BINANCE RESEARCH

AI x Crypto: Exploring Use Cases and Possibilities

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Key Takeaways

- While artificial intelligence ("AI") has been the talk of the town only in recent months, the technology itself has been under development for decades.

- Currently, there are a handful of AI use cases in crypto. We examine the existing ecosystem developments by sector in this report. It is crucial to note that we are still in the early stages of development, and more work needs to be done for widespread adoption, especially regarding the use of AI in crypto applications.

- Within DeFi, we have seen AI being used to augment the smart contract audit process, facilitate trade automation, and be paired with predictive analytics for more accurate forecasts.

- In the NFT space, AI has enabled generative art creation, allowed for intelligent and interactive NFTs, and provided tools to streamline the data analytics process.

- DAOs have also integrated AI to improve manual DAO operations. Additionally, some early developments exist for using autonomous agents to act as delegates for token holders and using AI to power the central DAO smart contract.

- Looking ahead, the intersection of AI and crypto has the potential to unlock a whole new world of possibilities. To provide some perspectives on these possibilities, we explore the views of thought leaders on the future of AI use cases in crypto.

Introduction

While the launch of OpenAI's ChatGPT has brought about significant interest and sparked intense discussion globally in recent months, artificial intelligence ("AI") is a technology that has long existed and has been under development for decades.[1] From virtual assistants like Siri and Alexa to self-driving cars and medical diagnoses, AI has revolutionized the way we interact with technology and has the potential to shape our future in ways we have yet to fully understand.

Similarly, blockchain technology and cryptocurrencies have made waves with their disruptive impacts on traditional finance and introduced new forms of digital assets and payment systems. But what happens when these two fields converge? **The intersection of AI and crypto has the potential to unlock a whole new world of possibilities.**

As we shall explore in this report, there are several areas in which AI can be integrated into crypto, bringing a slew of benefits. Nonetheless, as with all emerging technologies (or anything in general), there are always positives and negatives.

Benefits

Improve Efficiency	AI can help automate several tasks and decision-making processes in web3 applications, improving efficiency and productivity.
Better Analytics and Insights	Analyzing the vast amount of data available on- and off-chain is often time-consuming. AI can help complement the big data analytics process to generate insights and act as an additional check for unwanted data points (e.g., artificially inflated trading volume) to boost accuracy.
Enhance Risk Management Processes	From complementing smart contract audits to automating risk monitoring processes in trading, AI can help identify red flags and improve risk management processes.

Challenges

Limited Adoption	AI-focused crypto dApps have gained some traction but are currently used by a small group of users. Understandably, this is a relatively young space, but driving more real use cases will be key in increasing adoption.

Utility vs. Proof of Concept	While many projects are actively developing in this field and looking to integrate AI, several projects are still in the proof of concept stage. Usable products with product-market fit are key in driving the adoption and growth of this space.
Focus on Data Privacy	Given the reliance on large amounts of data, privacy is an area of concern, especially regarding how data is used and secured. The importance of data protection, usage, and security policies should not be understated.
Technical Challenges	Integrating AI and blockchain technology can be technically challenging, requiring project teams to possess talents with expertise in both forms of technology. Developing common standards and continued research in these fields will help drive innovation.

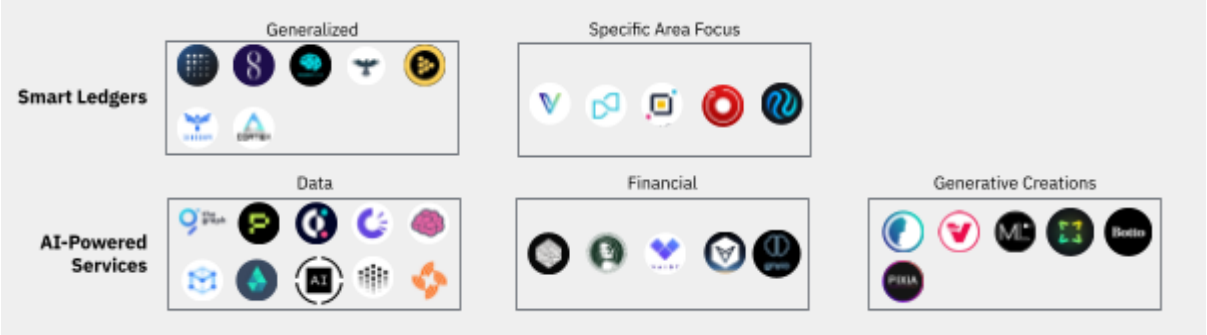
Admittedly, we are still in the early phases of development, and more work needs to be done for the widespread adoption and integration of AI in crypto applications. On the bright side, even at the current stage, AI offers a few helpful use cases that complement existing processes.

In this report, we will explore the intersection of AI and crypto. Specifically, **we will explore the various use cases of AI in the crypto ecosystem and consider the future of this intersection** by examining what other thought leaders are saying.

Ecosystem Overview

While the use of AI in crypto is still in its infancy, it is a rapidly growing area. Today, the technology is prevalent in many aspects of crypto, spanning sectors and offering different supporting functions tailored to improve the overall user experience.

Figure 1: Ecosystem overview



Source: Binance Research

Broadly speaking, the ecosystem consists of smart ledgers and AI-powered services. In this case:

- **Smart ledgers** refer to networks that use AI to automate tasks and provide distributed ledger technology to create blockchains dedicated to tracking those tasks.
- **AI-powered services** refer to projects that use AI on the backend to provide a service to users.

For more details, refer to our latest Industry Map, where we provide additional information about each subcategory and the relevant projects.

AI Use Cases by Sector

To provide a comprehensive look at the state of the market, we structured this section based on crypto sectors, sharing observations on the use cases of AI in crypto and case studies of projects in each area.

Note that this is not an exhaustive list of use cases or projects utilizing AI in crypto. Rather, this section serves to provide a conceptual understanding of how these technologies have been adopted today. **The mention of specific projects does not constitute endorsement or recommendation by Binance.** Instead, projects cited are merely used for the purposes of illustrating conceptual use cases. Additional due diligence should be undertaken to better understand the projects and associated risks.

DeFi

Use Case #1: Smart Contract Audits

Smart contract audits involve a comprehensive inspection and analysis of smart contract codes to identify security or technical issues that may result in potential vulnerabilities in the system. Audits act as a preventive measure for projects across all sectors of the crypto ecosystem. They are especially important for DeFi projects, given the amount of funds secured in smart contracts.

AI can be used to augment the smart contract audit process. For example, AI tools can be used during the initial screening stage to analyze the code and identify potential red flags. Security experts can then review these potential vulnerabilities, provide solutions, and conduct additional tests as required. Essentially, AI can serve as an additional pair of eyes in the smart contract audit process.

Case Study: ChatGPT

ChatGPT is a large language model developed by OpenAI, designed to generate human-like responses to natural language inputs. Experiments have been run to understand its capabilities, particularly whether it can improve insecure smart contract code.

For example, ZKasino, a decentralized betting platform, used ChatGPT in a pre-audit, while CertiK, a blockchain security company, was also concurrently conducting a comprehensive audit. ChatGPT proved its helpfulness in correctly citing several common security concerns. However, it failed to identify certain serious security issues that CertiK pointed out.[(2)]

Figure 2: Comparison of ChatGPT and Human-based Security Audit

	ChatGPT (AI)	Auditor (Human)
Common Vulnerabilities (e.g., reentrancy, transfer failures)	High false positive rate	Accurate
Code Optimization	Can only provide basic optimization recommendations	Case-by-case and can give insightful optimization recommendations
Design-related Vulnerabilities (e.g., logic issues)	Not suitable	Suitable
Complicated Mathematical Issues	Not suitable	Suitable

Source: CertiK

In its current form, AI tools such as that provided by ChatGPT can help point out common red flags and complement the security audit process. However, **manual audits by experienced security experts to supplement the review are still essential for a comprehensive and accurate analysis.** Notably, the bug bounty platform, ImmuneFi, has banned several users after they submitted bug reports generated by ChatGPT.[3]

Use Case #2: Intelligent Trade Automation

DeFi offers traders a plethora of trading opportunities. However, monitoring one's position on an ongoing basis can be difficult and time-consuming, especially during times of market volatility. Consider a scenario where you can engage an autonomous agent to monitor your positions, manage risks, and take profit based on rules you set.

Of course, trading bots are not new but additional features and more sophisticated tools are getting increasingly possible with the development of AI and integration with DeFi dApps.

Case Study: Fetch.ai

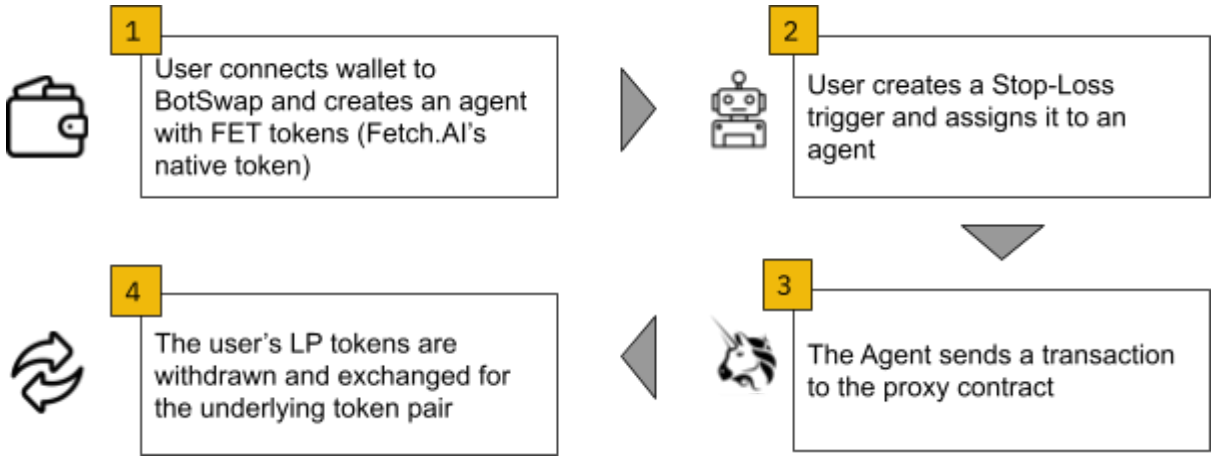
Fetch.ai is a decentralized platform that combines AI and blockchain technology to enable the creation of intelligent and autonomous software agents that can perform a wide variety of tasks, from simple data analysis to complex machine learning algorithms.

It has recently announced the development of a set of agent-based trading tools tailored specifically for decentralized exchanges ("DEXes"), which is expected to launch in Q2, 2023.[4] With these tools, users can reportedly use intelligent agents to execute trades on their behalf based on user-defined parameters (e.g., maximum slippage). Additionally, agent-based trading aims to reduce the instances of liquidity contract hacks and rug pulls by eliminating the need for liquidity pools as trades are executed in a peer-to-peer manner.

As an additional example, one of the earlier dApps powered by Fetch.ai's technology is BotSwap. BotSwap works as an automated liquidity management tool for liquidity providers on DEXes. With BotSwap, users can create autonomous agents to manage and protect crypto assets by responding quickly to excessive impermanent losses. For instance, liquidity providers can define a trigger price for a token pair where liquidity is automatically withdrawn from the pool if it is breached. Instead of constantly monitoring prices and manually withdrawing liquidity, BotSwap simplifies the process for liquidity providers.

Note that BotSwap is one of the earlier dApps powered by Fetch.ai's technology. It remains to be seen if it is still under development or will be phased out with the upcoming launch of the aforementioned agent-based trading tools.

Figure 3: How BotSwap works



Source: BotSwap, Binance Research

Overall, intelligent automation tools have the ability to **improve the user experience by streamlining complicated processes, making them more intuitive for users of DeFi.** By doing so, such tools have the potential to advance the adoption of DeFi applications to the masses.

Use Case #3: Predictive Analytics

Predictive analytics uses data, statistical algorithms, and machine learning techniques to identify the likelihood of future outcomes and forecast trends. When paired with AI, the insights gleaned from these technologies can allow for more accurate forecasts and autonomous decisions to be made.

For example, AI and predictive analytics can help analyze large amounts of on-chain data to predict token price movements and automate subsequent trading decisions. Apart from trading, price predictions may even enable DeFi projects, such as over-collateralized lending protocols or stablecoin projects, to preemptively adjust collateralization ratios to maximize capital efficiency.

An alternative use case could be in risk management, where historical data is analyzed to identify risk patterns and predict the likelihood of different types of risks occurring. In this case, AI can rebalance the portfolio or provide suggestions to mitigate potential risks.

Case Study: Ocean Protocol

Ocean Protocol is an ecosystem of open-source data-sharing tools for the blockchain. Contributors to the protocol share a common vision of unlocking data for AI.

Users of Ocean Protocol include data scientists who work with data and can create value from data by building AI models or simple machine learning models. With that, these algorithms can be monetized and sold to users who can use the data for their intended purposes.

For example, Ocean Protocol has run four rounds of its Predict-ETH Challenge since October 2022, where participants use data feeds and AI modeling approaches to predict the price of ETH over a 12-hour period. Accurately predicting ETH prices can be valuable in trading ETH, yield farming, or DeFi protocol development. Models that can generate consistently accurate predictions can be sold as a data feed on Ocean market, benefiting the data scientists, as well as buyers who may be traders, DeFi users, or project teams.

NFTs

Use Case #4: Generative Art

Several NFT projects have utilized AI to create generative art, which refers to art created through the use of an autonomous system. This is broadly achieved by putting in place a set of rules that automates the output and embedding some form of randomness in the algorithm. In other words, the creator can input a set of rules or constraints (e.g., patterns, colors, shapes) and the AI will generate the artwork based on this framework.

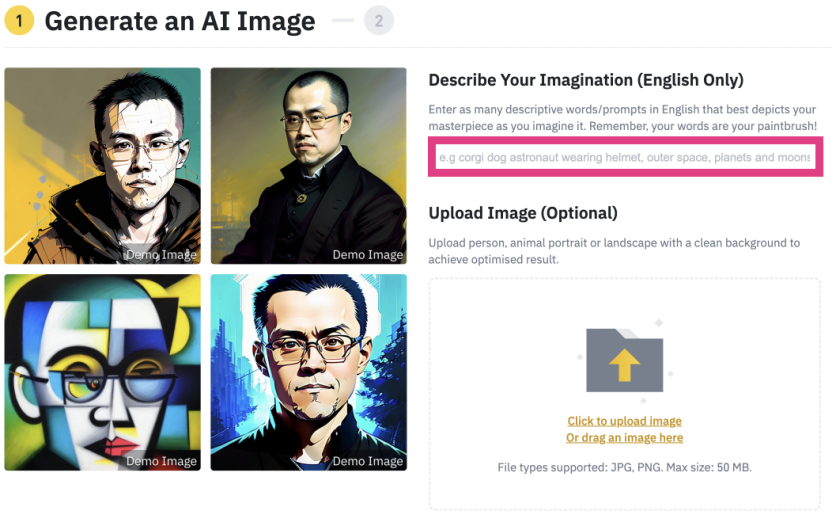
Through the use of AI, generative art enables creators to come up with unique, one-of-a-kind pieces that are infinitely scalable, yet still maintain a consistent style in the collection.

Case Studies: Binance Bicasso; Autoglyphs

Binance Bicasso is an AI NFT generator that allows users to create unique images generated by AI simply by submitting text or an image to the system. It uses AI algorithms to create images based on patterns and/or features of uploaded images. Users can also be specific about the type of images they want Bicasso to generate by including details such as color schemes, composition, or elements that they want to see in the artwork. Users can mint their creations as NFTs on the BNB Chain when they are satisfied with the artwork.

By analyzing a large number of datasets, an **AI image generator such as Bicasso can generate new and unique images with similar styles or elements** to those in the dataset. Taking it a step further, such a technology has the potential to create realistic images for games and movies, and can be used to generate design prototypes.

Figure 4: Generating an AI image with Binance Bicasso



Source: Binance

On another note, some of the notable generative art NFT projects have been very well received, and are prized collections that have sold for 6 digit figures. A case in point is Autoglyphs, a generative art NFT project that was launched in 2019 by Larva Labs (the creators behind CryptoPunks). Anyone could create a glyph by donating 0.2ETH (~US$35 at the time) to Larva Labs' chosen charity. Each piece is unique and created by code running on the Ethereum blockchain. There is a cap of 512 glyphs and the generator has shut itself off forever now that the full supply has been minted.

From a technical perspective, it is interesting that, unlike many NFTs that store the art off-chain, Autoglyphs store their art inside the contract itself (i.e., on-chain). This is visually observable when examining any glyph creation transaction on the blockchain. In this example, the event data contains the output of the generator and encodes a character art pattern that can be drawn by following the written instructions in the comments of the smart contract.

Use Case #5: Elevating NFTs with Intelligence and Interactivity

Imagine being able to turn your previously-static NFT into an intelligent NFT ("iNFT") that can communicate with and respond to you. In essence, an iNFT brings to life the underlying NFT by using the generative powers of AI.

iNFTs integrate both AI and NFT technology to offer interactive tokens with intelligent traits and reasoning abilities. Through the use of AI, iNFTs can analyze data to learn and evolve their personality based on real-time interactions. Conceptually, AI enables the iNFT to absorb new metadata to shape its future interactions and personality.

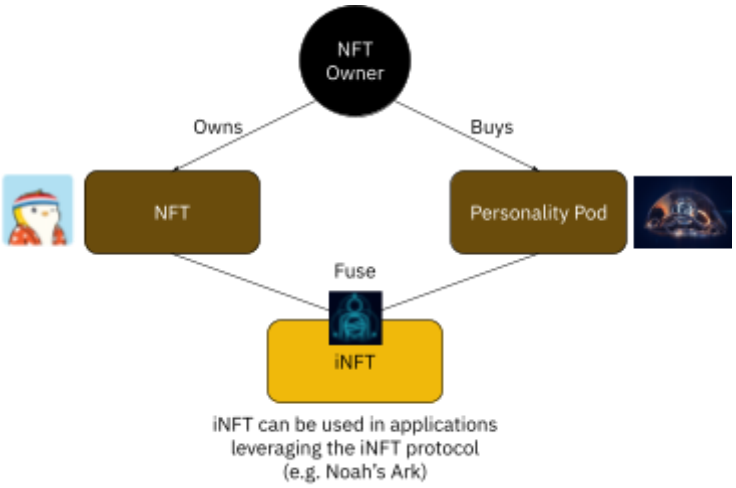
This could have profound implications for web3 gaming and the future of the metaverse where in-game characters are significantly more interactive, and conversations become more life-like.

Case Study: Alethea AI

Alethea AI is a research and development company building at the intersection of generative AI and blockchain. It is developing a decentralized iNFT protocol that will enable anyone to create iNFTs that can be used in dApps on the protocol. For example, the Alethea AI team has created a metaverse called "Noah's Ark" on the iNFT Protocol, which enables the integration of iNFTs.

iNFTs can be created by fusing a "Personality Pod" with an NFT. Personality Pods are ERC-721 assets by Alethea AI that represent the on-chain personality traits and intelligence levels of the iNFTs.

Figure 5: iNFT Creation Process



Source: Alethea AI, Binance Research

Alethea AI analogizes iNFTs to humans with three parts:

1. The body is represented by the underlying NFT that shows the profile picture.
2. The soul is its Personality Pod which has different intelligence levels.
3. The mind can perform higher-order services as it matures in intelligence levels.

Today, holders of 10 NFT collections, such as Bored Apes and Pudgy Penguins, can utilize Alethea AI's Personality Pods to create iNFTs.[5]

Use Case #6: Improved Data Analytics

Accurate market data is key to understanding industry trends and is important for investors to make informed investment decisions. However, instances of ingenuine trades, such as wash trades, may artificially inflate sales and distort true sales volume.

By integrating AI into the analysis to filter out noise, more accurate data output is possible. This is broadly achieved through AI/machine learning, whereby huge volumes of data are fed as an input to identify wash trading patterns or trends. The end result is a more accurate depiction of market activity.

Case Study: UnleashNFTs

bitsCrunch, a data analytics company, has recently launched its UnleashNFTs NFT analytics platform. The AI-powered NFT analytics dashboard utilizes AI and machine learning ("ML") to identify wash trading by "creating a knowledge graph that scans the history of all transfers, wallet addresses, and reward token distribution of NFT-related transactions through an intelligent algorithm."

Essentially, through the use of AI/ML, UnleashNFTs is able to analyze a large amount of data with relative ease, allowing the platform to differentiate between true and inorganic trading volume.

DAOs

Use Case #7: Improve Tedious DAO Operations

Running a DAO can be operationally challenging and involves many tedious tasks. In a DAO study conducted by Bankless, it was found that 62% of DAO members' time was spent on "keeping the lights on" activities, such as creating marketing materials, summarizing governance decisions, and producing educational content.

AI enables DAO members to spend less time on tedious tasks and focus more on their strategic purpose.

Case Studies: DALL-E; ChatGPT

DALL-E is a generative AI model that can create images from text prompts. In contrast, ChatGPT is a large language model designed to generate human-like responses to natural language inputs. Essentially, AI tools such as DALL-E and ChatGPT can be used to improve efficiency of operations of DAOs by replacing or complementing some of the manual work.

In an interview conducted by Aragon with Kenneth Francis, a contributor at TalentDAO, Francis highlights that AI is already being used in TalentDAO for low-level operational tasks.

"If you look at DAO culture today, there is a huge emphasis on [writing and content] - DAO whitepapers, manifestos, Mirror posts," marketing materials, tweets, etc. Furthermore, DAO governance often entails long-winded debates and lengthy governance proposals. Kenneth uses "AI to enhance [the production] of all of that."[6]

By using DALL-E for DAO marketing/graphics or using Chat-GPT for governance proposals/summaries, DAO contributors, like Kenneth, can spend more "time focused on creating value." Overall, Kenneth believes that this is a "net benefit for everyone [in DAOs] because people will get to work in more fulfilling roles, even at the early stages of their career."

Use Case #8: AI on the Edge of DAOs - Autonomous Agents Act as Token Holders

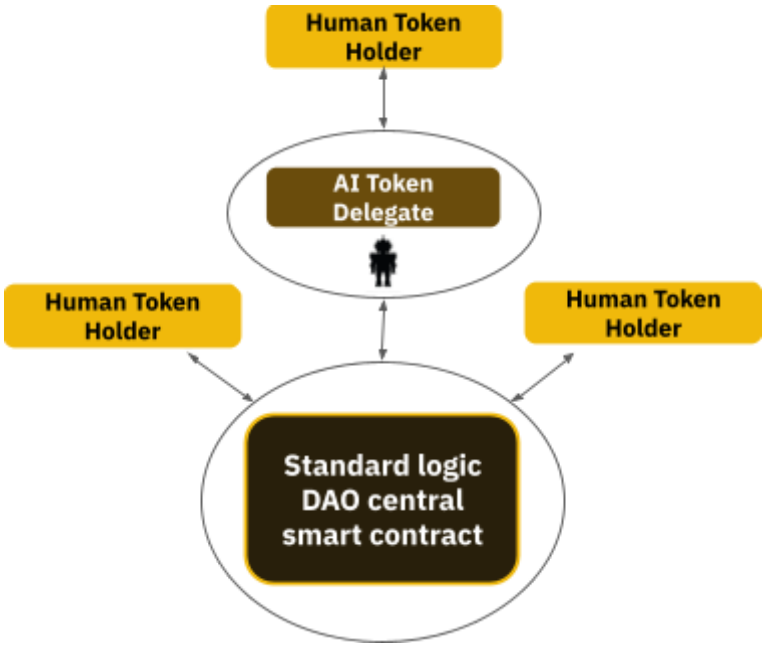
Decision-making within DAOs is democratic and decentralized. This means that every member of a DAO has a voice. Theoretically, the democratic nature of DAOs has several value propositions. However, practically, requiring every member to vote on every single proposal can often be overwhelming for members. Many members of DAOs don't have time to vote or even the capacity to understand every single proposal. A 2022 study on a

few of the largest DAOs shows that average engagement per proposal averages under 5%.

The lack of voter participation within DAOs not only limits the efficiency of decision-making within the DAO but could serve as a potential centralization risk, if only a small subset of the DAOs members engage in the voting process.

By having autonomous agents act as delegates for token holders, voter participation within the DAO can increase, the speed of decision-making can accelerate, and decentralization can become practically established.

Figure 6: Autonomous agents act as token holders



Source: Binance Research

Case Study: Valory

Valory recently released "Governatooorr", an autonomous, AI-powered delegate designed to combat governance apathy within DAOs. Specifically, Governatooorr is an autonomous agent that leverages OpenAI's large language model ("LLM") to process governance protocols, Valory's Propel to facilitate DevOps, and Autonolas as a framework for a blockchain-based AI application.

By using Governatooorr, DAO members technically no longer need to read governance proposals, or even vote to engage in their DAO's governance process. Instead, DAO members can use Governatooorr to automatically and autonomously engage in governance proceedings for them.

To use Governatooorr, a DAO member first delegates their governance tokens to the Governatooorr address. Second, the DAO member must choose whether they want Governatooorr to vote in a way that is often aligned with consensus, or in a way that often goes against consensus. Governatooorr will then monitor for any proposals that are published on the DAO's governance website. When new proposals arise, Governatooorr will allocate governance tokens on behalf of the DAO member according to their specified voting style.

Governatooorr allows DAOs to have **more voter participation** (through the proxy of an AI delegate), **greater autonomy** (AIs are making decisions without the need of a single voting party), **increased speed of voting rounds** (AI monitors and submits votes instantaneously), and **greater decentralization** (no single voting party has control in the scenario of other inactive voting members).

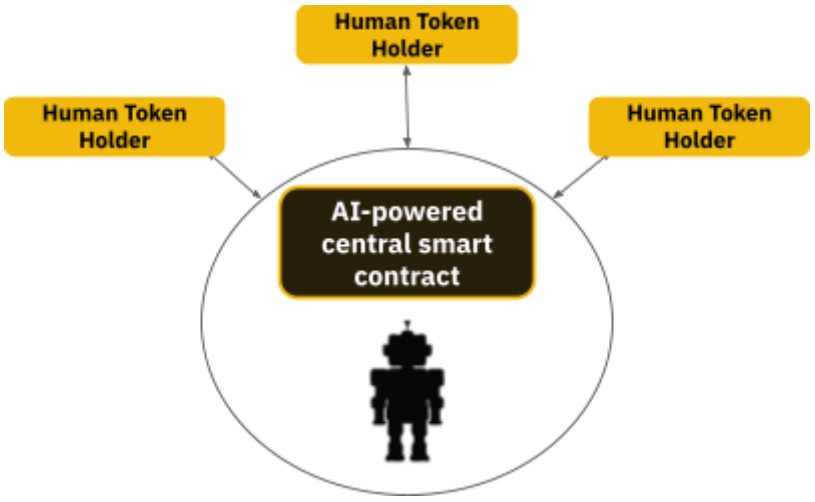
It is worth highlighting that **Valory's Governatooorr is a relatively new project** and was cited as an example of a conceptual use case. **Additional due diligence needs to be done to better understand the project and the potential associated risks.**

Use Case #9: AI at the Center of DAOs - AI-powered DAO Central Smart Contract

The central smart contract of a DAO serves as its technical backbone. Specifically, the smart contract defines the rules of the organization, holds the DAO's treasury, and ultimately, spends DAO funds in a manner ratified by DAO members.

With the integration of AI, the DAO central smart contract can consume resources devoted to it by human token holders and autonomously make decisions.

Figure 7: AI at the center of DAOs - AI-powered DAO central smart contract



Source: Binance Research

Case Study: SingularityDAO

SingularityDAO is a DAO on SingularityNET that uses AI to autonomously allocate assets and manage the portfolios of token holders. SingularityDAO is implemented in a way that is roughly similar to the structure shown above in *Figure 7*. SingularityDAO's main purpose is to govern its native crypto product, DynaSets, which are baskets of crypto assets that are dynamically managed via AI-based models. SingularityDAO token holders can stake the DAO's governance token, $SDAO, to participate in decisions relating to the parameters/configurations/training of the AI model managing the Dynasets.

It should be recognized that SingularityDAO is not a perfect case study of a DAO with an AI-powered central contract, as the governance and decision-making of the DAO are still manually controlled by humans. A perfect implementation of *Figure 7* would imply that the central contract is able to autonomously make decisions and execute transactions.

For example, consider a DAO whose purpose was to autonomously find the best marketing services. Startup companies who required marketing content could allocate resources to the DAO's AI-powered central smart contract, effectively becoming token holders of the DAO. The central smart contract of the DAO, through machine learning, is capable of analyzing a large data set of marketing providers and a specific input provided by the startups (e.g., budget, type of content), to ultimately, suggest the marketing provider that would best meet the startups' needs. Autonomously, the smart contract could then allocate the resources provided by the startup to the marketing provider and, in turn, return the produced marketing content to the startup. Over time, based on the resources being devoted to the DAO, other startups could have confidence that the logic behind the DAO's central smart contract was effective at finding the right marketing providers for its respective token holders (the startups).

Others

Use Case #10: Improving the Metaverse Experience

AI has the potential to significantly improve user experiences in virtual worlds by creating a more interactive and immersive environment. For one, through the use of speech AI and natural language processing, AI-enabled non-playing characters ("NPCs") are able to act as chatbots to engage and communicate with players in a more realistic manner. This is an existing technology and we are largely familiar with this through our use of virtual assistants such as Apple's Siri or Amazon's Alexa.

Another key component of the metaverse experience lies with the visual aspect. Life-like digital avatars that can mimic physical traits and movements are made possible through AI models that scan 2D and 3D images to create them.

Case Study: Sophia's Age of Singularities Metaverse (Powered by SingularityNET)

Sophia's Age of Singularities ("SAOS") Metaverse is a project built around Sophia, a social humanoid robot powered by artificial intelligence. With a human-like face, Sophia has conducted one-on-one meetings with leaders of 17 nations, appeared on the cover of 10 magazines, become the first robot passport holder and has filed 12 patents (7 issued).[7]

The first phase of the SAOS metaverse consists of an NFT-based gameplay and an NFT collection called "The Hivemind", which is a visual representation of Sophia's advancement in her self-consciousness. NFT holders are able to interact with Sophia in The Hivemind's environment to navigate the metaverse. By interacting with Sophia in the Hivemind through NFTs and challenges, players will help activate areas that evolve Sophia and her awareness.

Essentially, the SAOS metaverse offers an interactive experience where humans and AI work together in a hivemind of smart contracts, providing for an interactive experience while working towards achieving Artificial General Intelligence ("AGI").

Outlook: What are thought leaders saying?

What better way to get a sense of the potential future developments than to hear from thought leaders at the intersection of AI and Crypto? In this section, we highlight big ideas shared by project founders with knowledge of this space. While these ideas may or may not come to fruition, they offer insight into what is top of mind for founders and what could be the future for the integration of AI and Crypto.

Trent McConaghy, Founder of *Ocean Protocol*

As previously mentioned in the **DeFi** section, Trent McConaghy and Ocean Protocol are recognized for building an AI x DeFi predictive analytics ecosystem. Notably, however, McConaghy has been outspoken in his belief that AI has broader applications for crypto, beyond the realms of DeFi and predictive analytics.

In a dystopian, ahead-of-its-time article series that was published right after the DAO hack of 2016, McConaghy argued that the relationship between AI technology and DAOs could be symbiotic and unlock the true potential of both AI and DAOs.

"AI DAOs could be way bigger than AIs on their own, or DAOs on their own," he wrote. "AI gets its missing link: resources; DAO gets its missing link: autonomous decision-making. The potential impact is multiplicative."(6)

More specifically, McConaghy presents three different ways AI and DAOs could take form in reality (*keep in mind, these projections were made in 2016*):

1. **AI sits on the edge of DAOs, in which autonomous agents act as token holders.**

As mentioned in the **DAOs** section, this projection has started to take form in 2023 and is being applied in projects such as Valory's Governatooorr.

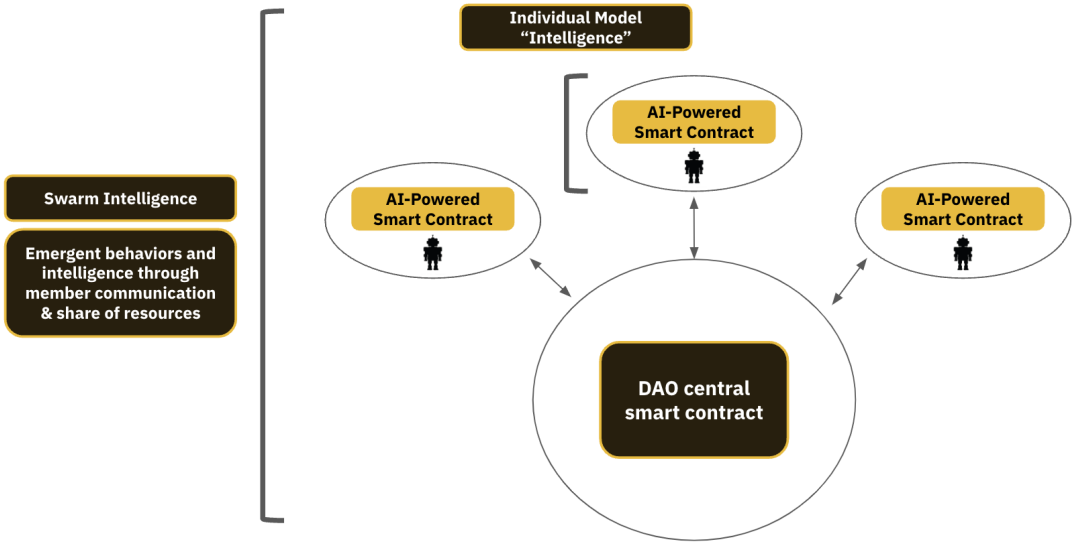
2. **AI is at the center of DAOs, whereupon the DAO's central smart contract is powered by AI.**

This is in the works and as mentioned in the **DAOs** section, we have seen some early signs of this becoming a reality (though not fully there yet) in projects such as SingularityDAO.

3. Swarm Intelligence.

The prediction from McConaghy for DAOs x AI that hasn't taken practical form yet is swarm intelligence. Swarm intelligence refers to a group of autonomous agents that, when grouped together, can achieve emergent, higher levels of intelligence. The concept of swarm intelligence comes from nature and suggests the type of emergent behaviors animals/insects (e.g., bees) have when they group together and share resources (e.g., building a bee's nest), which is often greater than the capabilities that they have on their own. **In a similar fashion, McConaghy predicts that organizations with emergent, high levels of intelligence could emerge by grouping together smart contracts, powered by simple AI models, into a DAO structure.** The AI-powered smart contracts would communicate with each other, allocate resources, and make decisions through the DAO framework.

Figure 8: Swarm Intelligence



Source: Binance Research

McConaghy doesn't elaborate on how swarm intelligence will specifically affect crypto. However, he does predict that **by giving autonomous agents the ability to access resources and govern themselves through DAO technology, they will no longer require human DAO members for the DAO to evolve eventually.** Furthermore, humans will not be able to control or influence the decision-making of the DAO because the governance of the AI DAO is decentralized and will be resistant to any outlying human votes that are unaligned with the votes from the AIs. McConaghy ends his three-part series by noting that AI DAOs could be potentially dangerous, considering that they are able to evolve without human intervention and are decentralized in a way that means the DAO cannot be easily controlled if it poses a threat to humanity.

Illia Polosukhin, Founder of *NEAR Protocol*

Illia Polosukhin is the founder of NEAR Protocol, the smart contract Layer-1 that currently has ~65K daily active users and over ~350K daily transactions.[8] While NEAR Protocol is well-recognized within the crypto community today, few know of its AI origins.

From 2014-2017, Polosukhin worked for Google, where he managed a team of deep learning researchers, helped develop Tensorflow, and wrote some of the most influential papers on artificial intelligence, such as Google's 2017 Transformers paper. In June 2017, Polosukhin left Google to build "NEAR.AI," which at its founding, was focused on training AI models and had nothing to do with blockchain technology. As the startup grew, Polosukhin found it easiest to pay employees in crypto. Inspired by crypto payments, he decided to pivot his startup to focus on building out crypto, leading NEAR.AI to become NEAR Protocol.[9]

Given Polosukhin's background in AI, he has been outspoken on how AI will actually intersect with crypto. We highlight some of his insights below:

First, Polosukhin thinks that decentralized, on-chain training of AI models is currently impractical. Currently, many of the AI models we know today are trained in a centralized manner, with ultra-expensive, purpose-specific hardware (such as NVIDIA A100 GPUs). A plethora of crypto projects have recently been started to decentralize the training of these models on-chain. While theoretically intriguing, practically, Polosukhin claims we are "orders of magnitude" away from actually decentralizing the training of AI models on-chain. Mainly this is due to the fact that training a model on-chain would require network participants to have purpose-specific GPUs and high levels of connectivity, which is not the case today.[10]

"When someone says let's do decentralized training on a [blockchain] that can maybe push 1MB per second and we are talking about training models pushing 700-800 hundred GB per second... This is orders of magnitude from decentralized training being able to happen."

Second, Polosukhin believes that AI will lead to the emergence of many new different applications in crypto. More specifically, Polosukhin theorizes that the open source nature of crypto application code, paired with cogeneration capabilities of AI could mean that users will be able to create their own, personalized, crypto applications (*quote*: *"imagine you advise an AI to create you an application that had features from Aave, Compound, and Uniswap with the ability to add 10x leverage to each"*).[9]

Sebastian Borget, Co-Founder of *Sandbox*

Sebastian Borget is the co-founder of Sandbox, the popular metaverse game whose client was installed by over 1.3 million users last year.[11] Borget argues that AI will "accelerate" the development of the metaverse in crypto. From his own personal experience, Borget has claimed that creating metaverse content, "which used to take days before, from ideation and conception, can now just take a matter of seconds." **AI "removes the need to create every aspect of a metaverse environment or avatar,"** Borget highlighted. Instead, **AI "can help generate and populate experiences much faster."**[12]

Chelsea Manning, Security Consultant at *Nym*

Chelsea Manning is a former US Army private who spent seven years in prison after facilitating one of the largest intelligence leaks in US military history. Today, Manning is a security consultant for the Layer-0 platform Nym, where she uses her past experiences to inform how Nym can help achieve ultimate privacy on the blockchain.

Last month, Manning argued in an interview: "As surveillance in AI becomes more efficient, it will reduce the effectiveness of virtual private networks and other circuits from protecting user data." In other words, **Manning fears that the pseudo-anonymity provided by blockchain networks will be rendered ineffective as AI surveillance techniques mature.** Another issue Manning highlights is deep fakes. Manning believes that as AI develops, it will be able to mimic the appearance and intelligence of humans in a way that is indistinguishable from real human beings.

Manning argues that privacy-preserving Layer-0s networks and cryptography may be a way to mitigate the detrimental effects of AI on blockchain security. More specifically, Manning highlights that with Nym, she is working to create a Layer-0 base layer for blockchain networks such that it preserves network anonymity and resistance to surveillance by adding cover traffic and timing obfuscation to transactions. Furthermore, Manning argues that cryptographic provenance (like the techniques used on many blockchains today), will help separate deep fakes from real human beings.

Closing Thoughts

Integrating AI in the crypto ecosystem opens up a realm of possibilities regarding potential use cases and offers alternatives to existing solutions. However, it is crucial to note that while the conceptual use cases may seem interesting, AI x crypto projects have generally not achieved widespread adoption at the moment. The relatively low level of adoption suggests that such projects may be “nice-to-have” but are not absolutely necessary (at least based on the current level of innovation in the space).

Nonetheless, emerging technologies take time to develop and, with time, will likely be able to iron out the kinks. Looking ahead, the continued advancement of AI technology and crypto may usher in interesting use cases helpful for different stakeholders in the ecosystem.

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