Kyte.One Whitepaper

Non custodial, Multi-chain DeFi prediction protocol

Abstract— **Kyte is an advanced non-custodial, multi-chain, decentralized prediction protocol available for different types of markets such as crypto, sports, entertainment, gamified airdrops and grid bots. Kyte aims to provide traders with a prediction market that provides an open source, decentralized, financial solution for market creation, settlement and reward distribution. Kyte also aims to make sure that the processes involved in trading are as transparent and fair by giving granular level authority and ownership to traders for their decisions.**

I. INTRODUCTION

A. Prediction Markets

In simple terms, a prediction market is a set of people predicting the result of an event and dates back to 1503 in which people bet on who would be the next papal successor. A prediction market can be based on pretty much any event for which the outcome can be objectively verified after the event has occurred like price changes of a stock, value of a commodity, changes in weather, result of a soccer game etc.

B. Centralized Prediction Markets & their problems

Historically, prediction markets have been centralized and involve a 'trustful' party. A central entity maintains a ledger to keep an account of all predictions before an event has occurred and similarly, the trusted entity determines the outcome of an event and distributes payouts to the traders.

However, centralized prediction markets have many risks and limitations: they only allow participation within a geography, they limit what types of markets can be created, who can participate in the markets and levy high transaction fees for participation as well as rewards. But the biggest limitation in centralized markets is that they require traders to trust the market operator to not steal funds and to resolve markets correctly which often is a problem.

C. Decentralized Finance (DeFi)

Decentralized finance operates on trustless systems which do not require a central party but instead are completely automated through smart contracts built on decentralized platforms. These are a new generation of financial products & services which work in a transparent and autonomous way without relying on any central institution.

In recent years, we have witnessed the birth of decentralized applications in the financial sector for transfer, trade and investment. The most prominent example of this phenomenon is the recent surge of value flowing into DeFi systems with more than $51B[1] total value locked in various applications as of April 2021.

D. Introduction to Kyte

Kyte aims to resolve prediction markets in a completely decentralized way. Kyte completely removes the risk of theft or corruption since they are deployed as smart contracts on trustless networks such as Avalanche, Binance and Ethereum. None of the market operators or developers have any control over the prediction market, distribution of funds or trade. The developers role is only to publish totally automated smart contracts on the respective trustless network. Once published, nobody (including the developers) would be able to modify the available funds in the market, market outcome determination policy, funds distribution policy, cancellation etc. - all of this would be managed by the open-source smart contracts which would be available in the public domain.

The Kyte protocol does not depend on any centralized system for data but instead uses open source, publicly available, decentralized systems for information DEXs[1] (Decentralized Exchanges) like Uniswap, Pangolin etc and oracles[2] like ChainLink[3], Band Protocol etc. These oracles allow information to be migrated from the real world to a blockchain without relying on a trusted intermediary so no third party, including the developers, can modify any data being used in the prediction systems.

II. HOW KYTE WORKS

Kyte has four different market types
1. Crypto, Sports & Entertainment
2. Gamified airdrops
3. Prediction bots battle
4. Grid bots battle

A. Crypto, Sports & Entertainment

These three categories of markets follow a four-stage progression: creation, betting, reporting and settlement. Markets can be created by anyone based on either a cryptocurrency market cap, ranking, value or any other real-world event like box office collection for movies or results of a tennis match. Trading begins immediately after the market is created, and all users are free to trade on any market. After the event on which the market is based has occurred, the outcome of the event is determined by the oracle. Following which traders can collect their payouts.

B. Gamified Airdrops

An airdrop, in the cryptocurrency business, is a marketing technique that involves sending coins or tokens to wallet addresses in order to promote awareness of a new virtual currency. Small amounts of the new virtual currency are sent to the wallets of active members of the blockchain community for free or in return for a small service, such as retweeting a post sent by the company issuing the currency.

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[1] DEX: Decentralized Exchange [Online]
[2] Blockchain Oracle [Online]
[3] Chainlink Oracle [Online]

Kyte plans to gamify these airdrops by partnering with organizations launching their cryptocurrencies willing to send airdrops to it's initial promoters.

Organizations launching their cryptocurrency can create markets for their new crypto by locking a certain amount of the token which has to be airdropped. Any user can then predict the outcome (value of the token, market cap, ranking on certain DEXs) for free. Once the outcome is determined, the market goes into settlement and the token gets airdropped to the winners. This can be used as a promotional activity by organizations launching their blockchain projects to spread awareness and gain users.

C. Prediction Bots Battle

Developers can build AI bots that predict the values of an event and deploy them to the blockchain using the Kyte SDK. Markets are then created for particular events and traders can bet on which bot would perform well for that event.

D. Grid Bots Battle

A Grid Bot[4] is designed to catch every price movement in the specified range. The bot splits the range into multiple Grid Levels and places a buy or sell Limit Order on every level, which allows one to buy every drop and sell every rise.

We plan to create grid bot battles every few months where developers use the Kyte SDK to build their bots and then run it on the Kyte Bot Blockchain. Traders will have the ability to stake their Kyte token on any bot which they feel would outperform all others. The performance of bots is measured by the amount of profit they earn through grid trading with the dummy currency pair.

III. CRYPTO, SPORTS & ENTERTAINMENT MARKETS

Crypto, sports & entertainment markets follow a five-stage process i..e Creation, Trading, Waiting, Reporting & Settlement, in case of a dispute there is usually one extra 'In Dispute' stage as well.

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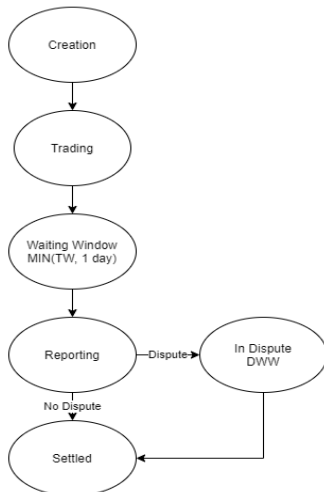
[4] AI Grid Bots [Online]

A. Market Creation

Traders can create markets in any of the three categories - crypto, sports & entertainments. The duration for which a market is active will depend on the category of the market and specifications by the Kyte smart contracts.

Cryptocurrency markets can be created to predict the value of digital assets at a specific point of time. For instance, users in the market can predict Bitcoin (BTC) value in 10 hours from now. Markets can not only be created for specific values but also market cap, ranking etc. Initially, the Kyte protocol will only allow crypto market creation for a minimum of 4 hours to 24 hours. These values can be changed by the Kyte community through on-chain governance.

The Sports & Entertainment market creation phase is slightly different from the cryptocurrency market in terms of the duration that they can live for. These markets will be live from the moment they are created to a certain time before the event has occurred, for example a sports event has ended & a specific team wins or draws. In case the event gets delayed, extended or cancelled, either the market will be postponed through on-chain governance or the market will be *'invalidated'* & all funds would be returned to the respective traders.

Traders creating the market need to choose the market category, asset, validity duration, goal and the oracle used for determination. Once all the preferences are selected, the creator can publish the market and it is then considered to be live and in the 'Trading' phase.

B. Trading

A prediction market is considered to be 'live' when it is in a trading phase. Traders will have a set of choices & can stake Kyte on any one choice with or without leverage. The traders who lose a bet, lose some percentage of their principal amount (multiplied by the leverage) to the traders who have won the bet. On deployment, this percentage is set at 20% but can be changed by on-chain governance. For example, if Trader A bets 20 Kyte on Choice A at 2x leverage but their prediction turns out wrong & Choice A is determined to be incorrect, then Trader A would lose 20*(20%)*(2) = 8 Kyte to the winning choice.

Depending on the amount staked by traders on the choices in the market, they are allotted with positions using the formula

$$\kappa_i = \frac{a_i * \omega_i * \beta_i}{\Phi_i(\varepsilon)}$$

where

κ: *Total number of positions*

κ_i: *Total number of positions of* i^{th} *user*

a_i: *Total playing amount of* i^{th} *user*

ω_i: *Leverage taken by i^{th} user*

β_i: *Boost multiplier of ith user*

Φ: *Set of choices*

Φ_i: i^{th} *choice*

$\Phi_i(\varepsilon)$: *Price of ith choice*

For example, for a market that has 2 options, A & B Alice decides to bet 20 Kyte on Option A with 2x leverage & Bob decides to bet 50 Kyte on option B with 3x leverage. For simplicity let's assume β_i to be 1 as well as $\Phi_i(\varepsilon)$ to be 1, both of which will be explained later. Now, using the formula above Alice would get (20*2*1) = 40 positions & Bob would get (50*3*1) = 150 positions.

Here β_i is the boost multiplier which users can use to increase their positions. Traders can stake Kyte to instantly increase their boost multiplier. This staked amount can be claimed back by the traders after 15 days (modified by on-change governance) and is not reduced/increased depending on the bets. In case the trader loses some bets, the staked amount remains untouched and losses are always calculated only on the principal amount. The staked amount determines the boost multiplier by the formula:

$$\beta_i = min(\frac{s_i}{a_i * S}, MS) + 1$$

s_i: *Total stacked amount by i^{th} user*
a: *Total playing amount*
a_i: *Total playing amount of ith user*
S: *Staking constant*
MS: *Max staking constant*

Here S, the staking constant will be 10 and MS (max staking constant) will be 0.6 during deployment and can be changed with on-chain governance.

For example, if the betting amount of Trader A is 100 Kyte and Trader A stakes 200 Kyte, then this trader will get a boost of 1 + min(200/(100*10) , 0.6) = 1.2

The choice pricing is one of the many deciding factors for the no. of positions the user will get with the same playing amount. The choice price gets updated based on an on-chain algorithm, which depends on the total Kyte stacked compared to other choices and the time left for the market to close.

Kyte follows an AMM inspired approach to choice pricing, which is given by the formula

$$\Phi_i(\varepsilon) = \frac{\Phi_i(\kappa)}{MAX(\kappa, PC)} * \tau + 1 \qquad (C1)$$

Here PC is position constant and will be 1 during deployment and can be changed with on-chain governance. τ is timing function, in the case of solidity it is directly proportional to the time elapsed and inversely proportional to the distance from winning choice. In cases other than solidity (more on this later), it is represented by an exponential decay function.

In case of solidity τ is calculated by the formula,

$$\tau = \frac{Time\ Elapsed}{TW * (\Delta_d + 1)}$$

TST: *Trading start time*
TET: *Trading end time*
TW: *Trading window*
Δ_{di}: *Distance from winning choice of ith choice*

$$TW = TSE - TET$$

By substituting the value of τ in eq C1, we have

$$\Phi_i(\varepsilon) = \frac{\Phi_i(\kappa)}{MAX(\kappa, PC)} * \frac{Time\ Elapsed}{TW * (\Delta_{di} + 1)} + 1$$

C. Waiting Window
This is when the market stops accepting predictions but the event has not yet occurred. The waiting window when the market is no longer live and waiting for the event for which it was created to occur. The duration for the waiting window is

$$WW = min(TW, 1\ DAY)$$

D. Reporting
Once the event for which the market was created occurs, the outcome is determined by the oracle selected while the market was being created. At this time, the result of the market is declared & anyone who has participated in the market prediction can dispute the outcomes. The duration for the reporting window is

$$RW = WW / 2$$

E. Disputes

Any participant can dispute a market that is in the reporting phase by using their Kyte. Disputes are declared to the community for 24 hours and members can then vote either for or against the raised dispute. If a user wants to dispute the result of a market, they can stake a certain amount of Kyte as a "dispute creation fee" & this dispute then becomes available to all users to vote. Other participants can also vote either for or against the dispute by staking their Kyte tokens & the dispute is resolved using majority voting. If the dispute is won, then the market result is changed accordingly & if the dispute is proved to be invalid the Kyte staked as the "dispute creation fee" is burned.

F. Settlements

This is the last phase of a market where the winning participants get their rewards, and the losing participants get back their tokens left after losses.

Rewards are calculated based on the total rewards available, and the number of positions held by the user. Total rewards is calculated by the formula

$$\rho = \sum_{k \neq j} \sum_{\forall users \in k} a_i * \omega_i * L$$

$j : Winning\ choice$

$\omega_i : Leverage\ taken\ by\ i^{th}\ user$

$a_i : Total\ playing\ amount\ of\ i^{th}\ user$

$L : Loss\ constant$

Reward to the ith user of winning choice (j) is calculated by the formula

$$\rho_i = \rho * \frac{\Phi_j(\kappa_i)}{\Phi_j(\kappa)}$$

$\Phi_j(\kappa) : Total\ number\ of\ positions\ in\ j^{th}\ choice$

$\Phi_j(\kappa_i) : Total\ number\ of\ positions\ of\ i^{th}\ user\ in\ j^{th}\ choice$

$\rho : Total\ rewards$

$\rho_i : Rewards\ for\ i^{th}\ user$

The members of the losing choices will get their leverage adjusted staked amount back by the formula

$$\zeta_i = a_i * (1 - \omega_i * L)$$

$\omega_i : Leverage\ taken\ by\ i^{th}\ user$

$a_i : Total\ playing\ amount\ of\ i^{th}\ user$

$\zeta_i : Reduced\ principal\ after\ loss\ for\ the\ i^{th}\ user$

IV. GAMIFIED AIRDROPS

A. Introduction to Airdrops

In March 2014, Auroracoin, the "cryptocurrency for Iceland", distributed Auroracoins to the country's citizens who entered their information on the Auroracoin platform. Auroracoin as a cryptocurrency did not succeed, however the idea of airdrops was widely accepted. Within 3 years from the launch of Auroracoin, several websites were launched which were dedicated to listing companies with active airdrops. Now, Airdrops have become a widespread phenomenon implemented by new companies to gain trust and build relationships with new customers. An airdrop is a distribution of a cryptocurrency token or coin, usually for free, to the 'first users' of a cryptocurrency.

B. Working of Airdrops

Airdrops are generally promoted on the company's website, as well as on cryptocurrency forums, and the coins or tokens are sent only to current holders of crypto wallets. To qualify for the free gift, a recipient may need to hold a minimum quantity of the crypto coins in their wallet. Alternatively, they may need to perform a certain task, such as posting about the currency on a social media forum, connecting with a particular member of the blockchain project, or writing a blog post. Once a user performs the specified activity there is usually a time limit after which the cryptocurrency is sent to the user's wallet.

C. Gamification by Kyte

Kyte aims to gamify airdrops by providing users the option to predict the value of the cryptocurrency on Kyte and receive that cryptocurrency if their prediction turns out to be correct. For example, if Company A is launching a cryptocurrency, say, ACOIN, then they can create a prediction market for ACOIN's value some X days after launch. Traders would take various positions in the market and the ones who win will get ACOIN airdropped to their wallets after the market ends.

D. Applying for an Airdrop Market

More often than not, airdrops end in scams, to control this a company that wants to create an airdrop prediction market first needs to submit a prediction market proposal to the airdrop market council. This is a completely decentralized council with members chosen from an on-chain governance

process described later. To apply for market creation, organizations will have to lock their own tokens which can be unlocked any time before the market is created. If the organization unlocks their tokens their application is withdrawn from the council. Gamified Airdrop markets have a 6 stage process - Application, Council Approval, Marketing Creation, Waiting Window, Reporting & Settlement.

E. Council Approval

The organization needs to decide the number of tokens that have to be airdropped to the winners & once the organization locks these tokens, their application is forwarded to the council members who carefully verify the authenticity of the project, team and vision. Once the governance process is complete and this is accepted then the organization cannot take back the locked tokens.

F. Market Creation

Though the market creation is similar to the crypto markets, the prediction process is different because predictions are free & positions for all the traders remain the same, they cannot increase their leverage unless they have staked some Kyte token in the platform.

G. Waiting Window

This is the time after which the market has stopped but the underlying event for which the market was created has not occurred.

H. Reporting & Settlement

Once the time has occurred, the locked tokens from the market creating entity get distributed to all the users who selected the choice that wins.

V. BOT BATTLES

A. What is a Grid Bot?

GRID Bot is a bot built by developers & traders to earn profits from the fluctuations in the price of a currency. They come under the category of 'trading bots; & help traders to perform the Grid Trading Strategy. It is a trading strategy which, in contrast to most other strategies, works best in a ranging sideways market with no clear direction.

B. Working of a Grid Bot[2]

Grid Bots use a grid trading strategy that appears to have originated from the Forex markets. Essentially the strategy creates a series of buy and sell horizontal levels and the bot accumulates profit as price moves and "bounces around" within the grid.

The strategy is really very simple, you specify the upper and lower price limits of the grid and also the number of grid levels. Grid Bot will then work out the span of the grid by deducting the lower grid price level from the upper grid price level, it then divides this figure by the amount of grid levels specified, which becomes the grid width.
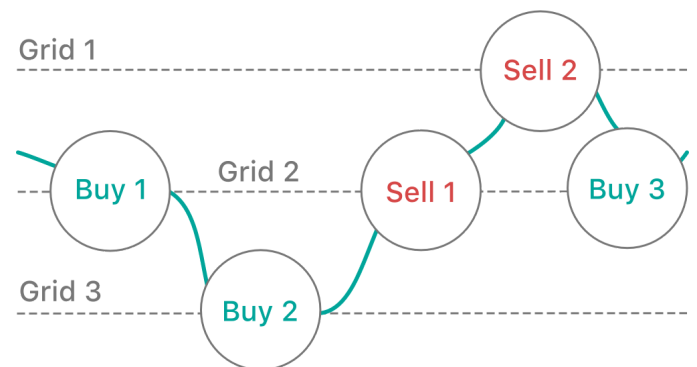
There are thousands of Grid bots available in the market with new ones being developed each day. A grid bot may yield high returns or may incur loss depending upon how well trained it is in trading. However currently, there is no way of comparing a grid bot with another, besides actually running it on exchanges and seeing their past performances.

To encourage grid bot development, we plan to create grid bot battles every few months where developers use the Kyte SDK to build their bots and then run it on the Kyte Bot Blockchain. This blockchain would be based on the Cosmos SDK & Tendermint, more on this will be discussed in the Kyte Bot Blockchain Whitepaper.

C. Grid Bot Battles in Kyte

Every few months (3 months for now, can be changed using governance) the grid bots on the platform will compete on a dummy currency pair which would represent real-world values of any two currencies for example ETH/USDT. Kyte has a certain percentage of tokens in the treasury reserved for grid bot bottles, winners of these battles get the tokens as well as 1 to 5% of the winning share.

Grid Bot Battles go through a 5 phase cycle: Submission, Council Approval, Trading, Waiting Window, Reporting & Settlement.

D. Market Creation

Any council member can propose to organize a bot battle by specifying the following parameters:
1. Start date of the battle
2. Currency Pair
3. Max No. of participants
4. Min No. of participants
5. Reward from Treasury
6. Reward percentage from winning pool
7. Duration of bot battle
8. Submission start/end date

Once a proposal is given, the council can vote to either go ahead with the battle or not. If the council decides to go ahead with the battle then the Bot Battle Market moves to the 'Submission' stage otherwise it is discarded.

E. Submission & Approval

Once developers have created their grid bots they can submit those for further review for an upcoming battle. Once a bot is submitted for review, it goes to the Bot Council which reviews the submission for quality & ingenuity.

F. Trading

When the start date of a battle is reached, the market automatically moves into the 'Trading' phase with the approved bots as choices. Traders will now have the ability to stake their Kyte token on any bot which they feel would outperform all others. The performance of bots is measured by the amount of profit they earn through grid trading with the dummy currency pair.

Positions, leverage, boost mode and reward calculation remain the same as Cryptocurrency Prediction Markets. The only difference would be how the pricing of a bot choice changes with respect to time.

Bot Choice price is directly dependent on the total Kyte staked compared to other bot choices and time left for the market to close.

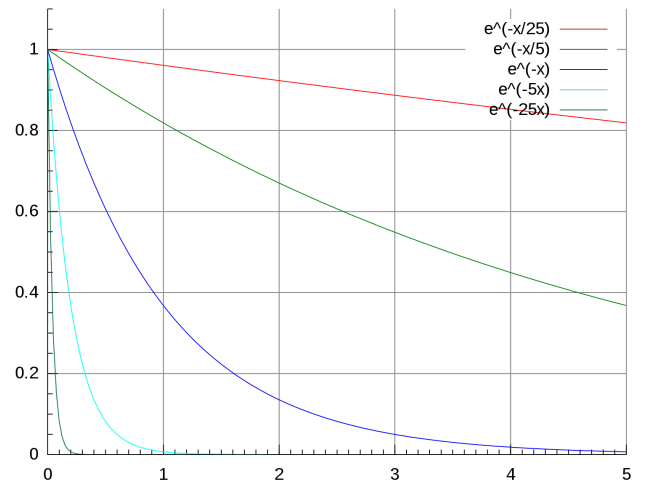$$\Phi_i(\varepsilon) \;=\; \frac{\Phi_i(\kappa)}{MAX(\kappa, PC)} * \tau \;+\; 1 \qquad (C1)$$

Where
Φ: *Set of bot choices*

Φ_i: i^{th} *bot choice*

$\Phi_i(\varepsilon)$: *Price of* i^{th} *bot choice*

$\Phi_i(\kappa)$: *Total number of positions in* i^{th} *bot choice*

The time function can be represented by an exponential decay[5] function[2].

The equation that describes exponential decay is
$$\frac{dN}{dt} \;=\; -\lambda N \qquad (C2)$$
$$\frac{dN}{N} \;=\; -\lambda dt \qquad (C3)$$

By integrating eq C3 on both sides

$$\int \frac{dN}{N} \;=\; -\int \lambda dt$$

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[5]Exponential decay [Online]

$$lnN = -\lambda t + C$$
$$N_t = e^{-\lambda t + C}$$

$$N_t = e^{-\lambda t} * e^{C} \qquad (C4)$$

At time t = 0
$$N_0 = e^{-\lambda * 0} * e^{C}$$

$$N_0 = e^{C}$$

By substituting the value of N_0 in eq C4, we have

$$N_t = e^{-\lambda t} * N_0 \qquad (C5)$$

Time effect on choice price can be given by
$$\tau = 1 - e^{-\lambda t} * N_0 \qquad (C6)$$

In our case $\lambda = 5$ and $N_0 = 1$,

Where t is directly proportional to time elapsed and inversely proportional to distance from winning choice.

$$t = \frac{Time\ Elapsed}{TW* (\Delta_d + 1)}$$

Substituting the value of $t,\ \lambda\ and\ N_0$ to equation C6, we have

$$\tau = 1 - e^{-5* \frac{Time\ Elapsed}{TW* (\Delta_d+1)}} \qquad (C7)$$

By substituting the value of τ in eq C1, we have the final value of a bot choice price $\Phi_i(\varepsilon)$ that will be given by:

$$\Phi_i(\varepsilon) = \frac{\Phi_i(\kappa)}{MAX(\kappa, PC)} * (1 - e^{-5* \frac{Time\ Elapsed}{TW* (\Delta_{di}+1)}}) + 1$$

G. Waiting Window, Reporting & Settlement

These stages will be similar to the Cryptocurrency Prediction Markets.

VI. Bot Prediction Markets

Developers can build AI bots that predict values of an event and deploy them to the blockchain using the Kyte SDK. Markets are then created for particular events and traders can bet on which bot would perform well for that event. All stages of prediction bot battles will be the same as the grid bot battles.

VII. Token Utility

Kyte.One will have an ERC20 utility token called KTE,

A. Participation

Users can use KTE to participate in all markets throughout the platform. KTE provides a single medium of prediction & betting, as well as transferring rewards to the winners.

In order to participate in certain markets, like Gamified Airdrops, traders have to stake the KTE on the platform for eligibility. These markets are free of charge and are usually a great way to discover and predict the outcome of new products giving Airdrops.

B. Staking Rewards

To increase leverage, traders can stake KTE and earn more if they win. Traders are encouraged to stake KTE since it allows them to increase their leverage while keeping their staked tokens absolutely safe.

C. Liquidity Mining

KTE can be staked by users on Kyte liquidity pools on specified DEXs to earn handsome rewards in the form of extra KTE tokens. This encourages liquidity for the KTE.

D. Bot Battle Treasury

Certain tokens will be reserved for Bot Battles and every few months these would be released to the winners of Grid Bot as well as AI Bot Battles.

E. Governance

The KTE is also used as a governance token throughout the platform. All council actions, governance votes require the token and hence gives the power to shape the future of the Kyte platform in the hands of its users.

F. Referrals

Any user of the Kyte platform can refer friends and family to participate in any market using a given link. Depending on the link used by new users to start participation, referring users can earn KTE corresponding to the transaction done by the new users. The referral percentage would be decided using on-chain governance.

G. Platform Development, Marketing, Partnerships & Expansion

The KTE will be used to further develop the protocol, create strategic partnerships, provide marketing incentives, online competitions, increase social engagement, run

promotions like Airdrops & for expansion of the Kyte platform.

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[2] Rundo, Francesco & Battiato, Sebastiano & Trenta, Francesca & Stallo, Agatino. (2019). Grid Trading System Robot (GTSbot): A Novel Mathematical Algorithm for trading FX Market. Applied Sciences. 9. 1796. 10.3390/app9091796