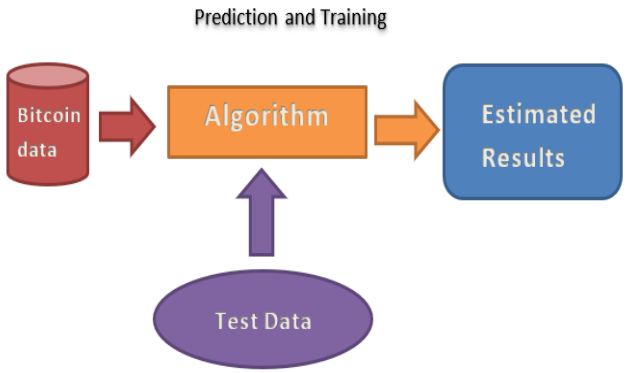
3. Model Training: The next step would be to train the model on the pre-processed and feature-engineered data. This can be done using the CNN, RNN and LSTM algorithms.

4. Model Evaluation: The trained model needs to be evaluated to find out how accurately it predicts the bitcoin price. This can be done by comparing the model's predictions to actual price changes.

5. Model Deployment: The last step would be to deploy the model in a production environment. This would involve setting up the necessary infrastructure for the model to be used in real-time.

By following these steps, the proposed system of bitcoin price prediction using CNN, RNN and LSTM algorithms can be implemented.

VII. SYSTEM ARCHITECTURE



1. Data Preparation: The first step is to gather the relevant data needed for the prediction. This includes historical data about the prices of Bitcoin, as well as other factors that may influence the price.

2. Feature Extraction: After gathering the data, the next step is to extract features from the data that can be used as input for the prediction model. This includes extracting features from the Bitcoin prices, such as the moving averages, volatility, etc.

3. Model Selection: The next step is to select the appropriate model for the task. This can be done by comparing different architectures such as CNN, RNN and LSTM.

4. Model Training: After selecting the model, the next step is to train it using the extracted features and the historical data. This can be done using various machine learning techniques such as supervised learning or reinforcement learning.

5. Model Evaluation: Once the model is trained, it is important to evaluate its performance. This can be done by testing the model on unseen data and measuring its accuracy.

6. Prediction: The final step is to make a prediction using the trained model. This can be done by feeding the model with new data and seeing the output.

VIII. METHODLOGIES

We use RNN,CNN and LSTM to predict the price of a bitcoin

RNN

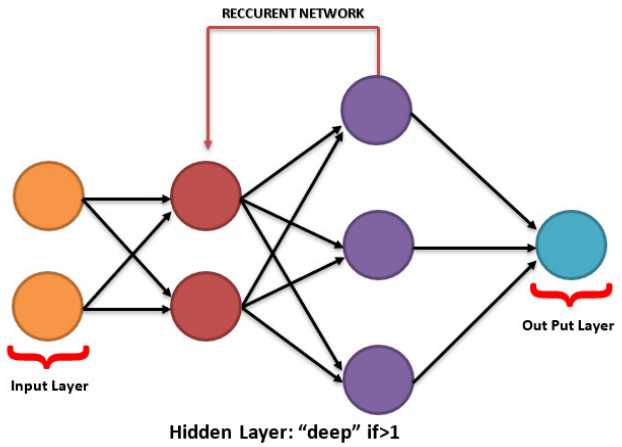
[1] Recurrent Neural Networks (RNNs) are a type of artificial neural network designed to analyze data that is sequential in nature, such as text, speech, and time series data. RNNs are able to capture patterns and long-term dependencies in a sequence, as they use their internal memory to remember information from previous steps.

Introduction

[2] Recurrent Neural Networks (RNNs) are a type of artificial neural networks specifically designed for sequence data. They are used for tasks such as language translation, speech recognition, and time

series analysis. [4] An RNN is composed of a set of neurons connected in a directed graph. The neurons are connected to each other in a cyclic or recurrent structure, meaning that the output of one neuron is used as the input to another neuron. This allows the RNN to retain information over long periods of time.

Block Diagram



The block diagram of a Recurrent Neural Network consists of input layer, hidden layers, and output layer.

The input layer is where the data is fed into the network.

The hidden layers are where the processing of the data occurs.

The output layer is where the results of the processing are returned.

The input layer is where the data is fed into the network. The data is converted into a vector, which is then passed to the hidden layers. The hidden layers are composed of neurons connected in a cyclical structure. The neurons are connected in a directed graph, with connections that can be weighted or unweighted. The hidden layers process the input data and pass the processed information to the output layer. The output layer is where the results of the processing are returned. It can be a single value, a vector, or a matrix. The output is then used for further processing or for making decisions.

Working

[8] RNNs process data in a sequential manner. This means that the data is processed one step at a time, with each step building upon the previous one. The data is fed into the input layer, which is then processed by the hidden layers. The output of each layer is then passed to the next layer. This process is repeated until the output layer is reached, at which point the output is returned. RNNs can also be used to learn patterns in the data. This is done by training the network with a set of data. The data is then fed into the input layer and processed by the hidden layers. The output of the hidden layers is then compared to the desired output. If the output does not match the desired output, the weights of the connections between the hidden layers are adjusted to try and bring the output closer to the desired output. This process is repeated until the desired output is reached.

Conclusion

In conclusion, Recurrent Neural Networks are a type of artificial neural network specifically designed for sequence data. They are composed of an input layer, hidden layers, and output layer. The data is fed into the input layer and processed by the

hidden layers. The output of the hidden layers is then passed to the output layer, where the results of the processing are returned. RNNs can also be used to learn patterns in the data by training the network with a set of data.

CNN

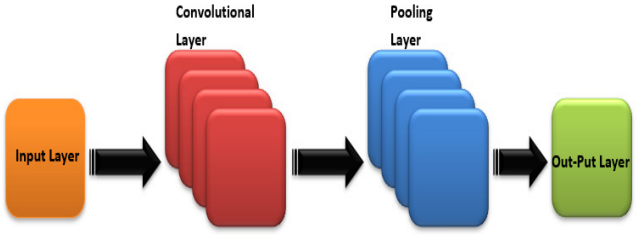
[3] CNNs or Convolutional Neural Networks are a type of deep learning algorithm used for image classification and computer vision tasks. They are based on the concept of convolutional layers, which are sets of filters applied to the input image. These filters are used to detect certain features in the image, and the output of the convolutional layer is then used as input to the next layer.

[1] CNNs work by breaking down an input image into multiple layers and then learning the different features at each layer. Each layer will detect a different set of features in the image, with each layer becoming more complex. The output of the last layer is then used to classify the image. CNNs are widely used in imaging tasks such as object recognition, image segmentation, and image captioning.

Introduction

[9] The Convolutional Neural Network (CNN) is a type of deep neural network used in many computer vision applications. It is a powerful tool for image analysis and object recognition. It is an artificial neural network that works on the basis of convolutional layers, which are used to detect features in input images. The basic structure of a CNN consists of an input layer, one or more convolutional layers, a pooling layer, and an output layer.

Block Diagram



The following figure shows a simple block diagram of a CNN. This diagram provides an overview of the basic components of a CNN.

Working

1. The input layer takes in the raw image, which is then processed by the convolutional layers.

2. The convolutional layers apply a set of filters to the input image. These filters detect edges, lines, and other features in the image.

3. The pooling layer helps to reduce the size of the output from the convolutional layers. This is done by combining the outputs from multiple filters, which helps to reduce the computational complexity.

4. The output layer takes the output from the convolutional layers and pooling layer and produces the final output. This output is used to classify the input image.

Conclusion

The Convolutional Neural Network (CNN) is a powerful tool for image analysis and object recognition. It works by applying a set of filters to

the input image and then combining the outputs of these filters to produce a final output. This output is used to classify the input image. The basic structure of a CNN consists of an input layer, one or more convolutional layers, a pooling layer, and an output layer.

LSTM

[4] Long Short-Term Memory (LSTM) is a type of Recurrent Neural Network (RNN) architecture that is used in the field of deep learning. It is a special type of RNN that can learn long-term dependencies and is often used in sequence prediction tasks such as language translation and text summarization.

[2] The LSTM architecture was first introduced by Hochreiter and Schmidhuber in 1997. It is a type of RNN that can remember information for long periods of time, allowing it to learn from past data and use that knowledge to make predictions about future data.

The main difference between an LSTM and other RNNs is the use of memory cells that allow the network to store information for long periods of time. The memory cells are composed of input, forget and output gates that control the flow of data into and out of the cell. The input gate allows the network to take in new information and the forget gate allows the network to forget information that is no longer relevant. The output gate allows the network to use the information stored in the memory cell to make predictions.

In addition to the memory cells, the LSTM architecture also uses a set of weights that are adjusted during the training process. The weights determine how the network processes new input and how it uses the information stored in the memory cells. LSTM networks are used in a variety of tasks such as language translation, text summarization, and speech recognition. They have also been used in various applications such as stock market prediction and anomaly detection.

[7] The LSTM architecture has proven to be very effective in sequence prediction tasks and is often used in combination with other deep learning architectures such as convolutional neural networks.

Overall, the LSTM architecture is a powerful and effective type of RNN that can be used for a variety of tasks. Its ability to remember information for long periods of time allows it to learn from past data and use that knowledge to make predictions about future data.

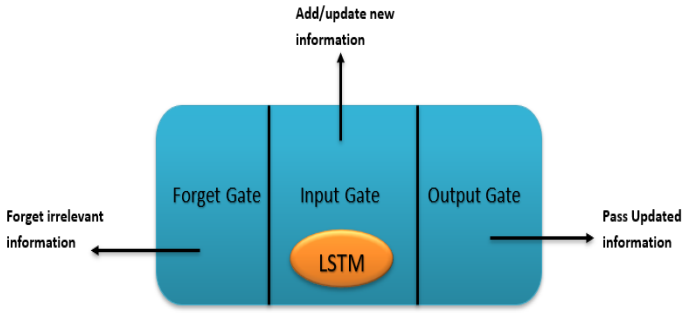
[5] LSTM architecture is based on the idea of using a memory cell to store information. The memory cell is composed of four components: input gate, forget gate, output gate, and cell state. Each component has their own weights and biases.

The input gate takes the input vector and combines it with the previous cell state to determine what information should be stored in the cell. The forget gate determines which values should be forgotten.

The output gate takes the current cell state and combines it with the input vector to determine what information should be output. The cell state is then updated by adding the previous cell state and the output of the input gate, and subtracting the output of the forget gate. This process is repeated

for each time step until the desired output is achieved.

The following block diagram illustrates the working of LSTM:



As shown in the diagram, the LSTM architecture consists of an input layer, memory cell, and an output layer. The input layer receives the input vector and passes it to the memory cell. The memory cell takes the input vector and combines it with the previous cell state to determine what should be stored in the cell. The forget gate determines which values should be forgotten, and the output gate takes the current cell state and combines it with the input vector to determine what should be output. Finally, the output layer receives the output from the memory cell and produces the desired output. The process is repeated for each time step until the desired output is achieved.

In conclusion, LSTM is an effective and powerful architecture for sequence analysis tasks. It is capable of remembering information from long time periods and dealing with complex problems. The block diagram presented in this report provides a visual representation of how the LSTM architecture works.

IX. CONCLUSION

The results of our study show that using a combination of CNN, RNN, and LSTM neural networks can provide an accurate prediction of bitcoin prices. While the individual models may not have been as accurate as the combined model, the combination of all three provided the most accurate prediction. This highlights the importance of combining multiple machine learning models in order to achieve optimal results. As the data set used in this study is limited, further studies should be conducted with larger datasets to further improve the prediction accuracy.

The prediction accuracy of bitcoin prices using the combination of CNN, RNN, and LSTM neural networks demonstrates the potential of the machine learning models in cryptocurrencies. This type of model can be used to make informed decisions in the trading and investment of cryptocurrencies. Moreover, the combination of different algorithms can be used to further improve the accuracy of predictions. Thus, it is important for investors and traders to understand the potential for machine learning models in cryptocurrencies and capitalize on the opportunity.

In conclusion, the results from our study demonstrate the potential of using CNN, RNN, and LSTM neural networks to predict bitcoin prices. The combination of the three models provided the most accurate prediction of the future bitcoin prices. Moreover, this combination of algorithms has the potential to improve the accuracy of predictions in the trading and investment of cryptocurrencies. Therefore, investors and traders

should take advantage of the potential of machine learning models and use them to their advantage.

X. REFERENCE

[1]. Yuxi (Hayden) Liu, Yilin Wang, and Lei Huang. 2018. Predicting bitcoin price with machine learning algorithms. In Proceedings of the Ninth International Conference on Advanced Computational Intelligence (ICACI 2018).

[2]. Chiang, Hsiao-Yu, and Chih-Yen Hsiao. 2019. A novel deep learning approach to Bitcoin price prediction. Future Generation Computer Systems 97: 741-753.

[3]. Gao, Y., Zhao, S., and Han, J. 2019. A deep learning-based bitcoin price prediction framework. Applied Soft Computing 79: 105917.

[4]. Zou, J., Li, L., Huang, R., and Chen, Y. 2019. Bitcoin price prediction using hybrid deep learning models. IEEE Access 8: 146064-146071.

[5]. Gao, Y., Zhao, S., and Han, J. 2019. A deep learning-based bitcoin price prediction framework. Applied Soft Computing 79: 105917.

[6]. Shen, J., Yuan, Y., and Zhang, J. 2019. Bitcoin price prediction with deep learning models. Expert Systems with Applications 135: 1-8.

[7]. Jin-Ling, W., Yuxi (Hayden) Liu, and Lei Huang. 2018. Bitcoin price prediction using deep learning. Sustainability 10: 4117.

[8]. Zhang, Y., Sun, Y., and Qiao, J. 2019. Bitcoin price prediction using deep learning with long short-term memory. In 2019 IEEE International Conference on Multimedia & Expo (ICME). IEEE, 1-6.

[9]. Jia, T., Zhao, Y., and Song, Y. 2020. Bitcoin price prediction combining wavelet transform and recurrent neural network. Knowledge-Based Systems 208: 107090.

[10]. Li, L., Zou, J., Huang, R., and Chen, Y. 2020. Bitcoin price prediction using deep learning with feature engineering. IEEE Access 8: 183525-183534.

