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A MACHINE LEARNING MODELLING FOR BITCOIN MARKET PRICE PREDICTION USING LONG SHORT-TERM MEMORY AND RECURRENT NEURAL NETWORKS

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ABSTRACT:

Machine learning based on Neural Network has integrated usages in a variety of fields such as translation, finance, distribution, and medical world as well as cognition. This study shows Recurrent Neural Network Learning Model on the basis of LSTM, which analyses the previous prices of a cryptocurrency, Bitcoin and predicts the next one.This model indicates the actual and predicted prices of Bitcoin for 81 days in the way that it has learned the former prices for 30 days and then anticipates the next day price. Regularized data set for Modelling is divided into test data set and training data set at the rate of 1:9. The latter set is once again separated into training data and verification ones. Machine Learning of this study needs to use Neural Network library, Keras framework.To fit the model is to look for the model's weight by optimizing the process, while using the training data. In this paper, fit function's batch size is 11 and epochs is 30. As learning gets processed more repetitively, the loss decreases more monotonously, and then it converges to more regular value. That is, it means there is no overfitting.As the result of the experiment, the machine learning proposes not only that after analysing the graphs of error rates and weight change rates, weight converges towards a particular one, but also that as learning goes over, the processing efficiency of its neural network gets better.

1. INTRODUCTION

In machine learning, predictive analysis supplies appropriate consultation and information, computing trends and future probabilities and then predicting potential result. Recurrent Neural Network generates following data prediction through learning the context, that is, the relationship among data in estimation problem dealing with such time series data as monthly sales, price index, unemployment rare, exchange rate, and stock price [2].

The observed value of the time series data has a time sequence. In order to analyse the temporal series data such as exchange rates or stocks, there can be several methods: moving average which is able to anticipate the future price, computing the average of the past and the present prices, ARIMA(Auto-Regressive Integrated Moving Average) which expects the future value, while modelling the data, the regression analysis which estimates how one or more independent variables influence on International Journal of Advanced Science and Technology Vol. 28, No. 5, (2019), pp. 225-232 226 the dependent ones, and the forth. Along with Artificial intelligence, cryptocurrency has been recently the subject of IT Convergence to which both tremendous technologies and the social interest have been increasingly devoted. Designating Busan as the unfettered free district for the

Blockchain, Korea has promoted the activation of the Block Chain, a new local growth engine.

The district for Blockchain not only leads new technologies but dominates the market of new industries in advance, providing special permission free from the regulations and demonstrations to application industries. A virtual currency, Cryptocurrencies dealt on the internet with no commodity money as encryption techniques are used. That can be save on the computer, without any concerns about either theft or loss, and doesn't spend any money being produced and saved. It has not just the capacity of payment and circulation as same as that of gold or cash; high scale of value like a real estate or a stock as well. Due to transaction confidentiality, however, it may be abused in tax evasionsor in drug dealings. Cryptocurrency is designed to let the individuals do freely financial dealings in P2P (peer to peer) way. Blockchain technology is a system that stores online transactional information on the block, which must be approved to be connected with an existing chain. It means the parties to a transaction exchange value with one another. Bitcoin based on Blockchain skill was invented by Nakamoto Satoshi in 2009.

2. RELATED WORK
Existing System

The main goal of this research is to understand is there any difference between ERP implementation's CSF in developed and developing countries? Understanding this subject can help us to implement ERP systems properly in developing nations. This research showed that in developed and developing countries "Change Management" was mostimportant factor

and in developed countries "Country-related functional requirements" factor was less important factor and "Fit between ERP and business/process" was the least cited factor among developing nations.

In last it concluded that national culture of developing countries has an impressive effect on ERP implementation in these countries. In other hand developing countries companies more depend on ERP vendors in compare to developed countries companies. In addition it seems developing countries underestimate business process reengineering (BPR) and fit between ERP and business/process factors in comparison with developed countries.The purpose of this study was to discover is there any differences between ERP's Critical Success Factors (CSF) in developed and developing countries or not. And if there are any differences, what are they? This study showed that in during ERP implementation CSFs are not much different in developed and developing countries but still there are undeniable differences.Artificial Neural Networks so as to forecast the next day price of Bitcoin, worthy of about $20,000 per a piece in December 2017, on the basis of the past prices. The error rate and weight change rate are compared by 3presenting the actual price and forecast price of Bitcoin for 81 days in the way of learning the 30-day previous prices and predicting the price of the next day.

Proposed System

A Cryptologic pioneer, David Chaum, devised Blind Signature technology, which telecommunicates the encoded messages sealing digital signature, and resulted in inventing Ecash. That is the primary commercial cryptocurrency. Bit Coin in 2009 was the new cryptocurrency accomplished

with Block Chain technology. After that, most cryptocurrencies have been improved with

Block Chain based. Ethereum emerged as the developed money which has services and applications in addition to Block Chain system in 2015[5]. WEF (World Economic Forum) suggested that the ranking of Blockchain must be the fourth of 12 future technologies in the Global Risks Report. Furthermore, in 10 years, 10 percent of GDP all over the world is expected to be based on Block chain technology [6]. In April 2019, about 40 major banks around the world announced that they would experiment CBDC (central bank digital currencies) founded on Blockchain [7]. Blockchain, which is encrypted with trade information on the public or private network, is a diversified ledger shared with relevant network participant

3. METHODOLOGY:

Recurrent Neural Network (RNN)

Recurrent Neural Network is a generalization of feedforward neural network that has an internal memory. RNN is recurrent in nature as it performs the same function for every input of data while the output of the current input depends on the past one computation. After producing the output, it is copied and sent back into the recurrent network. For making a decision, it considers the current input and the output that it has learned from the previous input.

Unlike feedforward neural networks, RNNs can use their internal state (memory) to process sequences of inputs. This makes them applicable to tasks such as unsegmented, connected handwriting recognition or speech recognition. In other neural networks, all the inputs are independent of each other. But in RNN, all the inputs are related to eachFirst, it takes the X(0) from the sequence of input and then it outputs h(0) which together with X(1) is the input for the next step. So, the

h(0) and X(1) is the input for the next step. Similarly, h(1) from the next is the input

with X(2) for the next step and so on. This way, it keeps remembering the context while training.
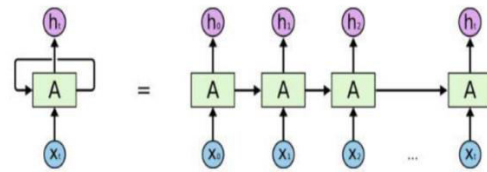

Figure 1:An Unrolled recurrent Neural Network

$$h_t = f(h_{t-1}, x_t)$$

RNN can model sequence of data so that each sample can be assumed to be dependent on previous ones Recurrent neural network are even used with convolutional layers to extend the effective pixel neighborhood. Gradient vanishing and exploding problems. Training an RNN is a very difficult task. It cannot process very long sequences if using *tanh*or *relu*as an activation function.

Long Short-Term Memory (LSTM)

Long Short-Term Memory (LSTM) networks are a modified version of recurrent neural networks, which makes it easier to remember past data in memory. The vanishing gradient problem of RNN is resolved here. LSTM is well-suited to classify, process and predict time series given time lags of unknown duration. It trains the model by using back-propagation. In an LSTM network, three gates are present:
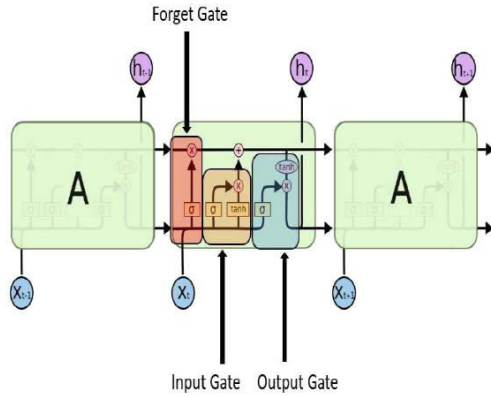
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Figure 2:Long Short-Term Memory

Input gate — discover which value from input should be used to modify the memory. **Sigmoid** function decides which values to let through **0,1.** and**tanh**function gives weightage to the values which are passed deciding their level of importance ranging from**-1** to **1.**

$$i_t = \sigma\left(W_i \cdot [h_{t-1}, x_t] + b_i\right)$$

$$\tilde{C}_t = \tanh(W_C \cdot [h_{t-1}, x_t] + b_C)$$

Forget gate — discover what details to be discarded from the block. It is decided by the **sigmoid function.** it looks at the previous state(**ht-1**) and the content input (**Xt**) and outputs a number between **0**(*omit this*) and **1**(*keep this*) for each number in the cell state **Ct−1**.

$$f_t = \sigma\left(W_f \cdot [h_{t-1}, x_t] + b_f\right)$$

Output gate — the input and the memory of the block is used to decide the output. **Sigmoid** function decides which values to let through **0,1.** and**tanh**function gives weightage to the values which are passed deciding their level of importance ranging from**-1** to **1** and multiplied with output of **Sigmoid.**

$$o_t = \sigma\left(W_o\,[h_{t-1}, x_t] + b_o\right)$$
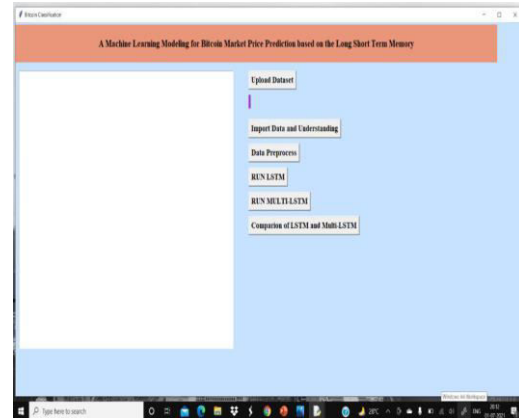
$$h_t = o_t * \tanh(C_t)$$

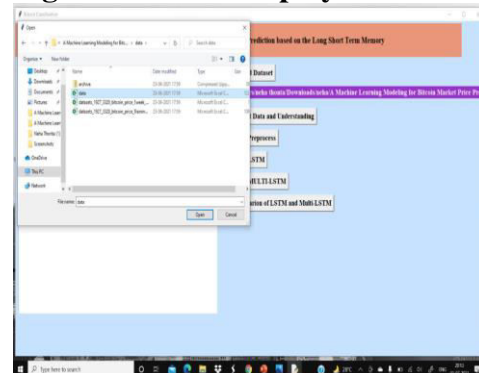## 4. STUDY OF RESULTS:

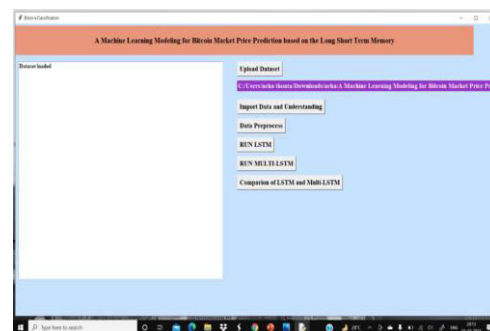**Figure 3:Screen display**

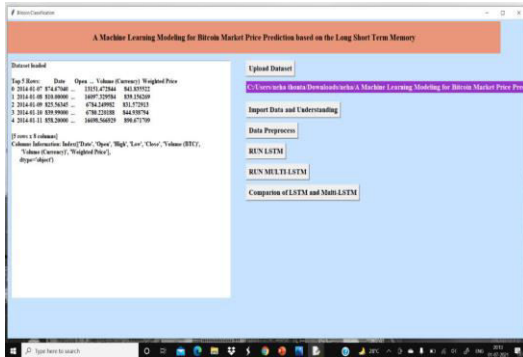**Figure 4:Upload the Data**

Figure 5:Select Data from folder

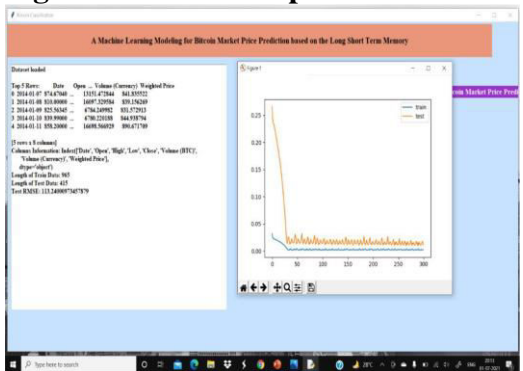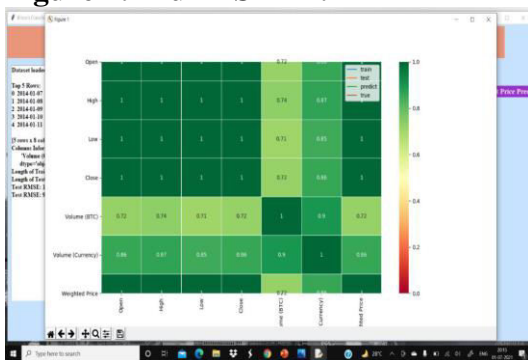**Figure 6:Click on import data**

Figure 7:"Run LSTM".

Figure 7:"Run Multi LSTM".

5.CONCLUSION :

Recently, AI technology has been used in a variety of practical fields and remarkably has grown up. AlphaGo (Alpha Zero) made by Google in 2016 made the world have much interest in Artificial Intelligence. In 2019, 3 years later from then, Alpha Zero, a name except for Go, has evolved into a general-purpose AI system that learns on its own and increases its winning rate without any additional learning. This paper proposes Artificial Neural Networks so as to forecast the next day price of Bitcoin, worthy of about $20,000 per a piece in December 2017, on the basis of the past prices. The error rate and weight change rate are compared by presenting the actual price and forecast price of Bitcoin for 81 days in the way of learning the 30-day previous prices and predicting the price of the next day. Experiments show that the weight beginning at zero results in converging to a specific value after increasing and decreasing repeatedly, and that its performance is improving as learning goes on. The research will aim at developing the best forecasting cryptocurrency program from applying various experiments of Artificial Neural Network learning models, adding and technically analysing data from much more cryptocurrency exchanges.In Future developing the best forecasting cryptocurrency program from applying various experiments of Artificial Neural Network learning models, adding and technically analyzing data from much more cryptocurrency exchanges.

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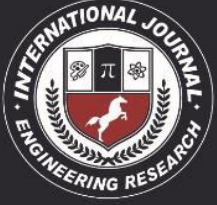
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