Literature Review

What has been used in the literature to forecast prices in the crypto market?

The most popular time series forecsting method in finance in the ARIMA method

The main benefit of using the ARIMA model is to transform a non-stationary series into a series without seasonality or trend

The major hurdles

regression-based approach , so they are not able to model data with non-linear relationships between parameters.

require certain statistical assumptions about the data

New techniques in deep learning have come up to solve problems related to sequential data. LSTM (Long Short-Term Memory), gated recurrent unit (GRU)

*(Hamayel & Owda, 2021) – several machine learning algorithms to predict cryptocurrency prices , the one that produced the best results was infact the gated recurrent unit*

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Dataset

The analyzed dataset was collected from Binance using its open access api , (Binance is one of the largest online exchanges where **users can trade cryptocurrencies**)

The data consists of three separate .csv files , one for each cryptocurrecy Bitcoin (BTC),

the second for Ethereum (ETH), and the last sheet for RIPPLE (XRP).

The recorded prices for BTC were collected on an hourly basis from 17 August 2017 to 11 February 2021 (totallying 39221 records ). For Eth AND xrp 04/05/2018 TO 11 February 2021(33017 unique records).

Table 1 illustrates the dataset specification of used time-series data from [19] with 1277 records. Table 1 illustrates the dataset specifica- the targeted cryptocurrency and Figure 10 shows sample data from the dataset.

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Screenshot showing a sample of the data from the BTC, ETH, and LTC dataset.

BASELINE

The model proposed in the Baseline is a hybrid model, consisting of two Long Term Short-Term Memory Networks (LSTM) networks and a single Gated Recurrent Unit (GRU) network.

The data it uses is Monero and Litecoin to train this particular model.

The algorithm utilised in this paper presented produced excellent predictive results. Something I believe we can improve upon using a tcn network.

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TCN MODEL SO FAR

Temporal Convolutional Networks (TCNs) is the class of time-series model I will be using ,

TCN is a variation on a CNN with 2 main features

1. Each hidden layer is the same length as the input layer – zero padding
2. Netowrk only uses information from past time steps – dilated convolutions

Could think of a TCN as a 1dfully connected convolutional network with causal convolutions

Adv :

Unlike rnn , tcn has a back propergation path diff from temporal direction of sequence (this avoids vanishing gradient problem) – hope to see

Low mempry requirement , lstm and gru’s use up memory storing partial results for multiple cell gates , tcn filters are shared across a layer , back prop only depends on n.w depth

However, with the sample causal convolution we showed previously, the receptive field sizes are limited unless stacking lots of layers.

dilated convolutions [7] are employed to enable an exponentially large receptive field with limit layers.

A dilated convolution is a convolution where filter is applied over a region larger than its size by skipping input values with a given step. This is similar to pooling or stride convolutions for it enhances receptive field size, however it makes the output size equal to the input.

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