**Automated Trading Crypto Futures as Retail Trader**

**Introduction**

The COVID-19 pandemic was an extraordinary time that is going to be discussed for generations to come. While most will think of the Trump presidency, the loss of life, the socio-political schism in the United States, and other headlines that dominated the media, there is one that stands out in particular, GameStop. During the Trump presidency and most of COVID, the stock market saw an incredible bull run, memes and subreddits like WallStreetBets were filled with “STONKS ONLY GO UP”, many of the subscribers were individual retail traders who invested in “meme stocks” such as AMC and GameStop. Not only did these meme stocks see unbelievable growth, it brought thousands into researching and trying their hand at day trading.

Day Traders or intraday traders, are individuals who buy and sell their preferred financial instrument within the same trading day. The financial instrument of choice, trading style, and the trader’s initial starting account all matter. For example, in order to day trade stocks, a trader needs at least $25,000 in their account, if not a stock day trader is limited to 3-day trades per 5-trading-day period. However, it is possible to start trading with less capital with other asset classes, such as futures or forex.

Despite the allure of day trading, there are harsh truths to consider about the profession. A study of Brazilian future traders found that 97% of day traders lost money in less than a year, another study focusing on Taiwanese day traders between 1995 and 2006 found only 5% were profitable. Day trading is a losing endeavor for the majority of people. Professional traders are mentored within their financial institutions and are given access to insider tips and tools, privileges that average trader can not access.

**Problem Formulation**

The percentage of successful day traders is extremely small. There are also financial barriers for the average person to enter the world of trading. Day trading stocks requires a minimum of $25,000. The high cost of entry requires a financial asset that is more accessible, like futures. Also, in order to make consistent profits, volume and volatility are needed, crypto currencies meet the criteria. The goal of the project is to create a profitable bot or algorithmic trading method using machine learning and/or technical analysis.

The idea is to remove the “human” element out of trading and develop a strategy that will be consistently followed by the algorithm. Using machine learning can help even the playing field, since a study showed in 2019 that around 92% of trading in the forex market is performed by algorithms and not humans.

**Objectives**

While algorithmic bots can be trained using both unstructured and structured data, for the purposes of this project the focus will be on structured financial data. Financial data will consist of historical data (end of day closing prices) and real-time. The data will used will be generated from the Binance futures API and possibly other open-source API such as Quandl:

* Identify different trading strategies
  + Determine which trading strategies to apply focusing on technical indicators and machine/deep learning.
  + Identify best time frames/intervals to test the strategies. Financial assets can be traded using different charts (ticks, volume, seconds, minutes, hours, days, etc.)
* Implement back testing of selected strategies
  + Find the optimal approach based on strategy
* Work with Real-time Data and gauge performance of algorithm with non-historical data.
* Answer the question: Is it possible to create a profitable algorithmic trading bot for crypto futures for retail traders?
* Based on back testing and real live data tests, gauge whether intraday trading is the optimal trading style for a profitable bot?

**Paper Summaries**

* Cryptocurrency Trading Using Machine Learning -Thomas E. Koker, Dimitrios Koutmos
  + The paper presents a model for trading based on reinforcement machine learning. The model presented yielded enhanced risk-adjusted returns and reduced overall risk. The model was compared to a buy and hold approach which is typical of most investors.
* Cryptocurrency trading: a comprehensive survey -Fan Fang, Carmine Ventre, Michail Basios, Leslie Kanthan, David Martinez‑Rego, Fan Wu, Lingbo Li
  + The purpose of the survey is to provide an in-depth review of 146 research papers on several components of cryptocurrency trading (trading systems, crypto-assets portfolio construction, technical trading, and others). The survey also discusses promising future prospects that remain open in the cryptocurrency trading field.
* Automated trading with performance weighted random forests and seasonality-Ash Booth, Enrico Gerding, Frank McGroarty
  + The paper examines a system that uses machine learning techniques to predict the price return over seasonal events found in financial data. The model proposed uses the predictions to create a profitable trading strategy. The technique the papers focuses on is weighted ensembles of random forests that increased profitability and stability.

**Methodology**

The first step in the project will be to treat the structured data as a time series and perform data exploration to identify trends and seasonality. The overall analysis of the data is paramount to the entire project as this is when a trading strategy will be formulated based on the data.

Once several trading strategies are selected, the rest of the project will consist of back testing and using real-live data to determine the performance of the algorithmic bot. The determining factors will ultimately be profitability, but that may not be achievable due to the timeframe. A successful strategy may take years to formulate and implement. A successful implementation for this project is whether the trades undertaken follow the chosen strategies.

**Evaluation**

Evaluation will be determined by levels of profitability when back testing and using real-live data streams. As this is a first-time attempt at creating an algorithmic trading bot, the bot’s adherence to executing the chosen strategy is another aspect that will be evaluated.