Featherstone, Jack Bartholomew

**A Final Year Research Project On: Predicting Price Fluctuations of Cryptocurrencies Using a Temporal Convolutional Network**

**Project Student:**

***Jack Featherstone***

**Project Supervisor: *Andrea Visentin***

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**Abstract**

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I believe cryptocurrency fluctuation prediction is a conversation that can be shared among various disciplines, including Computer Science, Mathematics, Data Science and Economics.

It is no secret why price forecasting for cryptocurrency has become a trending research topic globally.

Despite the various factors that contribute to cryptocurrencies volatile behaviour, many machine learning and deep learning networks have been used to predict cryptocurrency prices with great accuracy.

In this project I used a Temporal Convolutional Network (TCN) algorithm to predict the prices of three types of cryptocurrencies, namely Bitcoin (BTC), Ethereum (ETH) and Ripple (XRP).

I used time-series data from 17/08/2017 up until 01/01/2022.

\*results\*

The main goal behind this algorithm was to achieve a reliable dependable model that investors can rely on, based on past cryptocurrency prices.

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**Introduction**

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**WHERE MY INTEREST STEMMED FROM**

I was introduced to cryptocurrency from my colleagues and friends raving about this get rich quick scheme, so I decided to invest. When I didn’t become a multi-millionaire in one day, I panicked and sold back, I didn’t fully understand the process and technology.

After this escapade I was relatively captured on how people did this for a living and how they decided at what time to invest and what time to sell.

**CRYPTO’S RAISE TO FAME**

Since April 2011, when Bitcoin first surpassed one dollar, the term crypto has become progressively recognized as something that is here to stay, rather than some convoluted pyramid-scheme.

At the time of writing this 10/03/2022, the global crypto market capitalization is 1.83 trillion dollars with 18,000 crypto currencies available. – from Investopedia

Binance is one of the largest crypto exchanges in the world, figure 1 shows the increasing rate of users per year.

Lark Davis presented the figure below which depicts the whole concept of crypto having the highest adoption rate of any technology in human history. It is being compared with the initial growth of the internet, and we all know how that story ended.

Table

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**Figure 1.** Binance users per year

Chart, line chart

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**Figure 2.** Adoption rate of the term ‘crypto’

**CRYPTO VS STOCKS**

Crypto is a piece of data that is used as a medium of exchange without the need of a third-party intervening (bank). Its goal is to be as commonly accepted as cash or credit.

There is this common misnomer that crypto is just like a stock, this is just not the case. When we buy a stock offered by a particular company, we own a percentage in that company (assets / profit).

When we buy crypto, we are given a certain amount of that digital currency in which we can do as we please. We only own the rights of a particular amount of a digital currency.

Although Stocks and Crypto are fundamentally different, the way in which they are treated are quite typically the same. As of 2022 most day-day companies still do not accept crypto as an acceptable form of credit. As a result, the primary role crypto plays are a store of value in which you can hold onto or sell. This is the same ideology as stock market operates on only rather than store of value, you own a store of ownership.

It is no secret that Stock markets are rather unpredictable and are affected by many factors causing the high volatility in the market. The exact same can be said about cryptocurrency if not more factors that contribute to the volatile behaviour, one rather comical example of this would be the ‘Musk Effect’ a term coined from when Elon Musk’s tweets had a direct and substantial effect on the price of certain crypto’s. With factors such as media hype lending itself as a cause to why crypto produces unstable behaviour, as well as many other factors, predicting something in this unstable market will be extremely difficult.

**IMPORTANCE**

Before crypto, Investors were always on the search for tools and techniques that would increase profit and reduce risk within the stock market. Buying a certain stock involves risk,

the aim of the investor is to keep this risk as low as possible while maximizing profits. So naturally, any instrument that could minimise the risk would be valued highly.

Since the virtual explosion of crypto as outlined above, the exact same can now be said about cryptocurrency price prediction. Cryptocurrency price prediction has become a trending research topic globally and it has created a big opportunity for research.

The importance of being able to predict these high valued currencies, cannot be understated.

Students from various majors are constantly working on ways to more accurately predict the upswing or downswing of a particular currency to know when to invest and when not to.

I believe as technology is advancing, this is the opportunity to find the most informative indicators to make better predictions.

**MODEL I USED**

I used a machine learning model for time series forecasting to accurately predict fluctuations of crypto prices.

A time series is a sequence of data points that are listed in order of time. Time-series forecasting is a common technique used in many real-world applications such as weather forecasting and financial market prediction. It uses the continuous data for a particular period in time, to predict the result for the next period in time (e.g., using the past 3 years of daily temperature in a particular area, to predict next week’s temperature in the same area).

The stock market and now crypto market is a typical area that presents time-series data and many researchers have proposed various models using this data, for various different aims.

Many time-series forecasting algorithms have shown their effectiveness in practice. The most common algorithms are now based on Long-Short Term Memory Networks which are based off Recurrent Neural Networks. One model that was been showing promising results in the Financial Time Series is the Temporal Convolutional Network (TCN).

In this project, I applied a TCN to predict the upswing or downswing of a particular crypto based off its closing price (The price this crypto was during a specific time of the day).

Abstract

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One page summary of the report , including the key results. Standalone page .

For people who have only time to read one page (100 words)

Advert for the rest of the report : after reading this they should know if they are interested or not.

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Target Audience = Assume that people reading have knowledge on the mandatory modules but no optional modules.

Don’t go into too much detail . Don’t assume that the reader has knowledge they don’t .

How ? < 1 page , general outline of the approach to give direction to the thesis