AI CRYPTO

AI BlockChain for Decentralized Economy

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White Paper

Exclusion Clause

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Foreword

Artificial Intelligence for What?

Since the appearance of Cybernetics in the early 20th Century, many Artificial Intelligence (AI) scientists and engineers went through numerous trials and errors to prove, realize, and sometimes dismiss and fail various theories to understand intellectual behaviors of human. Regardless of the questions asked and how we answered them, what is the ultimate goal for AI research? It is not to fulfil the intellectual curiosity but when it comes to serve the mankind, that is the reason why our AI Crypto Team is dedicated to AI.

Blockchain is emerging to be the topic of conversation. It is a revolutionary idea as it is shifting the paradigm of existing technology. Not only blockchain is a technological innovation based on an open idea, we cannot disregard the fact that people are fascinated over cryptocurrencies based on blockchain. Are we just going to treat this innovation as the 'Tulip Fever'?

Artificial intelligence is a technology that can change our future, but the monopoly of research and development resources is a big problem. Artificial intelligence research requires three elements: data for learning, artificial intelligence algorithms, and computing power. The data generated by ordinary users is dominated by few big corporations such as Facebook, Google and Amazon. Many of the people who develop algorithms work for giants such as Google, Baidu and IBM. Dominant players in the computing power market are, again, for Amazon, Google, and Microsoft. If the research and development of artificial intelligence proceeds as it is, artificial intelligence will become the property of these giant corporations rather than human assets.

We, the AI Crypto Team, as artificial intelligence researchers, propose **AI Crypto Ecosystem** as a global shelter to make artificial intelligence a property of humanity. Individuals are willing to provide their own idle resources of computing power, to create data needed for artificial intelligence research and to be rewarded for their worth. In addition, the **AI Society**, an alliance of AI researchers, developers and start-up companies, aims to share their capabilities in the AI field so that fair rewards will be given. Artificial intelligence should be the property of all mankind, not private property of a certain.

"AI BlockChain for Decentralized Economy"

Introduction

The Problems of Early Cryptocurrency

Where does value come from?

Currency has four major functions: a standard of payment, a measure of value, a store of value, and as a medium of exchange. The role of the currency differs as the function for each is performed independently and systematically, but the common implication is the calculation of the value. In a modern society, economy was run on the gold-exchange standard, in which a centralized organization (i.e., the nation) decided the proportion of the monetary value by force (i.e., the law), using a certain material (i.e., gold) as a meaning of proof, therefore, granting value to the currency. But after the World Wars and with the problems in Bloc Economy, it became hard to sustain the gold-exchange standard. As a result, today's floating exchange rate system appeared, where value is determined according to each nation's strength, making it easier to transact capitals between nations. On the other hand, nation enforces currency by law in order to preserve its value and stability. This kind of currencies are called legal tender or fiduciary money. These types of currency usually exist in the form of fiat money, where grants value by force are irrelevant to the intrinsic value. The value of fiat money is secured by the nation's credit, which is calculated through the nation's productivity, economic policies, etc. Exchange rate is set by comparing each nation's credit. In other words, if a nation's credit decreases and its economy cannot support the circulating currency, the value of its currency conspicuously decreases and even gets deprived. So, the value of currency, which relies heavily on centralized power, is sometimes swayed by internal or external factors, and sometimes even loses the fiat value due to unjust policies. In 2009, Nakamoto Satoshi suggested Bitcoin, a cryptocurrency system based on blockchain through decentralized shared ledgers, excluding the compulsory circulation. Blockchain system records transactions or the issue of coins on shared ledgers, so called blocks, encrypts them and stores them in a distributed form, all by functioning as an independent currency from centralized organizations. Value is admitted by those who make transactions with this currency, just like fiat money. So, what is relevant to the intrinsic value of cryptocurrencies?

Limitations with the Proof of Work

Added value occurs when the value of output is increased by the value of resources put into. If a certain activity generates few added value or even a loss, it should be reconsidered whether to keep this activity. On the other hand, if the added value is significantly higher than the invested, this can be considered as an overheated situation rather than a proper reward. And if it is determined as an economic bubble, the value will be adjusted to the same level of the invested by the principle of the market economy. Then, where does the value of cryptocurrency come from? For existing cryptocurrencies, transaction records were recorded and verified in the form of distributed ledgers using the Proof of Work (PoW), ensuring safe and decentralized transactions. Generally, cryptocurrencies are issued in a unique way, known as mining. It stores all the transaction records on a block and encrypts them, proving this ledger is connected to the existing blockchain sequences. In other words, mining is adding a block containing new transaction records to the existing ledger, and when the new block is added, the user who made the block is rewarded with coins in return. While adding a new block, the hash value of the new block is calculated. For this to happen, a value called *nonce* is changed so that the header information of the block can meet a specific criterion. And this process requires an enormous amount of calculation, resulting in excessive consumption of electricity for feeding the hardware. Therefore, in a sense, the added value created by mining, could be called as the depreciation of the hardware used for mining and the usage of electricity. People thought the value of mined coins is larger than the invested value on mining, so that they participated in mining in order to earn coins. As a matter of Bitcoin, it adjusts the level of difficulty and eventually reduces the amount of coins mined to keep the value of coins by controlling its scarcity. When coins are no longer issued by mining, miners must solely rely on the transaction fees that come from verifying transactions. Thus, the system can only sustain when the value earned by transaction fees is not smaller than the value of effort for mining, keeping the creation of blocks going. Eventually, without resolving the current issue on PoW, the cryptocurrency system cannot be sustained.

‘Hardware as a Mining Tool’?

In the early days of Bitcoin, high-performance CPU or GPU for parallel computation were mainly used to mine Bitcoins. However, in 2013, the Application Specific Integrated Circuit(ASIC) was developed, enhancing the mining efficiency more than 100 times

compared to before, leading the mining industry of Bitcoin. The smaller the amount of power consumed in the mining process, the larger the added value of the coins mined, resulting in the motivation of the coin miners. When the mining is concentrated to a few miners with many mining devices, it is against the idea of decentralization, and the risk for falsifying transaction records increases. In other words, selfish miners can form an alliance and take over the decentralized network, damaging other innocent miners. In 2013, the maximum mining capacity of the most extensive ASIC at that time, was roughly up to 2882 times better than that of the most extensive graphic card. And in 2016, the number was approximately 1051. The gap between mining capacities of GPU and ASIC has become narrow and the mining capacity of some GPUs is better than that of some ASICs.[1] Both the mining capacities for GPU and ASIC are steadily increasing as time goes by, but GPU seems to be developing faster than ASIC. But even though GPU is making faster progress than ASIC, the gap between the mining capacities is still over 1000 times, so the demand for ASIC is expected to be steady for quite some time.

Practical Difficulties in AI Researches

High Cost of Hardware

AI, currently used in industries, is a type of machine learning predicting results through repetitive training process conducted with numerous data. Machine learning works based on computing power for recursively calculating massive data. For AI development, a large amount of logical operations should be calculated simultaneously. GPU is the most suitable hardware to conduct them since it processes operations in a parallel way. For the development of ASIC, which is optimized for a specific calculation is also supporting the computation in AI researches. However, not only the cost of hardware is relatively high compared to the demand, and the demand in mining industry is also high, making it difficult and expensive for AI researchers to access such hardware. In fact, many researchers find hardware too expensive, thus using commercialized cloud services that charge the users depending on the usage time such as Amazon Web Service, Microsoft Azure, and Google Cloud Platform, but still a more effective way of providing computational resources is necessary.

[1] https://en.bitcoin.it/wiki/Non-specialized_hardware_comparison and https://en.bitcoin.it/wiki/Mining_hardware_comparison

Difficulty in Securing Quality Data

One of the real challenges in AI research is that it is difficult to obtain a large quantity of high-quality data. Even though it is not an easy task to collect a variety of data online, it is essential to examine that the collected data is in a format which the computer can process. In addition, quality data is likely to be used for a range of purposes rather than for intended ones. Therefore, increasing the reusability of data in versatile ways, will increase the value of the data. Therefore, will be a vital resource for the AI industry.

Difficulties in Developing and Embodying AI Models

Although new models of AI algorithm are continually being introduced to the academic society, it requires a large amount of data and embodiment of the model by using hardware to compute. To make the matters worse, even the publicly shared models are impossible to use without programming skills or the basic knowledge for programming language. Even though a certain proposed algorithm is embodied, if there aren't enough hardware resources to run a test or data to apply, realizing the idea itself would have limitations. AI industry would grow so much faster if embodied algorithm can be easily accessed, utilized, or improved. Therefore, the proper reward is given to those actions. In conclusion, if a new system that encompasses all factors needed for AI researches is introduced, we believe that the current problems in the AI research field can be resolved.

As a result, only a few IT companies takes all; they can acquire large amounts of expensive hardware, have easy access to high-quality data, and can invest in developing and improving new artificial intelligence models. If there is a platform that is faithful to the basic idea of blockchain that aims at decentralization by resisting monopoly, we believe that unlike current artificial intelligence industry which is monopolized by the few, we can make a future that many people can participate and develop together. In addition, if there are no restrictions on the number of individuals and various start-ups involved in artificial intelligence, this type of platform is self-sustaining and can have a substantial impact on the artificial intelligence industry.

Our Vision

Just Use of Resources

We present AI Crypto Ecosystem, where computing hardware (GPU), quality data for learning, and models that can easily embody AI services are shared and consumed in a righteous way. The ultimate goal of AI Crypto Ecosystem is the creation of values through using resources in a just way. We do not stand fiat value created through simple mining, using tremendous amount of hardware resources and electricity. We suggest a new ecosystem, where values can be shared rather than exclusively owned, supporting the field of AI industry. This is not for earning profits through speculative consumptions, it is rather a pioneer attempt to rightfully reward the members of the ecosystem for creating values earned through just use of resources. We trust in serving the mankind through supporting AI researches.

Necessity for an Impartial Ecosystem

Vitalik Buterin, the founder of Ethereum, said that although blockchain is inefficient, it has some advantages. The first one is the **censorship resistance**; there is no intervention by the government, Internet companies, etc. The second is about the **fraud resistance**, and the third is the **transparency,** that anyone can see all activities on the network. The fourth is the **robustness**, that is, even if there is a problem with the computer, it does not shut down. The last one is about the **interoperability** which means anyone can interact with programming. All these refer to the common idea of **'resistance to the monopoly'**.[2] At the moment, data, computing resources, and models needed for AI development and research are not shared, exclusively owned by some possessors or creators. However, when a system where resources can be used with proper cost exists, the creators or possessors can earn profit (reward) by providing those resources. Moreover, users can avoid wasting resources on the same operation and throw the resources into new purposes, accelerating the development of the AI industry. For this to happen, a decentralized ecosystem where resources are not monopolized, and values are fairly distributed, is necessary.

[2] Vitalik Buterin's keynote speech at Deconomy 2018 (Seoul, Korea, 4 April 2018)

Our Mission

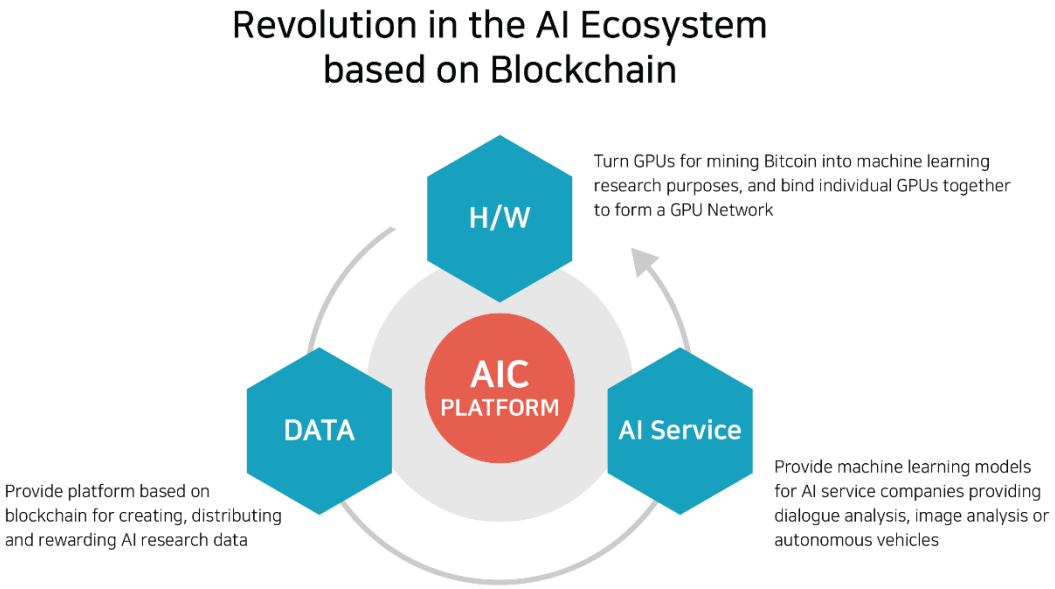

Figure 1. Revolution in the AI ecosystem based on blockchain that AI Crypto Platform suggests

Conversion the Purpose of Mining Hardware

The GPU hardware resources of an individual are not 100% used. We are trying to create new ways of easily utilizing these idle resources of GPU computing power owned by individuals and the GPU resources, which are currently concentrated only on mining cryptocurrencies, in the field of AI industry. Value earned through sharing and utilizing GPU in the AI ecosystem is much larger than value earned through simple mining. Furthermore, it enables just and valuable consumption which serves the mankind by developing AI technology. For this to happen, rightful use of resources and sharing profit created from the increase of value, rather than declaratory phrases or sacrificial participation, is the key.

Necessity of Data Creation / Distribution / Compensation

We are launching a platform where members can acquire and provide data used for training models for AI algorithms. It makes it easier to acquire data by attracting voluntary

participation from the members, and enhances the reusability of data, thus accumulating and utilizing quality data used for a various range of purposes.

Providing AI Models

When AI researchers / developers provide algorithms or models, users will make proper payment in return. There will also be a section in the ecosystem, where data can be processed and improved, reducing waste of redundant efforts. The ecosystem will be vitalized not by a centralized system, but rather the system where individual members participate voluntarily, sharing created values, making a living ecosystem.

AIC Architecture: AI Ecosystem on Blockchain

AIC Platform Structure

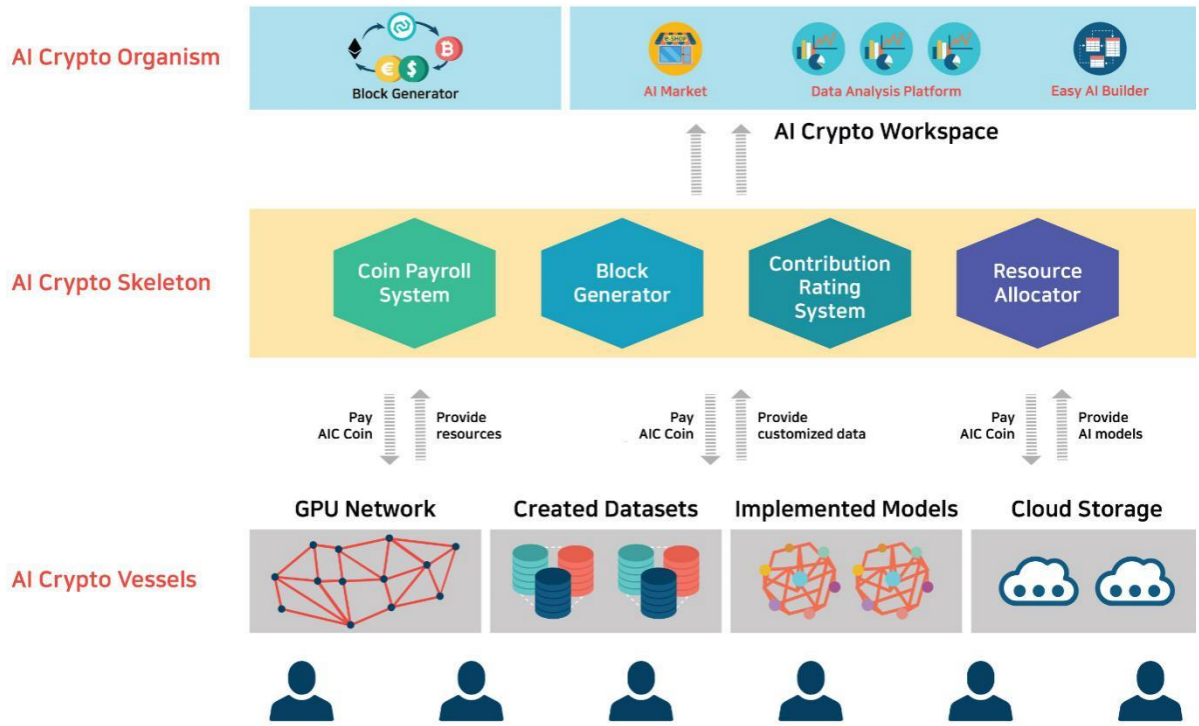

Figure 2. The AI Crypto Platform is mainly consisted of AI Crypto Vessels, AI Crypto Skeleton, and AI Crypto Organism.

AI Crypto Vessels

The participants of AI Crypto Ecosystem take part in the system by providing the main factors of AI such as hardware, data, and models in the stratum defined as *AI Crypto Vessels*. AI Crypto's hardware consists of a GPU Network for calculations and Decentralized Cloud Storage in order to save data. They provide the resources they possess and get coins as a fee from the resource users in return. At the same time, when the resources are proven worthy by other members of the ecosystem, the providers get additional rewards in the *AI Crypto Skeleton* in accordance with the principle of **Proof of Value (PoV)**.

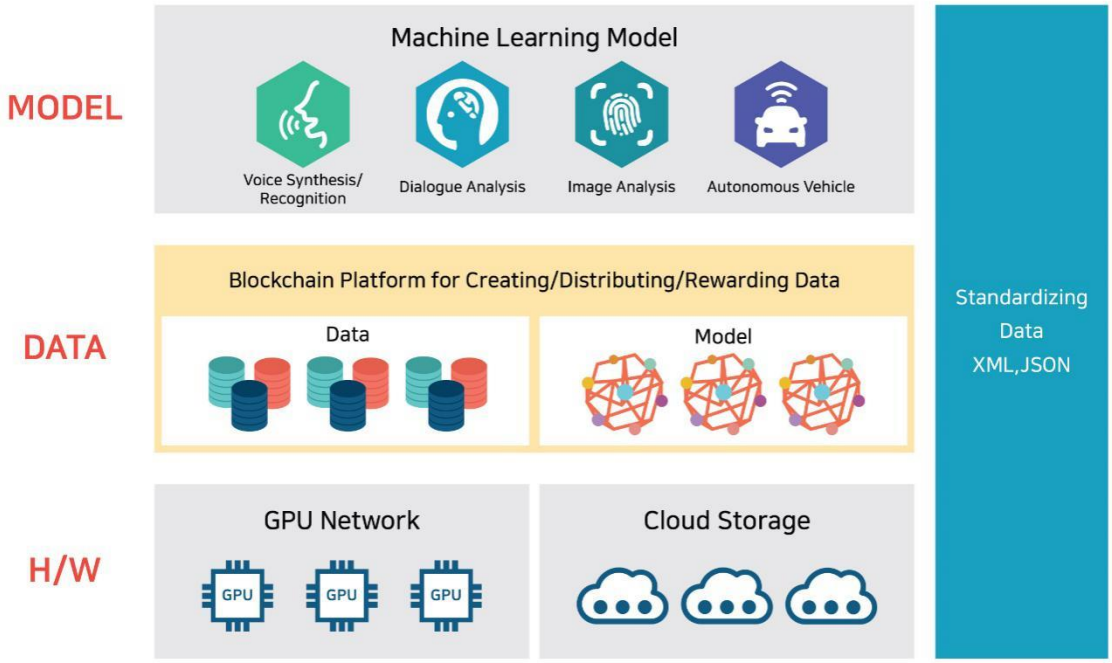

Figure 3. AI Crypto Vessels is consisted of AI service (Model), data, and hardware, and each member participates by providing each resource.

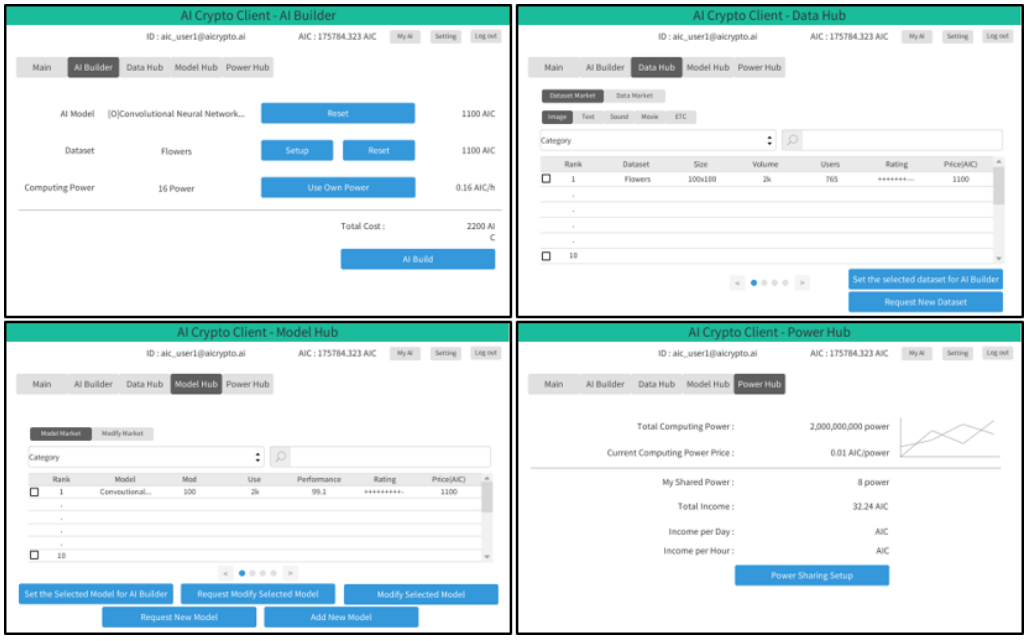

Figure 4. An UX example of the client prototype participating in the AI Crypto Vessels.

Hardware Ecosystem (GPU)

This basically means sharing GPU resources. The individuals taking part in the AI Crypto Ecosystem provides some portions of the computational capacity in their own GPU to the public network to supply resources needed for AI calculations, and get rewarded with AIC coins in return. The computational units distributed over the public network will be allocated to requested works by the *Resource Allocator* in *AI Crypto Skeleton*. The collected fees for using the resources will be distributed by the *Contribution Rating System* provided in the *Vessels* to realize the philosophy of **Proof of Value (PoV)**.

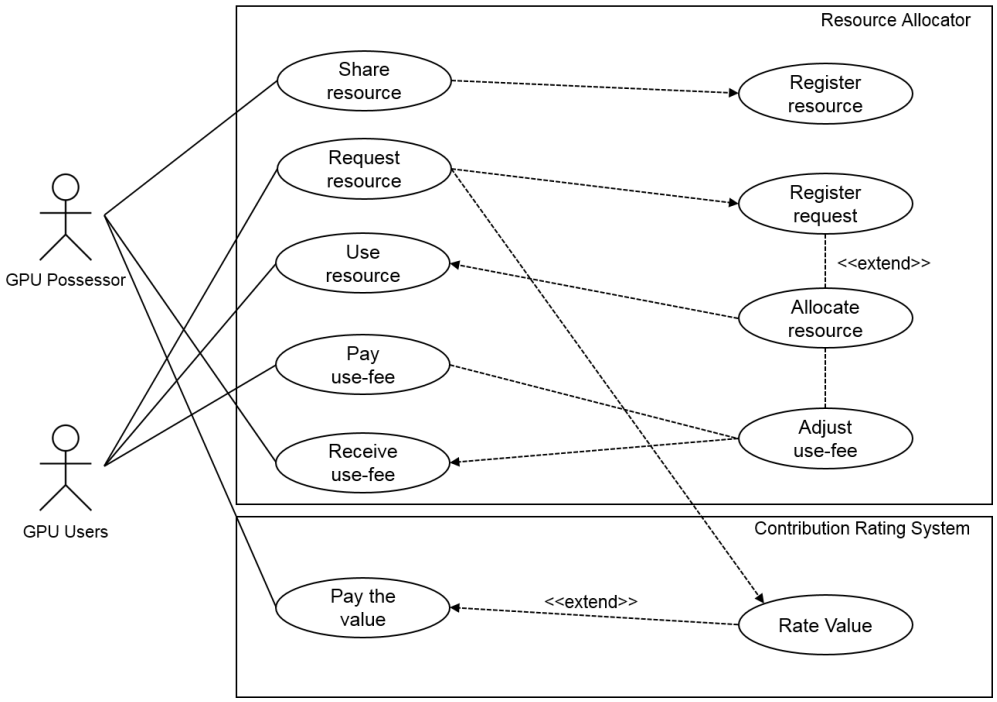

Figure 5. GPU possessors and users are the main members of the GPU Network. The distribution of resources is carried out by *Resource Allocator*, and the evaluation and rewarding are done by *Contribution Rating System*.

The hardware sharing system will be implemented based on a mixture of the Grid Computing system and the peer-to-peer (P2P) network, and each hardware participating in the network, the node, will be distributed with the maximum efficiency by the *Resource Allocator*. GPU resources required for machine learning operations form a computing grid on the network, and the data necessary for learning forms a data grid on the network.

Resource Allocator allocates each node participating in computing and collects data to be used as the input of computing from the nearest data grid. In terms of computing efficiency, theoretically, the most efficient case is that GPUs in a node utilize data within the same node. Also, each node that exists as an individual peer, collaborates preferentially with the closest nodes with short communication time. Therefore, the problem of communication inefficiency caused by decentralization, can be solved. In addition, the learning data registered in the data grid is not provided directly but is provided as simplified data that has been preprocessed. This reduces the burden on individual nodes in terms of security and efficiency.

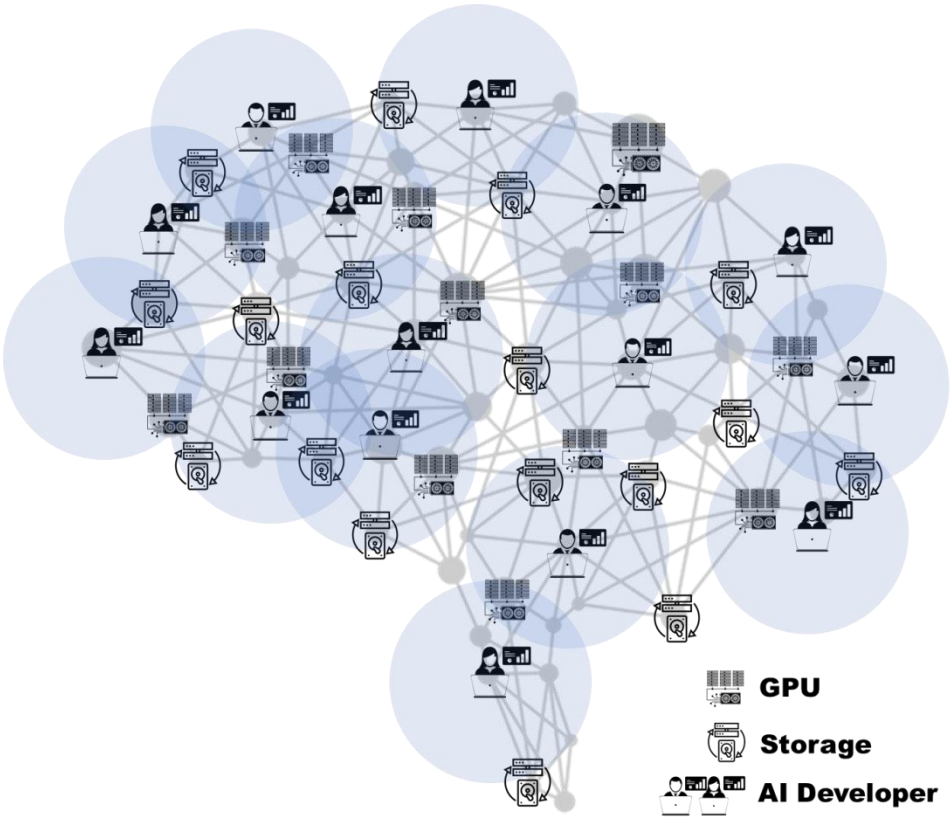

Figure 6. AI developers conduct model learning peer-to-peer, primarily using the closest GPU and storage resources.

It is also possible that a malicious participant would simply repeat the deep-learning computation, induce GPU resources, or produce false results regardless of the given task, to induce hardware traffic or otherwise. Therefore, a module will be included on the system to check whether the corresponding hardware node has done its job faithfully, through validation of the assigned work.

Shared Data Ecosystem (Dataset)

In the *AI Crypto Ecosystem*, users can use some or the whole parts of shared dataset for free or by paying a fee. The fee is delivered to data providers as a reward and some are used as a commission for running the *AI Crypto Skeleton*. The created data should meet the criteria of the initial requester and can later be provided to other users in need of that data, either for free or charged. If the created data is used frequently in *AI Crypto Ecosystem*, resulting in the boost of *AI Crypto Ecosystem*'s consumption value, it is evaluated highly by *Contribution Rating System* in the *AI Crypto Skeleton* and the provider will get rewarded with coins owned by *AI Crypto Skeleton* according to the principle of PoV. If a malicious user in *AI Crypto Ecosystem* requests meaningless data and tries to acquire coin by providing the data on one's own, the data that are not used by other members cannot generate any kind of profit and *Contribution Rating System* will give penalty once it detects fraudulent uses.

The creator who created valuable data that is widely used within the *AI Crypto Ecosystem* should be rewarded appropriately. However, some malicious users may use the data outside of the Ecosystem to prevent legitimate reward allocation. Therefore, the data provided to AI Crypto Ecosystem will be designed so that it can be used only within the Ecosystem, and it will be provided encryptedly in a way that defines the conditions of use so that data cannot be utilized outside the Ecosystem. In addition, considering the issue of privacy protection that is dependent on the data itself, such as the problem of non-identification of personalized data, the data distributed in the ecosystem can be directly used as an input data of artificial intelligence or machine learning model. It will also protect personal information and reduce network traffic. The raw data collected from the creator is stored in a separate space. To satisfy the needs of the data users who wants to check the quality of the raw data, a small number of data from the collected datasets can be previewed by random sampling. The reason why users do not see the full data is to prevent attempts to use the data without paying AIC.

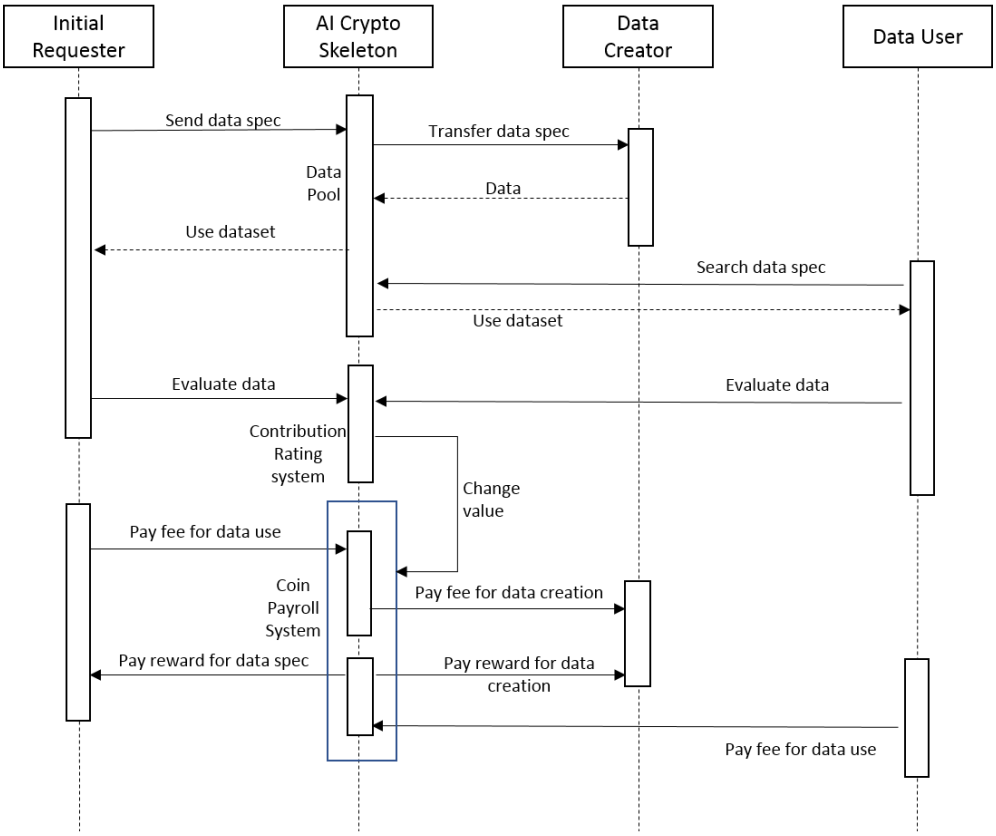

Figure 7. Shared data ecosystem is consisted of initial requesters, creators and users, and the distribution of resources and rewarding is conducted in the AI Crypto Skeleton.

Cloud Storage Resources Ecosystem

It's impossible to save massive amounts of data from the AI Crypto Ecosystem in one centralized storage center. Therefore, provided data needs to be saved through a Decentralized Cloud Storage system. Participants in the AI Crypto Ecosystem can earn AIC coins by: providing storage space, sharing computing power for network connectivity, and participating in the actual data collection.

AI Model Ecosystem

AI engineers can provide models that they designed through *AI Crypto Vessels*, contributing to the *AI Crypto Ecosystem*. The provided models will be compatible with the predetermined input / output format of data in *AI Crypto Ecosystem* so that can be implemented in any programming language. The value of models provided in the *AI Crypto Ecosystem* will be given in the form of reputation when they are used by other members in another layer

called *AI Crypto Organism*, and the developers will be properly rewarded by the principle of PoV.

AI Crypto Skeleton

Resources such as GPU, Dataset, Storage Space and AI Models provided by individual members in the *AI Crypto Vessel*, which circulate in the *AI Crypto Skeleton*, helping to vitalize the *AI Crypto Ecosystem*. Unlike the components of *AI Crypto Vessels* which are physical, the *AI Crypto Skeleton* exists distributed in the cloud. Conceptually, the *AI Crypto Skeleton* is consisted of *Resource Allocator*, which distributes the resources of *AI Crypto Vessels* and calculate fees, and *Contribution Rating System*, which evaluates the values of resources in the *AI Crypto Ecosystem*. These factors are embodied via ERC20 Smart Contract. The distribution of profits created from the *Organisms* is also conducted through *Coin Payroll System*.

A block for recording transactions is created at the node of GPU network in the *Vessel* randomly selected on the *Block Generator* and is verified in the exact same way by other GPU nodes chosen randomly by the *Skeleton*. The block is generated in each training session of machine learning algorithm at the same time, and its header contains the information such as node ID, running algorithms, session ID, so that it prevents the attempt to create a block by false. The transaction verification block created as a result of machine learning, is added to the blockchain when the *nonce* is adjusted according to the block creation cycle, and when the block meets certain conditions. At this time, the owner of each node that participates in the *Vessels* and provides the GPU resources cannot know the creation of the block until the new block is added to the chain. Each members of the *Vessels* cannot recognize whether a part of one's node participated in creating or verifying blocks or not, therefore getting rid of the possibility of verifying malicious transactions. Each block will be created every 2 seconds in the early stage of the *AI Crypto Ecosystem* and will be changed as the number of transactions and the participating GPU Nodes increases.

AI Crypto Organism

AI Crypto Team suggests a new alliance called the *AI Society*, consisted of deep-learning researchers and experts, and start-up workers in all related fields. *AI Society* will help vitalize *AI Crypto Ecosystem* and boost the development of AI. Members of *AI Society* can participate as hardware providers, or data and / or model creators in *AI Crypto Vessels*, contributing to *AI Crypto Ecosystem*. Or they can participate as users in *AI Crypto Organism*. For example, the owner of an Internet cafe can take part in the Ecosystem as a member of the *Vessel* by providing computer resources that are not in use. Also, AI researchers at universities can train models and develop them using the resources within *AI Crypto Ecosystem*. Then they can provide the models to corporations of the field. And start-up workers in the related field can use the AI service in the *Organism* to create new products and sell them. All these activities will contribute to the development of AI. In order for this to happen, the AI Crypto Team would put fair amount of effort in building the initial *Society* and providing the community where members can interact with each other. AI Crypto Team creates an alliance consisted of AI start-ups and developers as a first step to build *AI Society*. The AI Crypto Team would do our best for the members to use *AI Society* without facing any problem. The *AI Crypto Ecosystem* supported by *AI Society* gives rewards to the members for creating proper values as the result for actions in the *Skeleton*. For example, users outside the *Ecosystem* can launch their own AI service through easily combining various components within the *Ecosystem* on GUI through using the *Easy AI Builder*. Users outside the Ecosystem can share the benefits of the services with other suppliers of components in the *Vessels*. The created components can be traded in *AI PLAZA*, enabling all members in the *Ecosystem* to contribute utilizing the AI technology and make profit out of it. For special purposes, it can provide a *Competition Platform* for analyzing data, such as Kaggle, so that many people would be able to design the best AI model or find an appropriate format using the same dataset. In such ways, AI products created within *AI Crypto Ecosystem* contribute to the society through the *AI Crypto Organism*, also enhancing the value of *AI Crypto Ecosystem*.

The Key Technologies of AI Crypto

Summary of Key Technologies

This section explains the details on key technologies of AI Crypto, which include the AI Deep Learning module to solve the pain points of AI models, AI training data and AI Mining module to solve the inefficient utilization of scarce AI hardware resource. The AI Ecosystem module creates an ingenious token ecosystem that motivates every participant in AI Deep Learning and AI Mining, to utilize and allocate AI resources in a more efficient and innovative way. This solves or remits the three major issues in the promotion of AI technology as identified by AI Crypto. As shown in Figure 8, AI Mining, AI Deep Learning and AI Ecosystem jointly build the key technical framework of AI Crypto.

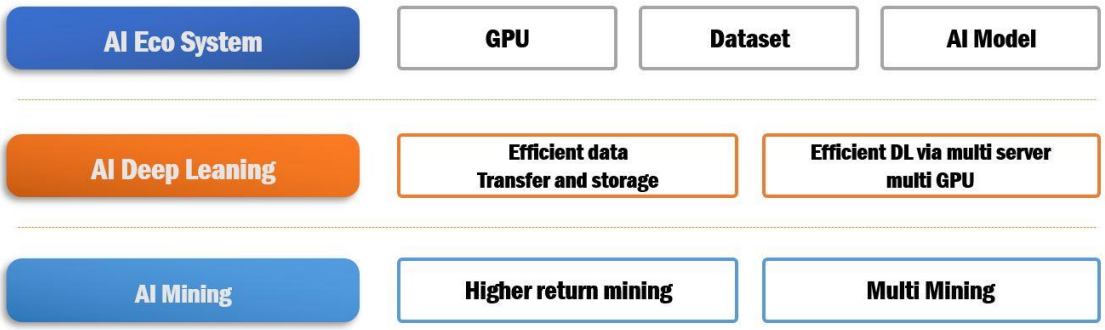

Figure 8. Key technology framework of AI Crypto

In addition, for the technical solutions to custom Ethereum virtual machine and smart contract expansion design, we will focus on cutting-edge technology development (blockchain 3.0) in the subsequent R&D to develop favourable public chain in the future, that will bring a feasible solution for the encryption design for sensitive training data.

AI Deep Learning

AI Deep Learning is a major direction for future technology development and has very large economic market potential.

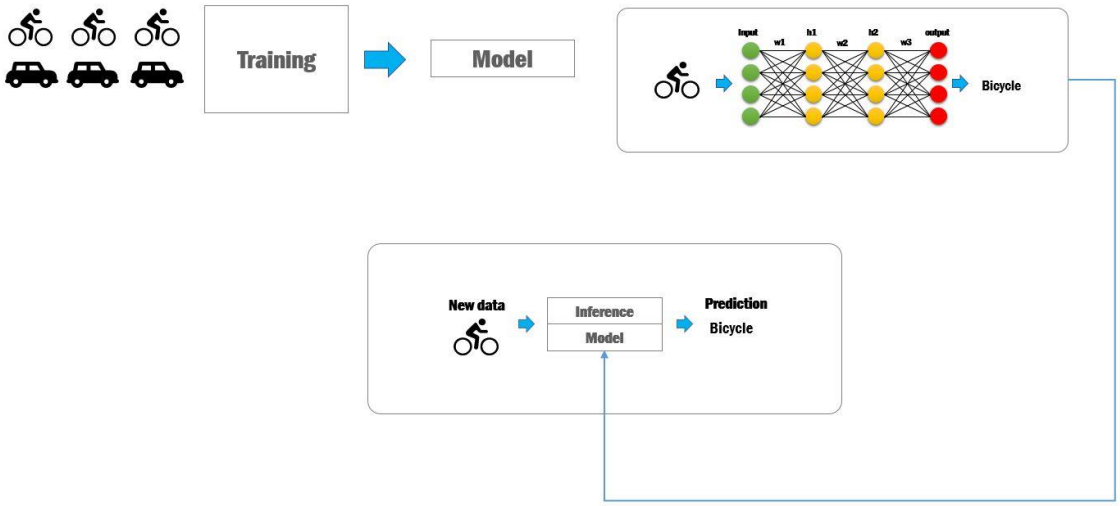

Figure 9. What Deep Learning do: Self Learning and prediction

In order to achieve accurate AI awareness during AI deep learning, multi-layers of iterative calculations are required. Se the following Figure 10 for more information. For example, as we all know to defeat the international chess king, the AI of Google AlphaGo must form an accurate strategy with multiple levels of iterative calculations. However, repetitive calculations require a lot of computing power and calculation time. So if you can solve these two problems, you can help develop AI deep learning.

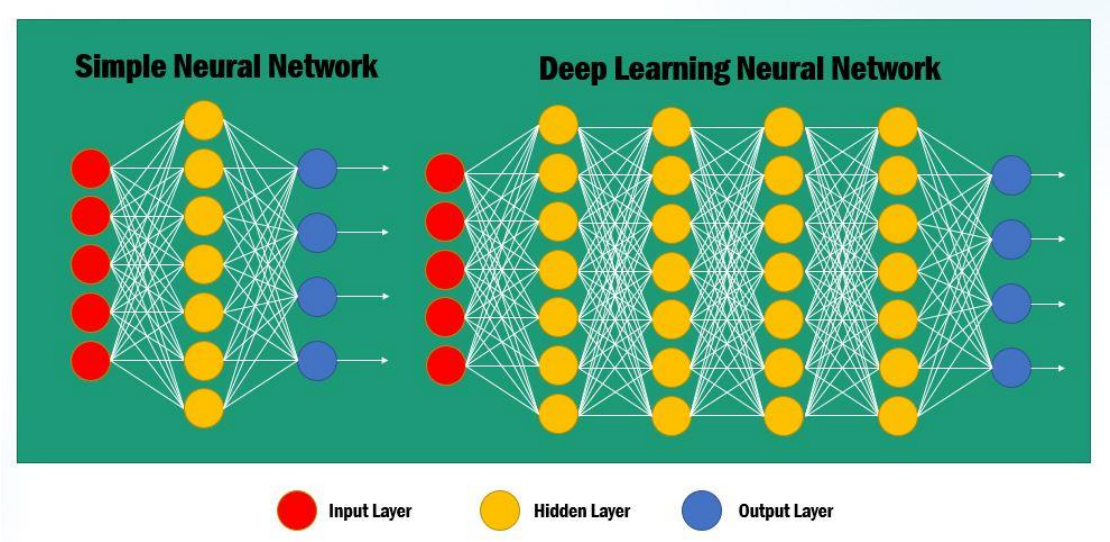

Figure 10. Multi layers Computations: requires huge amount of computing power

When interpreted as a mathematical formula, "multi-layer" is more than on layer, and the more layers, the more complicated the iterative calculation, the more accurate it is.

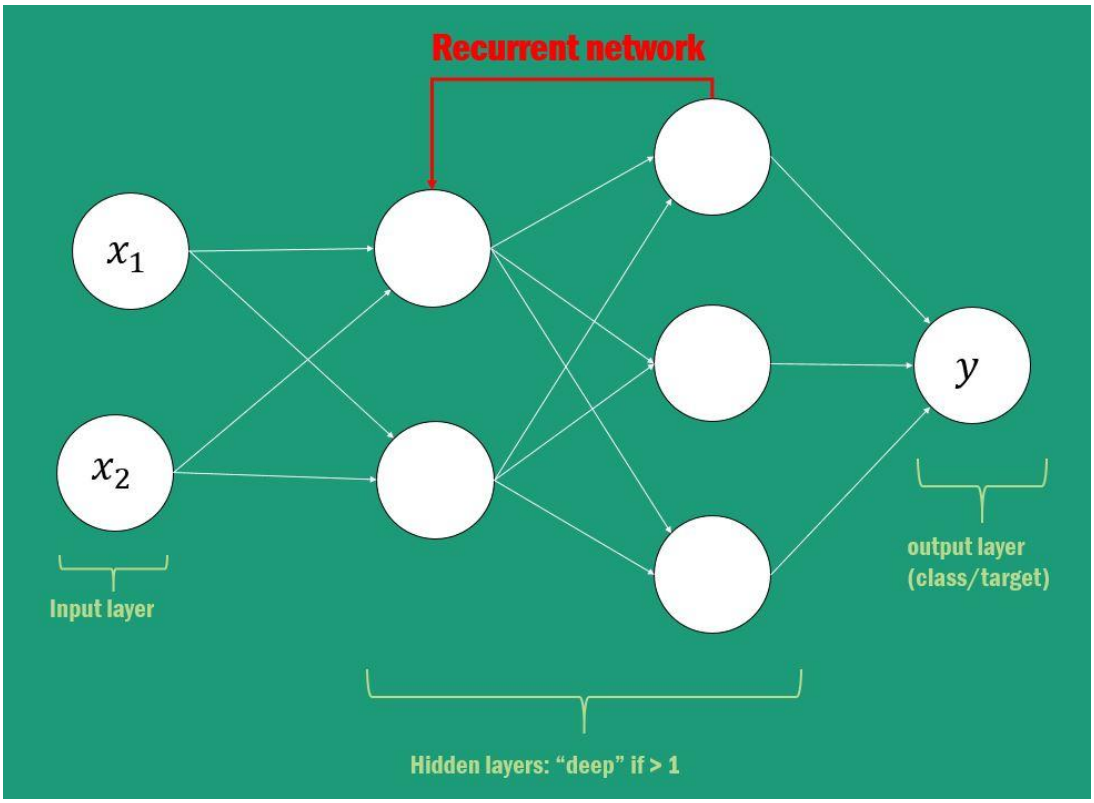

Figure 11. Multi layers Computations

Standardized Deep Learning Model

Due to the complexity of AI models, they often make it hard for model consumers to understand, due to the different machine learning algorithms, diversity of AI model contributors 'coding methods as well as machine deep learning models. Meanwhile, it also creates difficulty to evaluate the models' real effects. Hence, the corresponding model standardization rules (Distributed GPU Deep Learning Standardization) need to be set such as calling interface definition, parameter configuration and operating environment description, etc.

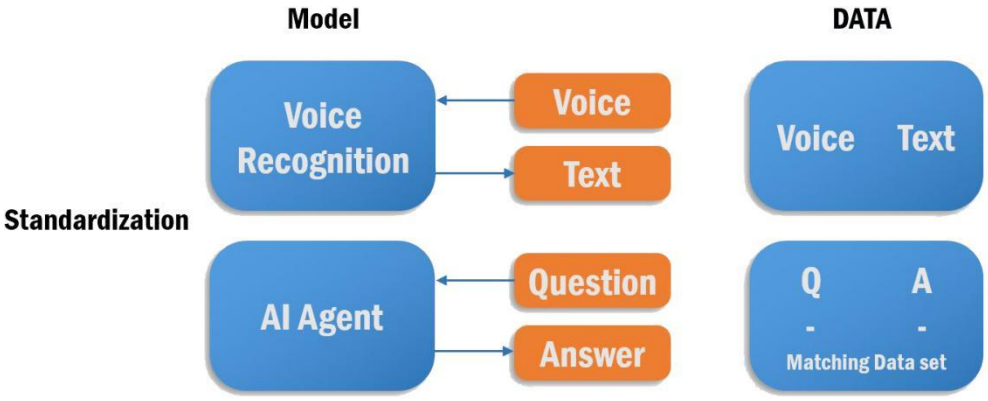

Figure 12. Example of standardization of application scenarios for deep learning models

Taking voice recognition and deep text matching (Q&A) as examples, Figure 9 briefly illustrates a sample of model standardization. The model contributors need to provide the descriptions of the training data input format for different application scenarios, so that the model can quickly verify the comparable application effects when solving real case scenarios.

Digitizing AI Data: More efficient transport and storage

The AI training data set in real case scenarios is often massive and requires large amounts of memory for in-depth calculations. This makes it inefficient to process deep runs and computation by sending large data sets in a distributed environment. The common solution is to read into memory in batches, which, however, will inevitably affect the operation efficiency. Starting with the intermediate process of numerical operations, as shown in figure 2.2, we plan to solve the bandwidth problem by pre-processing the actual data required for deep computing and sending it in the form of digitized data. At the same time, we will also consider the use of caching mechanism to improve operation efficiency to save cost.

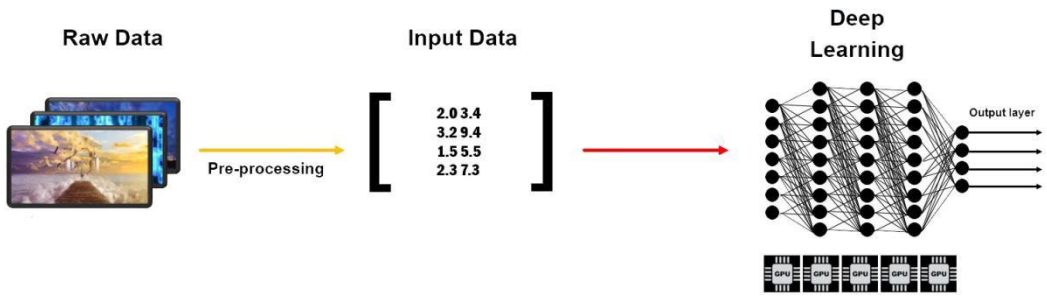

Figure13. Example of digitization of application scenarios for deep learning training data

AI Mining

As mentioned above, the scarcity of deep learning hardware devices makes the cost high. This is because such resources are often concentrated in the hands of a few institutions. To promote fairness and eliminate efficiency issues when using deep learning resources, AI Crypto plans to bring together as much temporary idling mining equipment (such as GPUs) as possible to form a hardware pool for deep learning sharing platforms. These devices, such as GPUs, FPGAs, ASICs, and DSPs, can be owned by either individuals or institutions (such as mining farms). Devices of different types and performances will connect with our platform in accordance with our defined common standard interfaces. Also, we will provide customized solutions for mining farms or other large and concentrated resource contributors. This provide high quality services and stable performance requirements for resource consumers. The application of blockchain technology not only solves the inequal spatial distribution of AI hardware resources, but also enables us to further integrate other technologies to optimize resource application efficiency.

The following are two key innovative technologies that we focus on to develop hardware configurations and software deployment solutions to maximize the utilization of resources. This effectively address the inequalities in the distribution of AI hardware resources, improving efficiency and creating greater value for the participants of AIC token ecosystem.

Multitasking Real-Time Switching

The AI Crypto sharing platform integrates the hardware resources of the AI device contributors to build a deep learning hardware pool. Through the resource scheduling, isolation & distribution system of AI Crypto, AI resource consumers, especially deep learning hardware consumers, will be able to use the scarce resources at more reasonable prices (lower than the GPU service fee of current mainstream cloud service providers). Also, consumers who bought long-term right to use learning hardware often have a lot of fragmentary time and do not need to perform deep learning computing. This makes multitasking real-time switching necessary.

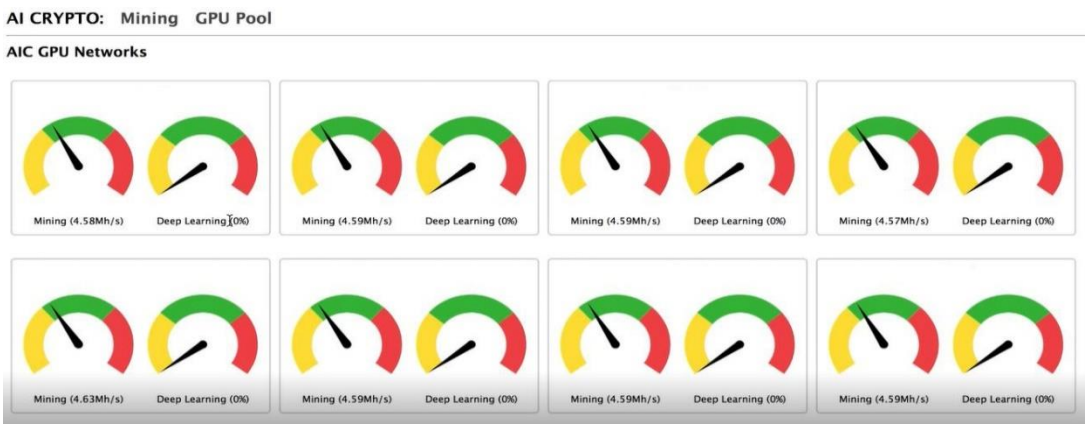

Figure18. Concept map of real-time monitoring and automatic switching between mining and deep learning

As shown in Figure 18, we developed a real-time monitoring system for deep learning hardware resources. Once the system is turned on, it can automatically switch from the current task to other tasks, such as switching between deep learning algorithm operation and cryptocurrency mining operation. This function will be monitoring in real time and automatically switch tasks, which can effectively solve the time imbalance of AI hardware resources.

Optimization of Mining Efficiency

The key to mining is to demonstrate the strength of hashing power through hash operation to obtain greater opportunity to create the blocks. Assuming the performance of the hardware devices is consistent, it will be a theoretically considerable direction to achieve a breakthrough in POW through software innovations. As shown in Figure 3.2, based on this idea, we developed the "Crypto + AI Mining" solution, which uses deep learning algorithms to optimize the hash function and further accelerate the hashing effect. Hence, under the same equipment conditions, this effectively increase the efficiency of AI hardware resources and help miners to obtain mining revenues at a faster rate.

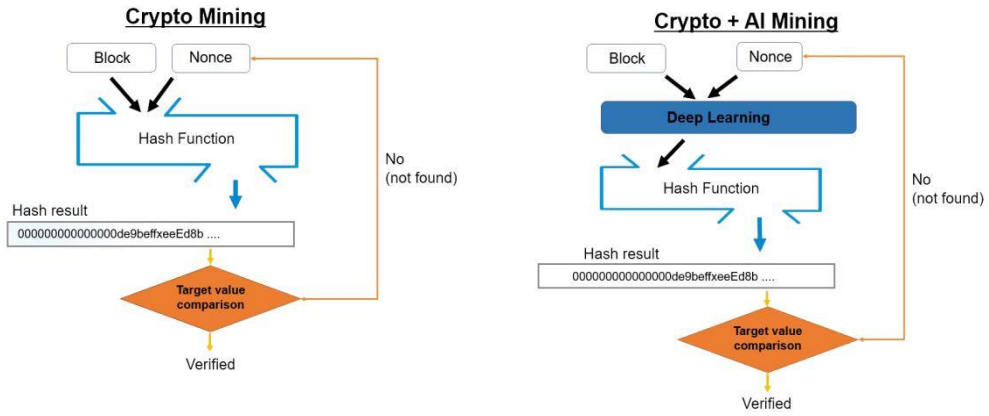

Figure19. Efficiency comparison between traditional mining and AI Mining mining

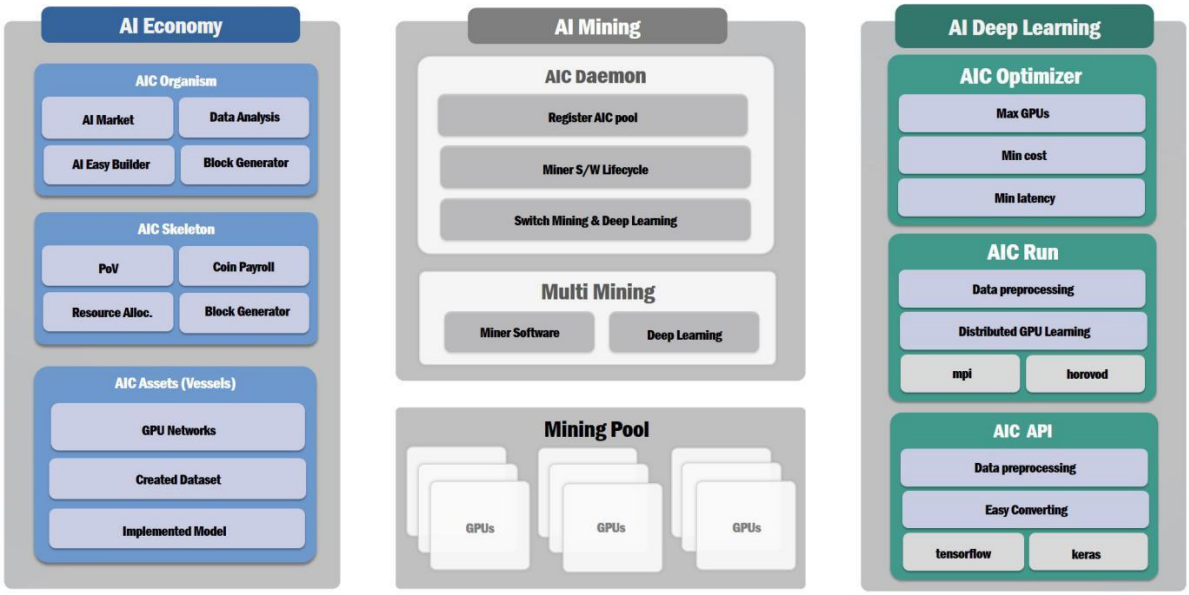

Figure 20. AI Crypto Architecture

Market Overview of AI Deep Learning

The Market for AI Deep Learning is huge, attracting international companies such as Amazon, Google and Facebook.

Figure14. Trend in AI Deep Learning: Billions dollar market size and growing exponentially

As you can see in the Figure 15 below, Google's AI Deep Learning business has been growing exponentially in recent years. Google is a leader in software, proving the evolution of the AI Deep Learning market.

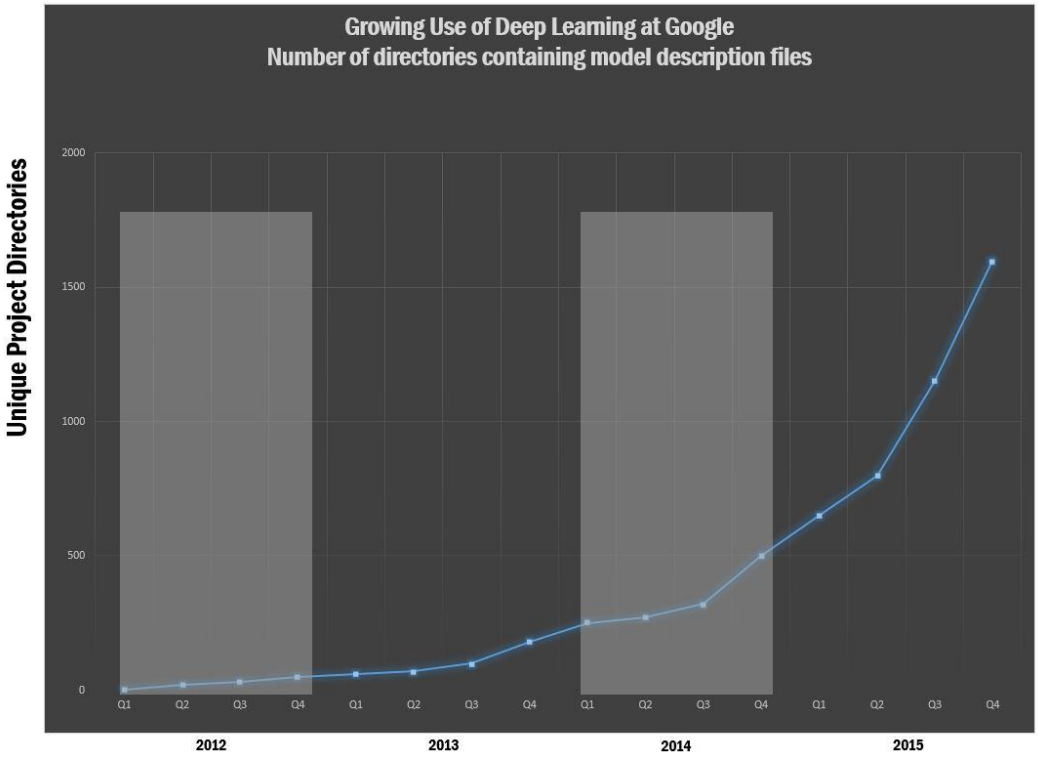

Figure15. Trend Growing Use of Deep Learning at Google

NVIDIA's AI Deep Learning business has grown exponentially in recent years. NVIDIA is a giant in the GPU industry, proving once again the evolution of the AI deep learning market.

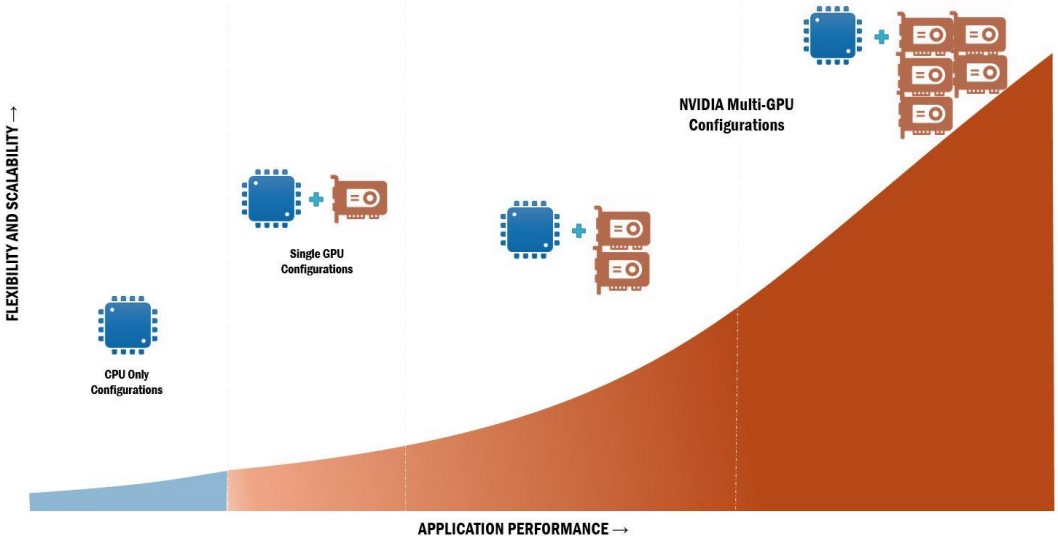

Figure16. Trend Growing Use of Deep Learning at Google

Business Model of AI Crypto

We are trying to create a win-win business model. For example, with multi-server, multi GPU(MSMG) AI deep learning technology, we can partner with mining owners with large

PGU, providing large amounts of AI deep learning computing power and significantly reducing computational cycles. This can serve some AI-intensive companies, such as AI research companies, large game companies and film industries that require AI work. Therefore, our potential strategic partners are mining owners, cloud computing companies, game companies and AI companies.

Figure17. AI Market Size

The Art of AI Crypto

Proof of Value (PoV) – Contributing Through Providing Value

One of the problems of cryptocurrencies based on blockchain is the absence of the real economy corresponding to the value of cryptocurrencies. Proof of Work (PoW), which is the most common consensus mechanism, consumes most of the resources on creating encrypted blocks which contains transaction ledgers. GPU, which seems as an essential tool for developing AI, has degenerated into a tool for simple calculations for mining coins. Moreover, the amount of electricity used in mining is tremendous, almost as much as the annual usage of Bangladesh or Rumania and is steadily increasing[3]. Another common consensus mechanism is the Proof of Stake (PoS), which rewards users according to stake holdings. The cost for creating blocks is cheaper therefore there is no need to verify diverged chains, resulting in limited blocking for unjust transactions (i.e., Nothing at Stake). To prevent these indictments and serve the mankind through AI technology via realizing the virtue of resources, the *AI Crypto Ecosystem* adapts the principle of **Proof of Value, (PoV)**. According to PoV principle, coins are delivered as rewards when a proper value is created through the rightful use of shared resources. When the *AI Crypto Ecosystem* is misused for malicious purposes, the user gets damaged by paying transaction fees, only getting rewarded when the members of the *AI Crypto Ecosystem* agree that the profits are generated, resulting in a virtuous cycle in the *AI Crypto Ecosystem* through PoV principle.

We are considering using the PoV for the Agreement Algorithm. How one should act could be a method introduced as part of the PoV for the Agreement Algorithm and block storage by modifying the consensus layer or alternatively, for profit sharing based on contributions made while following the existing Ethereum consensus model. The PoV would be applied properly within the ecosystem during the development process.

[3] Bitcoin Energy Consumption Index. https://digiconomist.net/bitcoin-energy-consumption

Distributed GPU Network via Sharing Economy

To realize the idea of rewarding righteous use of resources and creating values, we seek solution in sharing economy model; members in the *Ecosystem* who desire to contribute to the *Ecosystem* with their hardware resources can make the first setup by sharing their GPU. When their GPU is in an idle state, they should notify that the resources are available in the *AI Crypto Skeleton*. When there is a request for demanding resources inside the AI Crypto Ecosystem, *Resource Allocator* allocates the idle resources to the requesters. GPUs on the shared network are allocated anonymously to the requesters via *Resource Allocator* in the *AI Crypto Skeleton*, preventing malicious users from misusing the PoV principle for self-circulating the resources of the AI Crypto Ecosystem.

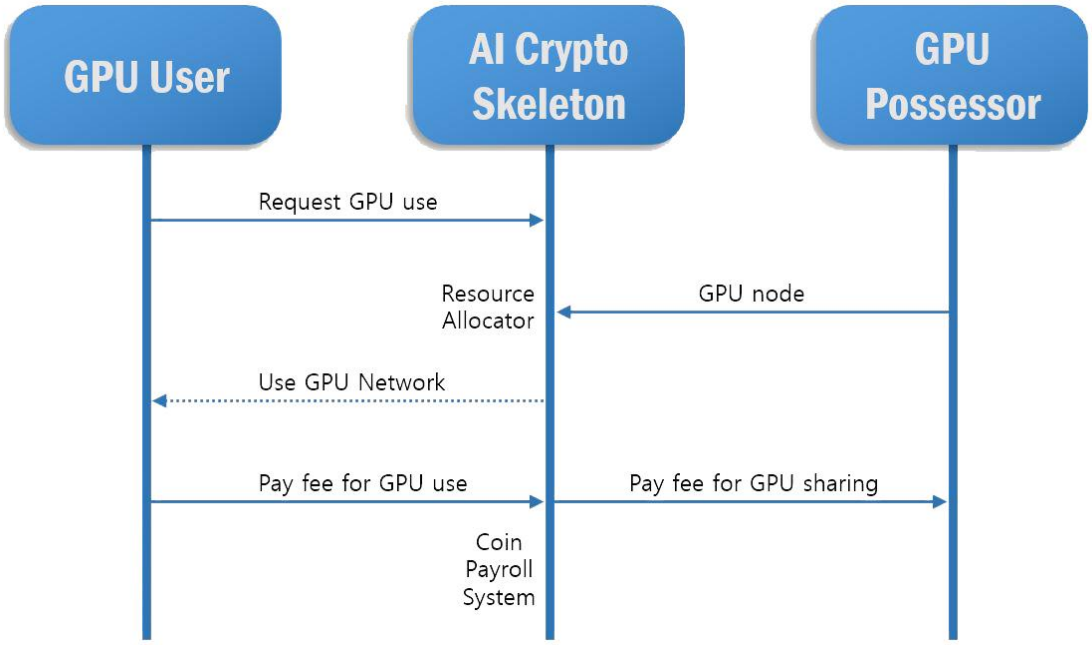

Figure 21. The shared hardware ecosystem is consisted of users and GPU possessors, and the distribution of their resources and rewards are made in the *AI Crypto Skeleton*.

ERC20 – Embodying the Smart Contract

AI Crypto Ecosystem would be embodied following the regulations of ERC20 standard. In the early stage of *AI Crypto Ecosystem*, *AI Crypto Backbone* would exist to sustain the *Ecosystem*, and will support transactions in cryptocurrency-exchange and transactions between the two different front-end layers in the *Ecosystem*; the *Organism* and the *Vessel*. When the protocols of *AI Crypto Organism* and *AI Crypto Vessel* are implemented in the platform, *AI Crypto Backbone* will evolve into *AI Crypto Skeleton* and play the role of the main-net of *AI Crypto Ecosystem*. *AI Crypto Skeleton* as the main-net will exist distributed on the cloud and will vitalize AI Crypto Ecosystem for the sake of the philosophy of decentralization, perfectly independent from any outside regulations.

ERC721 – Resources Sharing and Transaction

In the AI Crypto Ecosystem Data, Dataset, Model and Trained AI are carried out in the ERC721 format. The ERC721 format features individual Tokens with IDs for each possessor. By using the Tokens or through transferring ownership of said Tokens, AIC transactions will be set into motion in the AI Crypto Ecosystem. For example, as Data Providers have ownership of the provided Data, Data Providers can be paid a fee from the Data User.AI Developers can earn AIC coins when they are commissioned for AI development, composing Trained AI Models, or transferring ownership of AI Models.

AIC Ecosystem Use Cases

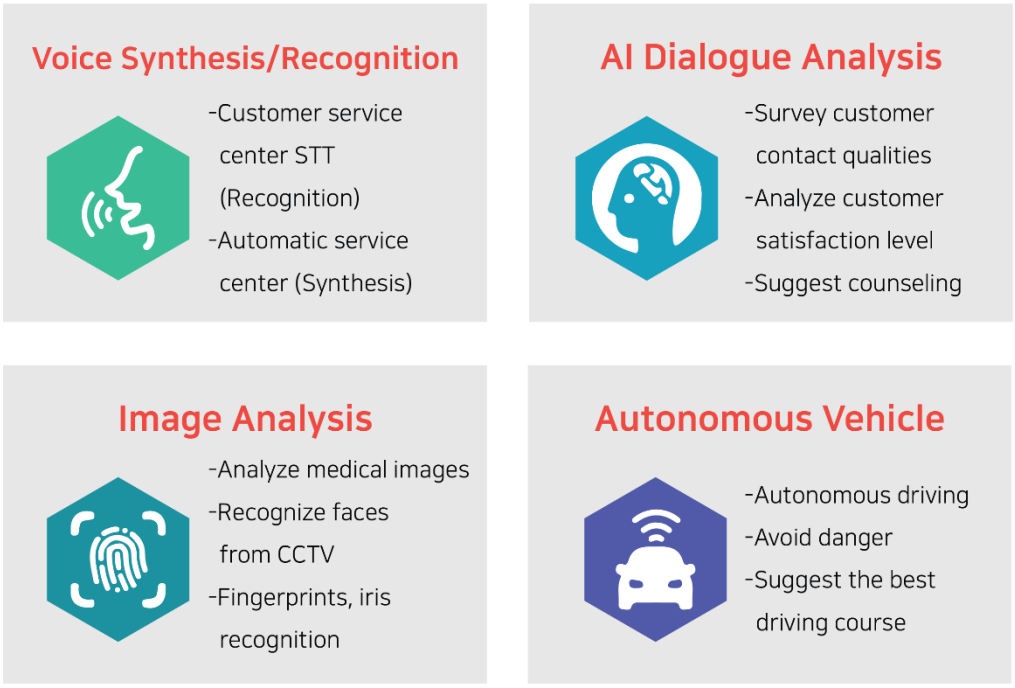

Figure 22. Major use cases of AI that can be applied to AI Crypto.

AI Service in Voice Recognition / Synthesis

It creates models for voice recognition engine using deep-learning and individualized voice synthesis technology, embody voice recognition services by collecting dataset specialized for specific domains. It also provides a platform where complex factors of voice recognition models are composed by simple GUI tools without needing the knowledge for programming and be serviced. It also provides items needed for voice recognition and synthesis, making it easier for users to create and provide data, enabling other users who want to create services to use the data easily through rewarding the providers properly.

Dialogue Analysis

It analyzes dialogues between users and consultants, or just users using dialogue analysis technology based on natural language understanding. This can be used to make customized suggestions and to increase sales or enhance the quality of customer counseling. Also, it

analyzes emotion, intent, and context from the previous conversations of the person it is talking to, training the analysis model to draw the best answers, and helping the AI agent to make fluent conversations in the finance, shopping, medical fields, and so on.

Image Analysis

AI based services operating on blockchain such as categorizing images, facial recognition, and fingerprint / iris recognition can be provided via the AIC platform. Unidentified data necessary for training AI model for image analysis will be distributed through the AIC platform, and various image analysis services will be provided using this technology.

Autonomous Vehicle Service

Autonomous vehicle service requires collecting massive amount of data and processing it, as well as conducting numerous calculations quickly. For this, embodiment of a complex artificial neural network and a high-performance computer is required. Through the GPU network provided on the AIC platform, users can develop the AI model for autonomous vehicle and make it into a service.

AI Crypto (AIC) Coins

10,000,000,000 (10 billion) AIC coins are to be issued and circulated in the AI Crypto Ecosystem, and members of the ecosystem can participate through Ethereum. The Hardcap of the initial funding is to be limited to 3 Billion AIC. The effective value of the currency would be adjusted in order to preserve the appropriate value by the *Contribution Rating System*. It will be announced on the official channels such as website or the social media network. About 30% of the coins (3,000,000,000 AIC) are to be distributed to fundraisers through ICO.

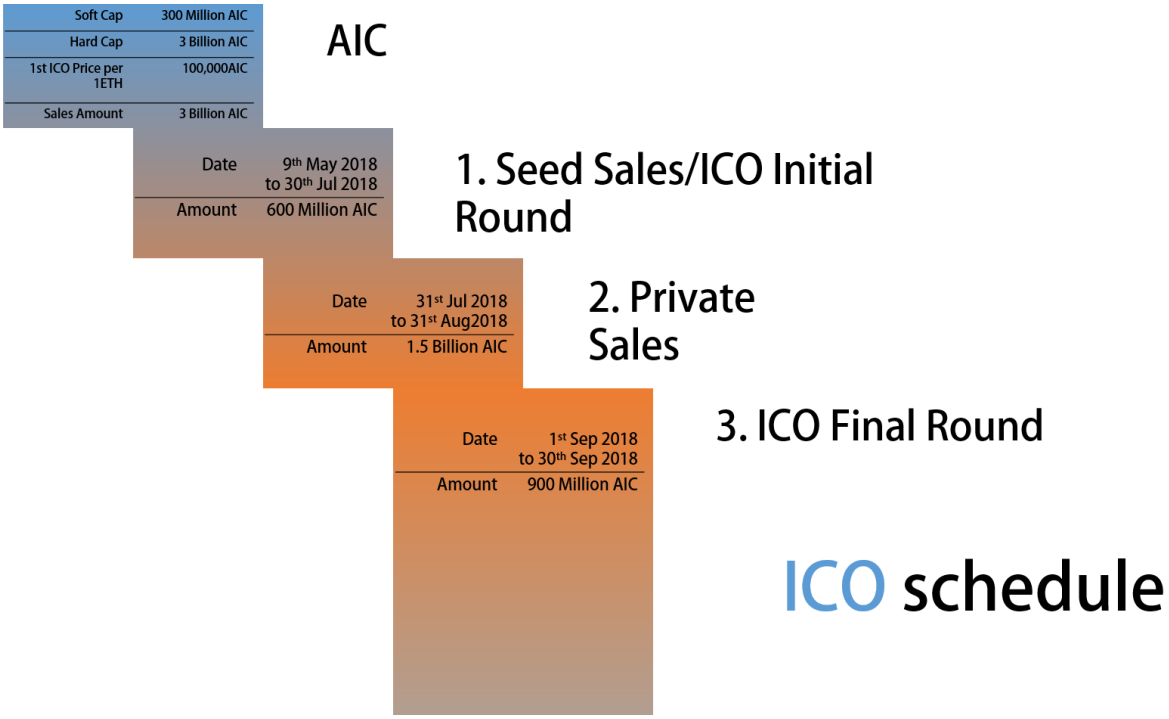

Figure 23. ICO Schedule

Distribution Mechanism

The AIC coins will be distributed in the following proportions to the members of the AI Crypto Ecosystem.

- Investor– 30 %
- Team – 25 %
- AI Ecosystem Incentive – 20 %
- Marketing – 15 %
- Advisor – 5 %
- Company Reserve – 5 %

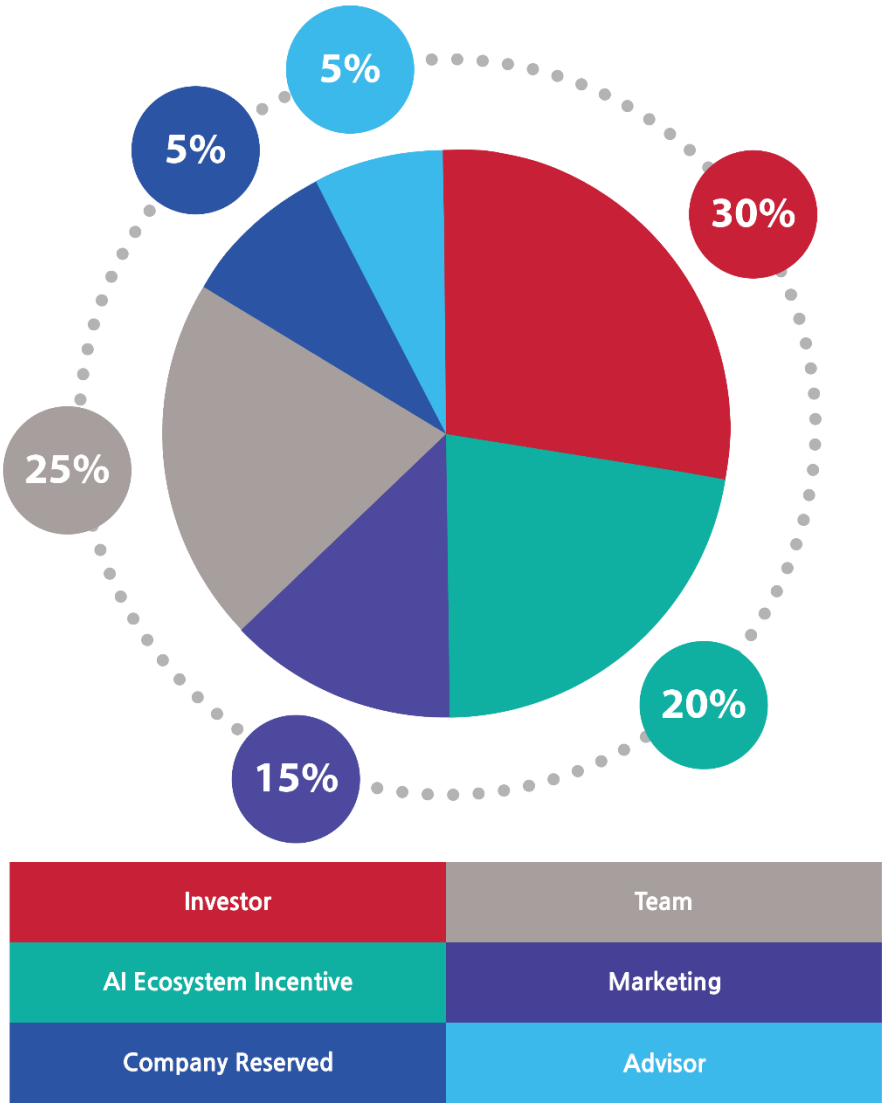

Figure 24. Distribution of AI Crypto coins

Proceeds Allocation

Development – 42 %

This expense is used for embodying the AI Crypto platform. This includes costs for developing the platform, embodying and testing the distributed *Resource Allocator* and platform components, making the use case of an AI application operating on the platform, and testing the UI / UX for building dataset.

Operating Expense – 25 %

Operating expense is used for running the AI Crypto platform before the initial fees are collected. This includes costs for building the initial architecture, and maintaining the GPU

Network, Dataset, AI Model and AI Crypto Ecosystem until they grow large enough to stand independently.

Marketing & Accounting – 14 %

The marketing and accounting expense is necessary to vitalize the AI Crypto platform. AI Crypto Ecosystem is alive when members provide and use shared resources in the ecosystem, therefore active participation of the existing providers and consumers of the AI market is vital. This cost does not include marketing costs directly for ICO.

Business/Strategic Expense – 11 %

The goal of the AI Crypto Ecosystem is to share GPU resources and allocate them to righteous usages, and decentralize major resources and share the benefits, resulting in realizing the values of the AI Crypto. At the early stage of the platform, a certain amount of administration and/or restriction will be inevitable in order to activate and vitalize the AI Crypto Ecosystem. For this sake, Business/Strategic expense will be used to effectively manage the shared resources all around the world.

Reserved – 8 %

This expense will later be used for updating the platform.

Plans for Additional AIC Coin Issues

AI Crypto will operate as an Ethereum based smart contract in its initial version. There are no additional coin issues until this time, and additional coin issues may occur after AIC Main-net hard fork.

The AIC coins will produce blocks and verify transactions in the *AI Crypto Backbone* based on the cloud. *AI Crypto Backbone* evolves into *AI Crypto Skeleton* right after when the AI Crypto Ecosystem is embodied, which verifies transactions through Proof of Value (PoV) principle. The transaction records are verified by an anonymous node in the *Skeleton*, and additional coins are issued when the resources are used in righteous ways and purposes. These are for rewarding the realization of values created through the righteous use of shared resources, which is the basic purpose of AI Crypto philosophy. It verifies values by enhancing the usage of AI Crypto Ecosystem.

The numbers of additional coins issued can be adjusted according to the vitalization of the AI Crypto Ecosystem. Also, the scale can be modified with the consensus of the members.

Future Plan

Roadmap

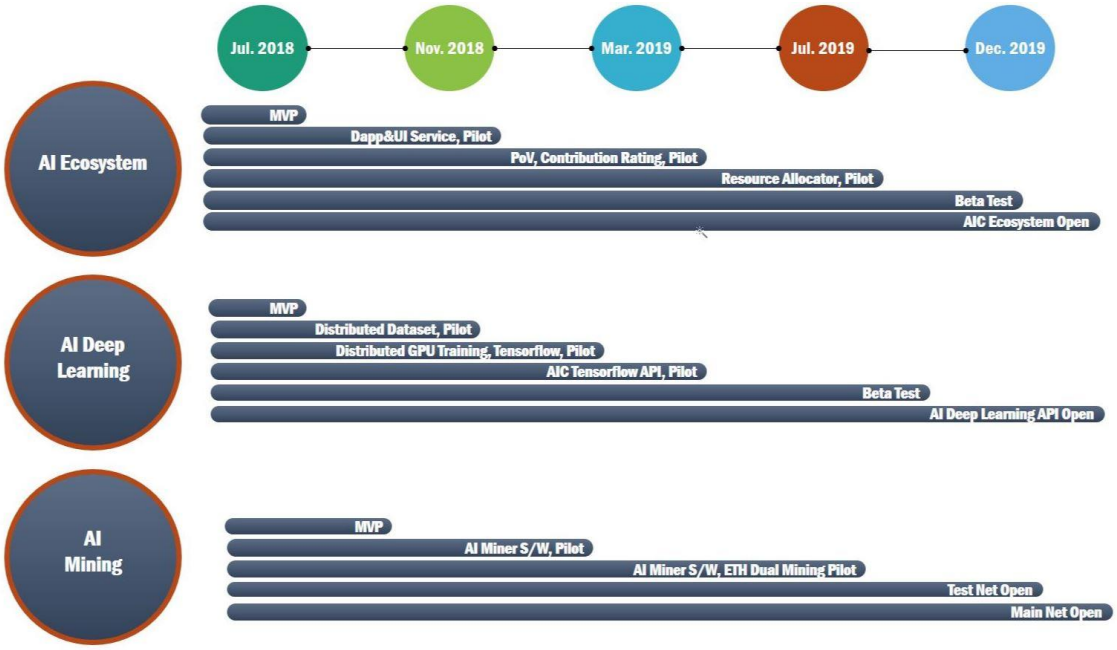

Figure 25. Roadmap

Exchange Listing

Figure 26. Listing

Preparations for the Future – Change in Platform

Since AI business is the hot topic of the fourth industrial revolution, we are looking forward to various attempts in developing and utilizing AI applications through blockchain technology, starting from the *AI Crypto Ecosystem*. The AI Crypto team is open to all kinds of technology if they fulfill the idea of 'righteous usage of impartial resources' and are willing to include them in the AI Ecosystem based on the consensus; this is more than just adding the contents to the ecosystem. Even though the *AI Crypto Ecosystem* grows larger in scale, this does not mean the birth of a large centralized organization, but the expansion of the decentralized society, resulting in more members agreeing to the righteous usage of resources.

Team Member & Advisor

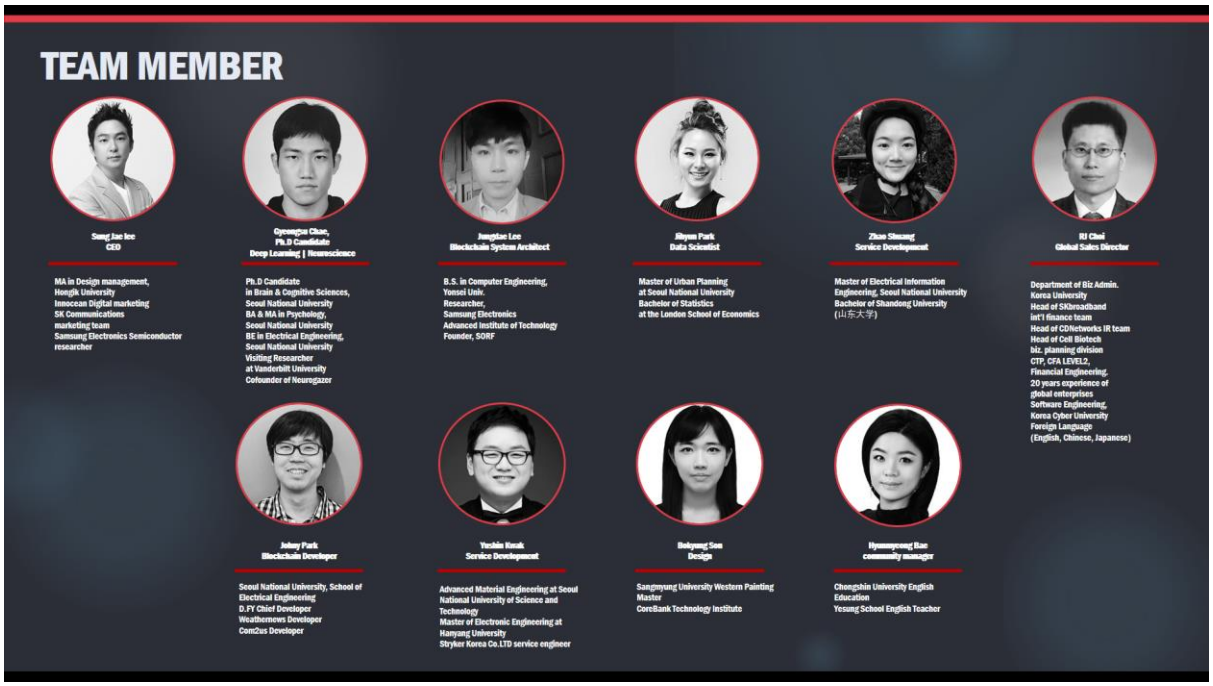

Figure 27. Team Member

Figure 28. Advisor

Contact

Website

http://aicrypto.ai/

Telegram (English)

https://t.me/aicryptoai

Medium (English)

https://medium.com/aicrypto

Facebook

https://www.facebook.com/aicrypto/

Twitter

https://twitter.com/aicryptoai

Kakao Talk (Korean)

https://open.kakao.com/o/gDrOFVH