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Bitcoin Price Prediction System

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ABSTRACT: Due to price volatility and changeability, it is hard to predict the price of a cryptocurrency. Clients use hundreds of different cryptocurrencies all over the world. In this piece, we focus on three of the most popular ones. Every transaction gives fake or faked products a chance to get into the supply chain and the industry. Wholesalers connect with and deliver to thousands of pharmacies and dispensers. This saves the drug companies the trouble of sending each drug to a different pharmacy. Instead, they can send large batches of drugs to a smaller number of wholesalers. Once the product is in the hands of the wholesaler, it can offer a variety of services, such as drug distribution, electronic order services, and repackaging. One of the most disruptive technologies of the 21st century is Bitcoin, with its decentralised computing model for trading digital currencies. This paper shows a new way to make a prediction model for Bitcoin transactions called RNN by using deep neural networks to learn how Bitcoin transactions are represented in networks. One way to reach our goal is to use a deep neural network (DNN) to find important hidden features in Bitcoin transactions, related accounts, transaction amounts, and the temporal and spatial properties of transactions. Our DNN model for predicting transactions is made up of three main tasks.

KEYWORDS: Cryptocurrency**,** Decentralized,Recurrent Neural Network**,** Deep Neural Network**.**

I. INTRODUCTION

Cryptocurrency is a novel asset class that emerged as a result of advancements in financial technology, and it has provided academics with a wealth of new study opportunities. The volatility and rapidity of price shifts in the bitcoin market make accurate price predictions difficult. Many distinct types of digital currencies are in circulation today. Coins denominated with a cryptographic hashing algorithm are digital or virtual currencies. It can't be duplicated or counterfeited because of the cryptographic protections in place. It is not produced by a government or a bank either. As an alternative, it is a cryptographically-verifiable but decentralised digital money. Because of this, it differs from standard currencies. Furthermore, it is built using a sophisticated technology called blockchain. The data is stored in a manner that makes modification, hacking, or cheating very difficult, if not impossible. Bitcoin is starting to carve out its own niche, which may be good news for other cryptocurrencies or their undoing. Cryptocurrencies are still in their infancy, making it difficult to predict whether or not they will gain acceptance in mainstream economies. Most people are familiar with Bitcoin, the first cryptocurrency ever produced, which was released in 2009 and for more than two years remained the sole cryptocurrency based on the Blockchain. But now, the cryptocurrency market is home to over 5,000 distinct tokens and 5.8 million users. The economics, cryptography, and IT communities have all lately shown considerable interest in Bitcoin. Bitcoin is unique in that it blends monetary transactions with cryptographic protocols. Many people believe that Blockchain (BC), the technology underpinning the Bitcoin cryptocurrency system, will be essential in making the Internet of Things (IoT) ecosystem safer and more private.

Bitcoin is the most widely used cryptocurrency, but there are hundreds of others. Bitcoin is influenced by factors that investors and traders generally ignore, such as the news, social media, and minor cryptocurrencies with a low market share. The volatile and ever-changing nature of cryptocurrency markets makes accurate price predictions difficult. Clients use hundreds of different cryptocurrencies all over the world. In this piece, we focus on three of the most

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popular ones. Every transaction gives fake or faked products a chance to get into the supply chain and the industry. Wholesalers connect with and deliver to thousands of pharmacies and dispensers. This saves the drug companies the trouble of sending each drug to a different pharmacy. Instead, they can send large batches of drugs to a smaller number of wholesalers. Once the product is in the hands of the wholesaler, it can offer a variety of services, such as drug distribution, electronic order services, and repackaging.

II. MOTIVATION

Bitcoin and its decentralised computer model for trading digital currencies is one of the most important new technologies of the 21st century. This study suggests a new way to build an RNN-based forecasting model for Bitcoin transactions that uses deep neural networks to learn representations of the Bitcoin transaction network. We could reach our goal if we used a deep neural network (DNN) to learn important hidden information, like the accounts that are linked, the amounts of transactions, and the temporal and spatial aspects of transactions. Our transaction forecasting DNN model was made by doing three important things.

III. LITERATURE REVIEW

PAPER 1: "A Comparative Study of Bitcoin Price Prediction Using Deep Learning", 2018

It was effective in resolving issues of regression and classification. Classification can foretell whether Bitcoin's price will rise or fall in the future, whereas regression can forecast the future price of Bitcoin itself. CNN and ResNet are well-known for their proficiency in a variety of tasks, such as sequence data processing, yet they underperformed when asked to forecast Bitcoin prices.

PAPER 2: "Recurrent Neural Network Based Bitcoin Price Prediction by Twitter Sentiment Analysis", 2018

The market value of Bitcoin rises or falls depending on the general sentiment regarding the cryptocurrency on Twitter. The purpose of this investigation is to see whether we can anticipate Bitcoin's price volatility by analysing public sentiment regarding the cryptocurrency on Twitter. Positive and unfavourable Bitcoin-related tweets from various news accounts are separated for your perusal. In order to predict the price in the following time period, the RNN model takes into account both the price history and the proportion of positive and negative tweets. The same Random Forest model is trained with each set of features separately to make a decision between the two methods of feature extraction. Pricing predictions using the RNN model are shown to be 77.62% accurate.

PAPER 3: "Machine Learning Models Comparison for Bitcoin Price Prediction", 2018

For continuous variables, the most frequent accuracy measures are the Mean Squared Error (MSE) and the R-Squared (R2). The findings demonstrate that deep learning-based methods such as GRU and LSTM are superior to more traditional methods such as Theil-Sen regression and Huber regression. Using GRU, the best values for MSE (0.00002) and R2 (0.992; 99.2%) are achieved.

PAPER 4: "Autoregressive Integrated Moving Average Model based Prediction of Bitcoin Close Price", 2018

Predictions about the future may be made via the process of forecasting, which involves looking at both historical and current data. Using the 'forecast' package, the ARIMA model may predict future data based on previous and current data, allowing for time series prediction. A chart of the expected price for the next 545 days is shown in Figure 3. Cost in US dollars is shown against the number of days it takes to make a prediction on the x-axis.

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PAPER 5: "An Empirical Study on Modeling and Prediction of Bitcoin Prices with Bayesian Neural Networks Based on Blockchain Information", 2018

This investigation examines Bitcoin's development through time to illustrate the operation of Bayesian neural networks (BNNs). It also selects the most relevant aspects of the Blockchain data relating to Bitcoin supply and demand and utilises them to train models to enhance their ability to forecast the price of Bitcoin. Run the experiment that evaluates the Bayesian neural network against various linear and nonlinear benchmark models for modelling and forecasting the Bitcoin process. The empirical investigations demonstrate that BNN accurately forecasts the future price of Bitcoin and explains its recent volatility.

PAPER 6: "Deep Learning Approach to Determine the Impact of Socio Economic Factors on Bitcoin Price Prediction", 2019.

This research uses the Root Mean Square Error (RMSE) metric to assess the accuracy of price predictions made by several deep learning models, such as the Convolutional Neural Network (CNN), the Long Short Term Memory (LSTM), and the Gated Recurrent Unit (GRU). The RMSE of the LSTM model is the lowest of all the competing ones (RMSE). In this way, LSTM demonstrates its superiority over CNN and GRU in identifying interdependencies over time. Since the LSTM model considers pricing history while the GRU and CNN models do not, the LSTM model is preferred.

PAPER 7: "Stock Prediction Based on LSTM under Different Stability", 2019.

The prediction model was learned from the training set, and its accuracy was evaluated on the test set. Before applying the LSTM model to stock price data, we utilised the Min-Max technique to standardise the range of each data point (0, 1), since the range of the dataset fluctuates from sample to sample. The next step was to tally the data from each dataset's 10 replicate tests and present the findings in Table I. There is little correlation between P value and the expected outcomes of the three data sets, even if the difference in P value indicates how reliable the data is. The proliferation of "big data" has facilitated the development of more accurate algorithmic forecasting methods. As a consequence, researchers have begun to shift their focus from classic linear prediction algorithms (as an example of a time-series prediction algorithm) to the more contemporary and widely used deep learning prediction algorithms. In the case of complicated stock price data, the nonlinear deep learning method is superior at displaying the dynamic interplay between the underlying rules and the external relationships of the data over time.

PAPER 8: "Empirical Analysis of Current Cryptocurrencies in Different Aspects", 2020.

The purpose of this study is to examine the various cryptographic currency systems now in use, explain how they function, and provide some background information on their development and current usefulness. Topics of conversation include What distinguishes one cryptocurrency from another, exactly? Short form, current market value, market capitalization of currency, programming language used, release year, cryptocurrency creator, block time, all-time high, all-time low, market rank of currency, kind of proof, and algorithm used in currency are some of these attributes. We were able to evaluate 10 distinct cryptocurrencies using a variety of criteria, which should make it easier to differentiate between them in the future. In addition, it includes useful background on the characteristics of cryptocurrency.

PAPER 9: "Bitcoin Price Prediction Using Machine Learning and Artificial Neural Network Model",2021.

Using examples, it demonstrates how to calculate Bitcoin's value using linear regression and the Long Short-Term Memory models. Figure 5 demonstrates that both the training data and the testing data typically have an accuracy of

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99.97 percent. On the other hand, the Mean Absolute Error demonstrates that the LSTM model is rather accurate, with an error rate of just approximately 0.08 percent.

PAPER 10: "Short-term bitcoin market prediction via machine learning", 2021.

Examining the bitcoin market's predictability across 1-60 minute time frames. In terms of accuracy, there is little to choose between the GRU and the LSTM on either the 1-minute or 5-minute prediction horizons. However, the GRU is more accurate on the 5-min prediction horizon, while the LSTM is more accurate on the 15-min and 60-min horizons.

IV. EXISTING SYSTEMS AND THEIR DRAWBACKS

Money may be sent in a variety of methods, including by checks, wire transfers, credit cards, and electronic payment applications like G-pay, Amazon Pay, etc. A financial institution, clearinghouse, credit card firm, or other third party processes the payment. It might take up to a week and cost between 6 and 10 percent to transfer money internationally. What Satoshi Nakamoto proposed ultimately ended up revolutionising the industry. Blockchain is the technology that allowed for the creation of Bitcoin, the first digital money. Due to the monopoly these intermediaries have established, individuals no longer have access to or control over their data. Because of this transparency and predictability, the public has trust in these organisations. Trust may be bolstered by legal frameworks set out by the government, but they are also easily broken. Bitcoin is a P2P (peer to peer) digital currency exchange that eliminates the need for a central bank or any other financial institution as a middleman when sending and receiving payments online.

V. PROBLEM STATEMENT

The goal of this project is to develop and deploy a Deep Learning technique that makes daily Bitcoin price forecasts utilising Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU). The volatile and ever-changing nature of cryptocurrency markets makes accurate price predictions difficult. Hundreds of different cryptocurrencies are used by customers in various parts of the globe. Three of the most frequent are discussed in this study. Since deep learning algorithms may discover previously unseen patterns in data, integrate them, and provide far more accurate predictions, this work employs them to try to perform the following:

VI. PROPOSED SOLUTION

In this study, we want to apply deep learning algorithms to foretell the future value of Bitcoin. Learn to recognise and combine these latent data patterns for enhanced forecasting accuracy. This article demonstrates an LSTM and GRU-based cryptocurrency prediction system, with a focus on Bitcoin. Forecasts of Bitcoin prices taking into account market conditions such as the starting price, the closing price, the lowest price, the highest price, trading volume, and Bitcoin transaction volume. Among all digital currencies, Bitcoin is by far the most valued. Bitcoin was developed in 2009 by an anonymous organisation under the alias Satoshi Nakamoto (Nakamoto, 2008). The system went live in 2009, but it wasn't until 2013 that its popularity really took off. Even though Bitcoin is technically a commodity and not a currency, it has recently entered these markets. Since its price fluctuations are mostly unknown, academics and economists may use this as a unique opportunity to study and compared it with more established currencies. Because Bitcoin is so unlike to other currencies and commodities, this is extremely important.

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VII. SYSTEM DESIGN

Proposed Model

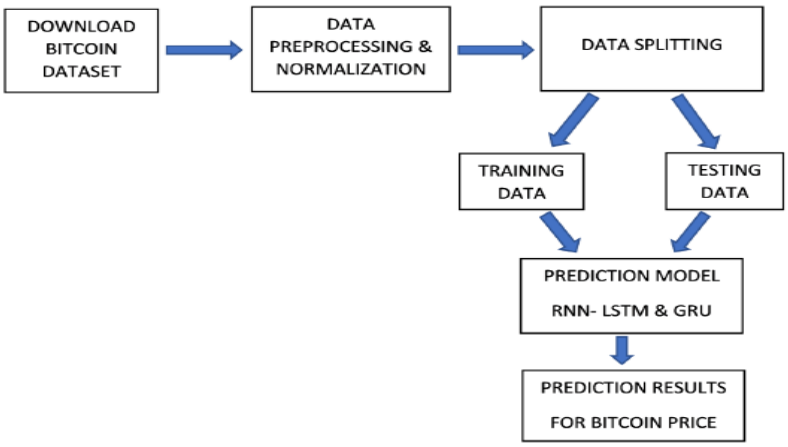

Figure: Architecture Diagram of the Proposed System

Systems design is the process of figuring out how a system's architecture, modules, interfaces, and data will all work together to meet certain needs. You could think of systems design as the way that systems theory is used to make things. Systems analysis, systems architecture, and systems engineering all do some of the same things. If the larger topic of product development "blends the perspectives of marketing, design, and manufacturing into a single approach to product development," then design is the process of using marketing information to create the design of the product that will be made. So, systems design is the process of making systems that meet the needs of the user.

Algorithm Design

LSTM Algorithm:

```
model = Sequential()
//model the bitcoin data sequentiallys in array format//
model.add(LSTM(units = 100, return_sequences = True, input_shape= (x_train.shape[1], 1)))
model.add(Dropout(0.2))
//LSTM requires the number of units in the structure//
//return sequence will give the sequence of value as a return value after the function is run//
//input shape requires 3D input value//
model.add(LSTM(units = 100, return_sequences = True))
model.add(Dropout(0.2))
//Dropout will reduce the redundant and oulier values //
model.add(LSTM(units = 100))
model.add(Dropout(0.2))
model.add(Dense(units=1))
```

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GRU Algorithm:

```
model = Sequential()
//model the bitcoin data sequentiallys in array format//
model.add(GRU(units = 100, return_sequences = True, input_shape= (x_train.shape[1], 1)))
model.add(Dropout(0.2))
//LSTM requires the number of units in the structure//
//return sequence will give the sequence of value as a return value after the function is run//
model.add(GRU(units = 100, return_sequences = True))
model.add(Dropout(0.2))
//Dropout will reduce the redundant and oulier values //
model.add(GRU(units = 100))
model.add(Dropout(0.2))
model.add(Dense(units=1))
```

VIII. RESULTS AND DISCUSSION

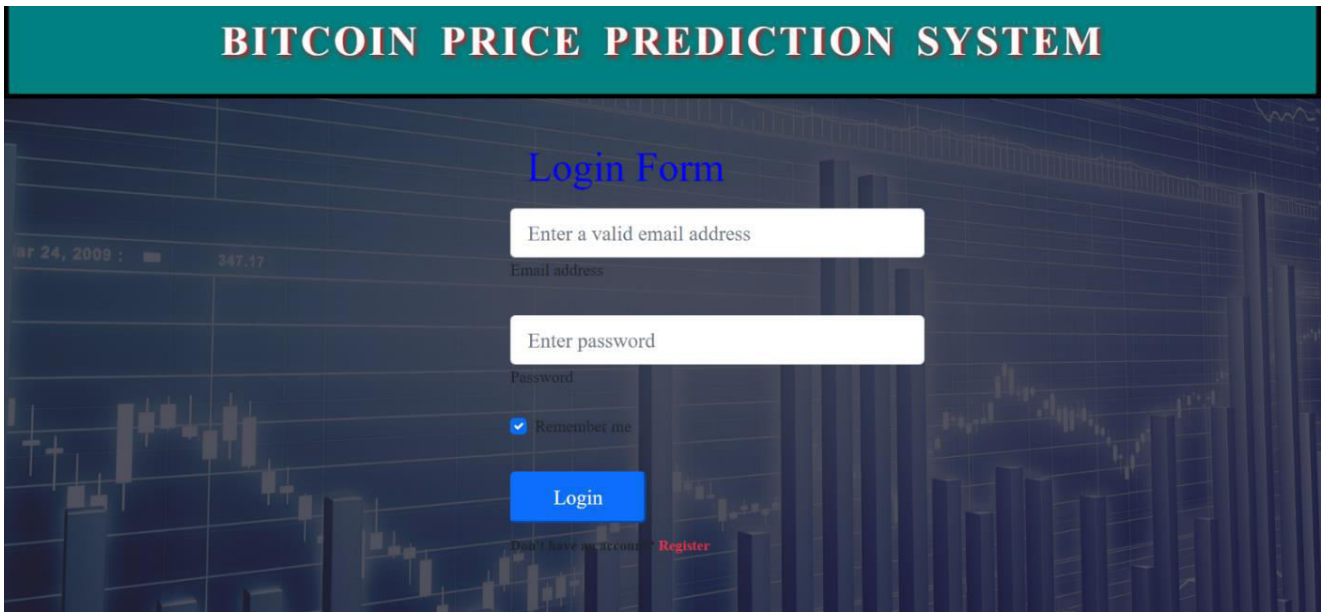

Figure: Login Page

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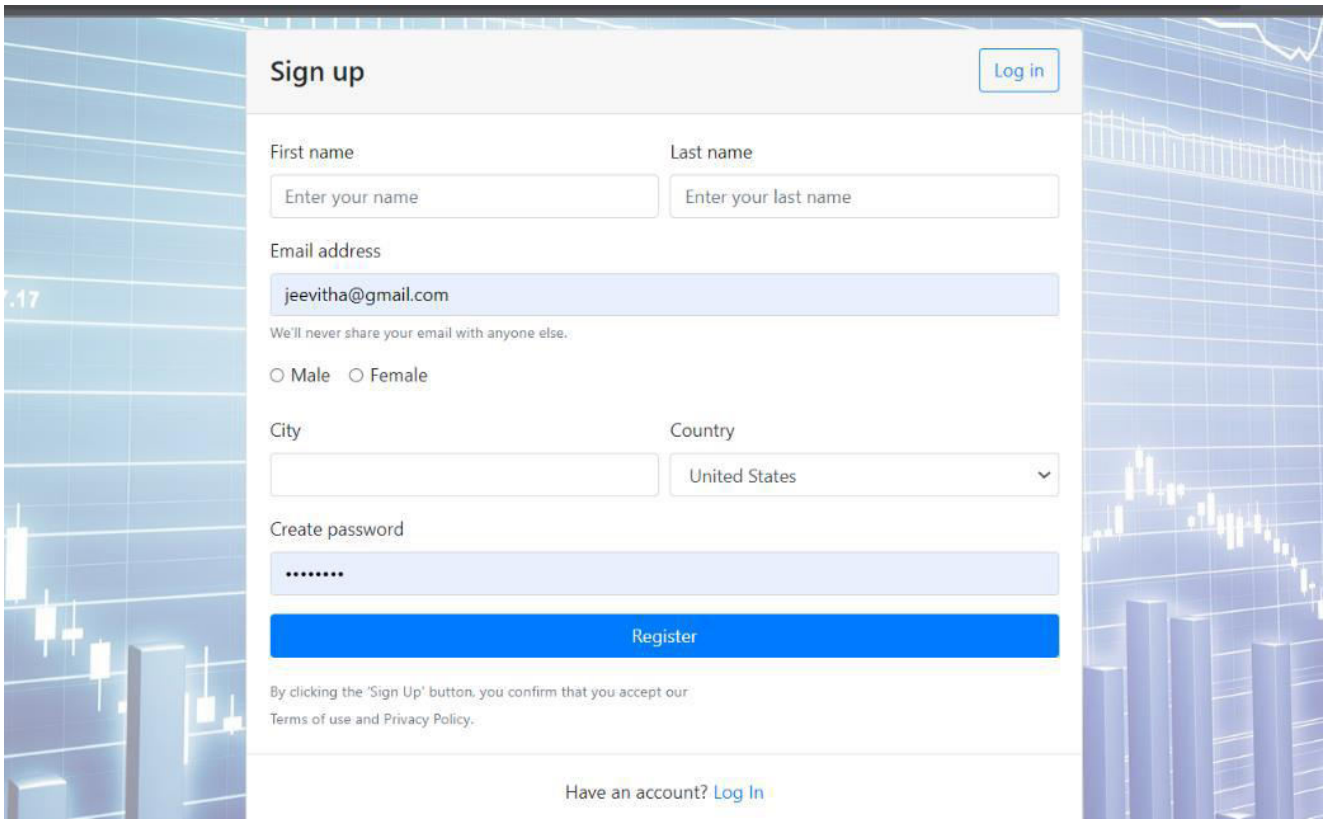

Figure: Register Page

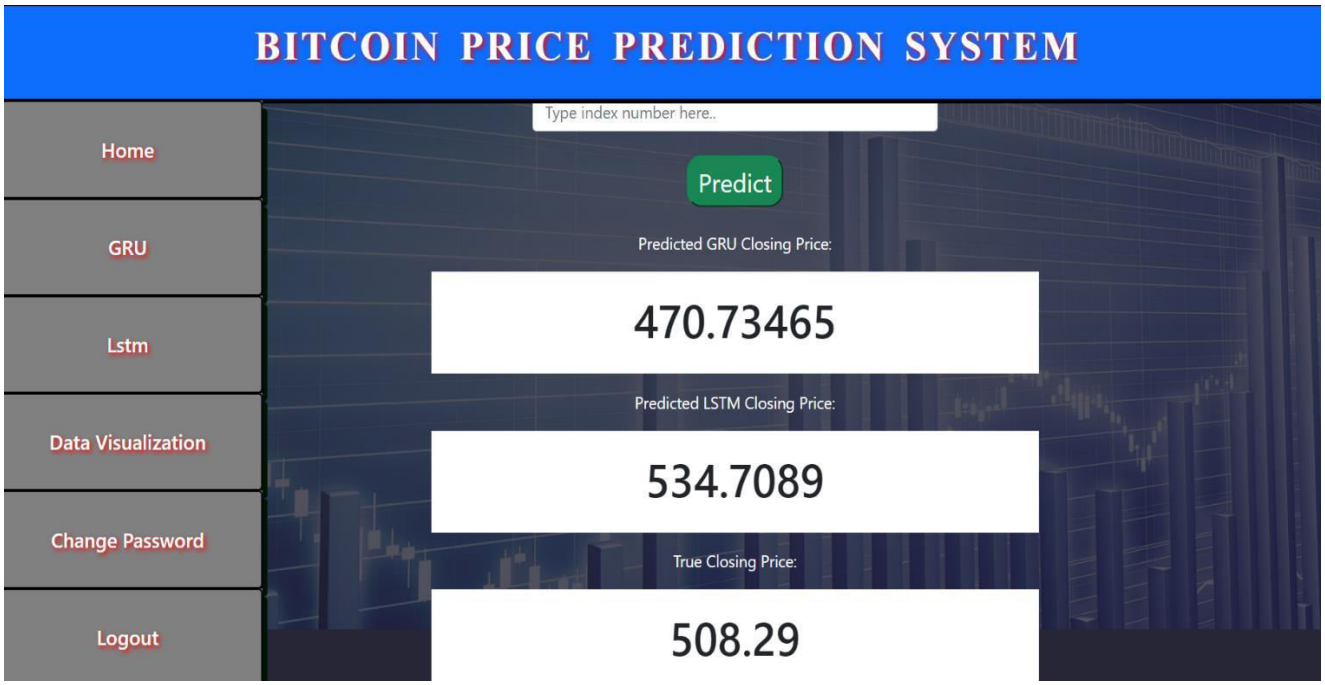

Figure: Results for LSTM and GRU

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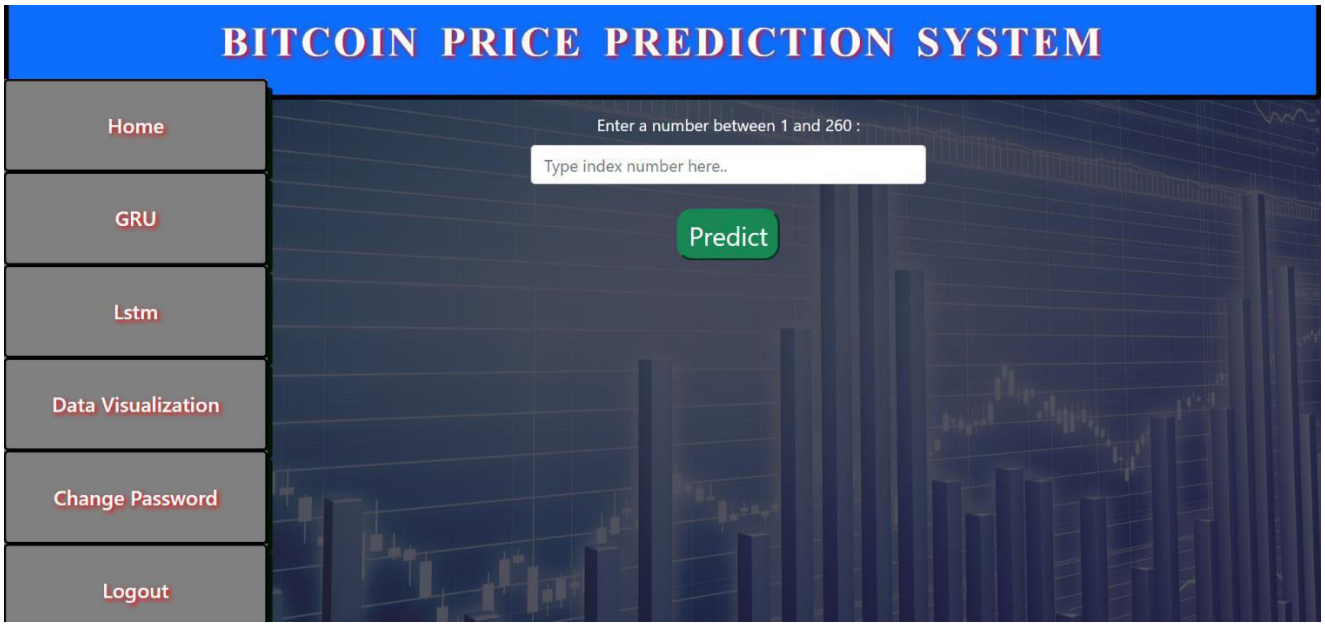

Figure: Index entry for Prediction

Figure: Results for GRU Algorithm

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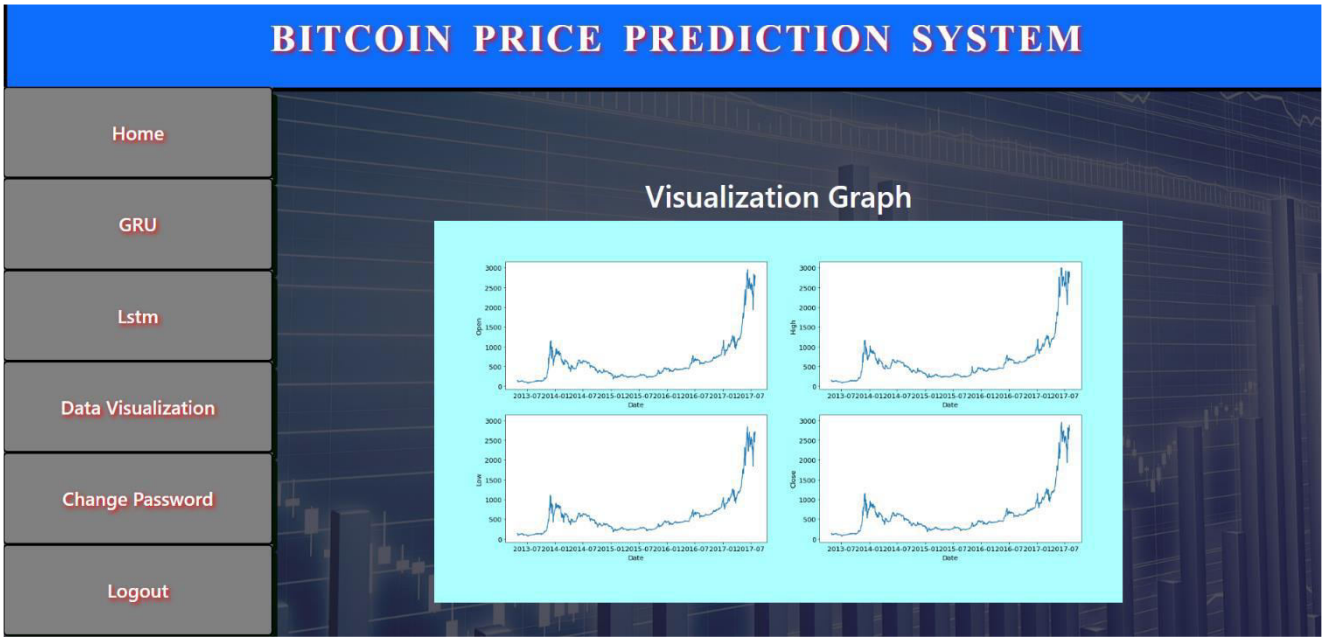

Figure: Graphical representation of Bitcoin features

VIII. CONCLUSION

The study shows that Linear Regression is less accurate than Long Short-Term Memory. This study only compares four things: how things open, close, go high, and go low. Because of this, if we also look at other features, the results may be different. Since the cryptocurrency market is volatile and affected by social media and other outside factors, data sets alone can't be used to make predictions. As technology gets better, this experiment can collect, analyse, and use more data, which leads to better results. Even though trading crypto has become popular, the biggest worry is that the number of digital coins is growing and that block chain technology is being used more and more. Compared to how many transactions VISA handles every day, it is still a small number. On top of that, the crypto market can't compete with players like VISA and MasterCard when it comes to the speed of transactions until the infrastructure that makes these technologies possible is scaled up on a massive scale. Cryptocurrencies haven't been around as long as the stock market, currencies, and commodities, so we don't know enough about their resistance and key support levels.

IX. FUTURE WORK

People could join new groups if they knew how to use crypto. Users are usually forward-thinking customers who value honesty in business. A recent study found that up to 40% of customers who pay with cryptocurrency are new to the company and spend twice as much as customers who use credit cards. More and more businesses are finding that their most important clients and suppliers want to do business with them using crypto. So, your business might need to be able to receive and send cryptocurrency to make sure that transactions with key stakeholders go smoothly.

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