Preface

The theme of World Health Day 2024 is "My Health, My Rights". With the continuous development of human civilization, people's pursuit of health is no longer limited to the ability to treat diseases. More and more health demands are highly valued, such as being able to treat diseases before they occur, increasing lifespan, improving quality of life, and enhancing lifestyle. In order to meet the health needs of the public, medical institutions have gradually made tremendous efforts in connecting medical information, cross regional medical insurance, personalized medical tracking, and other aspects, and have also achieved outstanding results.

However, due to the various drawbacks of traditional healthcare, health data cannot be sustained, information protection and personalized healthcare have gradually become empty words. These drawbacks are mainly reflected in: isolation of health data, fragmentation of health data, disclosure of health privacy, issues with health data ownership, loss of health data value, and so on.

Nowadays, we are not only facing deteriorating living environments in various aspects such as food safety, drug safety, and life pressure, but more importantly, the world, especially China, is facing the trend of aging society. Chronic diseases have always been a challenge for people's healthy lives, especially for the elderly. Real-time monitoring of chronic diseases and tracking &analyzing health data are particularly important.

We should not only take responsibility for our own health and monitor our health status in real time, but also have the right for health and maintain our own health data. Nowadays, with the rise and application of technologies such as blockchain, Web3.0, and AI, we have seen solutions to the above-mentioned problems.

In view of our team's investigation and analysis of the various current situations mentioned above, we have launched this project. JoinCare project is a health management platform that combines Blockchain, web3, AI technology, medical equipment and facilities as carriers. The project utilizes advanced blockchain technology, especially implemented on the Solana public chain, to ensure fast transactions and low costs. JoinCare utilizes the DePIN protocol to integrate intelligent health management hardware devices and provides personalized health advice and management plans through the AIGC big model, enhancing user experience and increasing engagement. This model not only benefits individual users from a healthier lifestyle, but also promotes the formation of a health centered social network, creating value for users and realizing benefits in the Web3 field. JoinCare aims to establish a sustainable health management content platform that combines scientific health management with fun, social interaction, and economic incentives, promoting the digital and decentralized transformation of the health

management industry, in order to achieve the following health management goals, including but not limited to:

1. Real– time monitoring of personal health data through mobile and portable devices
2. Health data is stored on a decentralized blockchain
3. Ownership of health data is held by users
4. Health data can achieve value circulation on this management platform
5. Establishment and management of personalized full lifecycle health records
6. Personalized remote Al medical interaction, such as Al reasoning, disease prevention, consultation, diagnosis, medical insurance, etc

I. What is Health Management

Health management is a concept first proposed in the United States in the late 1950s. Its core content is that medical insurance institutions and medical service providers carry out systematic health management on their medical insurance customers (including disease patients or high-risk groups) or medical service customers to effectively control the occurrence or development of diseases, significantly reduce the probability of accidents and actual medical expenses, and thus reduce medical insurance compensation losses. The initial concept of managed care in the United States also included signing the most cost-effective prescription agreement between medical insurance institutions and medical institutions to ensure that medical insurance customers can enjoy lower medical expenses, thereby reducing the burden of compensation for medical insurance companies.

With the continuous enrichment and development of actual business content, health management has gradually developed into a specialized system solution and operational business, and professional health management companies have begun to emerge that are different from traditional medical institutions such as hospitals. They serve as third-party service institutions and medical insurance institutions or directly face individual needs, providing systematic and professional health management services.

With the continuous development of Health Management, its current application scenarios mainly refer to the establishment of exclusive health records based on health examination results, providing health status evaluations, and proposing personalized health management plans (prescriptions) with targeted solutions. Based on this, professionals provide one-on-one consultation, guidance, and tracking counseling services, enabling customers to receive comprehensive health

maintenance and protection services from multiple perspectives such as society, psychology, environment, nutrition, and exercise.

1. Current situation and trend of health management development

The occurrence, development, and risk factors of diseases, especially chronic non communicable diseases, have interventability and serve as the scientific basis for health management. Everyone will go through a process of development from health to illness. Generally speaking, it goes from a healthy state to a low-risk state, then to a high-risk state, followed by early pathological changes, clinical symptoms, and ultimately the formation of a disease. This process can be very long, often taking several years to ten years, or even decades. Moreover, there is a high correlation between genetic factors, social and natural environmental factors, medical conditions, and individual lifestyle factors. The process of changes during this period is often difficult to detect. However, health management helps people with targeted preventive interventions before the onset of diseases by systematically detecting and evaluating potential risk factors. It can successfully block, delay, or even reverse the occurrence and development of diseases, achieving the goal of maintaining health.

In the West, health management plans have become a very important part of the healthcare system and have been proven to effectively reduce individual disease risks while reducing medical expenses. The experience of health management in the United States has shown that through effective proactive prevention and intervention, participants in health management services have a 50% higher chance of taking medication regularly according to medical advice, and a 60% higher chance of their doctors prescribing more effective drugs and treatments, thereby

reducing the overall risk of participants in health management services by 50%.

Health management is not only a set of methods, but also a comprehensive and meticulous program. Through health management, the following goals can be achieved: firstly, learn a set of self-management and daily health care methods; Second, change unreasonable dietary habits and unhealthy lifestyles; Three reductions, reducing medication dosage, hospitalization expenses, and medical expenses; The four methods of lowering blood lipids, lowering blood sugar, lowering blood pressure, and lowering body weight are used to reduce the risk factors of chronic diseases.

Specifically, health management can help you understand your physical age, determine your tendency towards illness, and have doctors provide you with a healthy lifestyle prescription and action plan. Long term (lifelong) monitoring of your health to minimize the occurrence of major illnesses. At the same time, timely guidance for medical treatment can reduce personal medical expenses, improve your healthcare efficiency, and ultimately achieve the goal of improving personal quality of life.

Health management is still a new concept in China, and its service targets are relatively narrow, mainly concentrated among people with higher economic incomes. The public's awareness is not yet high, and some concepts of health management have not been accepted by the public.

For example, some people can spend tens of thousands of yuan on smoking a year, but spending a few hundred yuan on health management is considered too expensive. Once they get sick, they can only spend a huge amount of money seeking expert doctors. However, the fact is that early prevention in health management can help them save this wasted money.

Health management is not only a concept, but also a method, and a comprehensive and meticulous service system. Its goal is to help patients

and healthy individuals better recover, maintain, promote health, and save expenses, significantly reducing medical expenses. People can achieve this goal through professional health management institutions, which can provide long-term tracking services, targeted health guidance for individuals, and ultimately maintain the best possible health status for individuals or groups.

2. Characteristics of health management

Health management refers to the comprehensive management process of detecting, analyzing, evaluating, and intervening in the health risk factors of individuals or populations. It has three main characteristics:

Health management is centered around controlling health risk factors, including variable risk factors and immutable risk factors. The former refers to controllable factors that can be changed through self behavior, such as unhealthy eating habits, lack of exercise, smoking and alcohol abuse, as well as abnormal indicators such as hypertension, hyperglycemia, and hyperlipidemia. The latter refers to factors beyond personal control, such as age, gender, family history, etc.

Health management reflects a combination of primary, secondary, and tertiary prevention measures. Primary prevention, also known as disease-free prevention or etiological prevention,

refers to taking measures against the causes or risk factors before the disease (or injury) occurs, reducing the level of harmful exposure, enhancing the individual's ability to resist harmful exposure, and preventing or at least delaying the occurrence of the disease (or injury). Secondary prevention, also known as preclinical prevention (or pre symptom), refers to the "three early" preventive measures of early

detection, diagnosis, and treatment in the early clinical stage of a disease. This level of prevention is achieved through early detection, diagnosis, and appropriate treatment to prevent changes in the preclinical or early clinical stages of the disease. It can enable the disease to be detected and treated early, avoid or reduce the occurrence of complications, sequelae, and disabilities, or shorten the time to disability. Third level prevention, also known as clinical prevention, refers to treating diseases and preventing disabilities. Third level prevention can prevent disability and promote functional recovery, improve quality of life, prolong lifespan, and reduce mortality.

The service process of health management is a circular operation cycle. The implementation stages of health management include health monitoring (collecting personal health information of service recipients is the prerequisite and foundation for continuous implementation of health management), health assessment (predicting the risk of various diseases is the fundamental guarantee for implementing health management), and health intervention (helping service recipients take action to control risk factors is the ultimate goal of implementing health management). The entire service process is continuously looped through these three links to reduce or lower the number and level of hazardous factors and maintain a low risk level.

3. he significance of health management

Lifestyle includes many aspects such as dietary structure, work, sleep, exercise, cultural and entertainment, and social interaction. Excessive stress causes mental tension, and unhealthy habits such as excessive socializing, smoking, excessive drinking, lack of exercise, and overwork are all harmful factors to human health.

For example, for those who work in the office for a long time, prolonged sitting, lack of exercise, and long-term use of computers can lead to neck

and lumbar muscle strain, cervical spondylosis, lumbar disc herniation, constipation, hemorrhoids, skin damage, etc. Drinking too much coffee, strong tea, alcohol, smoking, work stress, lack of sleep, poor sleep quality, etc. can also cause varying degrees of health damage. Over time, various illnesses can arise.

Modern medical research has also shown that many diseases are not mainly caused by biological factors, but by unhealthy lifestyles, psychological factors, environmental factors, etc. This new medical concept is called the "biological, psychological, and social medical model.".

Health management is the use of information and medical technology to establish a comprehensive, meticulous, and personalized service program based on the scientific foundation of health care and medical care. Its purpose is to help healthy and sub healthy individuals establish an orderly and healthy lifestyle, reduce risk status, and stay away from diseases by maintaining and promoting health; Once clinical symptoms appear, medical services are arranged to restore health as soon as possible.

Health management is not only a concept, but also a method. It is a comprehensive and meticulous service program aimed at helping patients and healthy individuals better recover, maintain, promote health, and save expenses, effectively reducing medical expenses.

Numerous international studies on preventive medicine have shown that spending 1 yuan on prevention can save 8.59 yuan in medication costs, as well as approximately 100 yuan in rescue costs, loss of work, and accompanying expenses.

Health management is a preventive medicine that seeks to trace back to its roots. It provides health education for individuals and groups, enhances awareness and level of self– management of health, evaluates and monitors health risk factors related to their lifestyle, and provides

personalized interventions, greatly reducing disease risk, lowering medical costs, and thus improving individual quality of life.

In the United States, where health management was first born, the development of health management is becoming increasingly rapid. 77 million Americans have access to healthcare services in approximately 650 health management organizations, with over 90 million Americans becoming beneficiaries of health management programs.

4. Health management process

1) Information collection

Include basic personal information, health examination, family medical history, past medical history, current illness, lifestyle habits, family happiness, social happiness and so on.

2) Health assessment

The first is to assess the current physical condition and the second is to assess the probability of developing a disease in the future.

Health management services are provided by licensed "health managers". After the 13th Five-Year Plan, China put forward the construction of "great health", and put improving the level of public health management at the national strategic level. According to the "plan", people's health will be shifted from medical treatment to prevention, and people's self-health management awareness will be continuously improved.

3) Health education

Through planned, organized and systematic social education activities, people can consciously adopt healthy behaviors and lifestyles, eliminate or reduce the risk factors affecting health, prevent diseases, promote health and improve the quality of life.

4) Health intervention

By intervening in diet, prevention and treatment of patients can be achieved; The process of forming a healthy lifestyle for individuals or groups through sports, transforming them from a negative state to a positive state; The troubles of illness are not only physical, but also psychological. Long term illness without treatment can lead to thoughts of suicide. It is necessary to seek psychological assistance in a timely manner; Middle aged and elderly people, especially the elderly, have weakened digestive system function and reduced access to nutrients, especially insufficient intake of protein and micronutrients. Nutritional supplementation is needed, and nutritional intervention is selective supplementation of nutrients.

5. Personalized health management

Personalized health management provides professional health management services such as health education, health assessment, health promotion, health tracking, health supervision,

and medical guidance and accompaniment based on data analysis of personal lifestyle habits, medical history, and physical examinations. The following are the main target audience:

Healthy individuals and those who love health have recognized the importance of health, but due to insufficient health knowledge, they hope to receive scientific, professional, systematic, and personalized health education and guidance. They plan to maintain a low risk level of health risks through regular health assessments and enjoy a healthy life to the fullest.

Sub healthy individuals are those who experience symptoms such as limb weakness, mental exhaustion, and poor sleep. Due to different industries, social competition, and family pressures, I understand that I am in a sub

healthy state but do not know how to improve it? Strongly demand measures to improve work efficiency and overall health level.

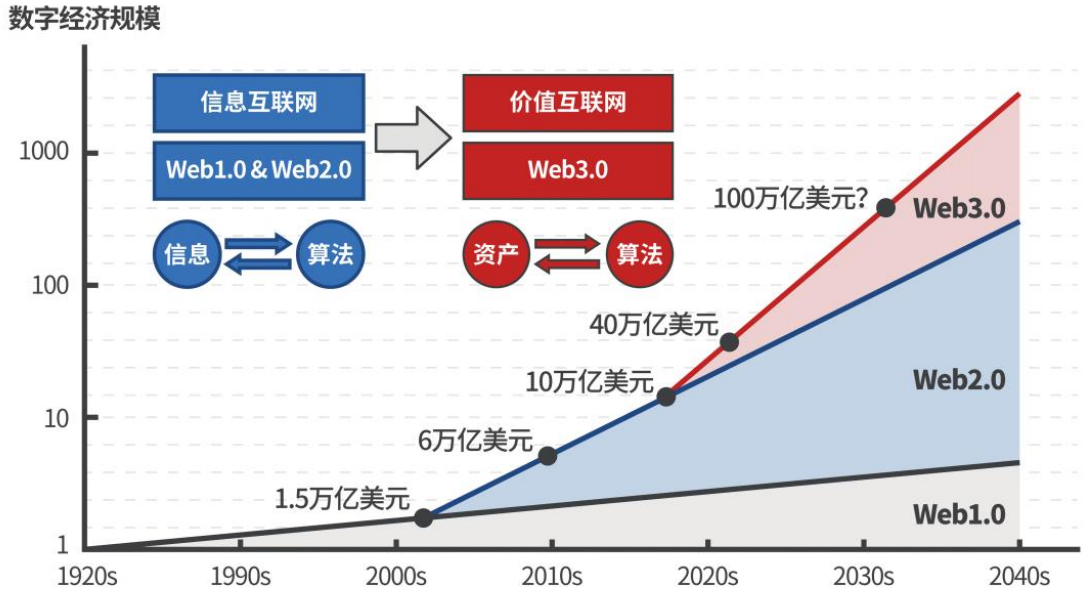
The group of people with diseases who hope to actively participate in their own health improvement while undergoing treatment. It is necessary to comprehensively improve the living environment and behavior during clinical treatment, in order to monitor risk factors, reduce risk levels, delay disease progression, and improve quality of life.

II.Medical treatment into the Web3.0

1. Development status and prospect of Web3

1.1. Web3 concepts

Web3.0 is known as the next generation Internet. It took half a century for the Internet to develop from Web1.0 to Web2.0 to the current Web3.0. Since 1980, Web 1.0 has been "read", a portal website represented by Sohu, unilaterally transmitting information to users. Since 2000, Web 2.0 has been "read+write", where users rely on the platform to generate information and exchange information based on the central platform. Since 2014, Web3.0 has been "read+write+own". Users do not rely on the platform and have their own information, marking the transformation from the information Internet to the value Internet.



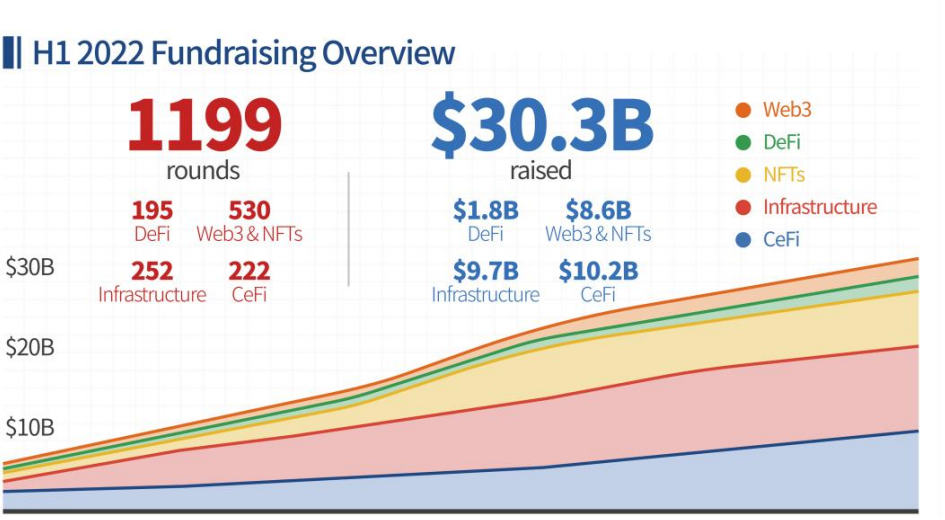
Measurement of the scale of digital economy generated by the Internet over the generations, source: <<Web3.0 Prospective Research Report>>(2022), a trusted blockchain promotion plan.

The society hopes that Web3 will break the monopoly of giant Internet company platforms on data and build a new Internet value system where users have digital sovereignty. Web3 does not yet have a recognized and widely accepted definition, and practitioners, experts, and institutions from various fields have put forward their opinions on Web3. The ICT Academy believes that Web3 is not just a simple innovation of the Internet application layer, but may bring about an overall evolution and systematic upgrade of the Internet architecture. Garter pointed out that both Web3 and the metauniverse will become an important part of the next generation Internet. The core of the metauniverse is "immersion", while the core of Web3 is "decentralization".

1.2. Application and technical development of Web3

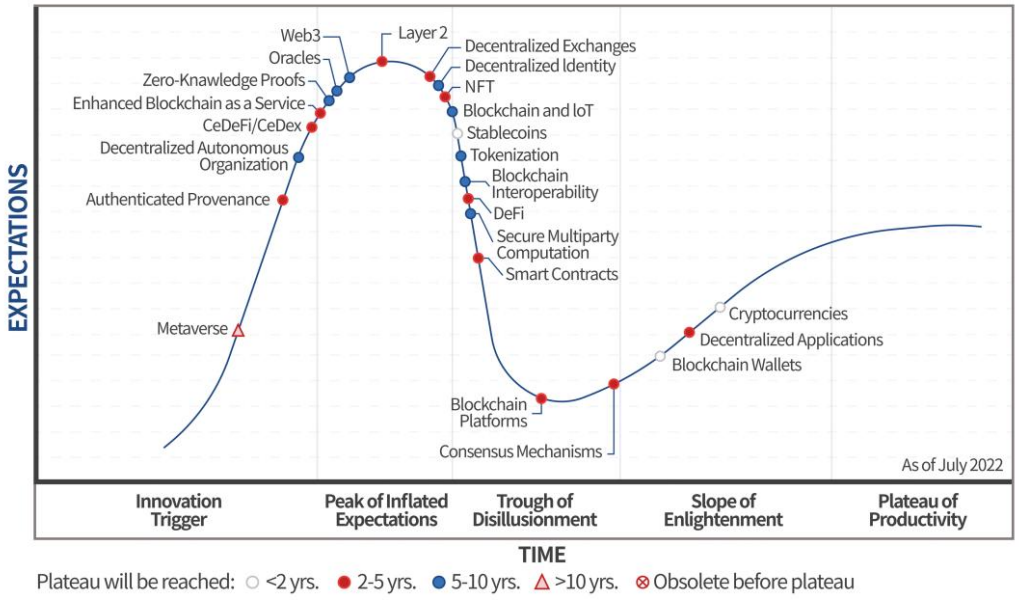
Global innovation exploration revolves around two key cores of Web3: decentralization and blockchain. At present, the main application areas include: Cryptocurrency, DeFi (Decentralized Finance), CeFi (Centralized Finance Relative DeFi), GameFi (Game Finance), NFT (Non fungible Token), DAO (Decentralized Autonomous Organization), etc.

From an investment perspective, the global investment amount of Web3 in 2021 was 30.49 billion US dollars, with a cumulative investment amount of 65.8 billion US dollars, a year-on- year increase of 713% compared to 2020, ushering in explosive growth. The investment amount in the first half of 2022 was 30.3 billion US dollars, a year-on-year increase of 202% compared to 2021. Among them, CeFi led with 10.2 billion US dollars, followed by the fields of encryption infrastructure, Web3 and NFTs, and DeFi.



2022 H1 Crypto Investment Overview Data from Messari and DoveMetrics Joint Release Report

From a technical perspective, Gartner predicts that most technological innovations in Web3 will mature within 2 to 10 years. Blockchain platforms, smart contracts, DeFi, NFTs, and others will reach maturity within 2–5 years, while decentralized identity and others will reach maturity a few years later due to technological development and regulatory issues.



Graph blockchain and Web3 technology maturity curve(Gartner, 2022)

1.3. Web3 policies and layouts in various countries

Countries around the world attach great importance to the development of their local Web3 industry and have begun to deploy cutting-edge strategies, gradually formulating and improving Web3 regulatory policies and development strategies.

1) The United States has upgraded the development of Web3 to a national strategic level

At the end of 2021, the Financial Services Committee of the United States House of Representatives held a hearing on "The Future of Digital Assets and Finance", during which consensus was reached that encryption requires proper and effective regulation and must ensure that the Web3 revolution takes place in the United States.

In September 2022, the White House released the regulatory framework for Bitcoin and cryptocurrency, which was the first comprehensive and systematic government report by the United States seeking to develop digital assets. During this period, the Biden administration successively released 9 related reports on the United States' leadership in digital assets, national digital currency CBDC, climate energy, future payment systems, money laundering and fraud risks, hoping to guide the development of Web3 in the United States.

2) Europe is at the forefront of cryptocurrency asset regulation

In March 2022, in order to curb the financial risks caused by cryptocurrency assets and DeFi, relevant EU departments passed the "Cryptocurrency Asset Regulatory Market Proposal" to ensure that the digital revolution in finance is embraced under strong regulation. In addition, Europe built the flagship project of Blockchain Infrastructure (EBSI) in 2020, enabling European citizens to access public services more securely through blockchain. EBSI and EBSI digital wallets, as well as

ESSIF (Autonomous Identity Framework), provide strong technical support for the development of Web3 in the European Union.

3) Singapore provides a regulatory sandbox that allows for financial innovation experimentation

In July 2022, Singapore held the Global Web3 Ecological Innovation Summit, known as the Global Web3 Entrepreneurship Factory. Singapore adopts a very open attitude to attract a large number of talents and investments, and specifically issues cryptocurrency licenses to financial technology innovation enterprises with blockchain, metaverse, and Web3 technology as their core. Coinbase, FTX, A16z and other European and American leading Web3 companies have successively set up R&D centers or headquarters in Singapore, attracting global Internet practitioners to settle down.

4) Japan focuses on the cultural service industry and launches a development strategy plan

In 2022, Japan launched a national strategic plan for the development of Web3.0, specifically setting up a Web3.0 minister to promote new digital services such as NFT and DAO, integrating metaverse and NFT, and laying out Web3 around areas closely related to Japanese culture such as games, anime, and animation.

5) China has strong supervision over financial applications, with a focus on alliance chain technology to encourage development from virtual to real

To meet the basic needs of maintaining economic stability and financial order, the development of cryptocurrency in China is accompanied by strong regulation. In 2017, the government introduced policies prohibiting token issuance and financing; In 2021, regulatory

policies classified virtual currency related business activities as illegal financial activities. In the same year, the People's Bank of China released the digital renminbi (e-CNY) based on consortium chain technology. As a

national legal tender, e-CNY retains features such as security, anti double spending, and non counterfeitability, and can load smart contracts with currency related functions to promote business model innovation.

Although digital collectibles are a well-developed Web3 application in China, secondary trading of digital collectibles has always been in a gray area due to China's resistance to malicious price speculation of digital cultural and creative works. At the beginning of 2023, "national brand" digital asset trading platforms have successively announced their launch, such as China Digital Asset Trading Platform, Greater Bay Area Digital Cultural Asset Trading Platform, Guangwen Digital Cultural Asset Trading Platform, etc. The secondary trading of digital collectibles is becoming possible.

Alliance chain is the mainstream form of blockchain in China. Authoritative institutions and enterprises have launched alliance chains with different degrees of openness to reduce the development and deployment costs of blockchain. For example, the National Information Center, China Mobile, China UnionPay, and others have released blockchain based service networks (BSNs); Beijing Microchip Research Institute, Tsinghua University, Beihang University, Tencent, and others have released Chang'an Chain ChainMaker; The Institute of Information and Communications Technology has released the Spark Chain website. Chinese enterprises rely on the development of blockchain service platforms to provide digital applications such as identity authentication, information tracing, privacy protection, supply chain management, and judicial certification for governments and enterprises. In addition, Chinese technology companies are also trying to layout NFTs through foreign investment.

1.4. Prospect and enlightenment of Web3

Web3 has begun to change the way people perceive and use the Internet. However, we still face challenges at present:

Lack of unified standards, different platforms use different technical standards, which leads to issues with data sharing and interoperability.

The technology is not yet mature and stable enough, and there are significant security risks that require more time and resources to develop and improve the technical system. For example, Ethereum smart contract security vulnerabilities have caused billions of dollars in asset losses.

The exploration of business models is in its early stages, with no killer applications or truly valuable scenarios emerging.

Today, the global Internet industry is at a critical juncture of transition. On the demand side, the Internet dividend has disappeared and contradictions have become prominent. On the supply side, information technologies such as blockchain, distributed storage, encryption technology, edge computing, and federated learning have gradually matured, providing technical support for the development of Web3. Web3 represents a new development model of digital economy, which is expected to profoundly affect the next generation of Internet. Enterprises around the world are exploring the new, innovative and characteristic development direction of Web3 applications. Countries around the world are highly concerned about and actively exploring the reasonable supervision mode and industrial development mode of Web3, hoping to lead the next generation of Internet waves.

2. JoinCare's performance based on Web3

Although there have been many attempts to overcome the various problems in the current healthcare industry, there is still no perfect solution. Solving problems in a centralized environment where different stakeholders coexist and are guided by one entity will inevitably be limited and constrained.

To address the issues of data interoperability, sharing, and secure storage of user information in the healthcare industry, JoinCare must explore the development of a new set of health information management systems. JoinCare uses a trusted data exchange method based on blockchain and smart contracts to achieve data sharing among various service providers in the big health industry. Using technical language, while ensuring information security and data integrity, it connects the data of each service node, strictly controls every link in the medical big health system, and safeguards user rights and security.

JoinCare utilizes blockchain technology to achieve a consumer oriented comprehensive medical information management system that existing medical and health information systems cannot achieve. In other words, by establishing an ideal medical data recording platform, all requirements for reliability, transparency, and security of health care information systems can be met, achieving secure exchange of reliable information.

JoinCare is not a single service, but a platform for the entire medical and health information industry chain system. The integration of APIs and SDKs in the distributed DAPP provided by the platform makes it easy for various applications and services to access information on the platform and develop new services based on it. In addition, the platform integrates defi functionality, providing a unique and free opportunity for health data exchange for all users and health industry participants, thereby achieving data value.

JoinCare designs its products from key perspectives such as trustworthy sources, secure storage, convenient use, and shared incentives. It establishes a tripartite drive between upstream and downstream product service providers, hospitals, and consumers in the industry chain, bridging the data barriers between health industry service management, hospital services such as electronic medical records and personal information, medical apps, and intelligent health hardware. It connects various medical platforms, insurance platforms, online and offline

institutions, and establishes a common care community, data market, and DAPP application market.

In summary, JoinCare mainly consists of four major components:

"Digital case trust" in the healthcare industry

"Distributed Medical Community" in the Healthcare Industry

"Medical data trading" in the healthcare industry

" Health insurance contract " in the healthcare industry

2.1 Digital case trust

In 2018 alone, the potential market for medical data trading in China has reached or exceeded 10 billion yuan in market size. With the increasing demand for medical data, the market size is expected to see significant growth. However, the current supply of medical data in Greater China is limited, and data quality cannot be guaranteed.

The blockchain electronic medical records on the JoinCare platform will be the most important application of blockchain technology in the healthcare industry. If we imagine a medical record as an account book, it was originally held in the hands of various hospitals, and patients themselves do not have access to it. Therefore, patients cannot obtain their medical records and historical information, which can cause great difficulties for patients seeking medical treatment because doctors cannot fully understand your medical history records. But now if

blockchain technology can be used for storage, there will be personal medical history data available for use, whether it's for medical treatment or planning one's own health. The true master of this data is the patient themselves, not a hospital or third-party institution.

In this context, the JoinCare platform will continuously generate high-quality medical data and generate a trust similar to traditional financial markets, truly returning medical data mainly based on electronic medical records to patients (consumers), while also returning the huge medical data profits monopolized by large medical institutions and enterprises to themselves.

2.2 Distributed medical community

JoinCare is committed to protecting people's basic rights through code and establishing a decentralized social media network. Here, information is permanently stored and the review system is transparent. All interaction information, relationships, and transactions on JoinCare are encrypted and recorded in a distributed ledger, and can only be accessed with authorization.

"Often helping, always comforting", JoinCare blockchain social platform helps to achieve the sacred goal of the healthcare industry; By empowering participants in the health industry, we provide a way to realize the value of healthcare on a large scale, thereby forming a high-quality and high-frequency blockchain health community with hundreds of millions of users participating together. JoinCare will become one of the most active communities in the healthcare industry.

Taking the current global issue of chronic diseases as a starting point, JoinCare first starts with a large group of chronic disease consumers, entering the market through wearable devices and home smart health devices. Users generate a large amount of auxiliary medical data for self health management and hospital follow-up. Users upload data to

JoinCare based on compliance requirements, creating irreversible, tamper proof, and decentralized health data assets on their personal anonymous distributed ledger. Without any centralized institutional or personal control, users will have absolute ownership of health data on the JoinCare health management platform and achieve value exchange on the platform, which will also form a positive self motivation mechanism.

There are three main types of health data generated by user initiated actions on JoinCare:

1) Pan health data: Obtain data on exercise, diet, BMI, sleep, and more through intelligent exercise wristbands, intelligent weight scales, and intelligent body fat meters.

2) Personal and home intelligent detection data: Patient sign data generated through intelligent hardware such as intelligent health data collection device, intelligent blood glucose meter, intelligent electrocardiogram, intelligent blood pressure meter, intelligent blood uric acid meter, intelligent glycated protein detector, intelligent blood lipid four item detector, intelligent three in one detector, intelligent blood oxygen meter, intelligent urine routine detector, etc.

3) Medication data: The data generated by sub health treatment behaviors is obtained through various intelligent quantitative medical devices such as intelligent moxibustion boxes and intelligent temperature controlled belts.

In the future, data on health and nutrition, scientific sports, and more will be added gradually.

JoinCare can obtains external data assets through the intelligent Internet , It can also connect with the internal data of major hospitals (or Internet

hospitals) through blockchain technology to build a complete electronic health record database (EHRs) centered on the health industry consumers. These data can be collected from the hospital medical information system and uploaded to the JoinCare system through the data docking tool provided by JoinCare. For example, the way that JoinCare has landed health service consumers and medical institutions' data docking is divided into the following three steps:

4) Network data nodes are deployed in each hospital, reporting self-service machines and doctor workstations are used as data sources, and the JoinCare client standardizes the data and sends it to the local node for processing. The node receives the data, stores it to the blockchain network, and generates a hash value of the file;

5) The hospital's self-service printing and other business systems connect with JoinCare to obtain data download QR code identification information. The patient scans the two- dimensional code of the printed page through the mobile DAPP to realize the association of data, thus indicating that the ownership of the data belongs to the current blockchain account;

6) JoinCare data center stores a copy of the file associated with users for other medical institutions to access the content of the file data. When the user is called by a third-party hospital, the original content of the file can be retrieved through the distributed storage network to realize the information cannot be tampered with. Users can access personal electronic health record data through a mobile DApp terminal. At the same time, the inspection Internet of Things used by primary medical institutions is directly connected with the inspection

equipment, so as to achieve the opening up of the data of medical institutions at all levels.

2.3 Medical data trading

In the information underground market, due to the value of personal medical and health information being ten times higher than credit card information (data source: Technology News), centralized health information systems have become a high-risk area for cybercrime and hacker attacks. Traditional medical and health personal information data is established in various centralized medical institutions, which poses risks such as inconvenient access, information leakage security, and centralized trust. The decentralized encrypted data storage and transmission method of blockchain is changing traditional fragile health information

systems, helping governments, health service providers, and users ensure the security of information while also considering the convenience of using health information.

As the sole legal owner of data, consumers in the healthcare industry can authorize the uploading of their health diagnosis and treatment data in hospitals, health data generated by various medical devices, and personal health management data to JoinCare. Individuals have achieved authorized use of health data through JoinCare smart contracts, while also ensuring the privacy of health data.

Therefore, in this context, JoinCare's healthcare market has naturally become a trading ground for health data and health applications. JoinCare will collaborate with upstream and downstream companies in the industry to jointly launch the JoinCare ecosystem construction and share the data market. Strategic partners in the JoinCare ecosystem will release the

DAPP application on JoinCare, where millions of new and old consumers generate massive amounts

of health data every day; Pharmaceutical companies utilize the characteristics of blockchain disintermediation to use the saved channel costs to reward users for contributing health data. The interoperability of these health data and the multiplier effect of data value transmission will release enormous value. JoinCare will connect research institutions and users to search for data samples for health institutions on a global scale, quickly achieve sample size and result accuracy, and reduce cost by calling a large number of data samples that already exist in JoinCare. The ways and types of health data provided by users to research institutions:

- One time rental. Organizations will use JoinCare APIs to pull relevant health data from the healthcare data market.
- Ongoing medical data requirements. If the organization needs a long-term health data, the provider is required to continuously provide health data, such as how many steps the user walks per day, what the user's heart rate is and other effective decision data.
- Medical data proofreading. JoinCare combines completely different data sources to provide an easy way to access users' data and obtain user consent.
- Anonymous medical data. Users can choose to provide labeled health data anonymously to interested organizations. Institutions can also filter users' health data by broad category criteria (such as gender, age, BMI, etc.), and relevant users can receive relevant rewards.
- Evidence-based medicine. Since traditional medical treatment lacks sufficient effective and safe health data, different doctors give prescriptions based on their personal experience and knowledge. Evidence-based care is a treatment plan based on high-quality health data.

Therefore, after institutional or individual developers, products and service providers analyze and develop through the use of health big data, the resulting applications can be released in the application market, set transaction methods, charging rules, and limit the scope of application. Individual or institutional users can exchange value of health data through JoinCare Health Management platform.

2.4 Health insurance contract

JoinCare is committed to creating a smart contract based "Ping An Insurance" in the healthcare industry. Based on the JoinCare platform, we aim to build a trusted exchange and computing system for medical collaboration. By utilizing a visual smart contract platform, we provide doctors and experts with a means to formalize the diagnostic process and medical knowledge, and generate a smart contract system that serves functions such as intelligent diagnosis and treatment, hierarchical diagnosis and treatment, and disease management. This enables the trusted exchange and sharing of expert knowledge among medical institutions, doctors, patients, medical insurance institutions, and governments, accelerates the flow of expert knowledge, and ensures that data can be openly and transparently traced in the process of other demanders. We link the entire medical industry entity into an organic ecosystem, promoting the overall healthcare industry. Efficiency improvement.

In order to protect the interests of patients in the future, the JoinCare platform utilizes blockchain smart contract technology and currently sets up the following health protection contracts:

1) Chronic and major disease protection contract

The chronic disease and major disease protection contract refers to the maximum insurance amount paid to the insured for major diseases during the validity period of the insurance. The contracts signed between

patients and insurance can be tracked and recorded on the JoinCare platform.

2) Hospitalization insurance contract

Patients suffering from illness in hospital, can be reimbursed with the usual medical insurance card, or in the platform insurance company to buy disease insurance in hospital insurance, whether you buy a medical insurance card or in JoinCare platform to buy disease insurance in hospital insurance, on the platform can be recorded and query, to provide insurance contracts for hospitalized patients.

3) Accident protection contract

Before the user encounters an accident injury, purchase an accident injury insurance, and receive certain compensation within the validity period of the accident protection insurance.

4) Protection Contract for extreme sports fans

Extreme sports enthusiasts often carry out high-risk activities, so a protection is very necessary, extreme sports enthusiasts can buy the protection contract with the insurance company on the platform, once they trade, the system will automatically generate smart contracts for them, extreme sports enthusiasts can track and query on the JoinCare platform.

III.JoinCare Project introduction

1. Chronic disease management is a hot topic in health management

1.1 Definition and classification of chronic diseases

Chronic Diseases, also known as Noncommunicable Diseases (NCDs), refer to older people as a general term of diseases with insidious onset, long duration and persistent illness, lack of clear evidence of infectious biological etiology, complex etiology, and some of which have not yet been completely identified. These diseases mainly include cardiovascular and cerebrovascular diseases, cancer, chronic respiratory diseases, diabetes and chronic kidney disease. Chronic diseases are serious threats to the health of residents, and have become a major public health problem affecting the economic and social development of the country.

According to the classification of the World Health Organization, chronic diseases can be roughly divided into four categories: The first category is cardiovascular and cerebrovascular diseases, such as hypertension, coronary heart disease, stroke, etc.

The second category is malignant tumors, including various cancers. The third category is chronic respiratory diseases, such as chronic obstructive pulmonary disease, asthma, etc. The fourth category is other types of chronic diseases, such as diabetes, chronic kidney disease, chronic liver disease, chronic digestive system diseases, mental diseases, etc.

The occurrence and development of chronic diseases are often related to many factors, including genetic factors, environmental factors, lifestyle and so on. With ageing populations, urbanization, industrialization and the spread of unhealthy lifestyles, the incidence of chronic diseases is on the rise, becoming a major global public health challenge. It is of great significance to carry out health management research of chronic diseases and explore effective prevention and control strategies for improving people's health level and reducing social and economic burden.

1.2 The impact of chronic diseases on global health

Chronic diseases, including cardiovascular diseases, diabetes, chronic respiratory diseases, and cancer, have become major health problems worldwide. These diseases not only affect the physical health and quality of life of patients, but also place a huge strain on global health systems. The prevalence of chronic diseases is not limited to developed countries, with changes in lifestyle and diet, developing countries are also facing a growing problem of chronic diseases.

The impact of chronic diseases on global health is multifaceted. Chronic diseases are the leading cause of death worldwide. According to statistics, millions of people die every year due to chronic diseases, and the number is still rising. Chronic diseases place a heavy burden on the global economy. The treatment and management of chronic diseases require substantial medical resources, including medical facilities, medicines and human resources. These costs are not only a financial strain on individuals and families, but also a huge challenge to the nation's health care budget. Chronic diseases also have a profound impact on society. As patients require treatment and care for a long time, it may lead to a reduction in the workforce and affect social productivity. At the same time, chronic diseases may also lead to psychosocial problems, such as anxiety and depression.

Governments and health authorities are taking a range of measures to address the impact of chronic diseases on global health. These measures include strengthening the prevention and control of chronic diseases, raising public awareness and awareness of chronic diseases, and improving lifestyle and dietary habits. At the same time, with the development of science and technology, such as big data, artificial intelligence, blockchain, Web3 and other new technologies also provide new possibilities for chronic disease management. By leveraging these technologies, we can better monitor and manage chronic diseases and improve treatment outcomes and quality of life.

While some progress has been made, chronic diseases remain a major challenge in global health. We need to continue to strengthen research and cooperation, explore more effective chronic disease management methods, and make greater contributions to the global health cause, which is JoinCare's industry mission and the direction of human efforts.

1.3 The age of chronic disease management

Chronic disease health management occupies a vital position in the global health system and its importance cannot be ignored. Chronic diseases are one of the leading causes of the global burden of disease. According to the World Health Organization, chronic diseases kill millions of people every year, and the number continues to rise. Through effective health management, morbidity and mortality from chronic diseases can be significantly reduced, thereby reducing the global burden of disease.

The health management of chronic diseases is of great significance to improve the quality of life of patients. Chronic diseases are often accompanied by long-term physical discomfort and psychological pressure, which seriously affect the quality of life of patients. Through health management, patients can be helped to develop personalized rehabilitation plans and improve the quality of life.

Chronic health management also helps control health care costs. The treatment and management of chronic diseases require long-term investment of medical resources and funds. Through effective health management, the occurrence and development of chronic diseases can be prevented and delayed, thus reducing the consumption of medical resources and the expenditure of medical costs.

Strengthening the research and practice of chronic disease health management is an inevitable choice to ensure global public health security and improve people's health. High-quality chronic disease management will greatly reduce medical costs, improve the quality of human life,

increase human life expectancy, and reduce the disease burden of the world, especially in China, this is the age of chronic disease management.

1.4 Pain points of chronic disease management

- The sharp increase in population aging brings pressure and opportunities to chronic disease management

With the intensification of global population aging, chronic diseases have become the main public health challenge facing the world. Population aging not only means an increase in the proportion of elderly population, but also represents a significant transformation in social structure and economic burden. This change is particularly obvious in the management of chronic diseases, because the elderly are often the main patient groups of chronic diseases, such as cardiovascular disease, diabetes, arthritis and chronic obstructive pulmonary disease.

As age increases, the physiological functions of the human body gradually decline, the immune system weakens, and the resistance to diseases decreases, making elderly people more susceptible to the invasion of chronic diseases. Meanwhile, elderly people often have multiple chronic diseases coexisting, which makes disease management more complex and difficult. This not only increases the consumption of medical resources, but also brings a heavy economic and psychological burden to families and society.

In China, with the advancement of medical technology and the improvement of people's living standards, the average life expectancy continues to extend, and the number and proportion of elderly people are growing rapidly. This trend makes the management and prevention of chronic diseases increasingly challenging. To address this challenge, we need to take more proactive and effective measures, such as strengthening chronic disease health education, raising public health awareness, strengthening grassroots medical service capabilities,

achieving early detection, diagnosis, and treatment of chronic diseases, promoting the optimization of medical resource allocation, and improving the efficiency and effectiveness of chronic disease management.

Internationally, countries are also actively exploring effective models for chronic disease management. For example, some developed countries have achieved effective control of chronic diseases by establishing sound medical security systems and health management systems. At the same time, they also continuously improve the technological level and international influence of chronic disease management through technological innovation and international cooperation. These experiences and practices provide us with valuable reference and inspiration.

The aging population is an important reason for the increased burden of chronic diseases and a common challenge facing the world. We need to take comprehensive measures from multiple levels to strengthen the management and prevention of chronic diseases, in order to address the challenges brought about by aging population and increasing burden of chronic diseases.

- Uneven distribution of medical resources and diversified health needs

In the field of chronic disease health management, the problem of uneven distribution of medical resources is particularly prominent. On a global scale, developed countries have relatively abundant medical resources, while developing countries face the dilemma of resource scarcity. Even within developed countries, there is a significant imbalance in the distribution of medical resources between urban and rural areas, as well as between people of different socio-economic statuses. This inequality has led to unequal management of chronic disease health, making it difficult for some patients to access timely and effective medical services.

At the same time, with the aging population and changes in lifestyle, the health needs of chronic diseases have shown diversified characteristics. Different types of chronic diseases require different management methods, and patients' demand for health services has shifted from simple disease treatment to comprehensive health management. The existing medical resources and service models often fail to meet these diverse needs, resulting in poor management effectiveness for some patients.

To address this issue, on the one hand, it is necessary to increase investment in medical resources and improve the accessibility and quality of medical services. This includes strengthening the construction of the grassroots medical service system, improving the diagnostic and treatment capabilities of grassroots doctors, and promoting the application of technologies such as telemedicine. On the other hand, innovative service models are needed to meet the diverse health needs of patients. For example, services such as health education, health counseling, and health risk assessment can be provided to help patients better manage their health status.

The government and all sectors of society should actively participate in the management of chronic disease health. The government can guide the rational allocation of medical resources and improve the fairness and efficiency of medical services by formulating relevant policies. Meanwhile, various sectors of society can also promote the development of chronic disease health management by providing financial and technical support.

The uneven distribution of medical resources and diverse health needs are important challenges facing chronic disease health management at present. Only by increasing investment, innovating service models, and strengthening cooperation can we effectively address these challenges and improve the effectiveness and quality of chronic disease health management.

1.5 Opportunities for chronic disease management

With the rapid progress of technology, the field of chronic disease health management has faced unprecedented opportunities and challenges. On the one hand, modern technology provides more means and methods for chronic disease management, providing more precise and efficient support for disease prevention, diagnosis, and treatment. On the other hand, technological progress has also brought a series of new challenges, such as data security, privacy protection, and technology popularization, which urgently need to be solved.

In terms of opportunities, the application of technologies such as big data, artificial intelligence, the Internet of Things, blockchain, and Web3 provides new perspectives and solutions for chronic disease management. For example, through big data analysis, accurate prediction of the prevalence trend of chronic diseases can be achieved, providing scientific basis for policy formulation. The application of artificial intelligence technology in chronic disease diagnosis can improve the accuracy and efficiency of diagnosis, reduce missed diagnosis and misdiagnosis, and popularize the Internet of Things technology. This makes self-monitoring and management of chronic disease patients possible, and improves their quality of life and self- management ability.

Technological progress has also brought a series of challenges. With the application of big data and artificial intelligence technology, the security and privacy protection of personal health information are becoming increasingly prominent. How to ensure the security and privacy of patient information, avoid information leakage and abuse, has become an urgent problem to be solved. The popularization and application of new technologies require a large amount of capital investment and talent cultivation, which may face significant difficulties and challenges for some economically disadvantaged regions and populations. The

application of new technologies may also bring about some ethical and legal issues, such as how to evaluate the accuracy and reliability of artificial intelligence diagnosis, and how patients accept new technologies, which need to be continuously explored and solved in practical applications.

Technological progress has brought opportunities and challenges to the management of chronic disease health. We should seize opportunities, actively apply new technologies to improve the efficiency and quality of chronic disease management, while also paying attention to challenges, strengthening data security and privacy protection, promoting the popularization and application of new technologies, and providing better health management services for chronic disease patients.

2.1 JoinCare's technological advantages

There are many factors to consider in this project, including the characteristics and limitations of Starknet, distributed storage and computing, privacy protection, gas cost optimization, health data protection, family gene establishment, and the application of AI technology. What technologies do we have to update them based on Starknet current technology state, in order to avoid the following issues during use.

- From smart contracts

StarkNet uses Cairo language to write smart contracts. For Ethereum developers,learning and mastering Cairo is a completely new language that requires time and effort.

- Ecology

The StarkNet ecosystem is not mature enough compared to the Ethereum mainnet, with relatively few developer communities and existing open source resources.

- Compatibility

Due to the use of different smart contract languages (Cairo), compatibility with existing Solidity contracts on Ethereum is poor, and migrating existing Ethereum applications requires rewriting smart contracts.

- Wallet support

At present, there are relatively few wallets that support StarkNet, and the user experience is relatively poor, requiring more time to improve.

- Technical Risk

As an emerging technology, the widespread application of StarkNet and STARK zero knowledge proofs still requires time to verify their security and stability.

- Degree of decentralization

Although StarkNet is decentralized by design, its actual degree of decentralization and security still need to be further tested in large-scale applications.

- Cost

Although ZK-Rollup can reduce transaction fees, it is computatively expensive to generate zero-knowledge proofs, especially STARK proofs, which may affect cost-effectiveness in some application scenarios.

- Delay

It takes a certain amount of time to generate and verify zero-knowledge proofs, which may result in a relatively long time for the final confirmation of the transaction, affecting some applications with high real-time requirements.

2.1.1 Overview of system architecture

1) Medical equipment – real–time transmission of health data.
2) Mobile application – including Starknet wallet, responsible for data reception, offline signature, packaging and uploading.
3) Starknet – Perform smart contracts and privacy computing, distributed storage and calculation of data.
4) Distributed storage – Distributed storage systems protect data such as IPFS.
5) AI module – for data analysis, health record generation, personalized health recommendations and user rewards.

- Data transmission and storage

How to achieve data distribution from device to mobile terminal? The scheme is as follows:

1) The medical data is transmitted to the mobile application through the
2) Bluetooth, and the mobile application performs preliminary processing and encryption of the data.
3) Package the encrypted data, verify it with an offline signature, and upload it to the Starknet network.
4) Using IPFS(FileCoin) and other distributed storage to encrypt data again to ensure data security and privacy.

- Data privacy calculation

User data privacy calculation can be obtained only after user authorization, which is as follows:

1) Data encryption, encrypting data on mobile devices to ensure that data uploaded to distributed storage cannot be read by unauthorized users and must be signed and voluntarily uploaded by users.

2) Through multi-party computation, local data privacy computation, and utilizing Starknet's privacy computing capability zero knowledge proof technology,multi-party privacy security computation is performed to ensure data privacy while completing tasks.

- Gas optimization

1) Offline signature, the offline signature is made in mobile applications, reducing the amount of on-chain calculation and reducing gas costs

2) Batch processing transactions, multiple transactions will be packaged for processing, further saving gas costs

- AI Applications

1) AI applications are mainly reflected in data analysis, reasoning, personalized health recommendations, health rewards, etc., as follows:

2) Use AI models to analyze user health data and generate health reports and health records

3) Personalized recommendations, providing personalized health advice and preventive measures based on users' health data and historical records

4) Health reward, according to the user's health behavior and data contribution, give corresponding rewards, in the form of tokens to encourage and release, so that users can provide continuous health data.

2.2.Technical details and implementation of JoinCare

2.2.1 Bluetooth data transmission

1) Bluetooth data transmission

Using BLE (Bluetooth Low Energy) protocol to ensure stable and low-power data transmission, while establishing a matching connection between mobile applications and medical devices to achieve automatic data transmission.

```
// Example Golang code: Using BLE package for Bluetooth data
transmiss
ion
package
main


import (
    "github.com/go-ble/ble"
    "github.com/go-ble/ble/examples/lib/dev"
    "
log" )


func main() {
    // Initialize Bluetooth device
    d, err := dev.NewDevice
    ("default") if err != nil {
        log.Fatalf("Can't initialize device: %s", err)
    }
    ble.SetDefaultDevice(d)

    // Scan Bluetooth devices
    ble.Scan(nil, false, func(a ble.Advertisement) {
        log.Printf("Found device: %s", a.Address())
        // Connect and read data (sample code, not actual implementation)
    }, nil)
```

2) Data encryption and packaging

```
// Data packaging example
type MedicalData struct {
    DeviceID     string  `json:"device_id"`
    Timestamp    int64   `json:"timestamp"`
    HeartRate    int     `json:"heart_rate"`
    BloodPressure int    `json:"blood_pressure"`
}

func packageData(data MedicalData) ([]byte, error) {
    return json.Marshal(data)
}

Data encryption, using StarkNet's zk-Rollup
technology for data encryption (sample code).
```

```
// Encrypting data (pseudocode, example)
func encryptData(data []byte) []byte {
    // The data is encrypted using the StarkNet encryption algorithm
    return starknet.Encrypt(data)
}
```

3) Distributed storage

Using IPFS for distributed storage, uploading data to the IPFS network, obtaining a unique CID, and Starknet can only store CIDs in contracts to ensure data traceability and security.

- Use IPFS to store data and get the CID (content identifier) of the data

```
// Upload data to IPFS using the go-ipfs-api package
package main

import (
    "github.com/ipfs/go-ipfs-api"
    "log"
)

func storeDataOnIPFS(data []byte) (string, error) {
    sh := shell.NewShell("localhost:5001")
    cid, err := sh.Add(bytes.NewReader(data)) if
    err != nil {
        return "", err }
    return cid, nil }
```

- Write smart contracts in Solidity and deploy them on StarkNet

```
// Solidity Smart Contract Example
pragma solidity ^0.8.0;

contract MedicalDataContract { s
    truct MedicalData {
        string deviceID;
        uint256 timestamp;
        string dataCID; // IPFS CID }

    mapping(address => MedicalData) public medicalData;

    function storeMedicalData(string memory deviceID, uint256 timestamp,
        medicalData[msg.sender] = MedicalData(deviceID, timestamp, dataC
    }
}
```

4) Privacy calculation

Using Starknet's zero knowledge proof technique to ensure the security of data privacy computation, while adopting a multi-party secure computation protocol to ensure the security and privacy of multi-party participation in computation.

```
// Privacy computing (pseudocode, example)
func privacyComputation(data []byte) ([]byte, error) { //
    Privacy computing using MPC technology
    return mpc.Compute(data)
}
```

5) AI analysis and recommendations

At the data level, uploading data triggers AI models for genetic data analysis, generating genetic reports. At the user inference level, AI predicts and infers health risks from user data, providing personalized recommendations. By utilizing user behavior and genetic algorithms, creating a archive pool with a family gene database, track and analyze family health history and genetic information.

1.Data analysis

The main steps involved in data preprocessing, feature extraction, and statistical analysis , as follows.

1) Optimize smart contracts: reduce the complexity and computational load of smart contracts, lower execution costs and time.

2) Layered architecture: the complex logic is divided into multiple smart contracts, distributed processing, reducing the load of a single contract.

- Data preprocessing: Cleaning data, dealing with missing values and outliers.
- Feature extraction: Use feature engineering techniques to extract useful features from raw data.

- Statistical analysis: using statistical methods such as mean, median, standard deviation, etc to perform descriptive analysis on data.

Implement method:

1) Python library: Use Pandas, NumPy for data processing and analysis

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Example: Loading and analyzing medical data
data = pd.read_csv('medical_data.csv')
print(data.describe())

# Visual blood pressure distribution
sns.histplot(data['blood_pressure'])
plt.show()
```

2.Data reasoning

Machine learning and deep learning techniques are commonly used. There are two types of learning, supervised learning (using labeled data to train Moses for classification or regression) and unsupervised learning (using the clustering algorithm K-Means to group data on unlabeled data).

The implementation scheme is as follows:

1) The machine learning library does not use Scikit-learn for model training and reasoning
2) Deep learning framework TensorFlow or PyTorch for deep learning model training

```
from sklearn.ensemble import RandomForestClassifier
from sklearn.model_selection import train_test_split

# Example: Training a random forest classifier X
= data[['age', 'weight', 'height']]
y = data['condition']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2)

model = RandomForestClassifier()
model.fit(X_train, y_train)
predictions = model.predict(X_test)
```

3.Data forecasting

Using a time series analysis or regression model, the steps are as follows:

- Time series analysis, using ARIMA, LSTM and other models to predict time series data.
- Regression model, using linear regression, decision tree regression and other models for prediction

The implementation method is as follows:

1) Time series library, using statsmodels for time series analysis
2) Deep learning frameworks train LSTM models with TensorFlow or PyTorch

```
from statsmodels.tsa.arima_model import ARIMA

# Example: Using the ARIMA model for time series forecasting
series = data['heart_rate']
model = ARIMA(series, order=(5, 1, 0))
model_fit = model.fit(disp=0)
forecast = model_fit.forecast(steps=10)[0]
```

4. Personalized recommendation system

The specific implementation steps for using collaborative filtering, content filtering, and hybrid recommendation systems are as follows:：

- Collaborative filtering, recommending based on user behavior or project similarity
- Content filtering, recommending based on project features
- A hybrid recommendation system that combines collaborative filtering and content filtering for recommendations

The implementation method is as follows:：

1) Recommendation library, Surprise library for recommendation system development
2) Deep learning, using neural networks for recommendation system optimization

```
from surprise import Dataset, Reader, SVD
from surprise.model_selection import train_test_split

# Example: Using SVD model for recommendation
reader = Reader(rating_scale=(1, 5))
data = Dataset.load_from_df(ratings_df[['user_id', 'item_id', 'rating']]
trainset, testset = train_test_split(data, test_size=0.2)


model = SVD()
model.fit(trainset)
predictions = model.test(testset)
```

5. Establish a family gene bank

Establishing a family gene bank involves gene data analysis, family map construction, and genetic risk prediction. The implementation steps are as follows:：

- Genetic data analysis: using bioinformatics tools to analyze genetic data
- Family lineage mapping construction: Construct a family lineage map to display the genetic information and relationships of family members.

- Genetic risk prediction: using machine learning models to predict genetic risk.

The implementation method is as follows:

1) Bioinformatics tool for genetic data analysis with Biopython.
2) Family genealogy chart tool, using graphviz or networkx to construct Family genealogy chart.
3) Machine learning model, using Scikit learn for genetic risk prediction.

```
from Bio  import  SeqIO

# Example: Reading genetic data
for record in SeqIO.parse("genome data.fasta", "fasta"):
    print(record.id)
    print(record.seq)

import networkx as nx
import matplotlib.pyplot as plt


# Example: Building a family genealogy chart G = nx.Graph ()
G .add edges from ([("Parent1",  "Child1"),  ("Parent2", "Child1")])
nx.draw (G, with labels=True) plt.show ()
```

2.2.2 System Security and Privacy Protection

Building a secure and privacy protected Joincare system requires comprehensive consideration of multiple aspects, including data encryption, access control, data anonymization, privacy computing, and compliance assurance. The following is acom prehensive plan, including these key points and specific implementation methods.

1.Data encryption

Ensure that all uploaded and stored data is encrypted, using TLS with (Transport Layer Security Protocol) encryption technology to ensure data security during transmission, and encrypting stored data using symmetric encryption (such as AES) and asymmetric encryption (such as RSA).

```
// Use Golang to implement TLS encryption
package main

import (
"crypto/tls
" "log"
"net/http"
)

func main() {
// Configuring TLS
    tlsConfig := &tls.Config{
        MinVersion: tls.VersionTLS12,
    }

    server := &http.Server{
        Addr:      ":443",
        TLSConfig: tlsConfig,
    }

    log.Fatal(server.ListenAndServeTLS("server.crt", "server.key"))
}
```

Data encryption: encrypting and storing data

```
# Implementing AES Encryption with Python
from Crypto.Cipher import AES
import base64

key = b'Sixteen byte key'
data = b'Patient data to encrypt'

cipher = AES.new(key, AES.MODE_EAX)
nonce = cipher.nonce
ciphertext, tag = cipher.encrypt_and_digest(data)

#store nonce and ciphertext
encrypted_data = base64.b64encode(nonce + ciphertext)
print(encrypted_data)
```

2.Access control

Strict access control mechanisms ensure that only authorized users and applications can access and process data, and multi factor authentication (MFA) is used to enhance system security; Role based access control (RBAC) ensures that users can only access data within their authorized scope.

The implementation method is as follows:

(1) Authentication: Use OAuth2.0 or JWT for authentication.

```
// Use Golang to implement JWT authentication
package main

import (
    "github.com/dgrijalva/jwt-go"
    "time"
)

var mySigningKey = []byte("secret")

func generateJWT() (string, error) {
    token := jwt.NewWithClaims(jwt.SigningMethodHS256, jwt.MapClaims{
        "user": "user123",
        "exp": time.Now().Add(time.Hour * 1).Unix(),
    })
    return token.SignedString(mySigningKey)
}
```

(2) Authorization management: RBAC is used to achieve authorization management

```
# use Python to achieve RBAC
from flask import Flask, request
from flask_rbac import RBAC

app = Flask(__name__)
rbac = RBAC(app)

@rbac.as_role('admin')
def add_user():
    pass

@app.route('/add_user', methods=['POST'])
@rbac.allow(['admin'], methods=['POST'])
def add_user_route():
    return add_user()
```

3.Data anonymization

Data anonymization technology ,removing or replacing personal identification information to prevent direct association between data and individuals, adding noise or using data masking techniques to make data difficult to track.

The implementation plan is as follows:

De-identification: Data is de-identified using anonymised libraries.

```
# Use Python to implement de-identification import pandas as pd
from sklearn .utils import shuffle

data = pd.read_csv ('patient_data.csv') data = shuffle (data)
data ['patient_id'] = data ['patient_id'] .apply (lambda x:  'anon_ ' + str (x)
data.to_csv ('anon_patient_data.csv', index=False)
```

4.Privacy computing

Using zero knowledge proofs and multi-party secure computation to ensure the data privacy and security during the computation process. Multiple parties jointly calculate the value of a function without disclosing their respective inputs, allowing for direct computation on encrypted data without the need for decryption.

The implementation method is as follows:

(1) MPC：Using PySyft library to implement multi-party computation.

```
# Use PySyft to implement multi-party computation
import syft as sy
import torch


hook = sy.TorchHook (torch)
alice = sy.VirtualWorker (hook, id="alice")
bob = sy.VirtualWorker (hook, id="bob")


data = torch.tensor ([1, 2, 3, 4, 5])
data = data.send (alice) .fix_precision () .share (bob, alice)
result = data.sum () .get () .float_precision ()
print ( result)
```

(2) Homomorphic encryption: Use TenSEAL library for homomorphic encryption calculations.

```
# Use TenSEAL to acheive homomorphic encryption
import tenseal as ts


# Create a context
context = ts.context(ts.SCHEME_TYPE.CKKS, poly_modulus_degree=8192, coef
context.global_scale = 2**40
context.generate_galois_keys()


# encrypt data
data = [1.0, 2.0, 3.0]
enc_data = ts.ckks_vector(context, data)


# calculate
enc result = enc_data + enc_data
res_ult = enc_result.decrypt()
print(result)
```

5.Compliance guarantee

By logging and auditing, recording all accessed operation logs,conducting audits and monitoring, and complying with relevant regulations such as HIPAA, GDPR, etc.

The implementation method is as follows:

(1) log record: Use ELK (Elasticsearch, Logstash, Kibana) for log record and analysis.

```
# Logstash configuration files example
input {
    file {
        path => "/var/log/medical_system.log"
        start_position => "beginning"
    }
}

output {
    elasticsearch {
        hosts => ["localhost:9200"]
        index => "medical_logs"
    }
}
```

(2) Compliance checks: Regular compliance checks are carried out to ensure that the system meets regulatory requirements.

```
# use Python to Conduct compliance checks
import json
import requests

def check_compliance(data):
    # Example: Check whether data meets HIPAA requirements
    response = requests.post('https://compliance-checker.example.com/che
    return response.json()

data = {"patient_data": "example_data"}
result = check_compliance(data)
print(result)
```

2.2.3 User experience and interaction

Improving the user experience and interaction of the medical system needs to start from the following aspects.

1) User interface

Design a friendly user interface that facilitates users to upload data and view health reports.

2) .Personalize notifications

Improve user Participation by pushing personalized health advice and reminders through the app.

3) User reward system

Clear and transparent reward mechanism to motivate users to continuously participate in health data uploading and interaction. Designing a user reward system for joincare user experience and interaction requires consideration of multiple aspects such as user participation, incentive mechanisms, data security, and privacy protection. The following are specific design ideas, implementation principles, methods, and specific implementations.

- Design concept

1. Target

1.1、 Motivate user participation: Encourage users to actively participate in health management and data sharing through reward mechanisms.

1.2、Improve user stickiness: Enhance user loyalty and stickiness through points, rewards, and achievement systems.、

1.3、 Promoting healthy behaviors: Users are encouraged to adopt healthy behaviors through rewards, such as regular checkups, exercise, and healthy eating.

2. key elements

2.1 Points system: Users earn points by completing specific tasks and behavs.

2.2 Reward redemption: Users can use points to redeem rewards, such as discount coupons, gifts, and health services.

2.3 Achievement system: Users earn achievement badges by completing specific goals, which are displayed in their personal profiles.

2.4 Privacy protection: Ensure the security and privacy of user data and comply with relevant laws and regulations.

- Implementation principle

1. Data acquisition and analysis

1.1、 Data source: Collect user health data through health devices, mobile applications, and manual input.

1.2、 Data analysis: Using AI and machine learning algorithms to analyze user data, identify health trends and behavioral patterns.

2. Reward mechanism design

2.1、 Points earned: Users earn points by completing tasks, healthy behaviors, and sharing data.

2.2、 Points management: The system records user points and provides query and management functions.

3. User interaction design

3.1、Task System: The system provides daily, weekly, and long-term tasks to motivate users to complete and earn points.

3.2、 Reminder system: remind users to complete tasks and earn rewards by pushing notification

3.3、 Feedback system: The system provides immediate feedback and reward confirmation after the user completed the task

- Implementation method

Technology Stack

Front end: React/Vue. js, mobile end uses React Native/Flutter. Back-end: Node.js/Golang, database using MongoDB.

AI and data analysis: Python, using TensorFlow or PyTorch

Blockchain: StarkNet, used for distributed storage and data privacy protection.

- Specific implementation

1. React example: User tasks and points display

```
import React, { useState, useEffect } from 'react';
import axios from 'axios';

function UserDashboard() {
  const [tasks, setTasks] = useState([]);
  const [points, setPoints] = useState(0);

  useEffect(() => {
    // Get user tasks and points
    axios.get('/api/user/tasks').then(response => {
      setTasks(response.data.tasks);
      setPoints(response.data.points);
    });
  }, []);

  return
    ( <di
    v>
      <h1> user tasks and points </h1>
      <h2> Current points: {points}</h2>
      <ul>
        {tasks.map(task => (
          <li key={task.id}>
    {task.name} - {task.status === 'completed' ? 'finished ' : ' unfinished
          </li>
        )
      )} </
      l>
```

2. Node.js Example: User tasks and points management

```
const express = require('express');
  const app = express();
  const mongoose = require('mongoose');

  mongoose.connect('mongodb://localhost:27017/healthcare', { useNewUrlPars

  const UserSchema = new mongoose.Schema({ us
    ername: String,
    points: Number,
    tasks: [
```

```
      {
        name:  String,
        status:  String,
      }
    ],
  });

  const User =  mongoose.model ('User',  UserSchema);

  app.get ('/api/user/tasks', async  (req,  res)  =>  {
    const user =  await User.findOne ({  username:  'exampleUser '  });
    res.json ({  points:  user.points,  tasks:  user.tasks  });
  });

  app.listen (3000,  ()  =>  {
    console.log ('Server is running on port 3000'); });
```

3. User health data analysis and bonus points

```
import pandas as pd
from sklearn .cluster import KMeans

# Simulate user health data data = {
'user id':  [1, 2, 3, 4, 5],
'steps': [5000, 8000, 7500, 3000, 12000],
'sleep hours':  [7, 6, 8, 5, 7],
'calories burned':  [200, 300, 250, 150, 400] }

df = pd.DataFrame (data)

# Using KMeans clustering to analyze user health behavior kmeans = KMeans (n
clusters=2)
df ['cluster'] = kmeans.fit predict (df [['steps',  'sleep hours',  'calories

# Allocate points based on clustering results def assign points (row):
if row ['cluster'] == 0:
return 10 else:
return 20

df ['points'] = df.apply (assign points, axis=1)

print (df)
```

4. Use StarkNet for data privacy protection

```
pragma solidity ^0.8.0;

contract HealthData {
    struct HealthRecord {
        uint256 steps;
        uint256 sleepHours;
        uint256 caloriesBurned;
    }

    mapping(address => HealthRecord) private healthRecords;

    function setHealthRecord(uint256 steps, uint256 sleepHours, uint256
        healthRecords[msg.sender] = HealthRecord(steps, sleepHours, calo
    }

    function getHealthRecord()
```

3.JoinCare hardware scenario

Traditional family health monitoring often relies on regular physical examination and doctor's diagnosis, but this method has problems such as long time interval and slow information feedback. And now with the development of big data, artificial

intelligence, blockchain, Web3 and other technologies, home health monitoring has achieved a transformation from passive to active, from single to comprehensive.

Smart wearable devices, telemedicine systems, AI health assistants and other products, like a pair of invisible eyes, real-time monitoring and analysis of our physiological data, timely warning of potential health risks, so that we can detect and deal with problems earlier.

We have launched smart bracelets, smart watches and other wearable devices, as well as mobile health monitors, blood pressure meters, blood oxygen meters will become an important tool for family health monitoring. They can monitor heart rate, blood pressure, sleep quality, step count and other key indicators in real time, and synchronize the data to the mobile phone DAPP via Bluetooth or Wi-Fi, so that users can check their health status at any time.

Initially, we will launch three devices (human health monitor, blood glucose meter, blood pressure meter), and in the future we will add more products, not only limited to medical devices, but also medicines, health products, etc. The application scenarios of the three devices are as follows:

- Collect health data from the device

Users use human health monitor, blood glucose meter, blood pressure meter three mobile equipment, can be used indoors and outdoors, suitable for families, enterprises, public places, social medical and other fields. Truly realize convenient medical treatment, monitoring at any time.

When the user obtains the device, the device can be bound to the Solana address in a few simple steps using the DAPP, thus becoming a node of the Solana blockchain and enjoying the benefits.

- Data linking

APP is a very mature technology, can be applied to all terminals, we have built this application platform APP: health management platform. Traditional apps store data centrally, and the data is all in the hands of the enterprise, and there is a risk of loss at any time. This project applies the blockchain decentralized storage technology in the APP, so as to realize the application product of DAPP, which is the platform for all information interaction and application, and also the core carrier of this project.

The user's health monitoring data are all encrypted and stored on the chain, and the data is in the user's own hands. Through Web3 technology, they can be valued, so that users who are willing to sell personal health data can cash in value at any time.

4.JoinCare data scenario

- Whole life cycle health file construction

Once each user uses this platform, they can continuously store health data on the chain permanently, thus forming a health file for their entire

life cycle. The construction of this file will have extraordinary significance for the whole ecology.

By standardizing user data management and recording it onto the blockchain to form blockchain electronic health records, a three-dimensional view is formed from a consumer centered perspective, consisting of three dimensions: time dimension, diagnosis and treatment event dimension, and main health issue dimension. The entire lifecycle is vertically recorded and browsed, paying attention to the overall health status.

From the perspective of disease type, main signs, and symptoms, semantic queries are combined through various conditions such as diagnosis, test results, main signs, and symptoms to facilitate health industry service providers to compare health medical records with similar or identical symptoms and signs, and to list highly likely problems and diagnostic references for health industry service providers; On the basis of integrated databases, gradually establish thematic datasets based on various aspects such as health, treatment, health economy, doctors, patients, etc., to provide complete and unified data presentation for service providers in the health industry.

- Personalized health management

As mentioned above, this platform will establish its own unique personalized health data for each user. Based on the analysis of these data, we will manage the user's personal health by scientific means. This management is aimed at preventing and controlling the occurrence and development of diseases, reducing medical costs and improving the quality of life, and targeting health risk factors related to individual and group

lifestyles. The process and method of continuous improvement through

systematic inspection, evaluation, intervention, etc. International experience shows that chronic diseases are diseases that can be effectively prevented and controlled. " As the World Health Organization (WHO) highlighted 10 years ago: One third of human diseases can be avoided through preventive health care, one third of diseases can be effectively controlled through early detection, and one third of diseases can improve treatment effect through effective communication of information. The significance of prevention is far better than treatment, and the cost of treatment is far greater than disease prevention, which is exactly the purpose of personalized health management of this project.

- Data encryption and storage

If the medical record is imagined as a ledger, it was originally in the hands of various hospitals, patients themselves do not master, so patients have no way to get their own medical records and history, which will cause a lot of trouble for patients to seek medical treatment, because the doctor can not understand your medical history in detail. But now if you can use blockchain technology to encrypt and save, there will be personal medical historical data, whether it is to see a doctor, to plan for their own health, or to pay to share, there will be historical data available for use, and the real owner of this data is the patient himself, rather than a hospital or a third party institution.

- Health data dealmaking

Traditional medical and health personal information data is established in various centralized medical institutions, which has inconvenient access, information disclosure security risks, and centralized trust risks. Blockchain decentralized encryption data storage and transmission is changing the traditional fragile health information system, helping the government, health service providers, users to ensure the security of information, while taking into account the convenience of use of health information.

As the sole legal owner of data, consumers in the medical and health industry can upload their monitoring data at home or health diagnosis and treatment data in hospitals, health data generated by various medical devices and data generated by personal health management to the blockchain of the platform. Through JoinCare smart contracts, individuals can realize the authorized use of health data, and at the same time, the privacy of health data is well protected.

Therefore, in this context, JoinCare's healthcare marketplace is a natural dealmaking venue for health data and health applications. JoinCare will unite upstream and downstream enterprises in the industry to jointly launch JoinCare ecological construction and share the data market. Strategic partners in the JoinCare ecosystem will launch DAPP applications in JoinCare, where tens of millions of new and existing consumers "data mine", generating huge amounts of health data every day. Pharmaceutical companies take advantage of blockchain disintermediation and use the savings in channel costs to reward users for contributing health data. The interoperability of these health data and the multiplier effect of data value transfer will unlock tremendous value. JoinCare will connect research

institutions and users to find data samples globally for health organizations, quickly achieve scale sample size, accuracy of results, and reduce costs by

invoking the large data samples already in JoinCare. How and what kinds of health data users provide to research institutions:

A.One-time rental. Organizations will use JoinCare APIs to get relevant health data from the healthcare data market.

B.Ongoing medical data requirements. If the organization needs a long-term health data, the provider is required to continuously provide health data, such as how many steps the user walks per day, what the user's heart rate is and other effective decision data.

C.Medical data proofreading. JoinCare combines completely different data sources to provide an easy way to access users' data and obtain users’ consent.

D.Anonymous medical data. Users can choose to provide labeled health data anonymously to interested organizations. Institutions can also filter users' health data by broad category criteria (such as gender, age, BMI, etc.).

E.evidence-based medicine. Since traditional medical treatment lacks sufficient effective and safe health data, different doctors give prescriptions based on their personal experience and knowledge. Evidence-based care is a treatment plan based on high-quality health data.

Institutional or individual developers, products and service providers use health big data for analysis and development, the resulting applications can be released in the application market, set transaction methods, charging rules, and limit the scope of application. Individual or institutional users can transact through this platform to realize the value circulation of medical and health information.

IV.JoinCare artificial intelligence scenario

After the first phase of the project, a large amount of medical and health data has been accumulated, which is the data source of AI analysis, it is the basis of AI diagnosis. Therefore, in the second stage, we will gradually access the AI algorithm center and conduct scientific analysis of the data, which can eventually realize the virtual doctor function of AI online consultation and assisted diagnosis.

1. user obtains health data

In hardware usage scenarios, users get continuous health data, which is continuous and non-fragmented, it will be a very important basis for AI analysis. At the same time, the user also uploads various electronic reports of offline diagnosis, such as blood test data, image test data, etc. These medical data constitute his personal health file.

2. The user submits health data and requirements

When users need to use AI functions, they only need to authorize their health data to AI. At the same time, ask the AI for the services, such as medical advice or assisted

diagnosis.

3. AI performs algorithmic analysis on data and provides inquiry price

After receiving the user's health data, the AI will interface with the diagnostic data of various large authoritative hospitals through a dedicated interface, on this basis, the user's personal health data will be analyzed algorithmically, and at the same time, according to the size of the collected diagnostic data and the difficulty of the algorithm, the service contract will be established on the chain, including the payment price and other information.

4. AI provide consultation answers or auxiliary diagnostic results for a fee

Ultimately, the AI delivers the results to the user through contract execution, while automatically collecting fees.

V. JoinCare's impact on the world

1. Influence on the social ideology

The JoinCare project, which combines AI and Web3, has a complex and multidimensional impact on social ideology. This project not only promotes progress in the medical and health field through technological innovation, but also subtly changes people's ways of thinking and values. The following is an analysis of the possible social and ideological impacts it may have:

1)Enhance information transparency and public participation

The combination of AI and Web3 in healthcare management projects makes medical data more transparent and accessible. This transparency helps to increase public trust in the healthcare system, enhance public participation and sense of ownership. People can actively participate in their own health management, thereby improving the overall health level of society.

2) Strengthening individual awareness and autonomous decision-making ability

With the increasing richness and personalization of personal health data, people will pay more attention to their **own** health status and needs. This kind of attentionwill promote the awakening of individual consciousness and make people pay more attention to the realization of self-worth. Meanwhile, AI technology can provide personalized advice and services based on individual health data, thereby enhancing people's autonomous decision-making ability.

3)Promoting social justice and equality

Under the framework of Web3, data ownership and usage rights are more clear and fair. This helps to break the information asymmetry and power imbalance in the traditional healthcare system, and promote social justice and equality. People can have more equal access to medical resources

and information, reducing medical disparities caused by regional, economic and other factors.

4)Raise concerns about privacy and ethical issues

Although the combination of AI and Web3 in healthcare management projects has many advantages, it also raises a series of privacy and ethical issues. People are beginning to pay attention to the privacy protection and security of personal health data, as well as the ethical boundaries of data use and sharing. This kind of attention will promote the improvement of relevant laws and regulations and the development of social ethics.

5)Promoting cross-cultural exchange and global cooperation

The decentralized nature of Web3 makes cross-cultural communication and global cooperation more convenient and efficient. In the field of healthcare management, people from different countries and regions can share medical resources and experiences to tackle global health challenges together. This cooperation will promote cultural diversity and inclusiveness, and promote common progress in human society.

In summary, the combination of AI and Web3 in healthcare management project has a profound and widespread impact on social ideology. We willfully recognize and grasp these impacts, actively respond to challenges and opportunities, and promote sustainable development in the field of healthcare and comprehensive social progress。

2. Impact on the international situation

JoinCare project’s impact on the international situation is mainly reflected in the following aspects:

Firstly, it may promote the optimal allocation and sharing of global medical resources. Under the framework of Web3, medical data can flow more securely and efficiently, making it easier for worldwide medical and research institutions to access and utilize this data. This helps to break

geographical restrictions, promote the optimal allocation of medical resources, and enable developing countries and regions to enjoy more advanced medical technology and services. At the same time, the application of AI technology can also improve the efficiency and quality of medical services, providing better medical security for patients worldwide.

Secondly, combining AI and Web3 in healthcare management projects may promote international cooperation and communication. Under the background of globalization, countries are facing common challenges and opportunities in the field of healthcare. Through the decentralized nature of Web3, countries can participate more equally in the cooperation of medical and health management projects, jointly research and solve problems in the field of medical and health. This kind of cooperation and communication helps to enhance international understanding and trust, and promote the construction of a human health community.

In addition, healthcare management projects that combine AI and Web3 may also have an impact on the international competitive landscape. With the continuous innovation and application of medical and health management technology, the strength of countries in the field of medical and health will be enhanced. This may lead to more intense international competition in medical and health technology, and countries will compete to develop advanced medical and health management technologies to enhance their international status and influence.

However, it should be noted that combining AI and Web3 in healthcare management projects may also bring some challenges and risks. For example, data privacy and security issues, as well as inconsistencies in technical standards and regulations, may pose certain obstacles to international cooperation and communication. Therefore, while promoting medical and health management projects, countries also need to strengthen the formulation and improvement of relevant laws and

regulations to ensure the compliance and safety of technology. In summary, the impact of medical and health management projects combining AI and Web3 on the international situation is multifaceted. It may promote the optimization and sharing of global medical resources, promote international cooperation and exchange, change the international competitive landscape, whilealso facing some challenges and risks. Therefore, countries need to fully consider these factors in promoting healthcare management projects in order to achieve more positive and sustainable development.

3. Impact on the business forms

JoinCare has had a profound impact on business forms. Firstly, Web3 technology has brought about changes such as decentralization, data ownership transformation, and community governance in the field of health management. By utilizing blockchain technology and smart contracts, Web3 makes the management and sharing of personal health data more secure, transparent, and controllable. Users can better grasp their health data and decide how to share and use it. This transformation provides new opportunities for the business form of health management. For example, by building a Web3 health management platform, enterprises can provide more personalized and accurate health management services to meet the needs of users for data privacy and security.

Secondly, the application of AI technology in health management has further promoted innovation in commercial forms. AI can intelligently analyze user health data through deep learning and big data analysis, providing personalized health management suggestions and warnings. This ability enables AI health management platforms to provide more precise and efficient services, improving user experience and satisfaction. At the same time, the AI health management platform can also share and cooperate with partners such as medical institutions and insurance

companies to jointly develop more comprehensive health management solutions, achieving win–win outcomes for multiple parties.

In addition, the combination of Web3 and AI technology has also given rise to new business models. For example, a decentralized health data based on Web3 can achieve secure and transparent transactions of health data, providing fair profit distribution mechanisms for data providers and users. At the same time, the AI health management platform can also combine the incentive mechanism of Web3 to incentivize users to participate in health management actively through tokens and other means, enhancing the platform's activity and user stickiness.

However, this combination also brings some challenges and problems that need to be solved. For example, how to ensure the security and stability of Web3 technology to avoid data leaks and attacks; How to balance the relationship between data privacy protection and commercial exploitation; How to establish effective cooperation mechanism and benefit distribution mechanism. These issues require all parties in the industry to work together to strengthen technology research and development, policy formulation and cooperation &exchange, and promote the healthy development of Web3 and AI in the field of health management.

In summary, the combination of Web3 and AI in the field of health management brings innovation and opportunities to the business form, but also faces some challenges and problems. In the future, with the continuous development and improvement of technology, we have reason to believe that this combination will bring more surprises and breakthroughs in the field of health management.

4. Impact on the platform and technology

JoinCare will have a significant impact on the healthcare platform and medical technology.

Web3 technology has revolutionized the data management of medical platforms through the characteristics of blockchain. Medical records can be reliably stored and shared, ensuring that data is immutable. This feature enables healthcare platforms to provide more secure, transparent and controllable data services. At the same time, blockchain technology improves the efficiency of data sharing, so that different medical institutions can securely access and share medical data under the premise of authorization. This not only improves the efficiency of medical services, but also promotes cross-institutional medical cooperation, providing more consistent and high-quality medical services to patients .

The application of AI technology in medical platforms and medical technologies has further promoted the development of health management. AI can conduct intelligent analysis of medical data through deep learning and big data analysis to provide personalized health management recommendations and early warnings. On the medical platform, AI can assist doctors to make more accurate disease diagnosis and improve the efficiency and accuracy of medical diagnosis. In addition, AI can also make personalized treatment plans according to the individual differences of patients, promoting the development of personalized medicine.

When Web3 and AI are combined, the healthcare platform can provide smarter and more personalized health management services. By utilizing the data management and security features of Web3, combined with the analysis and prediction capabilities of AI, the medical platform can provide users with more accurate and efficient health management solutions. For example, blockchain technology is used to ensure the security and privacy of user health data, while AI algorithms are used to analyze user health data to provide users with personalized health recommendations and warnings.

However, this combination also brings some challenges and problems. For example, how to ensure the security and stability of Web3 technology, and

how to balance the relationship between data privacy protection and commercial exploitation. These issues require all parties in the industry to work together to strengthen technology research and policy-making to promote the healthy development of Web3 and AI in medical platforms and medical technologies.

In summary, the combination of Web3 and AIhas brought innovation and opportunities to medical platforms and technologies, while also facing some challenges and problems. In the future, with the continuous development and improvement of technology, we have reason to believe that this combination will bring more breakthroughs and developments to the field of health management.

VI. Core team

Uwe Wernitz（CEO ）

Chairman of the Board and Chief Executive Officer

Main founder of JoinCare, Chairman of the Board and CEO, responsible for overall strategic planning, positioning, and management of the company. Prior to the establishment of JoinCare in 2018, Uwe Wernitz was an experienced entrepreneur, healthcare expert, and professional consultant. Uwe Wernitz served as the manager of B ü chler and Aqua VitalInt Limited, he not only served as a manager but also provided consulting services to companies in Germany, Spain, and Poland.

Uwe Wernitz has successively served as Deputy Chief Engineer and Technical Director of Mobile Internet Business Division of IBM iX Company. As one of the earliest practitioners of blockchain technology, Uwe Wernitz has been focusing on research in the field of blockchain in recent years and has served as a consultant for multiple CO projects, such as Cyberx, Scry, etc.

During his tenure as CEO, Uwe Wernitz led a team to successfully launch an advanced AI intelligent diagnostic and therapeutic health device. This device utilizes the latest data science technology to help medical

institutions achieve centralized management and intelligent analysis of medical data, providing data support for medical decision-making.

In 2023, as an expert in the medical and health field and an authoritative representative of the German Nutrition Society, officially served as the global image ambassador for the global high-end dietary nutrition brand VIK, attending the VIK brand press conference to further expand the brand's influence and market share.

Wassilios Tsoukalas（CMO）

Chief marketing officer

Joined JoinCare in 2018 and was fully responsible for the company's strategic planning, implementation, investment M&A and investor relations management.

From 2013 to 2017, Wassilios Tsoukalas served as the investment advisor and Chief Technology Officer of Deutsche Verm ö gensbratung (DVAG), leading the team to win the award of Best Investment Group in the German region in the efficiency evaluation of project investment incremental returns. The team was also rated as "Excellent" by the renowned rating agency Assekurata.

In 2018, he joined JoinCare as the Chief Analyst of Management Consulting. Later that same year, he began working as a financial assistant at JoinCare. At JoinCare, Wassilios Tsoukalas was promoted to

Vice President of Finance in December 2019 and became Chief Marketing Officer in July 2021.

Tobias Geyer（COO）

Chief operating officer

Tobias Geyer joined JoinCare in 2019 and is responsible for the company daily operations and management, participating in strategic planning and execution. From 2012 to 2016, he was the Marketing Channel Department Manager at European Mid-sized Bank, leading the team in marketing and sales activities.

He successfully developed and implemented marketing strategies, driving the growth of banking business and improving customer service. From 2017 to 2018, served as COO at German FinTech Company, responsible for managing the company's daily operations and business development. He collaborated with the team to develop the company's strategic plan and began to improve and optimize the company's operational processes.

VII. Special Guests

1.Research Professor Jochen Biedermann

CEO CEO of Frankfurt Financial Group and Silk Road Group in Germany

2.Research Professor Thomas Kochanek

Professor at the University of Saint Gallen in Switzerland

3.Distinguished Research Professor Michael Henke

Professor at Fraunhofer Logistics Research Institute, Dortmund University, Germany

4.Distinguished Research Professor Frank Kirchner

Professor at DFKI Robotics Research Institute, University of Bremen, Germany

5.Research Professor Max Meyer

Professor at Tongji University

6.Research Professor Stefan Schack

Consultant for the German President's Association

7.Distinguished Research Professor Martin Schottenloher

German academician, mathematician, expert and entrepreneur in industrial automation software, and professor at the University of Munich

8.Distinguished Research Professor Axel Kuhn

German academician

Professor at the Fraunhofer School of Industrial Automation, Dortmund University

9.Distinguished Research Professor Volker Schlegel

Senior German industrial policy maker, Federal Minister of Hamburg, German Ambassador and Economic Representative to Foreign Countries

10.Distinguished Research Professor Ojars Sparitis

Academician and Dean of the Latvian National Academy of Sciences

VIII. Legal statement and risk warning

1. Disclaimer

This document is for informational purposes only and its content is for reference only. It does not constitute any buying or selling advice, solicitation, or invitation to sell stocks or securities in JoinCare or its related companies. This document does not constitute or be understood as providing any buying or selling behavior, nor is it any form of contract or commitment.

Due to unpredictable circumstances, the goals listed in this white paper may change. Although the team will make effort to achieve all the goals of this white paper, all individuals and teams involved in Defi will bear their own risks. Part of the content of the document may be adjusted accordingly in the new version of the white paper as the project progresses. The team will make the updated content public through announcements or new versions of the white paper published in the APP.

JoinCare explicitly states that it does not assume participants ' any direct or indirect losses, including:

1.Rely on the content of this document.

2.The information in this article is incorrect, negligent or inaccurate;

3.Any action caused by this article;

The team will make effort to achieve the goals mentioned in the document, but due to the existence of force majeure, the team cannot fully fulfill the commitment. JoinCare Health Management Platform is a tool for generating efficiency on the blockfinance platform, not an investment product. The exchange of health data value by users in JoinCare is a spontaneous behavior and is not related to JoinCare. Please independently evaluate the transaction risk.

JoinCare does not grant any individual any right to participate, control, or make any decisions regarding the JoinCare application.

To the maximum extent permitted by applicable law, our team shall not be liable for any damages and risks arising from participation, including but not limited to direct or indirect personal damage, loss of business profits, loss of business information, or any other economic losses.

The JoinCare platform clearly conveys potential risks to participants, and all users registered at JoinCare platform represent that they have confirmed their understanding and acceptance of the terms and conditions stated in the rules, accept potential risks on this platform, and bear the consequences by themselves.

2. Risk warning

There are risks in the development, maintenance, and operation of JoinCare, many of which are beyond the control of the JoinCare developers. In addition to the other

contents described in this white paper, participants are also fully aware and agree to accept the following risks:

- Market risk

The value of health data on the JoinCare platform is constantly influenced by the entire industry, such as the overall market downturn or other uncontrollable factors, which may cause value fluctuations.

- Regulatory risks

Due to the early development of blockchain, there are no relevant regulatory documents globally regarding the pre requirements, transaction requirements,information disclosure requirements, locking requirements, and other aspects of the fundraising process. Moreover, it is currently unclear how the policy will be implemented, and these factors may have uncertain impacts on the development and liquidity of the project.

And blockchain technology has become the main regulatory object in various major countries around the world. If regulatory entities intervene

or exert influence, the value of blockchain finance or health data may be affected, such as legal restrictions on use, restrictions on defi, obstacles, and even direct termination of JoinCare or defi applications.

- Competitive risk

There are many projects in the current blockchain field, and the competition is very fierce, with strong market competition and project operation pressure.

Whether JoinCare can break through in many excellent projects has been widely recognized, which is not only related to its own team capabilities and vision

planning, but also influenced by many competitors and even oligarchs in the market. During this period, there is a possibility of facing vicious competition.

- Risk of talent loss

JoinCare has gathered a dynamic and strong talent team, including senior practitioners in the blockchain field and experienced technical developers. In the future development, it is not ruled out that the departure of core personnel or conflicts in team content may have a negative impact on the overall performance of Binkuai News.

- Project technical risk

The accelerated development of cryptography or technological advancements such as the development of quantum computers may lead to technological

attacks on the JoinCare platform, which may result in the loss of wallet funds. During the project update process, there may be vulnerabilities that will be promptly fixed upon discovery, but it cannot be guaranteed that they will not cause any impact.

- Risk of uninsured loss

Unlike bank accounts or accounts at other financial institutions, accounts stored on the JoinCare platform or related blockchains, there is usually no

insurance protection on the network, and there will not be any publicly available individual organization to insure your losses in any case.

- Other risks that are not currently known

In addition to the risks mentioned in this white paper, there are also risks that the founding team has not yet mentioned or anticipated. In addition, other risks may arise suddenly, or in the form of multiple combinations of risks already mentioned. Before making the decision to participate, participants should fully understand the team background, know the overall framework and ideas of the project, and participate rationally.