Whitepaper

VisionX: X-industry Collaboration Platform for High Performance AI Solutions

September 28, 2018

Version 1.0

VisionX: X-industry Collaboration Platform for High Performance AI Solutions

Artificial Intelligence (AI) is becoming an integral part of our daily lives and changing the way we do business. However, industrial AI remains a huge, underserved market. For example, Industry 4.0/intelligent manufacturing represents a $4 trillion opportunity; in China alone there are 60 million quality inspectors, costing companies $350 billion per year.

Industrial customers urgently need practical, accurate AI solutions that correspond to specific business needs, while many of these needs are indeed similar across a single industry or multiple industries, with examples such as defect detection, visual inspection and predictive maintenance etc. The main challenge faced by these customers is that individually, they do not possess a good AI solution to begin with, nor do they have the capability to gather enough relevant, high quality data to further improve their existing solution. Furthermore, it is very difficult for different companies that operate in the similar or even different industries to collaborate together in the development for AI solutions and data.

VisionX establishes a vision of "X", providing a sustainable and incentive-driven blockchain-based ecosystem that serves as a bridge between companies worldwide to boost the best AI and data solutions across each individual industry, multiple industries AND with personalized solutions for each customer. The tokenized incentive system of VisionX will includes both token incentives and a unique sharing of future related payments to incentivized ecosystem contributors according to the real value of their contributions. All the transactions will be monitored and recorded in real-time based on Blockchain tehcnology, making it possible to control the AI solution development process. Based on its unmodifiable characteristic, blockchain technology can build the trust among developers, contributors and requesters within the VisionX AI solution ecosystem. During the process of a transaction, all details are publicly visible, so the process of developing a AI solution will be

more transparent, and all involved parties can get a clear view of all the status. For example, contributions such as quality data, cleansing, annotation, data relevancy discovery, AI dataset building, AI solution building and AI solution sales will all be incentivized through token incentive distribution and recorded on the blockchain. Unbiased, high-quality data can be collected globally via VisionX smart contract. Leveraging on this ecosystem, companies and organizations can collaborate on AI solutions that address common needs and while obtaining customizable solutions for their own specific use cases.

VisionX delivers a turn-key solution using its patent-pending AI and Dataonomy^{SM} algorithms designed by a team of expert AI engineers and data scientists from Fortune 500 companies such as Samsung, Cisco, Panasonic, Midea Group, Microsoft, Rakuten etc. Starting with an initial focus on visual inspection for abnormity. VisionX intends to provide to all potential customers a base AI solution, which is more accurate than the current traditional solutions. Next, a customized solution will be developed for each individual use case with the integrations of additional customer data. Collaboration of platforms based on blockchain technology is not limited by any geographic conditions, and customers who require artificial intelligence solutions can work with data contributors located anywhere on the planet. As customers continue to contribute their data into the ecosystem, VisionX will be able to provide AI applications for various industrial functions beyond abnormity inspection and the manufacturing space. The data asset pool will grow to include thousands of basic solutions and millions of customized solutions for each industry segment, product and use cases in the ecosystem of VisionX.

VisionX incentivizes participants to collaborate in three major ways:

1. Participants will benefit immediately upon joining from receiving superior AI solutions that are projected to cut cost by 30 percent;
2. Participants will receive VNX for contributing data to the ecosystem;
3. Through secondary smart contracts, participants will be able to receive VNX from new sales of AI solutions built with their data contributions gain to the ecosystem.

By incentivizing cross-industry collaboration in a revolutionary blockchain-based ecosystem, VisionX will empower AI solution providers and industry business partners to work together to obtain incentives for their individual contributions and benefit from optimized AI solutions. Together, the VisionX team and its collaborators will pave the way for the next industrial revolution.

Table of Contents

1. Industry AI Market

1.1 AI and Industry 4.0

The notion of Artificial Intelligence is as old as the field of Computer Science itself, but as computational power such as parallel and distributed computing has advanced greatly over the last decade, the field of AI research and development has grown by leaps and bounds. In more recent years, AI applications for consumers, such as facial recognition technology on the iPhone X, voice recognition and natural language processing in virtual assistants like Siri or Alexa, and real-time decision making in the autonomous vehicle industry have gained traction and created an extensive impact in our daily life. On the other hand, landing AI solutions for various industries has also become a promising business with huge potential opportunities and markets, and it still remains underserved.

Industrial AI is a huge emerging market that is experiencing rapid growth all over the world. Many countries such as China, France and Japan have announced artificial intelligence as their key technological focus and published comprehensive plans to promote artificial intelligence and research development. Britain has announced a £1 billion-plus deal that includes public and private funding to "make the UK a global leader in AI" [16]. China's strategic plan "Made in China 2025" focuses on high-tech fields and aims to increase the Chinese-domestic content of core materials to 40 percent by 2020 and 70 percent by 2025[17]. The German government has also begun to develop an artificial intelligence strategy and just released the first core themes blueprint in July, 2018[18]. These declarations all indicate that utilizing artificial intelligence for the evolution of traditional industry is becoming the mainstream trend globally.

Quality improvement during manufacturing and faster product cycles are key areas in the development of an industry. Industrial tasks such as visual defect inspection, object pick-and-place, and predictive maintenance are repetitive, costly and prone to human error.

Automation of such activities is already disrupting industry, leading to "The Fourth Industrial Revolution," as described by Klaus Schwab in his 2016 book [2] by the same name. Industry 4.0 has created a huge market for AI providers to develop smart solutions for manufacturing companies, helping them increase efficiency and decrease cost through cognitive computing, cyber-physical systems and IoT. For example, Landing.AI [3] provides a corporate-level AI marketplace for SaaS solutions to automate processes in industries like manufacturing. IBM's Visual Insights uses cognitive visual inspection [4] for quality control and predictive maintenance.

Industrial investment in AI has already exceeded $100 billion and is only on the rise. Estimates indicate that manufacturing companies adopting AI innovations could see a 38 percent boost in profitability, fueling potential growth of a $15.7 trillion market [1].

1.2   Challenges

On one hand, companies are looking for AI solutions to decrease overheads and improve quality because they can only reach 60 to 70 percent accuracy for commercial off-the-shelf (COTS) products. Since not every company can afford the upfront investment to develop its own high-accuracy AI solutions, companies hand the data over to AI providers, expecting for a turn-key solution. On the other hand, however, AI providers are unable to acquire enough data from any single company to provide a satisfactory solution.

For example, if a steel manufacturer wants to use AI to scan for visual defects on the surface of steel sheets, their data points would be images scratches, dents or pinholes in their products. If they see a one percent defect rate, they will only obtain a single image of one type of defect out of one hundred of products. It will take months for the company to gather enough data points to build a moderately accurate detection model. Other industries have similar defect-detection needs with a variety of materials, as shown in Figure 1 below:
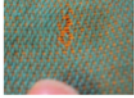
Figure 1: defect detection across multiple industries

If all of the players in the industry space pool their data resources, they will be able to benefit from a more complete, less-biased training data set. If the steel manufacturer shares their data with a plastics manufacturer, both of them will contribute images of scratch defects that can improve the accuracy of the defect detection models across both industries. If the AI providers enter the same data-sharing alliance, they will enrich the pool of accessible data for the development of AI applications, which in return, will benefit both parties involved. This is a win-win situation. Is it possible to bridge the industry users and AI providers in a collaborative, mutually beneficial ecosystem? Here comes VisionX.

2. VisionX Solutions

The VisionX team's mission is to provide a sustainable blockchain-based incentivized ecosystem to develop and boost the best AI solutions and datasets across multiple industries. By leveraging on a large, decentralized dataset that is continuously growing and improving, as well as unique technologies developed by AI providers across the world, VisionX will pave the way for companies to succeed in the Industry 4.0 era, benefitting not only the companies and AI providers in the ecosystem but also by extension the entire industry.

2.1   X-Industry Base Solution

VisionX provides a base AI solution for visual abnormality inspection across industries. Currently there are 60 million employees working on visual inspection in China alone, which costs $350 billion USD a year [5]. The average accuracy rate in visual defect inspection is about 60 to 70 percent with traditional methods. The current addressable market for visual abnormality inspection spans a variety of industries, including but not limited to consumer electronics, mining, automobile, aviation, medical supply, steel, furniture, textiles, processed food and so forth. The VisonX base dataset for these industries currently contains over a million images to train the algorithm to detect abnormalities like scratches, dents, pin holes, fiber patterns, broken seals, or aging components. By using AI solution with the existing dataset, VisionX will decrease the inspection cost significantly, and increase the accuracy rate to 95 percent. Similar AI solutions will apply to other areas such as robotic pick-and-place, predictive maintenance, data curation, and eventually to any need serviceable by industrial AI.
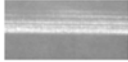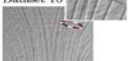
As it has been identified as a common problem across many industries with a huge addressable market, the base solution initially provided by VisionX focuses on visual defect inspection. Already, it has achieved a high level of accuracy in defect detection.   It consists the following parts:

1. Dataonomy[SM]: fully computational method to extract a large of relevant data
2. Architecture: decentralized cloud-edge AI computing architecture
3. Hardware solution: adoption for any type of specialty or commercially available cameras

Invented by a team of AI experts and engineers, VisionX implements a world class deep learning solution that delivers accurate results across multiple industries and is further

customizable to address specific individual problems. Enabled by early supporter DeepBrain Chain (DBC) Foundation, the cross-industry base dataset and solution are hosted on the decentralized AI Cloud.

This common data pool already comprises more than a million images, including nearly 130,000 visual defect images from 34 classes of six industrial areas (Figure 2 below) used to train automated defect inspection algorithms. The base dataset on DBC's decentralized cloud forms the basis of each customer's customized solution for faster deployment at a lower cost.

Industry Sector	Defect Image	Size	Classes	# of pics
Steel Industry		112MB	6	14,412
Welding Industry		27.6GB	5	39,912
Texture Surface		11.8GB	10	73,132
Wood Industry		3.4MB	7	1,784
Special Alloy Industry		129.2MB	6	144
Total		39.6GB	34	129,384

Total Defect Images across industries: **129K+**

Total Meta Dataset: **1 million+**

Figure 2: common data pool across six sectors

As there is limited relevant data for each solution, VisionX employs a unique patent-pending taxonomy algorithm called Dataonomy[SM] [20] to pull a huge set of highly relevant images for specific tasks such as abnormality inspection.

The patent-pending Dataonomy[SM] algorithm is a fully computational method for quantifying data class relationships and extracting a structure out of them. The "structure" means a collection of relations specifying which dataset provides useful information to another, and by how much.

The framework of VisionX approach is shown below in Figure 3.
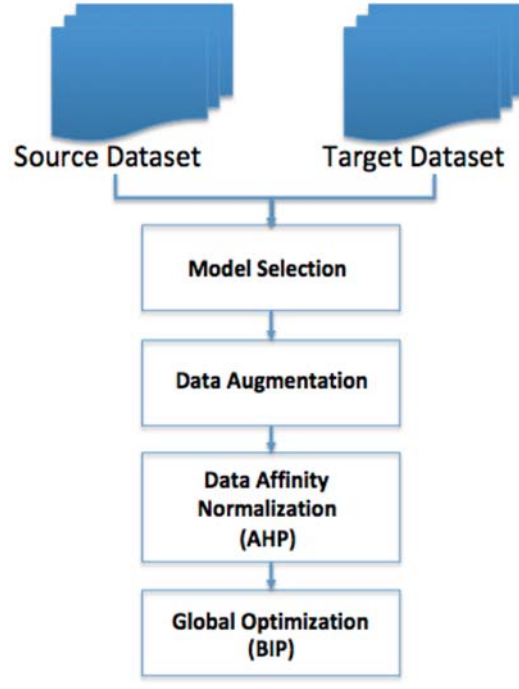
Figure 3: Dataonomy^{SM} framework

The pipeline is outlined in the following steps:

1. Use a pre-trained model for object classification, e.g. Inception V3

2. Find affinity matrix across dataset as follows. The performance of $Score$ is a useful metric as dataset affinity.

   a. Directly test the model on the defect dataset T, including $N = 10$ classes of defects across the industries, for each class $t_i, i = 1,2, \cdots, N$, it contains a good set $t_{good,i}$ and a bad set $t_{bad,i}$.

   b. For each image I_k from the defect set (good, or bad), the model defined in the step 1 generates the "possibility" for 1000 classes $p_{k,c}$, $c = 1, 2, \ldots, 1000$, in a public dataset, e.g. ImageNet.

   c. The VisionX team assumes that the possibility reflects the similarity between a class and a specific defect image. The similarity between a class and images without defect is:

$$Score_{good_{c,i}} \triangleq P_{good_{c,i}} = \sum_{k \in t_{good,i}} p_{k,c}$$

The similarity between a class and images with defect is:

$$\text{Score}_{\text{bad}_{c,i}} \triangleq P_{\text{bad}_c,i} = \sum_{k \in t_{\text{bad},i}} p_{k,c}$$

3. Obtain normalized data augmentation affinities using AHP (Analytic Hierarchy Process) [11].

Since the Score from step 2 has different scales, a proper normalization is required, and AHP is used for normalization.

For each defect class t, we construct a similarity vector M_t is constructed between all available data classes from ImageNet as source S for mapping to the target defect class. The element at (c, i) in matrix is the similarity of each class from source to the target defect class. The similarity between the source and target is:

$$m_{c,i} = \text{Score}_{\text{good}_{c,i}} + \text{Score}_{\text{bad}_{c,i}}$$

Vector M_t is then rescaled to be in the range from $0 + \epsilon$ to $1 - \epsilon, \epsilon = 0.001$.

In order to handle the defect images with a large variety of background, we define the score of the class containing the defect feature, as following:

$$M_t' = (\text{Score}_{\text{bad}_{c,i}} - \text{Score}_{\text{good}_{c,i}})/M_t$$

Combining M_t' from all the defect classes, we create a pairwise matrix M_T' is created. The transferability of $s_c, c = 1, 2, \dots, 1000$ to t is then quantified as the corresponding component of the principal eigenvector of M_T'. The principal eigenvectors of M_T' for all t in T are stacked to obtain an affinity matrix P, which can be illustrated by the image shown in Figure 4.
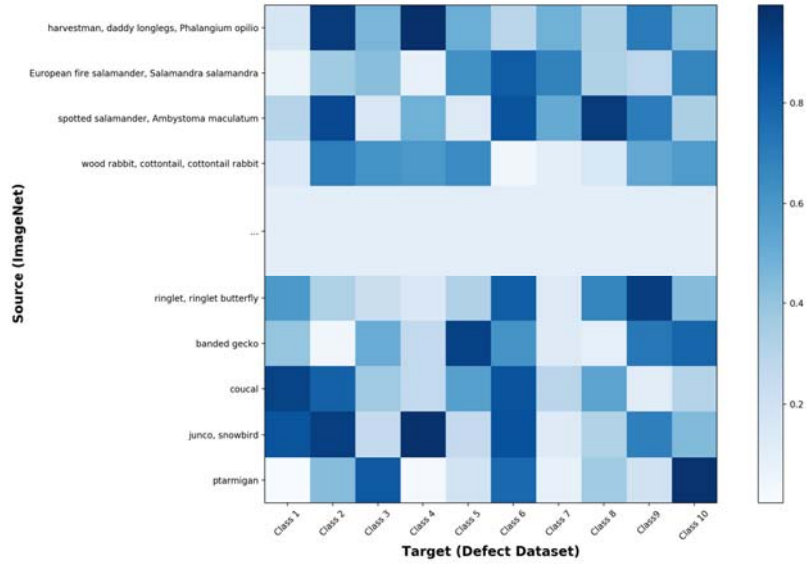
Figure 4: affinity matrix

4. Find global mapping taxonomy using BIP (Binary Integer Programming) [12].

With a normalized affinity matrix, the final step is to obtain a global class mapping scheme to maximize the performance across all defect classes, while minimizing the supervision. The selection problem is defined using Binary Integer Programming (BIP).

The parameters of this problem include: the supervision budget, and a measure of performance on a target defect dataset from each of its mapping. Additional parameters can be included as well, for example, a threshold to terminate the data augmentation from source to target, and a relative cost to acquire the label of each dataset, etc. A canonical form can be expressed as:

maximize $C^T x$,

subject to $Ax \leq b$ and $x \in \{0,1\}^{|E|+|V|}$

where C and b are vector, A is matrix for constraints; each element C_i is its mapping performance, obtained from affinity matrix p_i.

x here indicate which nodes are picked to be source and which transfers are selected. Several constraints C are added to obtain a feasible solution. For instance, a constraint to

ensure the cost does not exceed the budget. Figure 5 shows the general structure of this step.
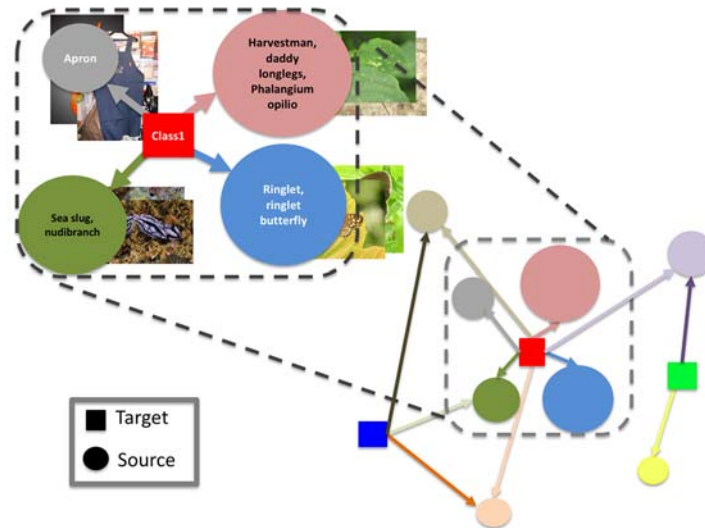
Figure 5: A sample structure built by Dataonomy[SM]

As sufficient data is gathered from each use case, we build the base model after the data is cleansed, annotated and certified. As the dataset continue to grow, the accuracy will be continuously improved. The Dataonomy[SM] algorithm will pull from an ever-increasing pool of information to develop highly specialized solutions for customers. Once a company's own data is added to the pool, the model can be fine-tuned to exceed 99.97 percent accuracy. Customers need not worry about the security of their data, as it is homomorphically encrypted in the cloud.

Figure 6: competitive advantage

VisionX's base solution is not only more accurate than traditional solutions, but also much faster and cost-efficient to implement.

The computational power required to process large amounts of data is very expensive for a single company, and traditional solutions cost $40-150k for the initial development plus additional $40k for deployment. In most cases, the company also needs to invest in specific hardware compatible with the software solution.

VisionX, built upon the patented edge computing architecture on a decentralized AI cloud of the DeepBrain Chain ecosystem [14,15], will significantly reduce the cost by 30 percent because the cost of computational power is shared amongst users in the ecosystem. VisionX's base AI solution is compatible with most of the equipment available on the market, and it will shorten the deployment time from months to days.

Customers will receive a turn-key software solution compatible with their chosen hardware to go to market immediately. For a visual inspection use case, VisionX simply deploys one to two small GPU servers at the customer's site, along with a camera, controls and an optional robotic arm. Easy to use data annotation tools will enable customers to markup

defect data. In the meantime, the building of a specialized AI model begins building for that company's specific problem will begin, optimizing performance for fully deployment in a few days.
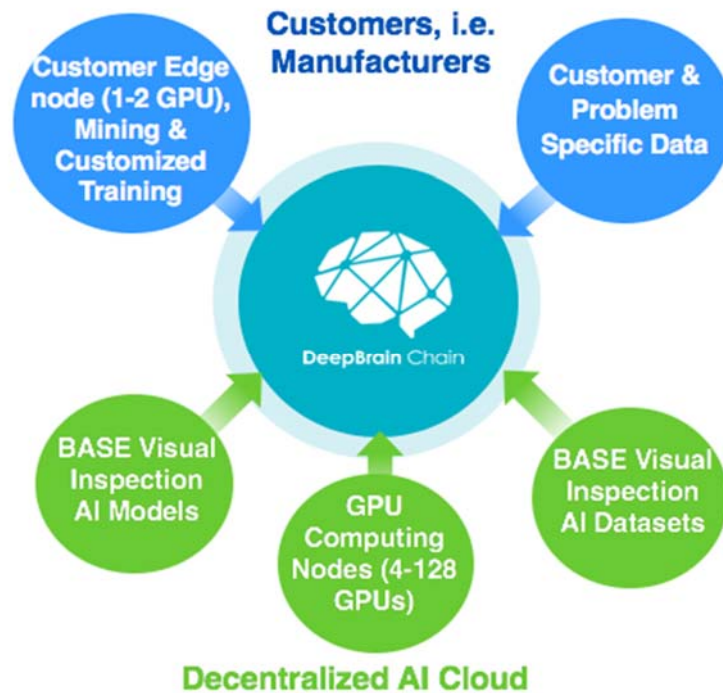
Figure 7: data on the AI cloud

VisionX will also serve as a high-volume data marketplace and optimized AI training platform. The Dataonomy^{SM} method was created to systemically enlarge a training dataset from public datasets (MIT places, ImageNet, etc.) and limited samples to create base-datasets and base-models [7] for any enterprise AI solution. The key aspects are large data collection without bias, micropayments for global labor and privacy-preservation, and the platform provided by DeepBrain Chain to support multi-party computation and homomorphic encryption.

2.2   Customizable AI Solutions

On top of its world leading cross-industry base AI solutions, VisionX can also provide customized AI solutions for each customer, and further improve accuracy up to 99.97

percent.

This low cost and high-speed solution are hallmarks of an attractive product to customers. Already, VisionX has leads within multiple global Fortune 500 companies for servicing its initial focus area of visual defect detection. The VisionX visual defect detection solution will scale to cover materials like steel, wood, welding, plastic, PCB and textiles, for industries like electronics, mining, auto, furniture, fashion and more - an enormous addressable market ready to invest in AI solutions. Thus, the VisionX team has forecasted very fast growth over the next few years, and a 60 to 70 percent gross margin as VisionX focuses on improving accuracy with advanced AI software and economical commercially available hardware.

VisionX is building a sustainable ecosystem for industry users and AI solution providers, in which companies are willing to contribute their data in exchange for world-class AI solutions and AI providers are able to develop better solutions with more data. On top of this virtuous circle, an innovative tokenized marketplace will further incentivize collaboration. Through secondary smart contracts, customers will also be able to receive VNX payments for their contributions and a share of related payments for future product sales where the products are created from these data contributions.

2.3   Sustainable Ecosystem

VisionX creates an innovative, incentive-driven AI and blockchain ecosystem to enable data and AI solution collaboration across industries. This tokenized incentive system includes future payment sharing which will incentivize developers and data contributors according to the real value of their contributions. For example, all contributions such as raw data collection, data cleansing, and data annotation, data relevancy discovery, AI dataset building, AI solution building and AI solution sales will all be incentivized through VNX token distribution and recorded on the blockchain. Together, within the sustainable ecosystem of

VisionX, companies and organizations across industries can collaborate with benefits for developing AI solutions. Furthermore, customers will be able to obtain customizable solutions for diverse situations far better than any one of them could achieve alone.

This incentive system, unique among blockchain projects, incentivizes collaboration in three major ways:

· Provides a world class AI solution in days instead of months with an estimated 30 percent cost savings,

· Incentivize contributions to the dataset and AI solutions that records on blockchain with its platform VNX token

. Through secondary smart contracts, users will also be able to receive VNX payments for their contributions and a share of related payments for future product sales where the products are created from these data contributions as recorded on blockchain

Customers can contribute quality data, and the broader community can contribute services such as data cleansing and annotation. All efforts are recorded on the blockchain, so that fairly incentivizing can be given to all parties in proportion to their contribution to the VisionX ecosystem. Incentives come in the form of VNX rebates, along with payments for future product sales where the products are created from these data contributions, and this can be applied towards software upgrades and annual license renewal.

The tokenized incentive program is revolutionary among blockchain projects. Incentivizing contributions will benefit the customers by saving them money, and also benefit the community and the whole industry by growing and improving the datasets and solutions. Fueled by these innovative incentives, the ecosystem of VisionX will quickly grow to encompass thousands of world class AI models to solve all types of problems across industries. As the AI market and ecosystem of VisionX continue to grow, so will the incentives for each of its contributors. Together, we will break through the current barriers that stand in the way of AI adoption and drive the industry to reach its full market potential!
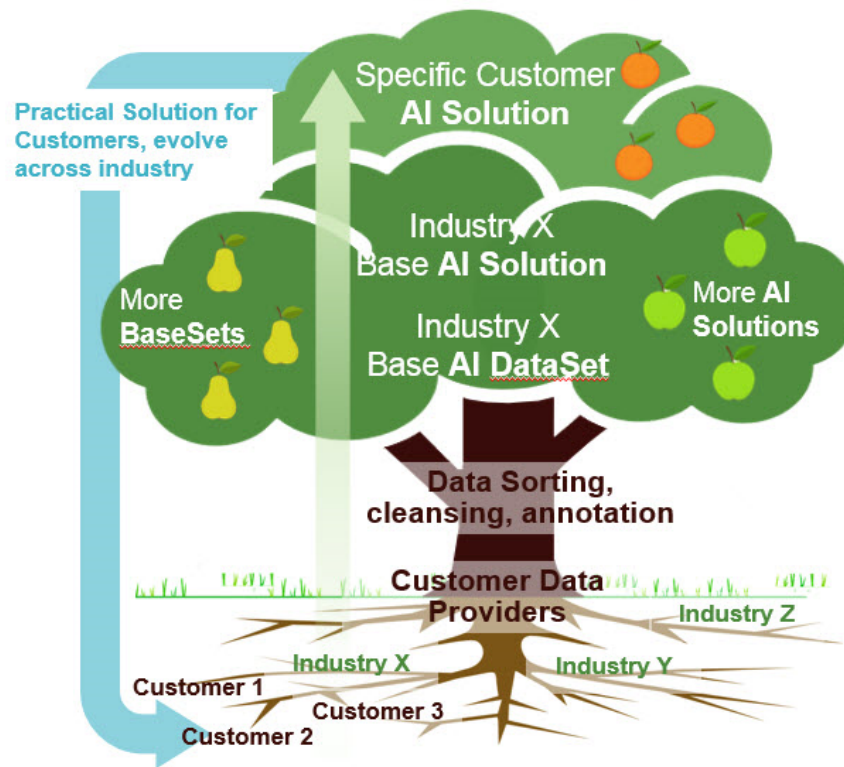
Figure 8: growth of VisionX ecosystem

Each company's place in the ecosystem and incentives from it will grow and branch out into further applications. For example, the steel company seeking a visual defect detection solution will contribute their data, images of scratches, pinholes, dents etc. The dataset will be enlarged through the Dataonomy[SM] algorithm, cleansed and annotated and form the Problem Dataset 1, the basis to build an AI Solution for Problem 1 - visual defect detection. This data also contributes to Industry Base Dataset 1 for steel manufacturing. As the dataset is further enlarged, it branches out to encompass an industry-wide dataset and AI solution that can be used across manufacturing. The steel company receives their world-class AI solution right away, and enjoys incentive payments related to the valuable data they shared as it becomes part of thousands of industry solutions, being rewarded for their contributions through a portion of the payments from each of these other industrial customers.

2.3.1 VNX Token Mining for Data Across Industries

- AI Solutions token incentive are distributed among data contributors (15%), AI solution/dataset builders (65%) and VisionX (20%)

- Customer provides more relevant data for their use case to further improve AI solution accuracy

- Data is screened, analyzed and validated by our Dataonomy^{SM} algorithms

- Data cleansing, annotation processes are performed

- VisionX will use profit to burn tokens, up to 50% of circulation

- If a certain data is included in the base/customer AI dataset(s), which helps improve an existing AI solution or helps build a new AI solution, VNX token incentives will be distributed based on:

  o The total estimated value of the specific industry/problem dataset improved, based on the principle of value discovery

  o Incentive token amount = "data selected in AI dataset/total dataset size" x "total estimated value of dataset"

2.3.2 Build New AI Solution/Dataset

- New solutions are driven by customer and market needs

- VisionX will publish standards and needs

- Companies and users can contribute data

- Meta and/or specialized AI datasets will be built

- Data is screened, analyzed and validated by our Dataonomy^{SM} algorithms

- Data cleansing, annotation processes are performed

- If a certain set of data is included in base/customer AI dataset(s), which helps improve an existing AI solution or helps build a new AI solution, VNX token incentives will be awarded based on,

  o The total estimated value of the specific industry/problem dataset improved, based on the principle of value discovery

  o Incentive token amount = "data selected in AI dataset/total dataset size" x "total estimated value of dataset"

Figure 9: VNX token economy

All data contributions are recorded on the VisionX blockchain for computing token incentives and future shared payments, encouraging the community to share high quality data, leading to better AI solutions for their own use as well as for benefiting the industry. Blockchain technology is an innovative Internet database technology. Based on its characteristics of decentralization, transparency, and certifiability, the blockchain database can be permanently distributed in various places and shared by the community. Based on a unique design principle, the VisionX AI solution platform that built with blockchain technology has its own ability to prevent data from being tampered with. The blockchain itself is an open book within the network, all transactions that occur can be seen by everyone on the

blockchain, and all parties will be involved in recording each transaction. Once the transaction occurs, everyone on the blockchain platform will participate in the certification of the transaction. Based on the unique characteristics of blockchain, all the data in the VisionX ecosystem will be open and transparent, and the selection of premium data and shared payments of developers and contributors are fair.

Customers with AI needs will purchase VNX from a token exchange. They will use these tokens to pay developers for their AI solutions and datasets. Developers, in turn, may use VNX to pay for raw data and other third-party services.

Customers will be able to obtain VNX in the form of a rebate when they contribute quality data that improves the AI solutions within the ecosystem. Finally, individuals are able to buy and sell VNX and obtain it through their own contributions.

VNX is an integral and indispensable part of the VisionX platform, because without VNX, there would be no incentive for users to expand resources to participate in activities or provide services for the benefit of the entire ecosystem on the VisionX platform. Users of the VisionX platform and/or holders of VNX which did not actively participate will not receive any VNX incentives.

There are many benefits of this decentralized marketplace. First of all, it lowers the cost of source data and annotation. The cross-sector data collected is free of bias, leading to higher quality models. Meanwhile, the growing pool of readily available data enables each new customer to go to market quickly with a reliable solution that outperforms any of the traditional AI options.

With constant additions of data that can be distilled down into something truly valuable, the ecosystem continues to grow and improve, attracting more customers, who become contributors themselves. The result is a flourishing marketplace in which every participant obtains a better solution with less investment of time and money. Together, the community will tackle the most complex challenges the implementation of industrial AI, unlocking the

potential of this market across industries.

2.3.3 Mining Smart Contract

1. Incentive for Data collection: In the VisionX system, we build a large-scale AI social network is built based on a blockchain. A decentralized workforce of data collectors can gather data for requesters, and data owners can publish their data in the net. Accessing this data is projected to be much less expensive than buying data from data companies directly. This system provides two main methods of data collection with kinds of three incentives to data providers as shown below and in Figure below.

i. Obtain basic VNX incentive from the VisionX platform if their data published on the platform is verified by the verification system.

ii. Obtain VNX payments from buyers if their data published on the VisionX platform are bought by data requesters. Also obtain additional incentive from DBC platform if their data published on the platform are marked as high-quality data by the VNX technical team
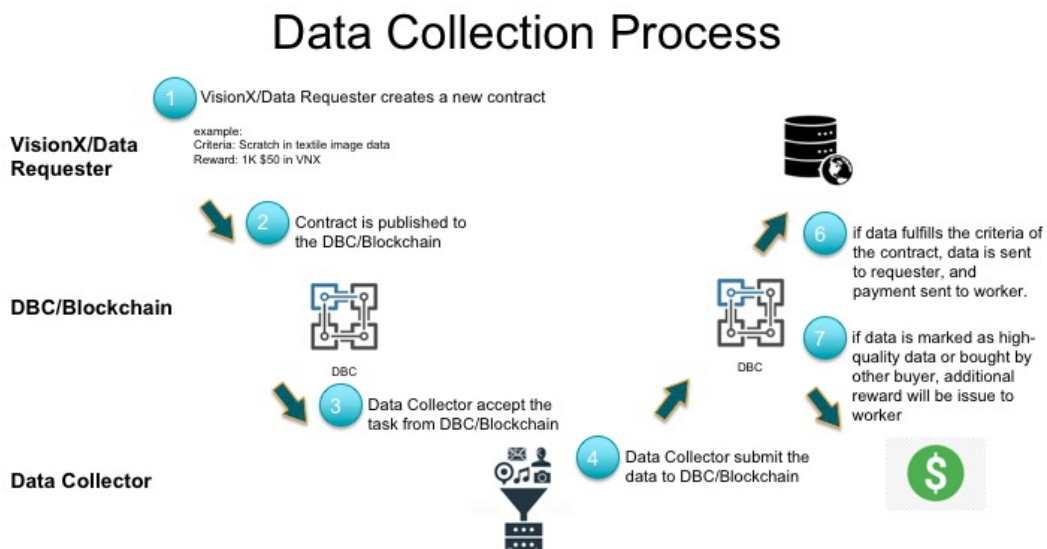
Figure 10: Two main processes of data collection on platform

Incentive for Verification: By adding the verification miner role into the system of VisionX, a verification miner can either do a random inspection or whole data inspection, and a user or user-hired third-party verifier only needs to perform a random inspection on the verification of verified miners. The amount of data to be inspected is reduced by this solution.
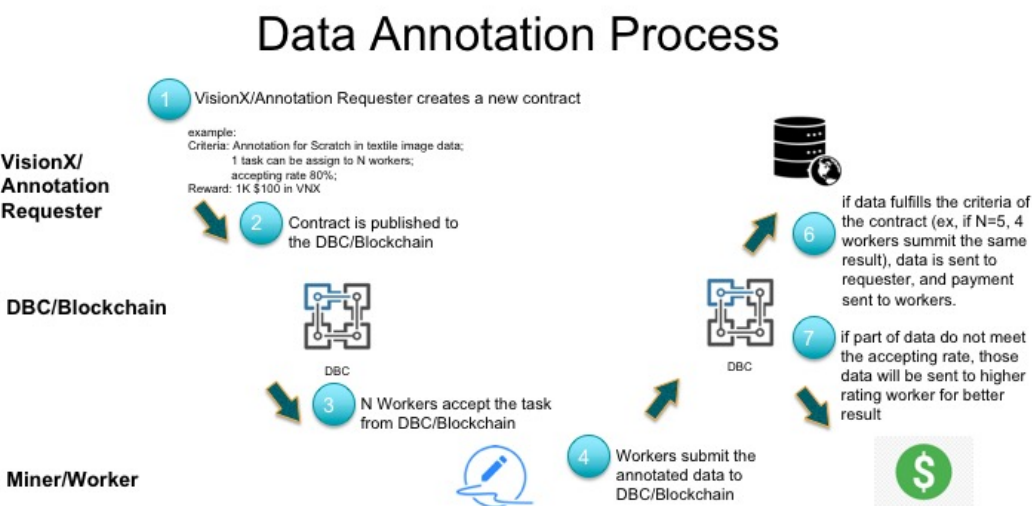
Figure 11: Data Annotation Process

i. Assign miners to several layers in the verification miner system. The first layer of miners verifies and corrects the annotation assignments sent by annotation miners. Each layer of miners verifies and corrects the assignments from the previous layer and sends their assignments to the next layer until the last layer which consists of the most qualified miners. [Figure 11]
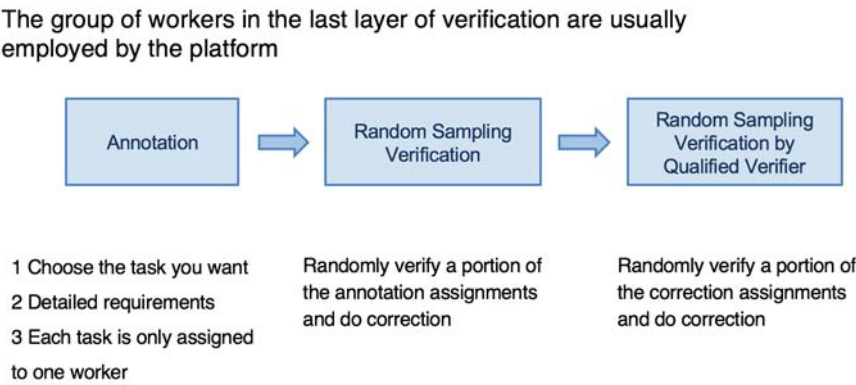
Figure 12: random sampling verification

ii. All the verifiers randomly receive tasks from annotation assignments and verification assignment, and receive VNX incentives for completing these tasks. [Figure 12]

Collecting fragmented time (usually on mobile devices)

Only applied on simple tasks (such as image classification)
Progress rate, verification quantity and accuracy are shown constantly

| Annotation | → | Verification and correction |

1 Annotate the original data

2 Get each task randomly from all the requests

1 Verify and correct the annotation assignments

2 Verify and correct the correction assignments done by other workers

3 Get each task randomly from all the assignments

Figure 13: verification and correction

iii. Set up a verification layer of miners for only verifying the correctness of annotation assignments, and set up a correction layer of most qualified miners for verifying and correcting the verification assignments from the verification layer. [Figure 13]

Complicated tasks

Usually need technical background or specific tools (such as audio transcription)
Progress rate, verification quantity and accuracy are shown constantly

| Annotation | → | Verification | ⟲ | Correction |

1 Annotate the original data

2 Get each task randomly from all the requests

1 Verify the correctness of annotation assignments or correction assignments but don't do correction

2 Get each task randomly from all the assignments

1 Correct annotation assignments or correction assignments labeled incorrect

2 Get each task randomly from all the assignments
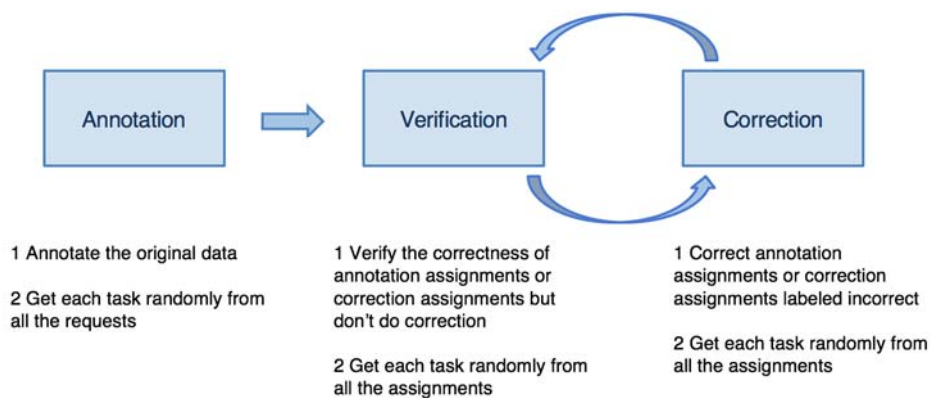
Figure 14: verification and correction layers

3. Token Sale and Distribution

The native digital cryptographically-secured utility token of the VisionX platform (VNX) is a major component of the ecosystem on the VisionX platform, and is initially issued by the Distributor as ERC20 standard compliant digital tokens on the Ethereum blockchain, and these will be migrated to tokens on the Deepbrain Chain's public chain when it's eventually launched. The total amount of VNX issued is 10 billion.

A total of 10% will be allocated to DeepBrain Chain Inc, as they will facilitate incubation of the project. DeepBrain Chain will lay the framework for the AI cloud net of VisionX to operate and thrive by feeding it with global data. The specific allocation is shown below:

- ■ Institutional investment, community development and airdrops
- ■ Mining (X-industry customers and partners, AI developers, contributors of data and service)
- ■ DeepBrain Chain Inc. and early investors
- ■ VisionX Foundation & Ecosystem
- ■ VisionX Team
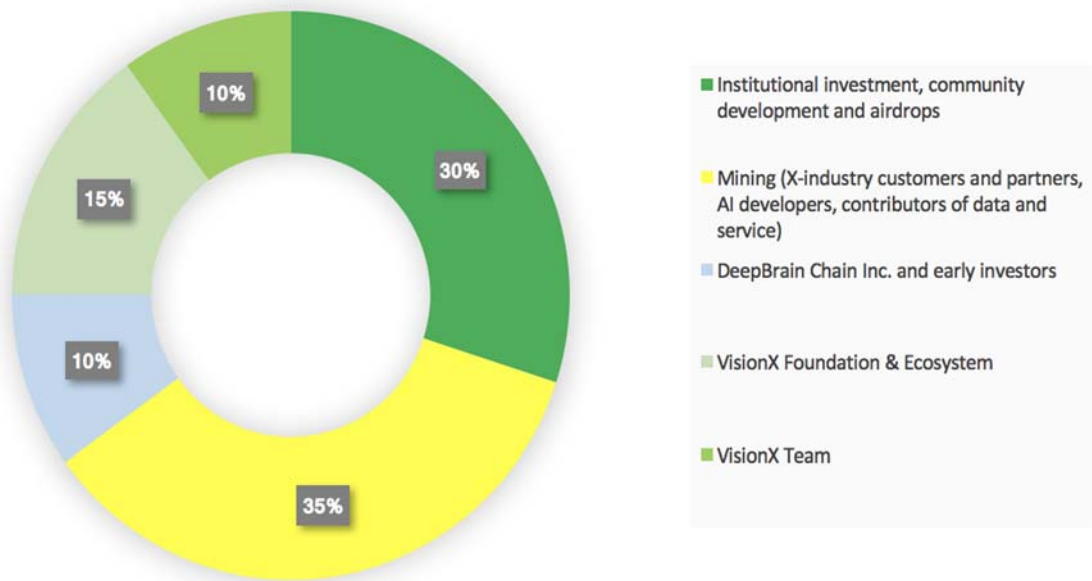
Purpose	Proportion	Quantity	Remarks
Institutional investment, community development and	30%	3 billion VNX	2.5 Billion for institutional investment, 0.5 Billion for community development

airdrops			and airdrops
Mining (X-industry customers and partners, AI developers, contributors of data and service)	35%	3.5 billion VNX	In the first 5 years of mining, 250 million VNX is produced each year, and the amount is reduced by half every 5 years
DeepBrain Chain Inc. and early investors	10%	1 billion VNX	DeepBrain Chain Inc. is the incubator of VisionX Project. Unlock 20% after 2 years of launching in the market, and unlock 5% every following month
VisionX Foundation & Ecosystem	15%	1.5 billion VNX	Support VisionX ecosystem development
VisionX Team	10%	1 billion VNX	Unlock 20% after 2 years of launching in the market, and unlock 5% every following month

3.1 Token Sale Capital Use Plan

Proceeds raised from VNX token sale will be used for the R&D of VisionX platform, and the business development. According to VisionX's development plan, the funds will be used as follows:

Category	Proportion	Illustration
Technology research and development	55%	Employ advanced technical personnel; Set up blockchain laboratory with international first-class universities; Performance optimization and upgrade of VisionX ecosystem; VisionX ecological strategic investment, and building the first landing AI application use case of VisionX
Marketing Promotion	25%	Media advertising investment and brand promotion; With users, factories, and developers, promote the interpretation and widespread use of VisionX
Operations	10%	Office expenses, travel expenses, transportation fees, conference fees, business entertainment expenses, fees of office equipment, servers, and so on
Community Incentive	8%	Encourage supporters to spontaneously establish regional VisionX applications and communicate with communities, and continue to maintain the community's activity, collect suggestions of the majority of supporters to promote the healthy development of the VisionX platform
Intellectual Property Right	2%	Patent fees, trademark fees, copyright fees, new technology certification and professionals' communication

4. Roadmap

2018 Q2

- Build the AI engineering core team

- Project conception and incubation

- Collect visual defect database

- Develop patentable technologies

2018 Q3

- Expand visual defect database size: 1 mil+ images, 130k+ defect images

- Validate distributed visual inspection AI software solution and MVP HW

- Whitepaper ready (English, Chinese)

- Complete legal setup and distribution model for tokens

- Start private fund-raising process

2018 Q4

- Deploy initial solution to pilot customers and obtain feedback

- Enhance the visual inspection AI software solution and continue enlarging datasets

- Design high, medium, low hardware series for different customers

- Token IEO and token airdrop

2019 Q1

- Expand customer outreach to multiple industries with Visual abnormity detection

- Software/Hardware development for predictive maintenance and robotics pick & place

- TestNet live, opening public mining of VNX tokens and token economics

2019 Q2-Q4

- MainNet Live, connecting companies, users X industries

- VNX community boosting with B2B partners & data contributors, via data/model marketplaces

- Expand AI solutions and datasets for various industries and use cases.

5. Team and Collaborators

5.1 VisionX Team

Chuanfeng Lee, President of Foundation,

Chuanfeng Lee has a Master's in architecture from the Research Institute of MCC Group. He is the director of the China Audio Association and a founding member of Advanced Audio and the Video Industry Association of Pudong New Area. He is also the founding director of Intelligent Workshop.

Dr. Dongyan Wang, Co-Founder

Dr. Wang has almost 20 years of Silicon Valley experience in AI and data science. He has led world class, global high-tech orgs as senior executive in Cisco, NetApp, Midea Group, and Samsung. He has extensive industry experience & network in AI & data science. He has led team won many industry awards, and has 10+ granted US patents, 20+ pending patents, in AI and distributed computing. He is also Chief AI Officer of DeepBrain Chain Inc.

Dr. Harry Gu, Co-Founder

Dr. Gu has over 30 years of RD and management experiences with AI, Vision and Robotics in Panasonic, Konica-Minolta, Midea Group etc. Dr. Gu as initial tech member participated in three AI Startups. He is the first author of more than 30 research papers and holds 20 granted patents (and 19 in pending). Harry holds Ph.D. degree from Osaka University and was working as professor and researcher in Southeast Univ., Osaka Univ., USC, UNR, RPI and Stanford.

Hua Zhou, Principle AI Engineer

Hua has 18 years' experience in AI, high performance computing, chip design and software development within companies like Microsoft, Freescale and Midea Group. He has strong expertise in AI platform, computer vision and deep learning algorithms for various applications, and system architecture with software and hardware. His team won second and third respectively in two global AI competitions in CVPR 2018.

Dr. Yu Zhu, Senior AI Engineer

Dr. Zhu has published more than 10 research papers on top AI conferences and journals, with extensive experience in developing large scale distributed deep learning platforms and conducting research in deep learning and computer vision. Dr. Zhu also has won numerous awards from world-class industrial and academic competitions, including placing third in the ChaLearn Challenge in ICCV2015, first in PaSC at BTAS2016, eighth in AI Challenger 2017 and second in LPIRC Challenge at CVPR 2018.

Dr. Wanxin Xu, Senior AI Engineer

Dr. Xu holds a PhD degree in Electrical Engineering from University of Kentucky. She got her Bachelor's degree from University of Electronic Science and Technology of China, majoring in Communications Engineering. Her graduate research mainly focused on 2D/3D image manipulation and human motion capture for visual privacy protection. She completed internships at Samsung Research America and Rakuten Inc.

Rhyan Cook, Global Community & Market Development

Rhyan Cook has a background working in computer software and cutting-edge electronics fields. As a tech entrepreneur, he founded start-ups including a Virtual Reality Gaming Centre and 3D Printing businesses in Australia. Joining DeepBrain Chain in early 2018, he has assisted and lead in the strategic direction of the company with a focus on business relations and investor communication. In depth experience within the blockchain industry will be fundamental in meeting and exceeding the goals of VisionX.

5.2   Advisors and Consultants

Feng He, Advisor

Feng He is the CEO of DeepBrain Chain. He was enrolled in a Ph.D. program at East China Normal University and Chinese Academy of Sciences. As an artificial intelligence expert, he holds the title of Innovation Character of the Shanghai computer industry. He started research on bitcoin and blockchain technology in 2014.

Hongquan Jiang, Advisor

As a "deep tech" investor he has led multiple successful investments in the area of IoT, artificial intelligence, augmented reality and Automotive in the last decade in Europe, US and China. Within RBVC, Hongquan is responsible for the search cluster "automation and electrification" which includes sensors, semiconductors, MEMS, electronics robotics and Autonomous & Cognitive systems. He has collected broad experiences in the automotive and electronic industries.

Kang-Hyun Jo, Advisor

Kang-Hyun has served as the Professor in charge of Intelligent Systems Laboratory and vice dean of e-Vehicle Graduate Institute during 2007-2009 and continuously the vice dean of College of Engineering during 2009-2011 in University of Ulsan, Korea. He has been served as a director of many societies: ICROS (Institute of Control, Robotics and Systems, Korea), KMMS(Korean Multimedia Society), SICE(Society of Instrumentation and Control Engineers, Japan), as well as IEEE IES TC-HF(Human Factors Technical Committee) Chair. He is currently contributing himself as an editor for a few renowned international journals, such as IEEE IES TII (Trans. on Industrial Informatics), etc.

5.3 Investment Institutions

At present, VisionX has successfully obtained the first round of investment and strategic cooperation with a Fortune 100 global company.

Gobi Partners has offices in Shanghai, Beijing, and Southeast Asia, and is a professional venture capital company focusing on investing in China's early science and technology projects. Gobi fund's strategic investors include IBM, Sierra Ventures, The McGraw-Hill Companies, and Steamboat Ventures (Disney's venture capital sector), etc. It has invested in Tuniu, Camera360, CloudCare, and other famous start-ups, and is a veteran investment fund.

As the project incubator, DeepBrain Chain Foundation was founded in Singapore, and it's the world's first blockchain-driven artificial intelligence computing platform. The goal of DeepBrain Chain is to become the "cloud computing platform for artificial intelligence", to create a AWS similar platform in the artificial intelligence world, and to provide high-performance computing power and data privacy protection to AI enterprises, committed to become the world's largest distributed AI cloud computing platform.

Hello Capital is committed to investment, incubation, and service to help the growth of high-quality blockchain projects, with a team of more than 30 blockchain professionals. Since its inception, Hello Capital has successfully invested and managed more than 50 blockchain projects, including DeepBrain Chain, Achain, SelfSell, EOS, Scry and other blockchain high quality projects. In addition to funding the development of the projects, Hello Capital also provides professional services to entrepreneurs in the blockchain sector in terms of

integrating marketing channels, providing operational advice, seeking strategic partners, and recruiting outstanding talents.

5.4 Strategic Partnerships

Changzhou Research Institute Limited Company of China Coal Technology & Engineering Group Corp (Tiandi (Changzhou) Automation Co., Ltd) is a scientific research enterprise specially engaged in developing, manufacturing, selling and serving for safety monitoring and control systems, production automation systems and communication products for coal mine, integrating scientific development, project design, process and manufacturing, system integration and project installation and service together.

As the world platform for digital currency investment, Bishijie is committed to making investment decisions easier. In addition to provide the industry's leading information, the social and personalized token community and smart real-time market has become the largest user in China and South Korea. The English version of Bishijie has already landed in the European and American markets, and products in Southeast Asia and other markets are also in preparation.

6. Risk Tips

1．Systematic risk: The common factor of the global environment may affect VNX just like how it impacts all securities. Take policy risk for instance. At present, the country's supervision policy for blockchain projects and Token Sale mode of financing are not clear, and there is a possibility of loss of participants caused by policy reasons. As for the market risk, if the overall value of the digital asset market is overestimated, the investment risk of participation will increase, and growth expectations may not be realized. At the same time, systemic risk also includes a series of force majeure factors, including but not limited to, natural disasters, large-scale failures of computer networks, and political unrest.

2． Risk of lack of supervision: Digital asset trading, including VNX, is highly uncertain, due to the lack of strong supervision in the field. Meanwhile, the digital currency market has the risk of soaring, plunging, and being manipulated. If an individual lacking experience enters the market, it may be difficult to resist the impact of assets and psychological pressure caused by market instability. Although academic experts and the media sometimes give cautious participation suggestions, there are no written regulatory methods and provisions introduced, so the current risk is difficult to effectively circumvent.

3．Risk of supervision: It is undeniable that in the foreseeable future, regulations will be introduced to regulate the blockchain economy concerning the electronic token sector. If regulatory bodies regulate the sector, the tokens purchased during the Token Sale period may be affected, leading to fluctuations or limitations in price and marketability.

4．Team risk: At present, there are many teams and projects in the blockchain technology field, and the competition is very fierce. There is a strong market competition and project operation pressure. Whether or not the VisionX project can break through many

excellent projects and become widely recognized, is not only linked to its own team capacity and vision planning, but also linked to external factors such as competitors and even oligarchs in the market.

5．Risk within team: VisionX brings together a strong team of senior practitioners in the field of blockchain, experts in the field of artificial intelligence, and experienced technical development personnel. VisionX boasts stability and cohesion of the team, which are crucial to the overall development of the project. In the future development nonetheless, note that it is not possible to exclude the possibility that the team would be negatively affected by the departure of the core personnel and conflicts within the team.

6．Project overall planning and marketing risk: The VisionX initiative team will spare no effort to achieve the development goals outlined in the white paper and extend the growth space of the project. Because the white paper may be adjusted as the details of the project become updated, if the details of the project update are not timely obtained by the Token Sale participants, there could be information asymmetry, which might negatively affect the subsequent development of the project.

7．Project technology risk: First of all, the project is based on cryptographic algorithm, and the rapid development of cryptography is bound to bring potential risks to be cracked. Secondly, while blockchain, distributed ledger system, decentralization, disagreeing with tampering, and other technologies support the core business development, the VisionX team cannot fully guarantee the landing of all of these technologies. Thirdly, during the process of project updating and adjustment, there may be loopholes, which can be remedied through releasing patches, but the extent of the impact caused by the vulnerability will be variable.

8．Hacker attack and crime risk: In terms of security, the amount of a single supporter is very small, but the total number is large, which puts forward high requirements for the security of the project. Note that electronic tokens are anonymous and difficult to trace.

They could easily be used by criminals, be attacked by hackers, or be involved in transferring illegal assets.

9. VisionX, just as all digital token projects, may face some unexpected risks. It is the responsibility of the participant to fully understand the team background, know the overall framework and ideas of the project, make reasonable conclusions, and make their own informed decisions before participating in the token marketplace.

7. Disclaimer

1． This document is only used for communication of information. The content of the document is for reference only and does not constitute any investment proposal or solicitation of the sale of stocks or securities pertaining to VisionX and its related companies. Such solicitation must be carried out in the form of a confidential memorandum and must comply with relevant securities laws and other laws.

2． The content of this document should not be interpreted as forced participation in the Token Sale. Any act related to this white paper shall not be considered as participating in the Token Sale, including taking a copy of the white paper or the sharing of it.

3． Participation in Token Sale represents that one has reached the age standard and has a complete capacity for civil conduct, so that the contract with VisionX is true and effective. All participants sign the contract voluntarily and should have a clear and necessary understanding of VisionX before signing the contract.

4． VisionX team will continue to make reasonable attempts to ensure that the information in this white paper is true and accurate. In the development process, the platform may be updated, including but not limited to platform mechanisms, tokens, their mechanisms, and token distribution. Part of the content of the document may be adjusted in the new white paper as the project progresses. The team will update the content by issuing announcements or new white papers on the website. Participants must access the latest version of the white paper and timely adjust their decisions according to the updated content. The VisionX team clearly indicates that they do not bear the loss of participants due to (I) facts that might depend on the content of the document, (II) inaccuracies in the information of this article, and (III) any act resulting from this article.

5． The team will spare no effort to achieve the goals mentioned in the document. However, given the presence of force majeure, the team might not be able to completely

accomplish the commitment.

6． As an official token of VisionX, VNX is an important tool for platform effectiveness, not an investment product. Owning VNX does not represent the ownership, control, and decision-making power of the VisionX platform granted to its owner. VNX as an encrypted token used in the VisionX, does not belong to the following categories: (a) any kind of currency; (b) securities; (c) shares of legal entities; (d) stocks, bonds, notes, warrants, certificates, or other instruments granting any rights.

7． VNX's value depends on the laws of the market and the demand after landing. It may not have any value, in which case the team will not make additional commitment to increase its value. The team is not responsible for the consequences caused by the increase or decrease in the value of VNX.

8． Within the maximum extent permitted by applicable law, the team is not responsible for damages and risks arising from participation in public offerings, including, but not limited to, direct or indirect personal damage, loss of commercial profits, loss of commercial information, or any other economic loss.

9． The VisionX platform complies with any regulatory policy that is conducive to the healthy development of the Token Sale industry, as well as industry self-regulation statements. Participant's participation means that he or she willfully accepts and complies with such inspections. At the same time, all information disclosed by the participant to complete such inspections must be complete and accurate.

10． The VisionX platform clearly communicates the possible risks to the participants. Once participants have participated in the Token Sale, they have acknowledged to agree with the terms and conditions in detail, accept the potential risks of the platform, and bear the consequences at their own expense.

11． Citizens of nations that have banned Token Sale are not allowed to participate.

8. References

1. AI to drive GDP gains of $15.7 trillion with productivity, personalization improvements https://press.pwc.com/News-releases/ai-to-drive-gdp-gains-of--15.7-trillion-with-productivity--personalisation-improvements/s/3cc702e4-9cac-4a17-85b9-71769fba82a6

2. The Fourth Industrial Revolution. Klaus Schwab, 2016

3. Landing.ai https://www.landing.ai

4. IBM Visual Insights https://www.ibm.com/us-en/marketplace/visual-inspection-for-quality

5. World intelligent manufacturing summit 2017 Report

6. Statista report

7. TechSciResearch

8. Biased Algorithms Are Everywhere, and No One Seems to Care https://www.technologyreview.com/s/608248/biased-algorithms-are-everywhere-and-no-one-seems-to-care/

9. New Research Aims to Solve the Problem of AI Bias in "Black Box" Algorithms https://www.technologyreview.com/s/609338/new-research-aims-to-solve-the-problem-of-ai-bias-in-black-box-algorithms/

10. Matt Turck:AI & Blockchain: An Introduction, http://mattturck.com/ai-blockchain/

11. R.W.Saaty.The analytic hierarchy process–whatitisand how it is used. Mathematical Modeling, 9(3-5):161–176, 1987.

12. https://www.mathworks.com/help/optim/examples/office-assignments-by-binary-integer-programming.html

13. Zamir, A.R., Sax, A., Shen, W., Guibas, L., Malik, J., Savarese, S.: Taskonomy: Disentangling task transfer learning. In: IEEE Conference on Computer Vision and Pattern Recognition (CVPR). (2018) 3712–3722

14. US no. 16/049,707 : Systems and methods for artificial-intelligence-based automated surface inspection

15. US no. 16/049,720 : Systems and methods for artificial-intelligence-based automated object identification and manipulation

16. Britain Spins A Big, Bold Investment In A.I https://www.forbes.com/sites/parmyolson/2018/04/26/britain-spins-a-big-bold-investment-in-a-i/#34dcb4861af7

17. Factbox: Made in China 2025: Beijing's big ambitions from robots to chips, https://www.reuters.com/article/us-usa-trade-china-policy-factbox/factbox-made-in-china-2025-beijings-big-ambitions-from-robots-to-chips-idUSKBN1HR1DK

18. "Outline for a German Strategy for Artificial Intelligence", https://www.ip.mpg.de/fileadmin/ipmpg/content/aktuelles/Outline_for_a_German_Artificial_Intelligence_Strategy.pdf

19. beyond-the-hype-separating-ambition-from-reality-in-i4.0, https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2017/05/beyond-the-hype-separating-ambition-from-reality-in-i4.0.pdf

20. Application No. 62/733,813, Method and system for improving data for industrial artificial intelligence