**Project Proposal – Team 6**

**Introduction/Background**

Cryptocurrency is drawing more and more attention from investors as more and more people are interested in decentralized finance. Predicting the price direction of cryptocurrency plays an important role in traders’ decision to buy or sell. There have been many studies on using machine learning techniques to predict the prices of Bitcoin, one of the most accepted cryptocurrencies as of today. For example, Mallqui & Fernandes found the Support Vector Machines (SVM) algorithm performed best in forecasting the Bitcoin exchange rates, while the combination of Recurrent Neural Networks and a Tree classifier performed best in predicting the Bitcoin price direction (2019). Another study also found that SVM algorithm is a reliable forcasting model for cryptocurrency, and it’s also suggested that the algorithm should be improved on the accuracy rate of the forecasted price (Hitam& Ismail, 2018).

**Problem definition**

We found several limitations in current literature. First of all, most literature focus on popular cryptocurrencies such as Bitcoin or Ethereum, and there is scarce literature on less popular cryptocurrencies. Second, most of them only predict price of cryptocurrencies, without any indication for traders whether to buy, sell or hold their investments. In addition, no studies have employed technical indicators commonly used by stock traders in their cryptocurrency price prediction model. As Mallqui & Fernades (2019) pointed out, the technical indicators commonly used by traders such as Relative Strength Index (RSI), Moving Average Convergence/Divergence (MACD), etc. could be used in addition to economic indicators to better predict Bitcoin price direction. Last but not least, a study found that cryptocurrency short-term predictability is difficult, thus day trading cryptocurrencies might be challenging (Liew, Li, Budavári, & Sharma, 2019). Therefore, we would like to propose a model that can help traders easily decide when to sell, hold, or buy cryptocurrencies at a given moment.

**Methods**

Our data will be obtained from **Binance** where **(data description: which coins, date range)**.

We are going to use unsupervised, Reinforcement Learning (RL) and supervised learning algorithms for our machine learning model. More specifically:

* *Unsupervised*: dimensionality reduction technique – PCA: to uncover the uncommon drivers of price (Liew, Li, Budavári, & Sharma, 2019)
* *Reinforcement learning*: A study found Recurrent Reinforcement Learning (RRL) outperformed Q-Learning when exposed to noisy datasets (Du & Zhai). Another study used a combination of double Q-network unsupervised pre-training using Deep Boltzmann Machine (DBM) to generate and enhance the optimal Q-function in cryptocurrency trading and achieved 599% more profit in simulation compared to conventional model (Bu & Cho,2018)
* *Supervised*: Bayesian Regression, Decision Tree, K-nearest Neighbor(KNN), Support Vector Machine(SVM) (Liew, Li, Budavári, & Sharma, 2019). A study found that SVM performed best and gave consistent results in terms of predictive accuracy compared to the logistic regression, artificial neural networks and random forest classification algorithms (Akyildirim, Goncu & Sensoy, 2020)

**Potential results**

We hope to see that our model will result in **???%** accuracy in indicating whether traders should buy, sell, or hold their cryptocurrencies at a given moment.

**Discussion**

We believe that our model would be practical and useful for traders, especially amateur traders to easily make a decision to buy, hold or sell their cryptocurrencies. Some limitations in our model include **???**small data samples, …

**References**

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Liew, J., Li, R., Budavári, T., & Sharma, A. (2019). Cryptocurrency investing examined. *The Journal of the British Blockchain Association,* *2*(2), 1-12. doi:10.31585/jbba-2-2-(2)2019