**Title: Crypto Exchange Price Prediction using Limit Order Book**

**Project Type: Application Project**

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**Problem**:

High frequency trading or Algo trading is gaining significant momentum in stock exchanges. In today’s market significant portion of the daily traded volume is done by specialized companies using those techniques. In the elaborated stock market it is almost impossible for individuals not using heavy machinery and very fast access to data to gain any advantage as margins and arbitrages are closed in fraction of a second.

The rise of the crypto market and exchanges might reveal opportunities that are long gone in the stock market for small scale algorithmic trading.

In this project we intend to explore and develop deep machine learning model that predict the future price of digital asset such as bitcoin. We believe that by examining trading information such as limit order book, price history, recent commands and more, it is possible to predict future direction of the digital asset. We will develop RNN based model that gets real time data from an exchange and produce a prediction whether price will increase by a certain threshold, decrease by a certain threshold or remain in between (neutral) in the next several minutes.

We chose a digital asset as it is tradable, price is volatile and there are many different exchanges. We believe that these characteristics make this asset a best fit for the type of model we are trying to develop although the technique and methodologies we will develop apply to any asset that is traded in an exchange.

**Challenges:**

1. It is not clear that good prediction can be made from the data that we collect
2. Identifying the right feature set from the data along with selecting the correct model architecture, cost function and the configuration of all the hyper parameters

**Dataset:**

We will extract real time data from an digital exchange such as Bittrex taken in 1 min intervals. Being RNN we plan to start with relatively small number of training examples (tens of thousands) and collect more data as it runs.

**Algorithms/Methods:**

1. We will build RNN (Recurrent Neural Network) that generates new data and improve its algorithm while working and providing predictions
2. We will start our proof of concept by learning, optimizing and testing on initial dataset that represent enough information for evaluation before building the RNN

**Result Evaluation:**

We will compare the results of our model theoretically on historical data that we collect as well as on real time data in simulation mode. The objective is to perform better than the digital asset itself.

**Prior work**

[1] Tian Guo , Nino Antulov-Fantulin. Predicting short-term Bitcoin price fluctuations from buy and sell orders. 2018

[2] Justin A. Sirignano, Deep Learning for Limit Order Books. 2016