DFetf: A crypto ETF managed by machine learning

DFetf is a tokenized fund managed by machine learning, while the token sale funding will be used to buy the underlying stock assets. DFetf cuts out the middleman, the platform, and is thus able to offer significantly lower fees of portfolio management to customers all around the world.

An algorithmic trading system for portfolio (AlgoPort) manages DFetf's fund and supports the token by adding most of its profit to a liquidity pool. Therefore, unlike the traditional hedge funds, DFetf’s dividend system is more updated and enhances the profit of customers by two means, based on AlgoPort profit and token profit.

DFetf is not a platform, it is a fully functioning product, and its token value is based on portfolio net asset value (NAV). However, with increasing the market cap, it can be gone further than the underlying portfolio nav, but with token raising and burning functionalities, we plan to make the token’s value as close to its NAV. These functions allow for further support of the token’s price and increase the profit of customers in addition to the AlgoPort profits. Therefore, DFetf tokens are directly tied to the underlying assets with novel liquidity pool functionalities that can be exercised via the smart contract. This ensures a greatest lower bound (infimum) on the market value based on our portfolio’s NAV. The number of tokens, burn and raise policy, the balancing between token, trading account, and liquidity pool are carefully determined and our approach is detailed in this white paper

DFetf allows for access to diverse stocks by holding a single token. It can be traded on exchanges at any time, holdings are fully transparent and there are no legacy banking fees or expensive fund managers.

The DFO (Deep Finance Organisation) team developed AlgoPort based on a deep Reinforcement learning approach, consisting of various assets in different markets, with daily rebalancing. We designed a strict reciprocal balancing between the liquidity pool and the portfolio cap, and it should be 50%. This allows to have enough money for trading and create an acceptable fund for the token liquidity.

Introduction

Artificial intelligence and machine learning are deeply integrated into the way we live our daily lives, whether it is to search the internet, get driving directions, detect spam in our emails, or receive personalized ads. After the space industry, investment and money market are the most influential areas for growth and development of technology and knowledge. Yet, the impact of artificial intelligence on the investment world and trading is probably more significant than its impact on discovering life on another planet!

Hunting unique investment opportunities by artificial intelligence considering thousands of variables and macroeconomic and microeconomic data and taking into account different risk measurements is called algotrading. The algotrading is one of the most powerful investment tools because not only can it process and use massive data for the decision, but it also can be evaluated in various scenarios and markets. These benefits are the main reasons that the majority of hedge funds have invested heavily in machine learning over the past few years.

Many investors have attempted to use machine learning for trading, but coming up with a profitable and low-risk strategy based on these models is a complex and time-consuming task. Instead of spending all the time and effort in training and testing models, investing in funds that are using ML models is more appealing and cost-effective for individuals. Thanks to years of machine learning and finance experience, DFO has developed a robust model with high revenue and low risk; A strategy that was successful in different test scenarios and has been trading in the market for more than two years.

In addition to taking advantage of AI and machine learning to increase revenue earned from the market, the DFetf fund utilizes a blockchain network to create a secondary marketplace independent from securities and exchange organisations in order to avoid cumbersome governments regulations. In contrast to regular funds, DFetf's shares are distributed on the blockchain network, which makes it easier for anyone around the world to invest. ETFs are baskets of assets traded like securities. They can be bought and sold on an open exchange, just like regular stocks. Therefore, by buying DFetf’s units, investors can benefit from the fund's performance. These units can be stored in various digital wallets and easily traded on different blockchain marketplaces.

The benefits are clear and many: no trading stress, automated algorithmic trading with full transparency, no broker fees, no exit fees, a liquidity pool for supporting the token.

1. Smart Contract

When dealing with financial assets, an infrastructure must exist to increase trust and eliminate threats. A centralized exchange institution is intended to ensure that people can exchange their assets with mutual trust between them. DFetf's token is defined as the units of an investment fund (ETF) that are distributed in a blockchain network instead of a centralized exchange in order to provide high security as well as lower trading fees. This opens up the possibility of having investors from all over the world and provides access to a large number of investors, who can trade their tokens easily in a fraction of a second.

DFetf's smart contract

DFetf's smart contract uses the BEP20 standard, which can be checked out on the bscscan.com website with a licensed MIT code. Investors may also take a look at the smart contract's code on DFO's GitHub repository and make sure there are no malicious components in the token; This code has been developed with the aim of maximizing the profit for investors so that they can continuously gain from the increase in the fund's NAV as well as having a high level of security for their assets.

After they are registered and created on the blockchain, smart contracts are immutable; As a result, no features can be added or removed from smart contracts. Everyone can read and check the code, which is written in Solidity language, to ensure that no new rules can be introduced. You can examine the smart contract on the bscscan.com website and by searching for the 0x000000000 address.

Binance smart chain (BCS) is selected as the platform for DFetf token, due to its flexibility, high throughput, security, and lower trading fees compared to other network infrastructures. This makes it possible to store DFetef tokens in many wallets, giving investors easier access to their assets. Moreover, BCS allows DFetf to be used for payments, which can keep the token in constant demand.

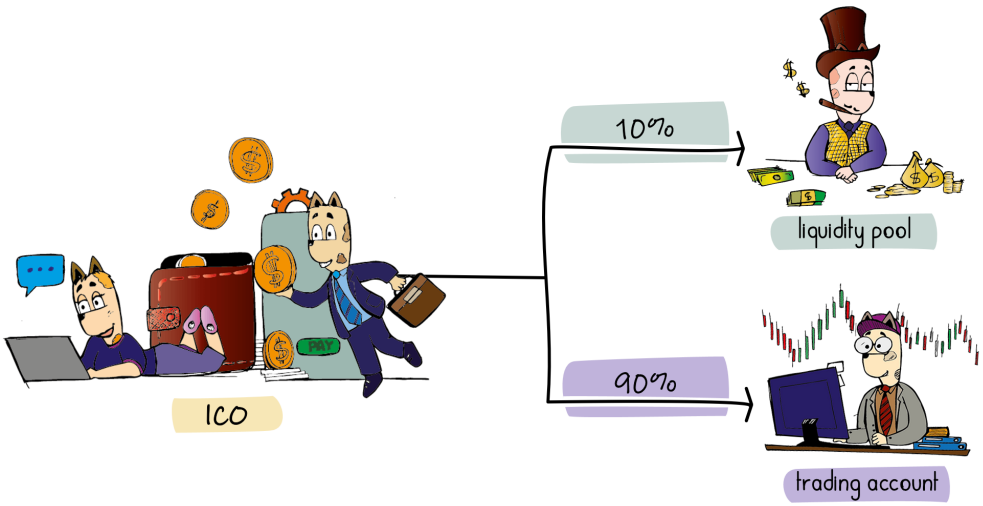
In addition to securing BEP20 standard functionality, DFetf's smart contract secures three key control functions for the token manager, allowing them to earn profits for the fund and investors. These functions enable the token manager to transfer money between the liquidity pool and the trading account to ensure a proper balance between the token and the fund, and as a result, lower the risk of DFetf. These functions include:

- **Burn**: Using this feature, the token units in the token manager's wallet will be removed from the network, as they did not exist from the start.
- **Raise**: the manager can generate new tokens and then sell them in the market to provide more cash for the trading account and, as a result, increase the fund's market cap.
- **Lock**: In order to prevent adverse effects by pumpers and dumpers, the token manager applies this feature to a particular wallet or to the entire market transfer, until enough money is available in the liquidity pool.

For investors, smart contracts can be explored on the Binance blockchain website in order to check the token name, token symbol, the number of supported decimals, and the balance of units in every wallet including the token manager's wallet. In addition, shareholders can make sure that the units are transferable between individuals and check the amount of raised and burned units, which shows how well the token manager performed in line with the success of the token.

2. Initial Coin Offering

In ICO 200,000,000 units will be sold at a fixed price of 0.005$, which sums to 1,000,000$. Funds raised by the ICO will be split between a liquidity pool (10%) and a trading account (90%). The liquidity pool is where all the resources to provide liquidity for the token are gathered to be used later. All the funds are gathered in the trading account and are used to invest in different markets; AlgoPort will manage the account.



The ICO will be held in one private stage and one public stage. Interested parties can participate in the private ICO before the public ICO on PancakeSwap's decentralized exchange.

3. Token management strategy

In this whitepaper, token management refers to all of the strategies and actions that are taken to manage the liquidity pool as well as the strategies used to raise and burn tokens. The strategies are designed to support the token and link the price as much as possible to the trading account's NAV. This protects the token price as it would not be rational to sell at a lower price than the NAV when they can be directly liquidated for a higher price.

Liquidity Pool

In the world of Decentralized Finance, the liquidity pool is responsible for providing liquidity for token exchanges. Liquidity refers to the ease with which an asset, or security, can be converted into ready cash without affecting its market price. To be tradable on a decentralized exchange, smart contracts are required to be linked to a liquidity pool after they are listed in the exchange. As a result, assets can be bought and sold at stable, transparent prices, reducing investors' risk since they can convert their units into cash easily. Moreover, individuals can be part of this pool and earn commissions on PancakeSwap.

The liquidity pool for DFetf's smart contract is defined on the PancakeSwap exchange and Its balance always depends on the value of the trading account's assets. In order to decrease the token's risk, DFetf's smart contract makes sure that there are always sufficient resources available in the liquidity pool. Immediately after the ICO, 10% of the total raised money is in the liquidity pool, but after a while, as the trading account becomes more stable, more money is transferred to the pool, and the amount of cash can reach as much as 50% of the total NAV. The liquidity pool's asset is held as DFetf-USDT[1] pair.

Burning the liquidity pool

Immediately after the ICO, investors are exposed to a higher risk because of the limited amount of volume available in the liquidity pool, but there is a high probability of a big profit since 90% of the raised fund is managed by a high return algorithm successful in various test scenarios. Backtests and simulations show that because of the algorithm's great performance, the liquidity pool will be filled in no time and as a result, the participants in the initial ICO will make an extraordinary profit.

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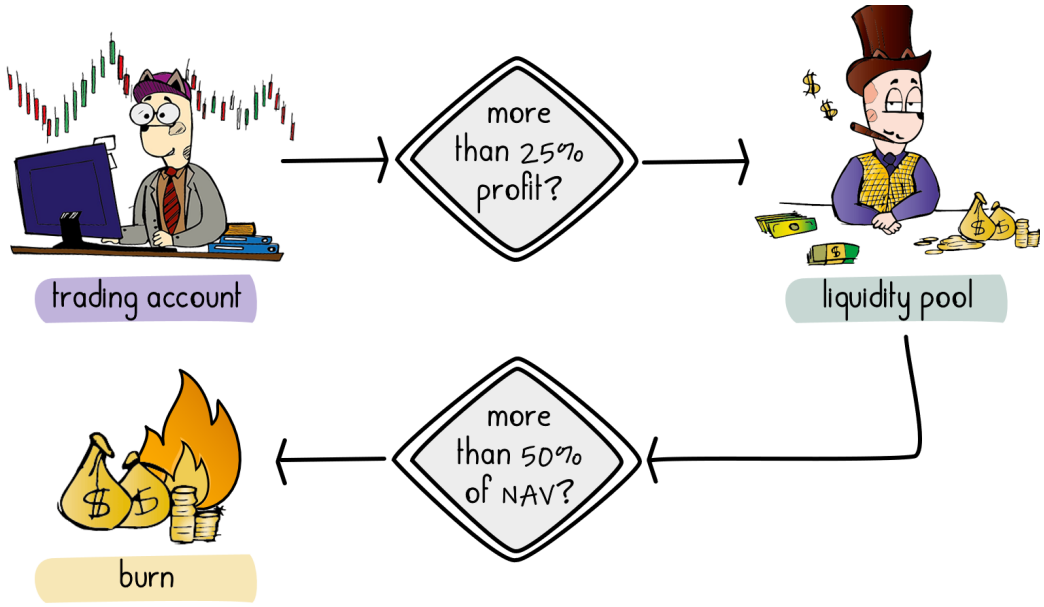
[1] USDT BEP20

Following ICO, DFO's powerful Algoport takes over control of the trading account and tracks the best opportunities in the market to invest in. Every time Algoport makes a 25% profit, 4% of the profit goes to fund managers, and all of the remaining money is invested in the liquidity pool.



This procedure is repeated with every 25% profit the system gains until the ratio between the liquidity pool and the trading account's NAV reaches 1 to 2. In this stage, the token manager uses the liquidity pool resources to buy DFetf tokens from the market at a fixed price, then burns purchased tokens. This action stimulates demand in the market and increases the token's price eventually, consequently increasing the value of shareholders' assets.

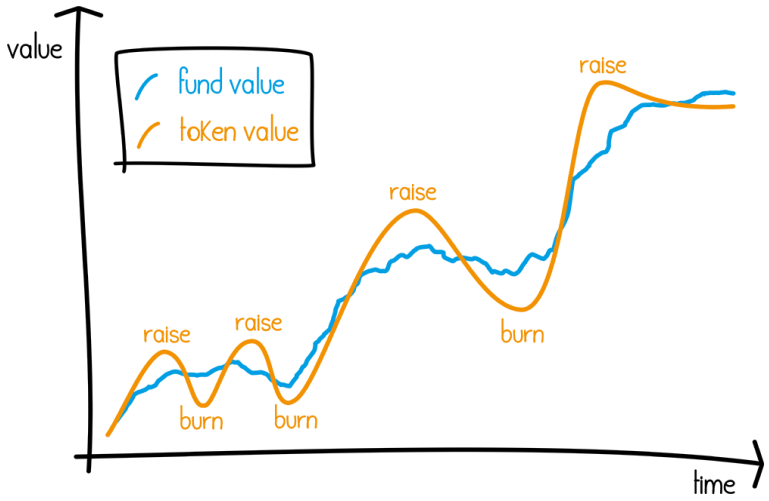
Raising to increase market cap

All investors benefit from the token's capital increase; When a new low-risk investment opportunity is discovered and the available cash to take that opportunity is not sufficient, the token manager chooses to use the capital increase option to acquire the required resources. The capital increase can also be used as a tool against price bubbles to eliminate the chance of sharp price decreases. In this case, the manager generates tokens in the blockchain network and begins selling them to the market, subject to the condition that the price must not decrease by more than 5%. A percentage of the capital increase fund will be transferred to the liquidity pool as well.

DFetf fund at a loss? No problem, the liquidity pool is here!

It should be noted that investing in financial markets is always associated with risk and loss. Using machine learning, AlgoPort has reduced the probability of loss to a minimum, but the occurrence of a black swan is still inevitable. Therefore, in some short-term scenarios, AlgoPort's strategy may not produce enough profit or even lose money. Instead of denying the possibility of loss by our models, we have developed a method to deal with it with available resources. In this case, since the NAV of the trading account has decreased, to maintain the 2:1 ratio between liquidity pool and trading account's NAV, the cash is withdrawn from the pool to take advantage of new opportunities in the market or even lower the average buy price of assets that were already in the portfolio.

DFetf as a stable coin



The strategies listed above are designed to ensure that the token value is linked to the fund NAV, and they converge eventually. In other words, DFetf is similar to a stable coin; as DFetf offers low-risk profit in addition to stability, it can be a good alternative to stable coins such as USDT. Stablecoins are an essential part of the crypto ecosystem; Yet they are tied to the dollar, so they suffer from the same problems as real money. The value of dollar depends on U.S government political stability, inflation rates, and reserve currency status. In addition, The characteristics of this token also makes it suitable for micro-investing applications.

The advantages of DFetf hedge fund model over other active hedge funds

The new generation of hedge funds, which is implemented on blockchain networks, invites participants from all over the world without any limitations or restrictions. In contrast to traditional mutual funds, which were forced to buy their assets from a particular market, the new funds have access to different kinds of markets and can distribute their portfolio in diverse forms. DFetf leverages the blockchain network to offer these advantages.

The mentioned strategies for managing the token are also unique and of a kind. These methods were chosen instead of sharing dividends because in this way, short-term investors will find the token more appealing and by trading DFetf they will provide more liquidity for the token, resulting in a more stable price.

In addition, since the majority of the fund's profit will be transferred to the liquidity pool, and will be used as a tool to control and increase demand for the token, a proper level of liquidity is provided continuously and as a result, it creates an ideal setting for users to benefit from the trading performance of our powerful AlgoPort with minimum risk.

DFetf would be the first of its kind – customers buy the units with crypto tokens based on the current price in the market, but the portfolio keeps stocks and commodities. It will transfer old-economy money via the crypto ecosystem into the AlgoPort and will boost liquidity and offer a stable investment for those who were previously hesitant to invest in crypto markets. Additionally, because of the growing interest in crypto and automated hedge funds, there is still a significant potential to bring retail investors into the crypto market.

4. Fund Management Strategy

The trading accounts contain assets of the fund in different brokers to execute the buy and sell orders. The fund has multiple accounts as it targets a variety of asset classes, including stocks, commodities, and currencies in order to manage the risk properly. Fund management refers to the methods and models used to administer the fund, which is operated by AlgoPort.

AlgoPort’s methodology; portfolio and risk management

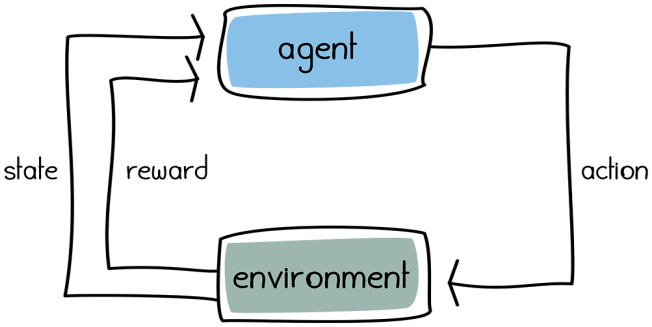
In portfolio management, a fund among various instruments is distributed to maximize the return while reducing the risk. Traditional methods, including quantitative analysis, use mathematical and statistical models to understand multiple assets' behavior better and solve this problem. Markowitz's theory (mean-variance analysis), which uses a covariance matrix to construct a diversified portfolio, is one of the most famous theories for portfolio construction. It has been shown that despite Markowitz's optimal performance in the training phase, their portfolios underperform when it is used in the test, even worse than the 1/N naive portfolio (In which you distribute your money equally among all of the instruments).

Over the past years, various machine learning approaches for portfolio management have emerged. The majority of these methods attempt to predict price movements or trends by feeding history prices and other features as input to predict the price for the next period. The performance of these algorithms highly depends on the prediction accuracy, but it turns out that future market prices are difficult to predict. Additionally, even if a model is successful, it cannot guarantee good performance since price predictions by themselves cannot be used for market action. A separate trading module should be designed to determine the weights of assets in the portfolio based on the ML model's prediction; This module must handle transaction and market impact costs as well. On the other hand, training a machine learning model requires precise evaluation and extreme tests. Since the machine learning model and trading module have to work together, it is hard to determine which one is responsible for the good or bad performance of the whole system, making the training phase complicated.

From another perspective, the portfolio allocation problem is a complex game where you have to compete against other investors and the market. You have to convince an investor to buy their asset at a low price and persuade another one to sell at a high price. Your success depends on others' failure. In addition, according to CNBC, trades performed by bots account for more than 70% of the major U.S. stock exchanges volume. Therefore, we are up against an army of bots in this competition, and whoever is better ready for every possible scenario and is equipped with a better algorithm wins. In this massive game, you are not only up against other investors, but also you have to deal with transaction costs, inflation, financial crisis, etc., making this a multi-objective and challenging task.

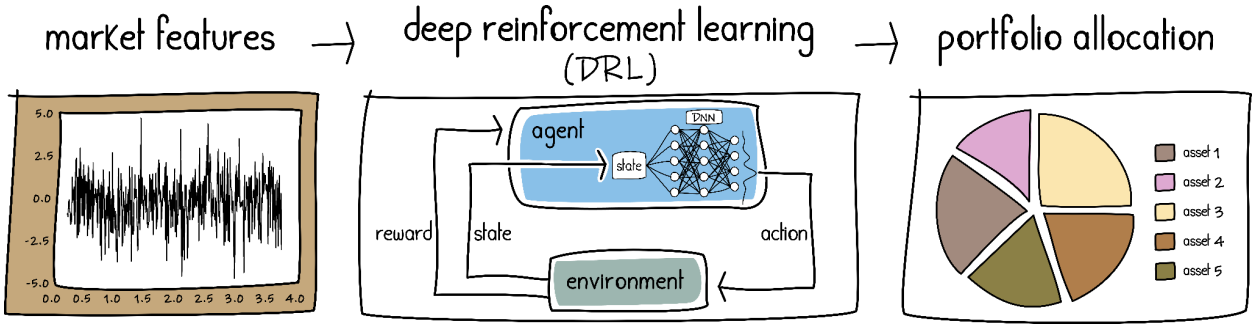
One of the most interesting areas of artificial intelligence is deep reinforcement learning (DRL). It is behind some of the most remarkable achievements of the AI community, including beating human champions at board and video games,

self-driving cars, robotics, and AI hardware design. In 2013, Google's DeepMind introduced their DRL agent called Alpha, which kicked off an explosion in DRL for games. Since then, DRL agents have beaten world champions in games such as go, dota2, starcraft, etc.



Unlike other machine learning methods, DRL is trained through a reward/penalty-based feedback mechanism, the goal of which is to continuously improve the agent. In every reinforcement learning, there is an agent and an environment. The environment provides information about the state of the system. The agent observes these states and interacts with the environment by taking action. These actions cause the environment to change to a new state. And based on whether the new state is relevant to the goal of the system, the agent receives a reward.

Its decision-making nature solves the challenges other machine learning approaches face, making DRL a suitable solution for a portfolio allocation problem. First, unlike other ML methods, DRL doesn't predict the prices, but it tries to create a portfolio to maximize the reward. Second, since it is a single system from end to end, it doesn't have the mentioned evaluation problem of other methods. Because of DRL's promising results in games and the similarities between games and the financial market, there is an active trend of published articles about this method for portfolio management problems. With a precisely evaluated design and training, DRL will eventually develop a low-risk strategy to profit in different market scenarios.

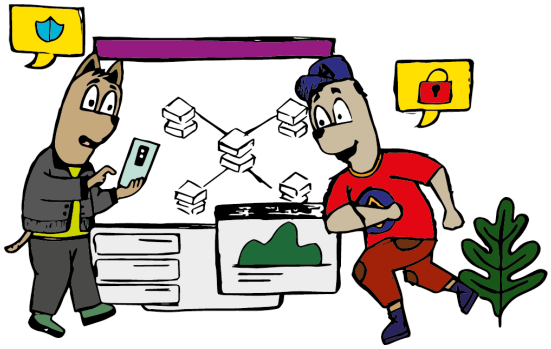


DFO team's AlgoPort uses DRL as its main decision-making core; It was developed by a team of machine learning specialists and finance industry experts and has been tested in extreme scenarios including incidents such as the covid and 2008 financial crisis. Additionally, a generative model was developed to simulate the market and create close-to-real data in order to further examine and evaluate our model in various possible cases the algorithm may encounter in the future.

Along with all the efforts to reduce the risk for DFetf, DFO created a second level of risk management. AlgoPort was designed so that it can be used in three risk profiles on the market: low-risk, mid-risk and high-risk. Therefore, it manages three distinct portfolios with different risk profiles. As a result, the overall portfolio contains a mix of high-risk and low-risk assets, enabling the fund to get huge profits while maintaining a minimal level of risk.

5. Deep Finance Organisation projects

The income and revenue generated by the DFetf managerial fee go toward other projects that DFO plans to pursue in the future. These projects are including but not limited to:



- **Development of ML portfolio package:** Based on the knowledge acquired through the design and implementation of AlgoPort, the DFO team is ready to build a similar package and plans to make it available to companies or individuals interested in utilizing ML methods as their portfolio manager.
- **Online Courses:** DFO is building a series of online courses for people interested in the intersection of finance and machine learning since the team is composed of academics and industry experts who have gained valuable knowledge about cryptocurrencies and machine learning along the way. The series provides the material students need to become experts in the field, as well as the basics and fundamentals.
- **Deep NFT Artwork Creator:** DFO has implemented a system that generates artwork using deep networks. Several of these works have been sold due to their beautiful appearances and their use in some industries, such as jewelry. Now, the DFO is seeking to use this opportunity to register these unique artworks as NFT.

- **Consultant Service:** Using the knowledge and insight gained during the process of establishing and managing the DFetf token, DFO intends to offer consulting services to traditional ETFs that are interested in getting into the crypto world and launching ETF on the blockchain ecosystem.

DFO only supports the DFetf token as the payment method for mentioned products or services.

DFO's Marketing approach

DFO's marketing team will dedicate significant effort to promote the token post-ICO to investors in the traditional financial sector through the creation of easy-to-understand information sheets, explainer videos, and planning documents. Token holders will be able to view detailed information about the fund's performance and assets, as well as the status of the DFO projects.

6. Conclusion

DFetf is a crypto-etf; the token sale funding will be used to build a portfolio of assets, managed by an innovative system known as AlgoPort. Using smart contracts and blockchain network technology, the token is managed in such a way that replicates the NAV of the fund. Therefore, investing in DFetf is relatively low-risk, while investors can also benefit from the performance of a powerful machine learning algorithm managing the ETF. Traditional investors who were uncertain about investing in crypto can now invest in a single token and support the emerging ML-based fund.

Disclaimer of Liability

- Before taking any action related to this White Paper, you should consult your legal, financial, tax, and other professional advisers.
- As described in this White Paper, the proceeds from the sale of the DFetf will be used to fund the company's project, businesses, and operations.
- You are not eligible and you are not to purchase any DFetf token if you are a resident of Crimea, Guinea-Bissau, Iran, Afghanistan, North Korea, or are subject to U.S. export controls or sanctions.
- There are risks and uncertainties associated with the DFO company and its business and operations, the Dfetf's token sale, and the underlying assets, as described in this whitepaper.