

## **Trend Prediction in the Cryptocurrency Market**

The goal of this project is to learn models and design algorithmic trading strategies based on cryptocurrency trading and transaction data, as well as sentiment analysis, to predict market changes and make profit over time.

Algorithmic trading is a prevalent practice in major cryptocurrency exchanges of the world. Algorithmic trading strategies are designed to make trading decisions by identifying true signals among massive amounts of data that capture the underlying cryptocurrency market dynamics. Machine learning has therefore been central to the process of algorithmic trading because it provides powerful tools to extract patterns from the seemingly chaotic cryptocurrency market trends, which are greatly affected by the supply and market demand, mining cost, competing cryptocurrencies, monetary inflation rates, user sentiment, and legal regulations, as well as global macroeconomic environment.

### **Challenges:**

Predicting cryptocurrency market trends remains both interesting and challenging from a machine learning perspective due to the multi-faceted endogenous and exogenous influences alongside a variety of methodological considerations and developments. The market trends are masked by various factors such as noise and volatility, and the data to be analysed is very high dimensional. Moreover, the market operates in various local-modes that change from time to time in unforeseen ways due to factors such as legal regulations and macroeconomic environment, making predictions less accurate as time passes.

### **Methodology:**

We apply various machine learning techniques to the problem of identifying underlying trends which govern the cryptocurrency market. It is widely believed that the cryptocurrency market and indeed individual cryptocurrency prices are determined by fluctuations in underlying but unknown factors (signals). More specifically, we study and compare various state-of-the-art deep learning methods such as a deep neural network (DNN), a long short-term memory (LSTM) model, Recurrent Neural Networks (RNNs, which can also be utilized for time series forecasting), a deep residual network, and their combinations for market prediction.

We use the available trading data from leading cryptocurrency exchanges to learn the target variables which drive the market; specifically, we use data related to price and order book. We will also take social media or online forums (e.g., twitter and reddit) for sentiment analysis. For example, the various features of twitter (tweets sentiment score, number of followers of the user, number of retweets, number of likes, etc.) will be used as parameter to increase the accuracy of the prediction results. In particular, transaction data for analysing whale market manipulation will be integrated to analyse the market trends.

### **Outcome:**

This project will further strengthen scientific research of IT Carlow by applying excellent research ideas to practical problems and produce research outcomes for the cryptocurrency markets. In particular, if one could determine and predict the market trends, one would have the opportunity to leverage this knowledge for financial gain.