

Predictive Analysis of price of Ripple

Project Synopsis

of Major Project

Bachelor of Technology
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Submitted By

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Abstract

This research is concerned with predicting the price of Ripple using machine learning. The goal is to ascertain with what accuracy can the direction of Ripple price in USD can be predicted.

The price data is sourced from the Ripple Price Index. The task is achieved with varying degrees of success through the implementation of a Bayesian optimised recurrent neural network (RNN) and Long Short Term Memory (LSTM) network. The LSTM achieves the highest classification accuracy of 52% and a RMSE of 8%.

The popular ARIMA model for time series forecasting is implemented as a comparison to the deep learning models. As expected, the non-linear deep learning methods outperform the ARIMA forecast which performs poorly. Wavelets are explored as part of the time series narrative but not implemented for prediction purposes. Finally, both deep learning models are benchmarked on both a GPU and a CPU with the training time on the GPU outperforming the CPU implementation by 67.7%.

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1.1 Overview



Figure 1.1: Ripple logo

Ripple is real-time gross settlement system (RTGS), currency exchange by Ripple. It is also called the Ripple Transaction Protocol (RTXP) or Ripple protocol. It is built upon a distributed open source Internet protocol, ledger and cryptocurrency called XRP (ripples). Ripple enables, Secure, fast, instant and free global financial transactions of any size with no chargebacks. The digital currency XRP acts as a bridge currency to other currencies. It supports tokens that represents fiat currency, cryptocurrency. It is based around a shared, public database which uses a process that allows for payments, exchanges and remittance in a distributed process. It is fastest and most scalable Digital Asset in the world. Ripple is a very popular network as many banks across the world use it as the basis for their own settlement.

Ripple is a technology that acts as both a cryptocurrency and a digital payment network for financial transactions. It was first developed in 2004 by Ryan Fugger, a web developer in Vancouver, British Columbia. Fugger conceived of the idea after working on a local exchange trading system in Vancouver with his intent to create a decentralized monetary system that effectively allow individuals and communities to create their own money. This led to the conception of a new system by Jed McCaleb of eDonkey network, which was designed and built by Arthur Britto and David Schwartz In May 2011, the development of a digital currency system begins in which transactions were verified by consensus among members of the network, rather than by the mining process used by bitcoin, which relies on blockchain ledgers This new version of the Ripple system was designed to eliminate bitcoin's reliance on centralized exchanges, It use less electricity than bitcoin and perform transactions much more quickly than bitcoin. Chris Larsen founded the lending services companies E-Loan and prosper, joined the team in August 2012 and together McCaleb and Larsen approached Ryan Fugger with their digital currency idea. In September 2012 the team co-founded the corporation OpenCoin, or OpenCoin Inc. launched Ripple.

1.2 Problem analysis

We utilize it for predicting real-valued quantity, the price of Ripple. Based on this price prediction method, we devise a simple strategy for trading Ripple. The strategy is able to nearly double the investment in less than 60 day period when run against real data trace.

1.3 Objectives of the Project

The goal of this project is to find out what exactly cryptocurrency, such as Ripple, is and why it has value, what its future outlook is and if it could become the mainstream currency of the future. Ripple is a fully decentralized currency. It has value because its supply is limited and there is demand for its low transaction costs, anonymity, investment possibilities and possibilities for use in illegal activities. Its future outlook is questionable as Ripple has a few severe disadvantages such as high price volatility, susceptibility to hacking, no protection from a central bank and no consumer protection. It is therefore unlikely that it will catch on as an established currency to the general public, as its two main strengths, anonymity and low transaction costs are not necessarily what the average consumer demands. However the technology behind cryptocurrency and Ripple can be applied to other currency or payment systems which could have a lasting impact on how people spend money in the future.

2.1 Feasibility

Feasibility study aims to uncover the strengths and weaknesses of a project. These are some feasibility factors by which we can use to determine that the project is feasible or not:

2.1.0.1 Technical Feasibility

Technical feasibility is one of the first studies that must be conducted after the project has been identified. In large engineering projects consulting agencies that have large staffs of engineers and technicians conduct technical studies dealing with the projects. In individual agricultural projects financed by local agricultural credit corporations, the technical staff composed of specialized agricultural engineers, irrigation and construction engineers, and other technicians are responsible for conducting such feasibility studies.

The Technical feasibility assessment is focused on gaining an understanding of the present technical resources of the organization and their applicability to the expected needs of the proposed system. It is an evaluation of the hardware and software and how it meets the need of the proposed system. This assessment is based on an outline design of system requirements, to determine whether the company has the technical expertise to handle completion of the project. When writing a feasibility report, the following should be taken into consideration:

- A brief description of the business to assess more possible factors which could affect the study
- The part of the business being examined
- The human and economic factor
- The possible solutions to the problem

2.1.0.2 Economic Feasibility

The purpose of the economic feasibility assessment is to determine the positive economic benefits to the organization that the proposed system will provide. It includes quantification and identification of all the benefits expected. This assessment typically involves a cost/ benefits analysis.

Economic feasibility is the cost and logistical outlook for a business project or endeavor. Prior to embarking on a new venture, most businesses conduct an economic feasibility study,

which is a study that analyzes data to determine whether the cost of the prospective new venture will ultimately be profitable to the company. Economic feasibility is sometimes determined within an organization, while other times companies hire an external company that specializes in conducting economic feasibility studies for them.

The purpose of business in a capitalist society is to turn a profit, or to earn positive income. While some ideas seem excellent when they are first presented, they are not always economically feasible. That is, that they are not always profitable or even possible within a company's budget. Since companies often determine their budget's several months in advance, it is necessary to know how much of the budget needs to be set aside for future projects. Economic feasibility helps companies determine what that dollar amount is before a project is ultimately approved. This allows companies to carefully manage their money to insure the most profitable projects are undertaken. Economic feasibility also helps companies determine whether or not revisions to a project that at first seems unfeasible will make it feasible.

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require. Economic feasibility determines whether the required software is capable of generating financial gains for an organization. It involves the cost incurred on the software development team, estimated cost of hardware and software, cost of performing feasibility study, and so on. For this, it is essential to consider expenses made on purchases (such as hardware purchase) and activities required to carry out software development. In addition, it is necessary to consider the benefits that can be achieved by developing the software. Software is said to be economically feasible if it focuses on the issues listed below.

- Cost incurred on software development to produce long-term gains for an organization.
- Cost required to conduct full software investigation (such as requirements elicitation and requirements analysis).
- Cost of hardware, software, development team, and training.

The following are some of the important financial questions asked during preliminary investigation:

- The costs conduct a full system investigation.
- The cost of the hardware and software.
- The benefits in the form of reduced costs or fewer costly errors.

2.2 Significance of Project

Predictive analytics of Ripple uses technology to predict the future and influence it. Organizations can use historical performance data to extrapolate and make predictions about the future and take actions that would affect those results.

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Were going to employ a Long Short Term Memory (LSTM) model; its a particular type of deep learning model that is well suited to time series data (or any data with temporal/spatial/structural order e.g. movies, sentences, etc.).

3.1 Steps of Implementation

3.1.1 Data

Before we build the model, we need to obtain some data for it. Theres a dataset on Kaggle that details minute by minute Bitcoin prices (plus some other factors) for the last few years (featured on that other blog post). Over this timescale, noise could overwhelm the signal, so well opt for daily prices. The issue here is that we may have not sufficient data (well have hundreds of rows rather than thousands or millions). In deep learning, no model can overcome a severe lack of data. I also dont want to rely on static files, as thatll complicate the process of updating the model in the future with new data. Instead, well aim to pull data from websites and APIs.

As well be combining multiple cryptos in one model, its probably a good idea to pull the data from one source. Well use coinmarketcap.com. For now, well only consider Bitcoin and Ether, but it wouldnt be hard to add the latest overhyped altcoin using this approach. Before we import the data, we must load some python packages that will make our lives so much easier.

3.1.2 Training

We have some data, so now we need to build a model. In deep learning, the data is typically split into training and test sets. The model is built on the training set and subsequently evaluated on the unseen test set. In time series models, we generally train on one period of time and then test on another separate period. As such, the training data may not be representative of the test data, undermining the models ability to generalise to unseen data. The most basic model is to set tomorrows price equal to todays price (which well crudely call a lag model).

3.2 Long Short Term Memory (LSTM)

Long short-term memory (LSTM) units (or blocks) are a building unit for layers of a recurrent neural network (RNN). A RNN composed of LSTM units is often called an LSTM network. A

common LSTM unit is composed of a cell, an input gate, an output gate and a forget gate. The cell is responsible for "remembering" values over arbitrary time intervals; hence the word "memory" in LSTM. Each of the three gates can be thought of as a "conventional" artificial neuron, as in a multi-layer (or feedforward) neural network: that is, they compute an activation (using an activation function) of a weighted sum. Intuitively, they can be thought as regulators of the flow of values that goes through the connections of the LSTM; hence the denotation "gate". There are connections between these gates and the cell.

4.1 Predictive Analytic Requirements

Building a decision requirements model to specify business understanding at the very beginning of a predictive analytic project allows the creation of predictive analytic requirements that:

1. Describe a clear target for the project. The decisions that the predictive analytic will influence are specified. The decision requirements diagram links these decisions to the ultimate business metrics or objectives that will be impacted by the analytic .
2. Identify the analytics to be developed. Each piece of analytic knowledge can be described along with the information to be analyzed to produce it .
3. Is specific about which decisions are being influenced. The decision requirements diagram shows which part of the decision making is influenced, exactly, by each predictive analytic model being developed and what other factors influence that decision - making.
4. Is specific about deployment. The links for the decisions involved show which organizations will be involved , which business processes will be impacted and which systems will have to be altered.

A complete set of requirements for a predictive analytic project should include other project details such as executive sponsor, timeline, resources, planned analytic approach , etc. The decision requirements model allows the business problem being addressed by the project to be described more precisely , but it does not replace these other elements.

4.2 Software Requirements:

1. Python 2.7
2. Python pip
3. Anaconda

4.3 Python Packages Dependencies

1. Pandas
2. Sklearn

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