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Using LSTM to Predict Bitcoin Prices:

**Abstract**:

Long short-term memory (LSTM) is an architecture of recurrent neural networks (RNN) which is a widely used class of artificial neural network in deep learning. These implementations of neural networks can be applied towards data analytics like predicting prices of volatile economy such as Bitcoin or similar forms of cryptocurrency. This application of LSTM will be applied to data pertaining to Bitcoin’s metrics over a duration of time. Data was pulled from Coin Metrics, which is a provider of crypto asset data. Using LSTM, the model will predict Bitcoin prices based on the given metrics.

**Introduction**:

Long short-term memory or (LSTM) is type of architecture for recurrent neural networks (RNN) that is widely used in deep learning implementations. Artificial neural networks like RNN are machine learning algorithms that simulate the processes of a human brain. Neural networks replicate neurons by using a multitude of networks through abstraction. The network uses a technique known as backpropagation to allow the network to pass information through the abstraction into the hidden layer. This method creates the multilayer network that improves the overall performance measure. RNN is a neural network the combines the similar process of regular neural networks but also incorporates previous input layers as well as the current. Through propagation and usage of recurring input layers, the model generates a rational prediction based on the given knowledge. LSTM is an architecture of RNN that uses sequential-data for learning. LSTM’s networks select the appropriate contextual knowledge that was learned from the recurrent network and choses which to keep and forget. This eliminates an issue of RNN which are the long-term dependencies, or contextual knowledge that are no longer relevant.

**Purpose:**

Bitcoin or any form of cryptocurrency is highly volatile by nature. The value of the electronic money varies extremely without any known trends or assumption of when the value changes. The volatility also has an impact of the current market value of currency, therefore empirical analysis on trends for cryptocurrency are immensely difficult. The objective of this application is to generate a reasonable prediction for Bitcoin prices based on the sequential data.

**Background:**

The sequential dataset used for this algorithm was pulled from Coin Metrics, which is leading provider of cryptocurrency data and network analysis. This dataset contains crucial elements pertaining to market value of the cryptocurrency such as date, txVolume, price, fees, exchangeVolume, etc. The dataset contains over 10000 entries that split into multiple for subsets. This helps the computation time as we randomly sampling smaller intervals of the dataset rather than all the data from a given time. We split the dataset as well for training and test sets. The data must also be preprocessed due to massive scale of the dataset. We chose to select a 60 day time period for the dataset and normalized it using a min max normalization which transforms our x and y coordinates to correspond to our min and max values of x for the given observation of x.

**Implementation:**

Works Cited

AuthorLastName, FirstName. Title of the Book Being Referenced. City Name: Name of Publisher, Year. Type of Medium (e.g., Print).

LastName, First, Middle. “Article Title.” Journal Title (Year): Pages From - To. Print.