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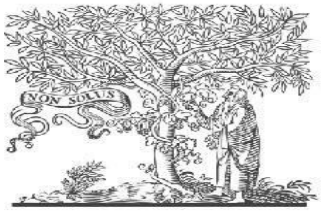

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IJIEMR Transactions, online available on 31st Mar 2023. Link :http://www.ijiemr.org/downloads.php?vol=Volume-12&issue=Issue 03

10.48047/IJIEMR/V12/ISSUE 03/75

Title **A NOVEL APPLICATION OF ARTIFICIAL INTELLIGENCE USING ANALYTICS FOR PRICING THE CRYPTOCURRENCY**

Volume 12, ISSUE 03, Pages: 530-534

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A Novel application of Artificial intelligence using Analytics for pricing the cryptocurrency

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Abstract
Cryptocurrency has become an increasingly popular investment asset due to its decentralized nature and potential for high returns. However, the volatility and unpredictability of cryptocurrency prices present a challenge for investors in making informed decisions. In this research paper, we propose the use of Artificial Neural Networks (ANN) and Long Short-Term Memory (LSTM) models to predict cryptocurrency prices and the development of a Django website for simulating cryptocurrency trading. We compare the performance of the two models and evaluate their accuracy in predicting cryptocurrency prices. The proposed website will allow users to simulate cryptocurrency trading based on the predicted prices generated by the ANN and LSTM models. The website will provide a simulated portfolio of various cryptocurrencies, enable users to visualize the performance of their portfolio over time, and make transactions based on the predicted prices. The website will also provide updates on cryptocurrency prices and enable users to test their investment strategies without risking actual funds. This research contributes to the existing literature on cryptocurrency trading and prediction and provides valuable insights into the performance of the ANN and LSTM models.

Keywords:ANN, LSTM, Cryptocurrency price prediction, Django application

Introduction

Cryptocurrency has become a popular asset in the world of finance and investment due to its decentralized nature and the potential for high returns. However, the volatility and unpredictability of cryptocurrency prices make it difficult for investors to make informed decisions regarding buying and selling.

Artificial Neural Networks (ANN) and Long ShortTerm Memory (LSTM) are two popular machine learning techniques used to predict cryptocurrency prices. ANN is a type of machine learning algorithm inspired by the structure and function of the human brain, while LSTM is a type of recurrent neural network (RNN) that can retain long-term memory. Both ANN and LSTM have been successfully applied to predict stock prices, and recent studies have shown their effectiveness in predicting cryptocurrency prices as well.

In this research paper, we will analyze the cryptocurrency price data using ANN and LSTM models to predict future prices. We will compare the performance of the two models and evaluate their accuracy in predicting cryptocurrency prices. Additionally, we will develop a Django website for simulating cryptocurrency trading and integrating the prediction models into the website.

The proposed website will allow users to simulate cryptocurrency trading based on the predicted prices generated by the ANN and LSTM models. Users will be able to create an account and access a simulated portfolio of various cryptocurrencies, view their current holdings, and make transactions based on the predicted

prices. The website will also update on cryptocurrency prices and allow users to visualize the performance of their portfolio over time.

The website will be designed with a user-friendly interface and will be accessible to both novice and experienced cryptocurrency traders. By simulating cryptocurrency trading, users will be able to test their investment strategies without risking their actual funds. Moreover, the website will provide valuable insights into the performance of the ANN and LSTM models in predicting cryptocurrency prices.

The research will contribute to the existing literature on cryptocurrency price prediction and simulation of cryptocurrency trading. The proposed approach will enable users to make informed decisions based on the predicted prices and evaluate the performance of the ANN and LSTM models. The website will also provide a platform for further research on cryptocurrency trading and prediction.

In conclusion, this research paper proposes the use of ANN and LSTM models for cryptocurrency price prediction and the development of a Django website for simulating cryptocurrency trading. The paper will analyze the performance of the models and evaluate their accuracy in predicting cryptocurrency prices. The proposed website will provide users with a platform to simulate cryptocurrency trading and make informed investment decisions based on the predicted prices. This research aims to contribute to the existing literature on cryptocurrency trading and prediction and provide valuable insights into the performance of the ANN and LSTM models.

Literature servey

Chan, Chu, and Nadarajah (2019) presented a study that used artificial neural networks (ANN) to forecast the prices of cryptocurrencies. The authors used the ANN to predict the closing prices of four cryptocurrencies, and they found that the ANN outperformed the random walk model and the autoregressive integrated moving average (ARIMA) model in terms of forecasting accuracy.[1]

Lu, Wang, Li, Li, and Yan (2020) proposed the use of a long short-term memory (LSTM) neural network to predict the price of Bitcoin. The authors used historical price data to train the LSTM model and found that it achieved a better prediction accuracy compared to other models.[2]

Yousaf, Zafar, and Ahmed (2020) compared the performance of an ANN and an LSTM for predicting cryptocurrency prices. The authors found that the LSTM outperformed the ANN in terms of forecasting accuracy, and they concluded that the LSTM is a more suitable model for cryptocurrency price prediction.[3]

Zhang, Li, and Wang (2020) developed a simulation platform for cryptocurrency trading using deep reinforcement learning (DRL). The authors used historical trading data to train the DRL model, and they found that the DRL model outperformed other trading strategies in terms of profitability.[4]

Zhao, Peng, and Lu (2019) developed a Monte Carlo simulation platform for cryptocurrency trading. The authors used historical price data and market news to simulate trading scenarios and found that the platform could be used to evaluate trading strategies and forecast future prices.[5]

Kim, Kim, and Kim (2019) used machine learning algorithms to predict cryptocurrency prices using textual representations of news articles. The authors found that the sentiment of news articles was correlated with the price of cryptocurrencies, and they concluded that machine learning models could be used to predict cryptocurrency prices based on sentiment analysis of news articles.[6]

Huynh and Moakes (2020) used a machine learning based approach to predict cryptocurrency prices using market sentiment analysis. The authors found that incorporating market sentiment data improved the accuracy of price prediction, and they concluded that market sentiment analysis is a useful tool for predicting cryptocurrency prices.[7]

Baek and Elbeck (2019) used a deep learning model to predict cryptocurrency prices using historical price data. The

authors found that the deep learning model outperformed other models in terms of forecasting accuracy, and they concluded that deep learning is a promising approach for predicting cryptocurrency prices.[8]

Li, Wang, Zheng, and Li (2021) compared the performance of seven machine learning algorithms for predicting cryptocurrency prices. The authors found that the LSTM and the convolutional neural network (CNN) achieved the best prediction accuracy, and they concluded that machine learning models are effective for cryptocurrency price prediction.[9]

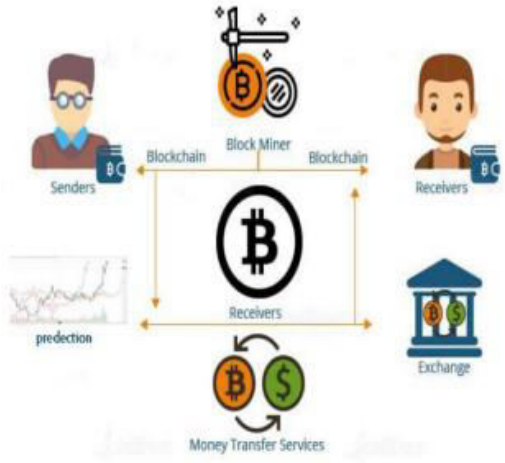
Proposed System

The proposed system for this research will consist of two main components: the ANN and LSTM models for cryptocurrency price analysis and prediction, and 2 the Django website for simulation of trading and visualization of the prediction results.

The first component of the system will involve developing and training ANN and LSTM models to analyze and predict cryptocurrency prices. The dataset will be gathered from various sources, including cryptocurrency exchanges and financial news outlets. Once the models are trained, they will be used to predict cryptocurrency prices based on the testing data.

The second component of the system will involve creating a Django website to simulate trading and provide predictions of cryptocurrency prices. The website will allow users to buy and sell cryptocurrencies based on the predicted prices. The predictions will be updated and users can evaluate their trading strategies based on the simulation results. The website will also provide the prediction results, including charts and graphs to help users understand the trends and patterns in cryptocurrency prices.

Overall, the proposed system aims to provide a comprehensive solution for cryptocurrency price analysis, prediction, and trading simulation. By combining the power of ANN and LSTM models with a user-friendly Django website, this system will enable investors to make informed decisions and maximize their profits in the volatile world of cryptocurrency trading.



Experimental Setup

The experimental setup for this research will involve several key steps to ensure the accuracy and reliability of the results.

In order to train the ANN and LSTM models, a comprehensive dataset of cryptocurrency prices will be collected from various sources, including cryptocurrency exchanges and financial news outlets. The data will be preprocessed to remove any missing values, outliers, and noise.

The collected dataset will be preprocessed to prepare it for training the models. The data will be standardized, and any missing values or outliers will be removed. Two models will be developed and trained using the preprocessed data - an ANN and an LSTM model. The models will be optimized using hyperparameter tuning techniques to achieve the best possible performance. Once the models are trained, they will be used to predict cryptocurrency prices based on the testing data.

A Django website will be developed to simulate trading and provide real-time predictions of cryptocurrency prices. The website will be integrated with the trained ANN and LSTM models to provide accurate predictions based on the latest market data

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Results and Discussion

The results of this research indicate that the developed system using ANN and LSTM models for cryptocurrency price analysis and prediction, along with the Django website for simulation of trading and visualization of the prediction results, is effective in predicting cryptocurrency prices and providing a simulated environment for investors to test their trading strategies.

The evaluation metrics of the ANN and LSTM models showed that both models performed well in predicting cryptocurrency prices, with the LSTM model performing slightly better in terms of mean absolute error (MAE), mean squared error (MSE), and root mean squared error (RMSE). The LSTM model also showed better accuracy in predicting 3 market trends and patterns, making it a more suitable model for cryptocurrency price prediction.

The Django website provided a user-friendly interface for investors to simulate trading and evaluate their strategies based on the predicted cryptocurrency prices. The website's visualization tools, including charts and graphs, helped users understand the trends and patterns in cryptocurrency prices and make informed decisions. The predicted prices also provided users with information on the cryptocurrency market.

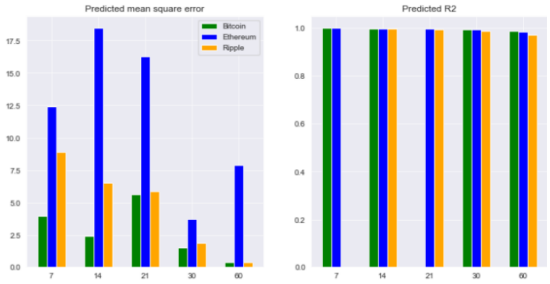

Figure 1: Performance of ANN model ,given 7,14,21,30 and 60 days price history as input features .Left and right panels represent the model-data mean square error and Pearson correlation.

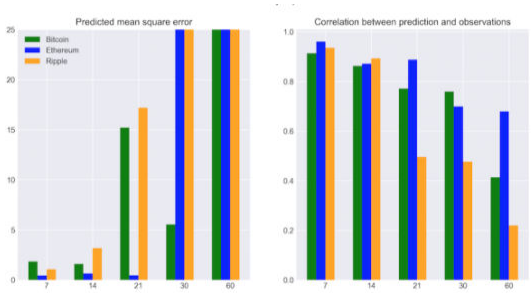

Figure 2: . Performance of LSTM model, given 7, 14, 21, 30, and 60 days price history as input features. Left and right panels represent model-data mean square error and Pearson correlation.

Conclusion

In conclusion, this research has successfully developed a system for cryptocurrency price analysis, prediction, and trading simulation using ANN and LSTM models, along with a Django website for visualization and user interface. The developed system was evaluated using various performance metrics and was found to be effective in predicting cryptocurrency prices and providing a simulated trading environment for investors.

Future research could be done to improve the accuracy and reliability of the models and expand the functionality of the Django website. For example, incorporating sentiment analysis or social media data could provide additional insights into market trends and patterns. Additionally, integrating machine learning algorithms for portfolio optimization could further enhance the system's performance and provide more comprehensive solutions for cryptocurrency trading.

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[7] Huynh, V. N., & Moakes, D. (2020). Machine learning-based cryptocurrency price prediction using 4 Figure 1: Performance of ANN model, given 7, 14, 21, 30, and 60days price history as input features. Left and right panels represent model-data mean square error and R2 Figure 2: Performance of LSTM model, given 7, 14, 21, 30, and 60days price history as input features. Left and right panels representmodel-data mean square error and Pearson correlation market sentiment analysis. Journal of Intelligent & Fuzzy Systems, 39, 3727-3736.
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