Bitcoin Price Prediction Using Deep Learning

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ARTICLEINFO	ABSTRACT
	Bitcoin is one of the most popular and valuable cryptocurrencies in the current financial market, attracting traders for investment and thereby opening new research opportunities for researchers. Countless research works have been performed on Bitcoin price prediction with different machine learning prediction algorithms. For the project: relevant features are taken from the dataset having strong correlation with Bitcoin prices and random data chunks are then selected to train and test the model. The random data which has been selected for model training, may cause unfitting outcomes thus reducing the price prediction accuracy. Here, a proper method to train a prediction model is being scrutinised. The proposed methodology is then applied to train a simple Long Short-Term Memory (LSTM) model to predict the bitcoin price for the upcoming 30 days. When the LSTM model is trained with a suitable data chunk, thus identified, sustainable results are found for the prediction. In the end of this project, the work culminates with future improvements. Bitcoin is a kind of Cryptocurrency and now is one of type of investment on the stock market. Stock markets are influenced by many risks of factor. And bitcoin is one kind of cryptocurrency that keep rising in recent few years, and sometimes sudden fall without knowing influence behind it on the stock market. Because it's fluctuations, there's a need and automation tool to predict bitcoin on the stock market. This research study learns how to create model prediction bitcoin stock market prediction using LSTM, LSTM (Long Short-Term Memory) is another type of module provided for RNN later developed and popularized by many researchers, like RNN, the LSTM also consists of modules with recurrent consistency. The Method that we apply on this project, also technique and tools to predict Bitcoin on stock market yahoo finance can predict the result above $ 12600 USD for next days after prediction, in the last section we make conclusions and discuss future works. Keywords: Long Short-Term Memory, RNN

I. INTRODUCTION

Instead of any direct human investments, generating profit with the help of algorithms is a common practice in the stock market. Many case studies have been performed to reach the conclusion that mathematical models warrant better results than humans. Bitcoins are an eye catching initiative in the fields of cryptography, economics, and computer sciences, as such currencies have a special character which is gained when integrating currency units with cryptographic technology. Due to the fact that cryptocurrency has a minute history, when compared to the stock market, new and unexplored territories are thus being scouted. Structurally, both the stock market and the cryptocurrency price data are having characteristics such as time series data, but high volatility is routinely present in the latter, with heavy wavering in the prices. A cryptocurrency market differs from a traditional stock market in the respect that the former has a lot of new features. It is required to apply new techniques for prediction suitable for the cryptocurrency market. Fewer studies have been conducted on cryptocurrency price prediction when compared to the stock market. In this project, we are predicting the Bitcoin price trend using a Long Short-Term Memory (LSTM) model. Our model is aimed to predict the next thirty day's price of Bitcoin. Cryptocurrencies are a digital currency where transactions can be done by online transactions, unlike the common currency, cryptocurrency is designed based on cryptography. Bitcoin is one kind of Cryptocurrency no regulation from any party and decentralized. The unique characteristic of Bitcoin is daily price fluctuations and always change every day. The value Bitcoin Exchange rate to (USD) is $ 12,354.73 USD on 28 June 2019 in yahoo finance stock market and sometimes keep rising and sudden fall on march the value is $ 3900 USD. The Stock markets are influenced by many uncertainties factor such as political issue, the economic issue at impacted to local or global levels. To interpretation key of

success, factor to providing accurate predictions is complicated work. For the market, we can analyse with any techniques such as technical indicator, price movements, and market technical analysis. To solve the problem above, regarding the fluctuations there's a need automation tool for prediction to help investors decide for bitcoin or other cryptocurrency market investment. Nowadays the automation tools are usually used in common stock market predictions, and we can do the same works and strategy on this domain cryptocurrencies. LSTM (Long Short-Term Memory) is another type of module provided for RNN. LSTM was created by Hochreiter & Schmidhuber in 1997 and later developed and popularized by many researchers. Like RNN, the LSTM also consists of modules with recurrent consistency.

II. LITERATURE SURVEY

The history of cryptocurrency (Cryptographic currency) begins in the 1980s started with David chaum, In his project, he proposed a novel of a cryptographic scheme to blind the content of the message before it is signed so that the signer cannot determine the content. These blind signatures can be publicly verified just like a regular digital signature. Chaum proposed digital cash approach in such a way that is untraceable by another party. The rise of cryptocurrency started on B-money In 1998, Wei Dai proposed b-money, an anonymous and distributed electronic cash system, In that method, describes two protocols based on network that cannot be traced, where senders and receivers are identified only by digital such as their public keys, and each message will be signed by its sender to receiver. International Conference on Electrical Engineering and Computer Science (ICECOS) 2019 206 Bit Gold In 1998, Nick Szabo propose models a new digital currency, the models based on cryptographic system puzzles, which after being solved, were sent to the Byzantinefault-tolerant public registry and assigned to the public key of the solver. Hashcash proposed by Adam Back,

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Haschash, a system relied on a cryptographic hash function to derive a probabilistic proof of computational work as authentication system Pow And the last is RPOW Hal finney propose currency system based on a reusable proof of work (RPOW) in 2004. Between 2008 and 2009, Bitcoin was made as to the first decentralized cryptocurrency by Satoshi Nakamoto. Nakamoto published the Bitcoin whitepaper in 2008, and after January 3rd, 2009, the genesis block of the bitcoin protocol was created. Nowadays it is most successful cryptocurrency in terms of market capitalization, beside above 700 altcoins that circulated in the world (e.g. Litecoin, Ethereum) based on Bitcoin have been proposed since the launch of Bitcoin.
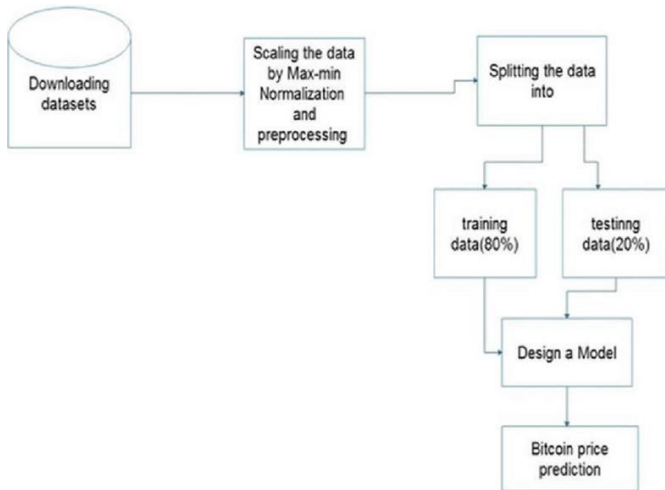
III. EXISTING SYSTEM

Numnoda et al. have obtained highly accurate results on implementing their prediction Gated Recurrent Unit (GRU) model. However, their prototype has a large time complexity. Thus, complicating the expected results in this ever-changing environment. Additionally, the selected features aren't enough to predict the Bitcoin prices; as various factors like social media, policies, and laws that each country announces to deal with digital currency, can all play a major effect on the fluctuation of the Bitcoin prices. Mangla et al. have compared four different price prediction models: Recurrent Neural Networks (RNN), Logistic Regression, Support Vector Machine, and Auto Regressive Integrated Moving Average (ARIMA). Their major findings are that- ARIMA performs poorly for predictions extending beyond the next day. Their RNN model can accurately predict price fluctuations for up to six days. And the logistic regression model can give accurate results only if a separable hyperplane exists. Guo et al. [3] have used a hybrid method consisting of multi-scale residual blocks and an LSTM network to predict Bitcoin price. Although, their work does not include comprehensive metrics which measure the investor's attention to more timely

detection of bitcoin market volatility, therefore resulting in a less accurate prediction. Awoke et al. [4] have considered basic deep learning models like GRU and LSTM. However, their research lacks further investigation to enhance the model accuracy by considering different parameters.

IV. PROPOSED SYSTEM

The proposed system implements machine learning algorithm to build the model to predict the price of the bitcoin based on historical dataset available on online database. LSTM (Long Short- Term Memory) is another type of module provided for RNN. LSTM was created by Hochreiter & Schmidhuber (1997)[3] and later developed and popularized by many researchers. Like RNN, the LSTM network (LSTM network) also consists of modules with recurrent consistency. LSTM is an updated version from RNN, the difference is the connection between the hidden layers of RNN. The explanation structure of RNN . RNN & LSTM have a similar structure, the other different is memory cell of structure hidden layer. And the design of three special gates effectively solves the gradient problems. The LSTM memory structure of hidden layer. Statistical methods including Logistic Regression and Linear Discriminant Analysis for Bitcoin daily price prediction with highdimensional features achieve an accuracy of 66%, outperforming more complicated machine learning algorithms. Compared with benchmark results for daily price prediction, we achieve a better performance, with the highest accuracies of the statistical methods and machine learning algorithms of 66% and 65.3%, respectively. Machine learning models such as Long Short-term Memory for Bitcoin 5- minute interval price prediction are superior to statistical methods, with accuracy reaching 67.2%. Our investigation of Bitcoin price prediction can be considered a pilot study of the importance of the sample dimension in machine learning techniques.

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BLOCK DIAGRAM:

V. SOFTWARE REQUIREMENTS

4.1 FUNCTIONAL REQUIREMENTS: Functional Requirement defines a function of a software system and how the system must behave when presented with specific inputs or conditions. These may include calculations, data manipulation and processing and other specific functionality. In this system following are the functional requirements: - Following are the functional requirements on the system:

1. The entire control model set must be translated to C output Code.

2. Inputs must be models designed using CLAW design components along with standard design components,

3. Multiple design models must be processed and the result must be combined to obtain a single output file.

4.2 NON-FUNCTIONAL REQUIREMENTS: Non-functional requirements are the requirements which are not directly concerned with the specific function delivered by the system. They specify the criteria that can be used to judge the operation of a system rather than specific behaviors. They may relate to emergent system properties such as reliability, response time and store occupancy. Non-functional requirements arise through the user needs, because of budget constraints, organizational policies, the need for interoperability with other software and hardware systems.

4.3 SYSTEM CONFIGURASTION:

H/W System Configuration:

Processor - Pentium –IV Speed - 1.1 Ghz
RAM - 4GB RAM
Hard Disk - 20 GB
Key Board - Standard Windows Keyboard Mouse - Two or Three Button Mouse Monitor – SVGA
S/W System Configuration:
Operating System : XP/7/8/8.1/10 Coding Language: Python – 3.7.0

VI. IMPLEMENTATION

Step 1: Data collection: Collect historical Bitcoin price data, along with other relevant factors such as trading volume, market capitalization, news articles, social media sentiment, and any other data that may be helpful in predicting Bitcoin prices.

Step 2: Data preprocessing: Clean and preprocess the data. This may involve filtering out missing or erroneous data points, normalizing the data, and splitting the data into training, validation, and testing sets.

Step 3: Feature engineering: Create additional features from the existing data that may help the deep learning model better understand the patterns and relationships in the data. For example, you could create lagged variables or moving averages of the Bitcoin price or other features.

Step 4: Model selection: Choose a deep learning model that is appropriate for time series forecasting. Common models include recurrent neural networks (RNNs) such as long shortterm memory (LSTM) and gated recurrent unit (GRU) networks, and convolutional neural networks (CNNs).

Step 5: Model training: Train the deep learning model using the preprocessed and feature engineered data. Use backpropagation and stochastic gradient descent to optimize the model weights and minimize the loss function.

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Step 6: Model evaluation: Evaluate the trained model's performance on the validation set using metrics such as mean absolute error (MAE), mean squared error (MSE), and root mean squared error (RMSE). Adjust the model's hyperparameters as needed to improve performance.

Step 7: Model testing: Test the final model on the test set to evaluate its performance on unseen data. Calculate the evaluation metrics and visualize the model's predictions.
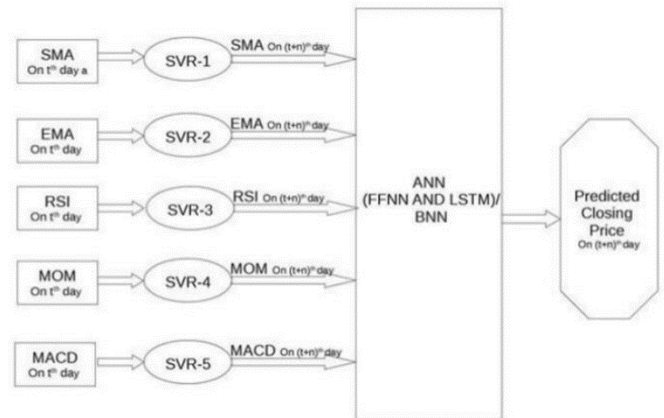
Step 8: Model refinement: Based on the evaluation and testing results, refine the model as needed by adjusting the hyperparameters, changing the model architecture, or adding new features.

Step 9: Prediction: Once the model is satisfactory, it can be used to make predictions on future Bitcoin prices.
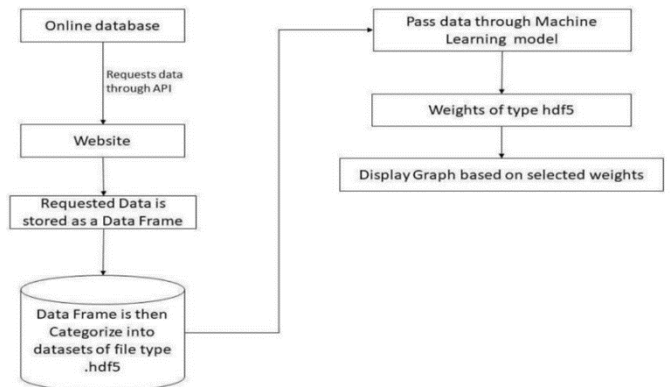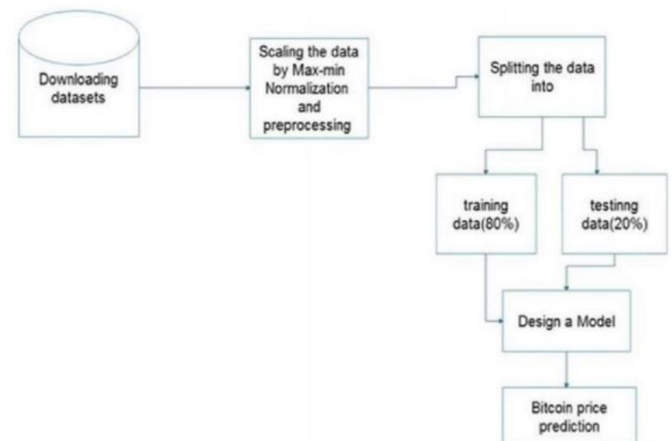
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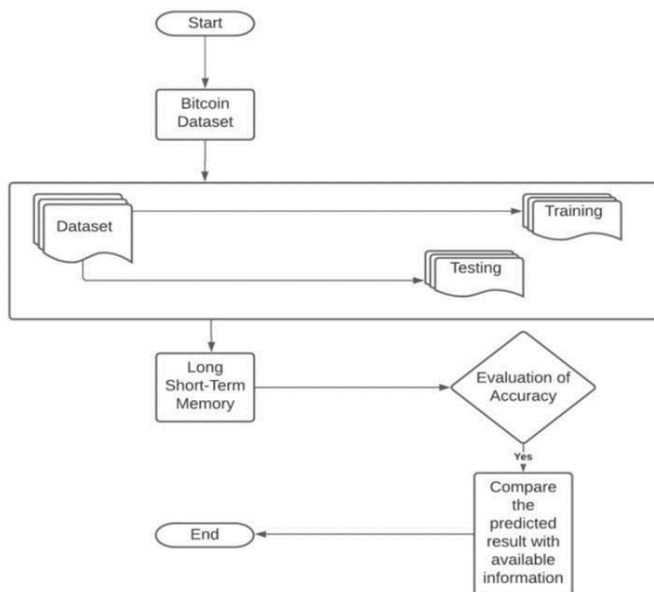
DATA FLOW DIAGRAM:

SEQUENCE DIAGRAM:

ACTIVITY DIAGRAM:

VII. ADVANTAGES

Predicting Bitcoin prices can help investors and traders make more informed decisions about when to buy, sell, or hold their Bitcoin assets.

It can also help companies in the cryptocurrency space, such as exchanges and payment processors, make better strategic decisions.

Bitcoin price prediction can help regulators and policymakers better understand the cryptocurrency

market and develop more effective policies to protect consumers and promote innovation.

Accurate Bitcoin price predictions can help businesses and individuals better manage risk and hedge against market volatility.

VIII. DISADVANTAGES

Bitcoin price prediction is inherently difficult due to the complex and volatile nature of the cryptocurrency market.

Predictions can be influenced by a variety of external factors, such as regulatory changes, global events, and market sentiment, that are difficult to account for.

Overreliance on price predictions can lead to risky investment decisions or missed opportunities.

Prediction models can be susceptible to bias or error, especially when trained on incomplete or inaccurate data.

IX. APPLICATIONS

Trading: Investors can use the predicted prices to make better trading decisions. With the help of deep learning models, investors can identify patterns in the Bitcoin market and predict future prices.

Risk management: Banks and financial institutions can use deep learning models to predict the risks associated with Bitcoin investments. This can help them manage their risk exposure and make more informed investment decisions.

Investment portfolio management: Deep learning models can be used to optimize investment portfolios by predicting the performance of Bitcoin and other cryptocurrencies. This can help investors make better decisions about how to allocate their resources.

Market research: Market analysts can use deep learning models to gain insights into Bitcoin market trends and predict future market movements. This can help them develop more accurate market forecasts and make better investment recommendations.

Fraud detection: Deep learning models can also be used to detect fraudulent activities in the Bitcoin market. By analyzing patterns in transaction data, these models can identify suspicious behaviour and alert authorities.

X. CONCLUSION

The LSTM model, implemented here, is a basic model that takes into consideration only a few features that affect the Bitcoin price. Our model is fairly accurate when predicting the future prices. However, to increase the efficiency of the model, more Bitcoin price features need to be taken into consideration. We recommend using Kaggle as the source of datasets, since information present in this website holds a high degree of authenticity. Our future work would include in-depth scrutinization on the topic of LSTM, and deep learning at large. Such factfindings would be beneficial for forecasting the prices of cryptocurrencies with the help of LSTMs, in the future. Our Proposed model has been succeeded to provide the result prediction bitcoin from yahoo finance stock market. Our model with time series techniques can build produce the results and the results can predict the price for the next days with split the data to train and test that we mention in the article above.

XI. FUTURE ASCEPTS

Adoption by mainstream financial institutions: As more and more institutional investors and financial companies embrace Bitcoin and other cryptocurrencies, the demand for Bitcoin may increase, which could drive up the price.

Government regulation: The regulatory landscape around Bitcoin is still evolving, and changes in regulations or restrictions could impact the price of Bitcoin. For example, if governments around the world decide to ban or restrict the use of Bitcoin, this could negatively affect its price.

Competition from other cryptocurrencies: Bitcoin is not the only cryptocurrency out there, and

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competition from other cryptocurrencies could affect its price. If a new cryptocurrency emerges that is more technologically advanced or has better features than Bitcoin, it could draw demand away from Bitcoin and depress its price.

Development of Bitcoin technology: Advances in Bitcoin technology, such as the implementation of the Lightning Network, could make Bitcoin more accessible and increase its adoption, which could drive up the price.

Economic instability: Bitcoin is often viewed as a hedge against inflation and economic instability. If the global economy experiences a recession or inflationary pressures increase, demand for Bitcoin could increase, driving up the price.

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