



A Decentralized AI Solution

WHITEPAPER
VERSION 1.0

Table of Contents

Executive Summary	3
The State of Artificial Intelligence	4
bitgrit: A Decentralized AI Solution	7
Team	13
bitgrit Technology	17
Partners & Competition	21
Strategy & Business Model	23
bitgrit Token (GRIT)	25
Timeline	27
Legal	28
References	31

Executive Summary

As the value created by Artificial Intelligence (AI) algorithms increases - like all economic outputs in our current global economic system - we find that value concentrates into the hands of the few. If AI leads to a significant increase in economic output over the coming decades, it will only exacerbate the problem of wealth inequality. bitgrit plans to democratize the value created by AI by ensuring that the people that contribute to its creation are the ones who receive the majority of the value delivered by these systems. bitgrit will foster an online Data Scientist community alongside a corporate AI marketplace with all contributions of the creation of each AI recorded on a public blockchain.

At bitgrit we are building a powerful architecture using cutting-edge blockchain protocols to keep up with the ever-changing technological landscape. We have extensive experience across relevant industry verticals and are building the smart economy of the future at the intersection of AI and blockchain. Rather than aiming to displace institutions, we bring the discussion towards institutions and adoption.

Being able to trust AI requires transparency and auditability of the sources of data that are used to train it, requiring open cooperation between the providers of training data, data scientists and end users. These needs can be met by the immutable frameworks for trust provided by distributed ledger technology.

bitgrit's platform will consist of a two sided marketplace between data scientists who will create AI algorithms and models, and individuals, organizations, and corporations who want cutting edge AI systems created for them. There will also be room for input of data into the system from individuals who can potentially contribute their personal data sets to help enrich the training data sets of these machine learning algorithms.

We at bitgrit want to leverage the growth of AI and blockchain to create an economic system that delivers the gains in productivity from technology and data to the people who create them while also creating value for large organizations and corporations in the form of access to a vast pool of talent and data larger than any internal team can deliver and without a large upfront capital investment.

By creating this distributed platform on an immutable ledger we can ensure that value is transmitted transparently and equitably to the people who are responsible for creating it.

The State of Artificial Intelligence

The recent explosion in big data alongside advancements in Deep Learning has fueled the third AI boom. AI is no longer restricted to the academic sphere, nor is it a marketing gimmick for companies. AI has become deeply intertwined with the business models of the FAANGs, and hundreds of new startups that are disrupting almost every sector of the economy.

While the field of AI has not changed fundamentally in the past 30 years, the relentless and exponential increase of computational power has resulted in the ability to create larger and, more importantly, multi-layered networks, with advancements in algorithm design allowing for automatic feature selection as well as backpropagation and pooling across these multiple levels. GPU based algorithms, which run orders of magnitude faster than their CPU based counterparts, have resulted in the first breakthrough in performance on image recognition. The combination of computing power increases and experimentation with novel neural network designs has resulted in state of the art performance and at times, breakthroughs in multiple fields of computing science, from image recognition and categorization, to speech recognition and speech synthesis, and dozens of other fields.

While these incredible results have certainly increased the prospects of AI as a game-changer across many verticals, several key challenges remain. The primary beneficiaries of machine learning have been large centralized entities that have been able to create or purchase large training data sets as well as hire from the small pool of talent that is capable of producing machine learning models that can benefit from training on said data sets. This exacerbates the problem of the global concentration of wealth by a few corporate entities.

In the near future, the expansion of IoT into the heterogenous personal computing space will accelerate the creation of data that can be used to train models. Unfortunately, the current evolutionary trajectory of ecosystems is leading to greater concentration of data into the hands of a few large companies.

As a result of the growth of AI and data, an increasing number of data scientists are entering the space to process new problem statements. Most experts in the field quickly get pulled out of academia and into industry, with a few large industry players vacuuming up most of the available talent.

Fortunately, for now, there are more talented data scientists yet to be discovered than there are data scientists who have been identified and are working for major players in the space. There is still an opening for us to create a global data scientist community that can work cooperatively and competitively to create machine learning models that deliver immense value.

bitgrit envisions an open and free environment for AI research, rather than an exclusionary and centralized one. More importantly, by recording attribution on an immutable public ledger, we can ensure that people who create the models that deliver value can be compensated with the majority of that value.

Why Decentralized AI is Needed

Trust is the foundation of every human connection. We have collectively built systems of trust to facilitate our interactions, but the economic rules of the system we participate in have resulted in the emergence of traditional institutions and networked services that have appropriated power asymmetrically, breaching our trust, and calling for a replacement: Decentralized AI. Decentralized AI is fundamentally needed because it creates a technological architecture whereby the distribution of models training (now much more valuable commodities) fosters more equitable structures, rather than a centralization of power into the hands of few.

The debate over Decentralized versus Centralized AI is no different than that of any other commodity. The origins of the debate over the distribution of resources can be traced back to Plato's Republic, where several important arguments were made, chiefly that people value competition over cooperation. Due to the hierarchical nature of humans, a few will rise to the top. And without authoritative intervention, the workforce would be brutalized.

Karl Marx made a similar argument over a thousand years later, and noted that "anyone who exchanges the limited resource of time for money is a slave." He therefore suggested that the workers rise up and seize the means of production in order to scale the value of their time and not be beholden to the corrupted power of the few.

Rather than a modern technological play of Marxist communism or Platonic fascism, Decentralized AI represents true democracy alongside equitable capitalism. Instead of the power of AI - or the means of modern business production - being controlled by the few, Decentralized AI places distributed power in the hands of the people.

More specifically, Decentralized Applications provide the benefits of fault-tolerance: no single point of failure, no central authority that could censor information, and distributed trust systems.

With Decentralized Applications, it is now (for the first time) possible to create open source and profitable applications, such as Decentralized AI dApps around community-controlled AI and Data Science. Further, Decentralized AI allows for competition in the AI space rather than centralization of money, talent, data, and computing power in a few corporate locations. The current state of centralized AI has led to a winner-take-all economy in Artificial Intelligence. Profits from AI benefit a few locations rather than the data owners and most merited Data Scientists themselves.

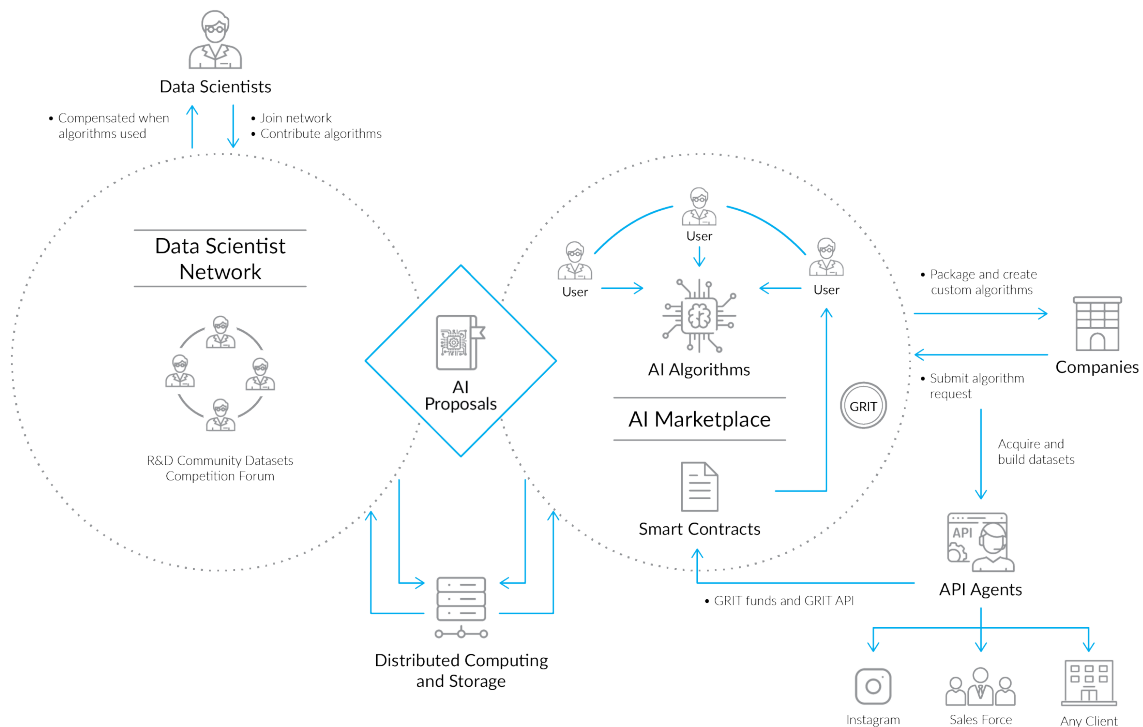
In a similar vein, Decentralized AI allows for greater accountability in data ownership and AI oversight. With the transparency of blockchain smart contracts, there is a clear structure for accountability in the case of data bias or AI abuse, as opposed to the traditional opaque systems of centralized AI and data. Within the new dApp structures, token ecosystems can be designed to incentivize users to collaborate, with rewards flowing to users based on the merit of their actions, automatically distributing value based on the value of the utility delivered by the system.

From a more pragmatic standpoint, there are countless historical examples of larger corporations exceeding the permission limits of user data and breaching user trust. For example, Yahoo announced in 2017 that all 3 billion user accounts had been compromised. Millions of Americans lost their social security information in the Equifax breach, while many private companies including Uber,

eBay, LinkedIn, and Adobe have misused user information. When this data is breached, user trust is irrevocably damaged. bitgrit uses user data from various services for the purpose of improving the services that send data to the bitgrit API, which can be verified by our open and immutable smart contracts that handle data management.

bitgrit: A Decentralized AI Solution

bitgrit envisions a future of democratized AI powered by blockchain. Two pillars will be established: An online community of Data Scientists and an AI marketplace.



First, the online community of Data Scientists (initially focused in Asia) is architected whereby users may share information regarding AI training and datasets. This open and free communication of models and know-how creates a stronger intellectual community centered around value-creation. Ultimately, this pillar will merge with the AI marketplace to create an even stronger service.

Second, bitgrit aims to create an Artificial Intelligence marketplace for clients to be able to share problems that they would like AI to solve along with the commensurate data and to purchase access to said models if the community is able to deliver a valuable solution.

Smarter AI

Currently, we are experiencing what is known as “narrow AI,” or Artificial Intelligence models that perform exceedingly well at a very specific task but fail to generalize to tasks outside of the domain they were trained in [1]. As a result, countless unique AI models are built for thousands of separate applications, never merging to create systems that generalize and avoid the replication of work.

In the future, AI systems will become better at generalizing, especially with the growth of Reinforcement Learning techniques. While the creation of a “strong AI” is speculation for now, a common thread of thought is that various knowledge representations and Artificial Intelligence systems will be merged to become smarter and achieve true intelligence [1]. Even without intelligence comparable to that of a human, the connection of weaker AIs has the potential to impact society in yet unimaginably beneficial ways.

As bitgrit creates a technological platform that enables the collection of AIs and sharing intuitions, we will ensure that the dividends from a breakthrough in AI would be more equitably distributed than if a single corporate entity were to create or control a strong AI. Further, since our platform relies on the inputs from many in a democratic system, our ethos encourages ethical data scientists to prefer our platform for advancing AI over a corporate entity.

bitgrit Asia Networks: A Data Scientist Network

The first pillar of our model, the Data Scientist community, aims to establish an online network of Data Scientists in Asia. To accomplish this, we will implement a dApp centered around community and learning themes. This creates a powerful foundation for building the AI marketplace.

Components

From a high-level overview, the Data Scientist network is composed of a front-end for Data Scientists, that connects to a protocol layer with three sections: a data-layer, a back-end for ranking and sharing systems, and a blockchain layer for the incentive-based tokenomics system.

Data scientists on the platform will have access to sample data from datasets used for training, a forum where they can share ideas and developments, competitions sponsored by entities that wish to tap into this pool of talent, and an incentive system composed of smart-contract-based rules and a fungible fixed supply token. The datasets are organized according to various learning themes, allowing participants to exchange viewpoints and learn collectively in line with their interests. These viewpoints are arranged in the forum, creating an open space for discussion. Further, the incentive system rewards participants with GRIT tokens, which ties in with the competitions. In these competitions, community members are rewarded by displaying merit in examining datasets to solve problems.

Benefits

Traditionally, Data Scientists work for various business entities, creating proprietary algorithms designed for specific use-cases. For example, Data Scientists at Facebook, Google, and Amazon, each create their own models with the Intellectual Property (IP) being owned by their respective corporations. As a result, the processes of knowledge acquisition, model training, learning, and more are each done in vertically integrated silos at each company. By providing a network centered around value creation and shared data sets with mechanism design used to create win-win outcomes even for competitive participants, bitgrit can give independent data scientists a chance to compete with larger players as a unified collective that transcends typical industry verticals.

How it Works

The bitgrit customer journey through our Data Scientist Network involves several steps: First, the user creates an account as a Data Scientist, stating their intentions on the platform and professional background. Likewise, companies with AI needs create an account and state their intentions. These companies submit a Problem Statement, allowing Data Scientists to post reactions and find problems matching their knowledge.

The GRIT Token circulates throughout bitgrit and may be used to purchase algorithms and/or data sets, and may be used as a store of value as well - in the sense that it can be converted to another cryptocurrency and ultimately to fiat. Through the process of sharing more and more valuable data and algorithms, a user may improve their ranking on the platform, offering credibility, visibility, and payment through GRIT. As Data Scientists compete to create the most accurate algorithms fitting companies' problem statements, their standing in the reputation system is recorded through smart contracts that self-execute on the blockchain.

Partnership with dApps

Decentralized applications are still in their infancy, but bitgrit can support their advancement by providing them with Machine Learning as a Service (MLaaS). bitgrit invites dApps to use the platform, which provides for the open sharing of knowledge and data science value, while allowing the dApps to retain their independence.

Currently, many dApps are facing the problem of a lack of users, and more importantly, a lack of connection with other applications. dApps that connect with the bitgrit platform will be able to earn tokens for providing data sets and spend those tokens to purchase API access to novel machine learning models that either deliver more value to their customers or result in operational savings or business model improvements for the company.

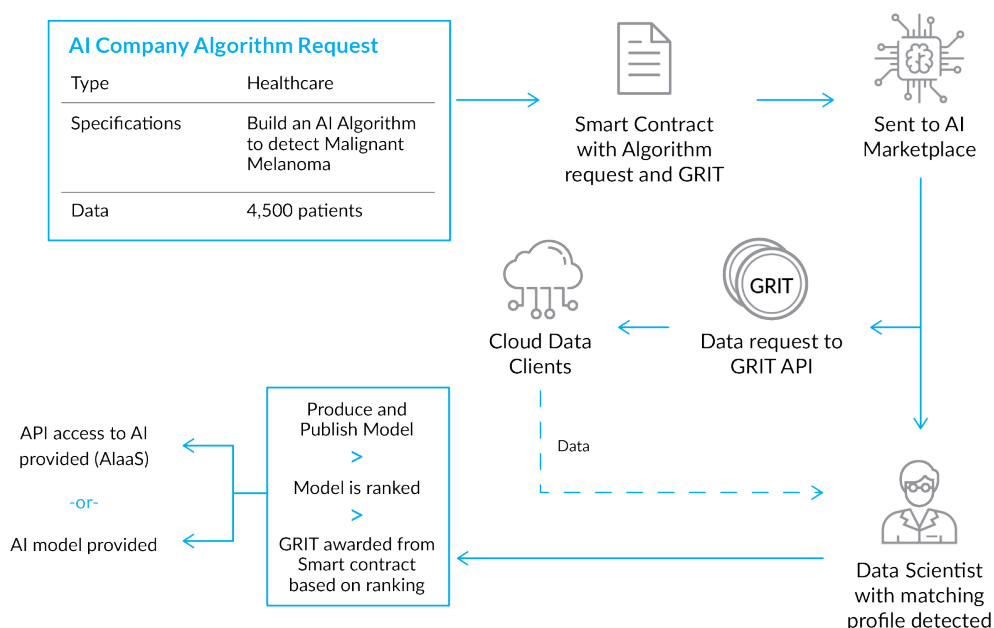
In a centralized architecture, it is relatively straightforward to achieve application interdependence. However, since dApps are using various technological architectures and stacks, as well as different approaches, it becomes difficult to connect these ecosystems. bitgrit acts as a free and open platform for these dApps to come together and overcome the aforementioned challenges, as well as earn token compensation through smart contracts.

bitgrit AI Marketplace

As with the Data Scientist network, the bitgrit AI marketplace is centered around the values of open knowledge creation and sharing to improve societal outcomes with technology. However, due to the specific market needs that we address, our AI marketplace targets corporations seeking to improve their AI models. Later on, we will connect this service with our Data Scientist network to mutually strengthen outcomes.

The AI marketplace allows clients interested in AI solutions to submit requests to an AI search agent, which will return algorithms used to solve similar problems. Further, these AI proposals are submitted to Data Scientists and data providers, who will work to create accurate models and provide high quality data, respectively. In turn, these users are rewarded with GRIT that clients submitted to the agent.

When a client, such as an SME, wants to buy an algorithm, they will go through a customer journey similar to an order-based system. Users can search the metadata of algorithms on the marketplace, or the metadata of data itself, to return relevant results. Similarly, Data Scientists may offer their services by searching the metadata of relevant proposals. For instance, a Data Scientist specializing in healthcare solutions may search for related proposals.



Evolution of AI

The concept of Artificial Intelligence has been around for millennia - at least in the philosophical sense of “reasoning as a form of calculation,” as AI is using calculations to assist reasoning [2]. We choose the phrase evolution carefully as the resulting understanding of the study of evolved systems, such as humans, could be used as the basis for future AI designs. Advancements in AI from extremely narrow systems, such as a robot performing repetitive tasks and using AI for movement correction, to more general AI systems, such as those created by Deep Mind, were achieved principally through building upon past knowledge and sharing knowledge across domains. In the future, smarter AI could be potentially achieved through Machine Learning algorithms like Reinforcement Learning that aims to solve higher tiers of problems.

User-oriented Data Provision Model

bitgrit takes advantage of an abundance of data that is often left unused by incentivizing users to act as data providers with GRIT. We store this user-provided data in an encrypted form, which is accessible to train Machine Learning models through in-memory decryption. Beyond providing solely self-sourced data, providers may combine datasets to create broader and deeper data for training.

This is very important in considering AI problems such as the lack of available, relevant, and high-quality data. Often, strong algorithms and frameworks, like TensorFlow, are open-sourced and

available for everyone to use. However, high-quality data is typically proprietary and owned by large corporations, so by incentivizing users globally to contribute data to bitgrit, we can build even more powerful models.

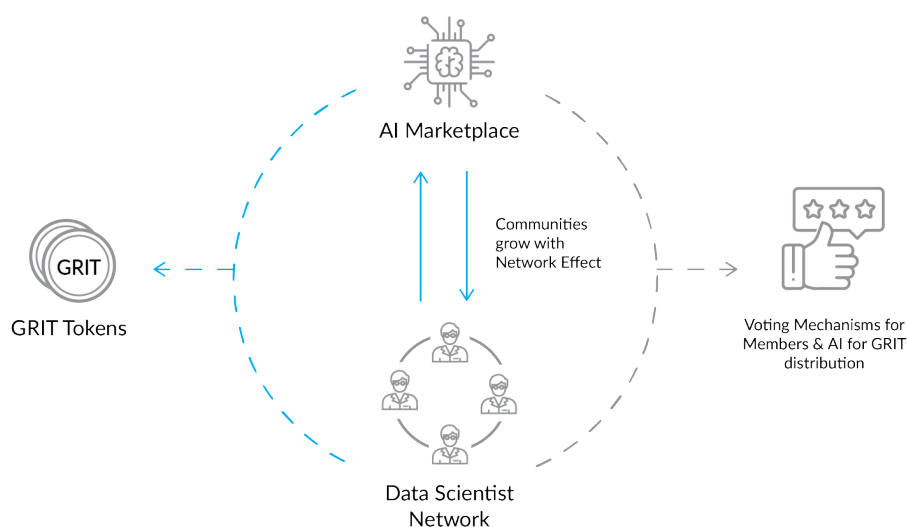
Finally, corporations themselves that create problem statements to be solved on our platform will contribute their own proprietary data sets. While this data will remain property of the contributing corporation, the model that is trained on the data will be made accessible to entities that wish to pay to access it.

Democratization of AI's Values

Artificial Intelligence is quickly becoming the new means of production in modern business models. If these means of production are not made accessible to all, the outcomes will be historically simple to understand: The centralization of power and a widening of inequality. However, AI is different from the historical means of production in that AI is quickly replacing other means of production across many verticals. With the rise of greater computational power, stronger models, and more data, AI will become one of the few remaining means of production, creating an immense risk of the abuse of power. Therefore, it is of utmost importance that AI is democratized, lest the power of such a system corrupt those who control it.

Token Economy

Incentive systems have fueled human behavior for millennia. Token ecosystems are simply a modernization of incentive systems, powered by the blockchain, that enables platform creators to shape user behavior. bitgrit will incentivize users to behave in ways that improve the network - chiefly, to openly share AI knowledge in the form of models and data. Of course, with the power to steer user behavior towards desired outcomes comes greater responsibility. bitgrit adheres to the pioneering field of Token Engineering to design token economy systems centered around responsibility [3].



Connection with DApps

The above values and features of the AI marketplace will largely be brought together through a connection with DApps on the bitgrit platform. DApps retain their autonomy and decentralization, while receiving the benefits of a much larger audience than they could achieve individually. As bitgrit users are incentivized to provide value to the platform, DApps, especially decentralized-AI applications, will receive the benefit of collective intelligence improving their services.

Benefits

The main benefits of the AI marketplace are in creating a horizontally structured economy, rather than a vertically structured one. In our AI marketplace, both value (through algorithms and data) as well as talent are shared. Corporations may cast a much wider net for AI talent than ever before and use verifiable metrics to find the best experts. At the same time, corporations are able to improve their algorithms better than ever before because they have access to a greater variety of talent and data. This creates a true sharing economy, which is especially important in AI as the potential for profit is massive. Creating a democratic ecosystem ensures equitable AI. The sharing economy is fueled by tokenomics, as users are incentivized to contribute models, data, and talent by receiving GRIT. We monetize the merit of AI experts by placing real value in the form of cryptocurrency on contribution.

How it Works

The core of the AI marketplace revolves around GRIT, which powers the ecosystem by incentivizing value-sharing. GRIT has several roles as a utility token, including as a right, as a medium for value exchange, as a toll, as a function, and as a currency.

GRIT owners have the right to use the AI marketplace as well as contribute models and data. The market determines the value of these models and data through voting mechanisms, which reward the user with a certain amount of GRIT, which in turn may be used as a medium for value exchange to create an AI product on the market or otherwise access other models, data, and talent.

As a toll, GRIT supports the maintenance and growth of the infrastructure behind the market, including the execution of smart contracts and usage fees.

Lastly, as an ERC-223 token, GRIT can be exchanged for more common cryptocurrencies such as Ethereum, which can be directly exchanged for fiat currencies, giving our AI marketplace users real-world value for contributions.

Over time, through the growth of the AI marketplace with the network effect, there will be large amounts of high-quality data, accurate models across a variety of domains, and top talent in circulation. As the value of GRIT grows alongside the products (models and data) and services (talent) on the market, the quality of the marketplace naturally increases, always being maintained by the users themselves.

Team

Core Team



Ashish Malhotra

Ashish is a passionate, self driven, result oriented professional with over 20 years of experience in Business Strategy, Sales, Marketing, Client Relationships & Project Management. Ashish has been instrumental making many start-ups to successful ventures, primarily in Information Technology-Cloud, Cyber Security, Virtualization, Data Centres & Technologies around.



Frederik Bussler

Experienced in Blockchain and Data Science as CEO at Smart Contract Auditing, Chief Data Officer at HealthDex, Co-founder at EinFarm, Data Analyst at Maven 11 Capital, and advisor for multiple blockchain companies.



Mukta Arora

Group Chief Information Officer at Aster DM Healthcare, a leading healthcare authority in the Middle East, India and Far East.



Gautam Bajaj

Experienced Software Engineer at Square Enix, Fandom, and Softbank Mobile, with Data Science experience at [24]7.

Co-Founders



Tetsuro Masunaga

Over 15+ years of experience in management and the TMT industry, involved in advertisement for Tokyo Olympics and other ventures. Founded Cosmology Inc., a web-focused advertisement company in 2011. Quickly expanded his company's business portfolio with his expertise in PR and advertisement, later founding the bitgrit project with Kazuya Saginawa as co-founder.



Kazuya Saginawa

Entered Canon Inc. in 2010 as a patent engineer, garnering experience in technological assessment and intellectual property. Saginawa then developed an interest in AI, Blockchain, and Cryptocurrency, pursuing his newfound passion by founding bitgrit with Tetsuro Masunaga.

Technical Advisor



Hidenari Aizawa

Involved in IT since 1996, Aizawa manages his own development company – accumulating a wealth of experience in 100 different cases relating to project management.

Aizawa also works as an advisor regarding technological matters for large-scale firms, performing consulting services and R&D technological and IT businesses.

Research Collaborators



Professor M. P. Gupta

Chair Professor & Head of Management Department at Indian Institute of Technology Delhi (India). Known for pioneering works in the area of e-governance. Founded the International Conference on E-governance (ICEG) in 2003, which is running into its 12th year with 14 edited volumes available publicly at www.iceg.net. Gupta is involved in several policy-making committees on ICT in India for both the central and state government.



Professor Arpan Kar

Associate Professor of Information Systems at the Indian Institute of Technology. Specialized in Data Science, Machine Learning, Social Media, Digital Transformation, Smart Cities, ICT4D and E-Governance, publishing over 100 publications and 5 books with over 650 citations. Served as Chairman / Coordinator / Member at IITD of different administrative portfolios like Doctoral Colloquium, Automation, Corporate Relations, Recruitment, and Policy & Vision.



Professor Noboru Koshizuka

Professor of Interfaculty Initiatives in Information Studies at the University of Tokyo and the University of Tokyo Graduate School of Interdisciplinary Information Studies, in addition to the General Information Analysis and Information Science Courses.



Professor Eiad Yafi

Dr Eiad YAFI is an Assistant Professor at the Malaysian Institute of Information Technology and deputy dean of institute of Postgraduate Studies, Universiti Kuala Lumpur. He received his PhD in Computer Science from the Jamia Hamdard University, India. Before joining UniKL, he was a faculty member at Arab International University Damascus, Syria. He is active in research in the areas of data mining, Blockchain, Human Computer Interaction and ICTD.

Business Advisors



Rupinder Goel

Global Chief Information, Officer Tata Communications India. A global technology leader with over 25 years of experience in digital and telecommunications for transformation of B2B and B2C operations. Goel has led digital transformation at multinational corporations by driving the adoption of the cloud, mobility, big data, social and automation using BoTs, the blockchain, APIs, AI, AR, IoT and m2m.

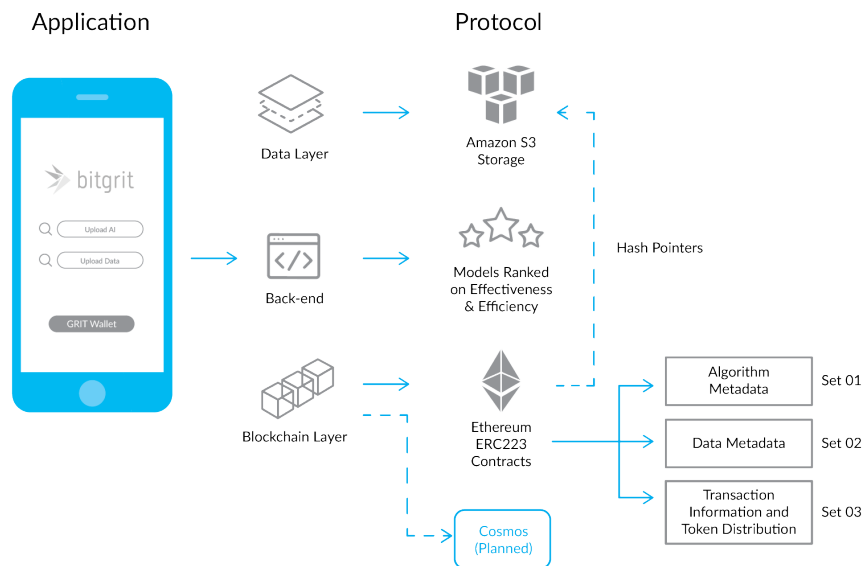


Wael Osman

Executive Chairman at Ryts, as well as the CEO of Pixonal, Wael holds 27 years of experience in both the Governmental and Private sectors, including working in the Executive Office of HRH Sheikh Mohammed bin Rashid Al Maktoum, as well as in The Executive Council of Dubai, and has played a crucial part in strategic planning and policy making for the government of Dubai.

bitgrit Technology

The following diagram provides a high-level overview of our architecture:



The Application Layer is the front-end where Data Scientists upload AI models and data, the search functionality, and the connection to the token wallet. Our Protocol Layer involves the Data Layer, back-end, and blockchain. Models and data are stored in the Data Layer, and the data itself is stored in an encrypted, distributed datastore with hash pointers on the Ethereum blockchain. Lastly, models are ranked based on user input in the back-end layer.

Data Layer

As evident from the diagram, we will be storing large amounts of data that we gather from our users on Amazon S3 storage (current system). Since the size of the dataset can be huge, depending on the requirements of the client, we plan to only be pointing the blockchain to the hash of the dataset. It would be technically infeasible to store the data layer on the blockchain itself due to poor scalability and energy efficiency. This architecture may evolve to become more decentralized in the future as bitgrit tries to leverage or collaborate with new players in the field.

Back-end Layer

This component will be responsible for ranking the models submitted by users based on the criteria specified by the client for the specific problem or against a general measuring scale as defined by bitgrit. This layer will make sure that the privacy of the data is not compromised when executing a model against a data set by providing an isolated environment which can only be accessed with the permission of the data owner(s).

Blockchain Layer

The Blockchain Layer is made of three sets of Ethereum ERC-223 smart contracts:

Algorithm metadata: Contains information regarding problem statement and the algorithm delivered. It will also contain other information such as efficiency matrix information of algorithm.

Data metadata: Contains hash pointer to the dataset in the data layer. Also contains other relevant info about data such as size and column values.

Transactions and token distribution: Transaction information and token distribution based on ranking (tokenomics set).

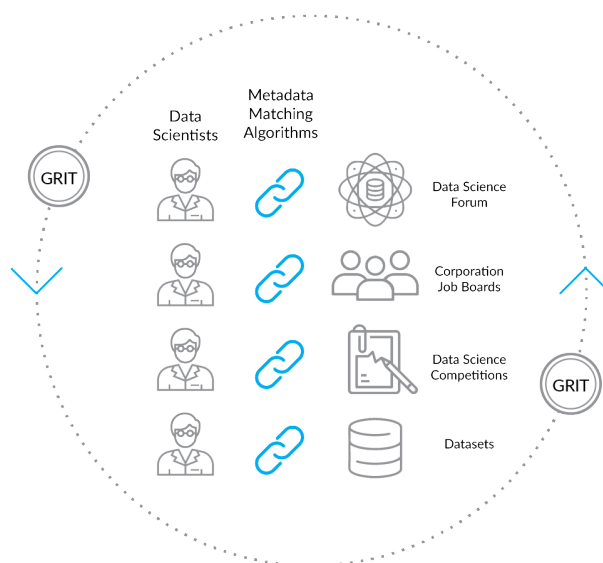
We have future considerations for using Parallel Independent Blockchains such as Cosmos.

Data Scientist Network

The front-end consists of the interface for the Data Scientist community, in which Data Scientists and corporations may connect and exchange value. The Network is directly linked to Ethereum smart contracts, enabling on-chain value exchange through the GRIT token in any one of four core pillars: Data Science Forums, Corporation Job Boards, Data Science Competitions, and Datasets.

Data Scientists and corporations can easily search the network for relevant data, talent, forum threads, or business opportunities. In order to maximize the ease of use and usefulness for all participants, we will implement matching algorithms to connect users with the most relevant opportunities. By making use of the metadata of aspects such as competitions, simple algorithms are implemented for the most obvious connections. In the case of more general and unstructured data, we make use of AI-based algorithms covering fuzzy and probabilistic matching.

In later stages of the network, we will establish a connection with the AI Marketplace, allowing mutual value transfer between the two platforms. The communities will then grow together, increasing opportunity size in the free market of data and talent.



AI Marketplace

The core of the AI Marketplace revolves around the buying and selling of algorithms of trained models and data sets through an order-based system. The marketplace involves three main participants: customers (companies hoping to build AI algorithms), data providers, and Data Scientists.

Customers may purchase AI in two forms: 1) a custom AI with complete ownership, or 2) access to an AI API connected to a trained model. If the customer purchases a custom AI, they will receive access to the source code and may train the model using the data providers' data in the cloud. If the customer buys access to the AI API, they receive a number of API calls to a trained model instead. The intellectual property of the models and data belongs to bitgrit.

In order to build the aforementioned AI algorithms, companies submit a problem statement to the marketplace along with payment in GRIT. Next, Bitgrit will contact data providers to make sure that the data is cleaned and serves the purpose of solving the submitted problem. Once we have data and the precise problem that needs to be solved, Data Scientists will compete to create the best algorithm. Success will be measured using various parameters, including accuracy and customer need, for a specific algorithm. The Data Scientist creating the most accurate algorithm is rewarded with GRIT. The data providers are also compensated for the volume of useful data they contributed.

Every time the algorithm that the data scientist created is sold, either in the form of its source code or through API calls to the trained model, the Data Scientist and data providers will be continuously rewarded.

AI stemming from themes can be used through APIs, and exhibitors will be able to receive their earnings automatically in GRIT. This platform will serve to tie together companies with AI creators and data providers. Through the building of a decentralized AI network, anyone will be able to use this network, which comes to fruition through the elements of learning themes and data, learning models and evaluation, and much more.

Users can access AI through APIs, and DApps-based automatic contracts will make transactions possible without the need for a middleman. The AI Marketplace will naturally grow as a free market economy between Data Scientists and companies. Over time, as the amount of distributed data, pre-built models, and crowdsourced talent in the market grows, it will become computationally and economically viable to evolve the Marketplace into a peer-to-peer AI Network. A decentralized marketplace for a variety of AI structures across many business verticals lends itself well to a future ideal of a "Cloud Brain" P2P Network.

Ethereum Public Blockchain

The Ethereum public blockchain will be used for our three sets of smart contracts. The first set contains algorithm metadata, the second set contains data metadata, and the last set contains transaction information and is responsible for token distribution. The first pair of contracts allows AI users to connect with the right data sets for their models, while the last set enables the transactions between the two.

There are several limitations of using the Ethereum blockchain for bitgrit smart contracts. Firstly, given

an Ethereum software update, every peer would have to update node software. Also, verification of user identity without a central authority (as blockchain is decentralized) poses technological challenges. Lastly, the AI marketplace system must be built to scale from the start, so our proof of concept would have the same scalability complications as the end-user product.

Solutions to the above limitations could include partial off-chain aspects of the technology, such as storing data on private nodes. As users of our platform may have data of their own to train their models with, not all data must be stored in a distributed fashion.

Although the high scalability and low latency of our architecture allows for a decentralized system that is highly cost effective, significant progress in blockchain technology is still required for a fully decentralized approach.

bitgrit plans to release a technical yellow paper that explains the technological architecture of the solution in greater detail.

Considerations

Since much of the bitgrit platform revolves around circulation of the GRIT token, for example through the Data Scientist network, AI marketplace, and API agent, we hope to implement high transaction throughput while minimizing fees.

Plasma is a series of contracts running on top of Ethereum, allowing for far greater scalability, and potentially solving many of the current problems with the Ethereum network. If Layer 1 or Layer 2 scaling solutions such as Casper or Plasma are available before the time of our platform releases (discussed below), we plan to implement them into our architecture.

Partners & Competition

bitgrit will build its Data Scientist network by focusing on events like the World Data Science Forum (<http://worlddsf.org>). WDSF is a platform for experts to exchange ideas on AI, blockchain, and IoT in Japan and India.

Potential Partners

Some potential partners for bitgrit include:

- **TODACORP** is TCP/IP for the internet layer-zero blockchain protocol capable of scaling blockchains efficiently in a decentralized setting.
- **DAIA** (Decentralized AI Alliance) is an open industry alliance to foster development of decentralized AI tech:
 - › affiliated fund that will support 100 projects over the next 2 years
 - › \$2 million for each of the first 50 projects
 - › movement for responsible AI
- **MIND.AI** is building a core reasoning engine based on a new data structure called a “canonical,” that learns in real time, generalized, from natural language. They are trying to build strong AI as well.
- **fazezero** provides a platform and governance framework where developers and clients can collaborate, including AI strategy assessment, sandbox, and solution design.
- **mkr.ai** is doing crowdsourced AI to flag disinformation, with token incentive structures, using APIs, and IPFS.
- **Eden Block** offer three pillars of support to blockchain companies, interested in decentralized AI:
 - › Eden Block Capital (investment, guidance, strategy)
 - › Eden Labs (research, analysis, consultation)
 - › EdenEd (events, workshops, knowledge)

Potential Competitors

Some of the potential competitors to bitgrit are:

Algorithmia offers a blockchain-powered Decentralized AI marketplace where better models are awarded with Ethereum. The decentralized sub-project is called DanKu, and is a new protocol for evaluating and purchasing AI models using the blockchain. DanKu is essentially a true trustless Machine Learning smart contract. The programmable contracts allow data scientists to publish datasets, evaluation functions, monetary rewards, and metadata to the marketplace. Marketplace Data Scientists train neural networks on this data, submit their models, and the best model receives the reward.

OpenMined is enabling truly decentralized AI processes by leveraging blockchain. They have built a working, open-sourced MVP where users can receive token payments from smart contracts for improving models in a decentralized fashion. The four OpenMined-specific building blocks are Capsule for key generation, Sonar for the federated learning server, Mine to host the data repositories, and Syft to contain encrypted Neural Networks.

SingularityNET is a Global AI Network that lets anyone create, share, and monetize AI services at scale.

Clarifai is an AI marketplace for various algorithmic use-cases, such as curation, visual search, customer analytics, and moderation.

Strategy & Business Model

bitgrit is extremely well-positioned for success in terms of market need, barriers to entry, organizational control, and scalability.

The market in Asia lacks a strong online community of data scientists, and there is no go-to service for democratic, organizational AI. With the continuing rise in big data and data science, the competitive business need for platforms such as bitgrit increases.

Further, the barriers to entry to building democratic, organizational AI and data science communities is exceedingly high, as the technologies used are on the cutting-edge. This provides a powerful strategic advantage, as it becomes very difficult for serious competition to enter the stage next to bitgrit.

Also, bitgrit has the strategic advantage of controlling the platforms used. As bitgrit will architect unique platforms and services for data science and AI, there is little reliance on potentially transient services. bitgrit plans to adopt cutting-edge technologies according to best fit, such as Cosmos, meaning that the crucial business aspects are within our control. Moreover, as bitgrit dynamically adopts technologies, we will survive this space of constantly changing platforms and services. Lastly, bitgrit has a tremendous advantage in scalability. As bitgrit provides scalable architectures for AI and data science, we can achieve long-term growth in users without prohibitive costs.

Target Markets

To determine which countries to target first, we will use Kaggle metadata as a point of comparison. As we will first launch the Data Scientist network, Kaggle presents the most similar application on the market.

After the United States, the most common Kaggle user country origins are India and China. Although India is over 4 times as populous as the US, it is seeing far less Kaggle usage than in the US. This makes India a potential market opportunity for bitgrit. bitgrit will not heavily target China due to the highly restrictive cryptocurrency laws in place.

Taiwan, Japan, Singapore, and South Korea are the next most popular Asian countries that we will target. They have far less restrictive laws in the blockchain space.

Besides being home to many data scientists, South Korea in particular is an excellent opportunity for bitgrit with close to 100% penetration of high-speed Internet and existing comfortability with cryptocurrencies and blockchain.

Rollout Schedule

We will launch our Data Scientist network as the first pillar of our model. The community established through this network will provide an ecosystem of value-sharing while infusing the GRIT token with real-world value. As bitgrit becomes known for high quality data science and talent, stepping forward into the AI marketplace will become a natural transition.

Achieving Network Sustainability

After the launch of the Data Scientist network, GRIT will act to incentivize behaviors that sustain the network. As users are given cryptocurrency for sharing value, the quality and quantity of data science practices and talent in the network will naturally grow.

As GRIT transactions increase in frequency, the network effect will reach a critical point and the platform will grow self-sustainably as new users enter to profit from GRIT and data science knowledge.

bitgrit Token (GRIT)

bitgrit will issue an internally circulating utility token called GRIT. This token is a limited-issuance token and can be used on bitgrit services. The distribution model of GRIT supply is through airdrop and incentive systems.

These token distribution systems are decided according to a plan calculated by several parameters, such as the volume of token exchange in the market.

Like other cryptocurrencies, GRIT can also be exchanged or transferred. It is targeting to be traded on several cryptocurrency exchanges.

GRIT will be issued using the ERC-223 standard, which has backward compatibility with ERC-20.

Ethereum is the industry standard for smart contract and the issuance of an original token. Issuing the currency as an ERC-223 token will provide existing benefits such as smart contract, wallet, and exchange. Especially for smart contracts, automatic incentives and automatic agreement eases the building of a decentralized application.

Token Economics

GRIT is the driving force of bitgrit. It enables us to quantify the value of AI provided by data scientists and enliven the AI marketplace.

AI Marketplace

The AI marketplace will be able to support micropayments, and expand upon the possible applications of AI technology.

Incentive System

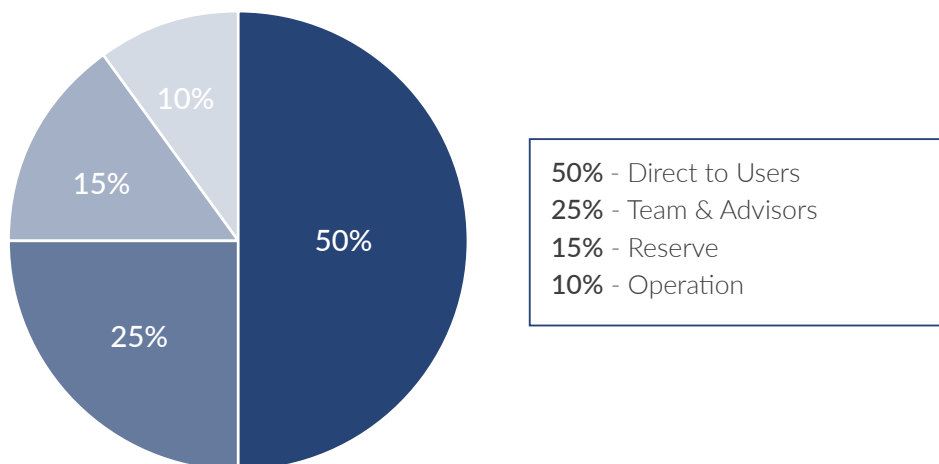
We will grant incentives to participants of bitgrit services, designing high quality AI and offering career opportunities.

Global Payments

International payments can be made by utilizing the characteristics of cryptocurrency.

Token Distribution

1,000,000,000 tokens will be generated and distributed as follows:



Airdrop & Marketing

No tokens will be airdropped or sold before at least the Alpha version of our platforms is launched and a user base is established. This is done to ensure that the token value is determined primarily by users of the platform, as opposed to speculators or investors.

Inflation Schedule

Based on an effective inflation plan, GRIT tokens will be distributed through Airdrop and other incentive systems leading up to 2020. The inflation schedule will take into account the growth of the platform, and the equations modulating this schedule will determine the exact airdrop allocation. Using the model of an airdrop fosters the growth of users in the network, as opposed to traditional methods, such as an ICO, that would incentivize opportunistic traders to gain an imbalanced control over the volatility of the GRIT token. An ICO is further avoided due to regulation issues, especially in Asia.

Our inflation schedule is modeled after exponential decay, where the portion of remaining tokens distributed diminishes over time. In the timeframe of token inflation, other technologies such as Cosmos may be determined to be better solutions for our platforms. Given this, measures were taken to allow the GRIT token to shift to another blockchain for users to maintain their exact standing at any time.

Timeline

2018

- : Concept Development
- : Team building
- : White paper
- : Airdrop

2020

- : Bitgrit Web service Beta Release
- : AI Marketplace Beta Release
- : Airdrop

2019

- : Bitgrit Web service Alpha Release
- : AI Marketplace Alpha test Release
- : Airdrop

2021

- : AI Network Alpha test Release

Legal

Legal/Security Warnings

- Users are responsible for their own computer's security. It should be understood that if a user's computer is hacked, or that if a virus infects their system, the user may become unavailable or unable to access our Services and the bitgrit Token (GRIT).
- Users are responsible for reading the white paper and other documents to fully understand the risks associated with the Services and tokens.

Disclaimer of Liabilities and Warranties

- Users use the Services at their own risk.
- Users are fully aware of the risks, uses and complexities of the Services and bitgrit Token (GRIT), which is an open source software based on tokens and blockchain.
- Bitgrit shall be held harmless from any damage or loss arising out of or in connection with the availability or unavailability of the Services and the bitgrit Token (GRIT) as long as it is not contrary to applicable laws. Bitgrit shall not be liable for any indirect, incidental, special, punitive, consequential damages, including but not without limitation to loss of profit, damages for credit and losses of data.

Long Version

The following provisions set forth the terms of usage for our service. In utilizing our service, the User hereby understands and expressly agrees to all of the articles. The Users acknowledge that the use of the Services and the bitgrit Token (GRIT) do present some risks, and accordingly agrees to indemnify and hold bitgrit harmless in the event that any of the following risks should manifest:

Regulatory and Tax Risks

The laws, regulations, and tax systems relating to the Services and tokens are in a state of flux. Any changes in laws and regulations, tax systems, policies, limitations, regulations, or tax(es) imposed on the issue, holding, or transaction of tokens, etc., may cause them to become restricted, or to be subject to circumstances unfavorable than they are in currently.

Risk of Ethereum Networks

Considering that the bitgrit Token (GRIT) is a token operating on the Ethereum Platform, risks may arise out of or in connection with bitgrit's use of this platform. One of such risks is that the GRIT may be influenced by changes in services or specifications provided by the Ethereum Foundation.

Network Risks

When undergoing token trading, transactions are not executed immediately – a token trade transaction

will remain on hold for a certain period of time until a sufficient examination of transaction contents (authentication of transactions in Blockchain) is completed. Therefore, the user's transaction may not be immediately reflected on the user's managed address, or alternatively the user's transaction may be cancelled until a sufficient transaction check is made upon the network. Since tokens are recorded electronically and the transfer is carried out over an electronic network, there is a risk of loss of value in undergoing the trading of tokens.

Risk Inherent in the Token Issued

A token is not a legal currency and its value is not guaranteed by a specific person or body. There are also other inherent risks in present within the structure of the token itself, such as bugs in the programming relating to the token.

Risk of Inadequate Use

Public interest and use of the Services and the bitgrit Token (GRIT) may be limited. A lack of such interest and use may affect the user's ability to access the Services (Development and bitgrit Token (GRIT)).

Risk of Weaknesses or Exploitable Breakthroughs in the Field of Cryptography

Advances in cryptography may bring about technical risks in relation to the Services and bitgrit Token (GRIT). Bitgrit will keep track of advances in cryptography and constantly strive to improve security measures, but cannot predict the future developments of cryptography or ensure that all security measures are able to be implemented at their fullest potential.

Risk of Cyber Attacks

The Services and bitgrit Token (GRIT) are potentially vulnerable to cyber-attacks. Bitgrit strives to take effective measures against said cyber-attacks, but does not guarantee that it shall be invulnerable to any and all attacks.

Dispute Resolution

Any and all disputes, controversies or differences which may arise out of or in connection with this Agreement shall be submitted to arbitration in (LOCATION). The arbitration shall be conducted by one or more arbitrators in accordance with the Arbitration Rules set in place by the International Chamber of Commerce (ICC). The reward rendered by the arbitrators shall be final and binding upon the parties.

Risk of Fluctuation in Value

Users recognize and understand that the prices of bitgrit Token (GRIT) may vary depending on the issuer's performance, success or failure of business plans, prices, market trends, natural disasters, wars, political upheavals, strengthening of regulations, diffusion of other similar virtual currencies, and any other unexpected events or special reasons.

Liquidity Risk

Users are aware and understand that bitgrit Token (GRIT) market trends, trading volumes, and other circumstances may render transactions impossible or difficult, or may similarly cause one to be forced to perform transactions at significantly unfavorable prices.

Force Majeure

Bitgrit shall also be exempted from any liability for events of force majeure, such as earthquakes, typhoons, tsunamis, and other acts of God, as well as wars, riots, civil commotions, governmental orders and regulation of local governments, and amendments to laws and regulations.

References

[1] Potember, Richard, "Perspectives on Research in Artificial Intelligence and Artificial General Intelligence Relevant to DoD," Jan 2017. [Online]. Available: <https://fas.org/irp/agency/dod/jason/ai-dod.pdf>.

[2] Spector, Lee. "Evolution of artificial intelligence," Nov 2006. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S0004370206000907>

[3] McConaghy, Trent. "Towards a Practice of Token Engineering, " Mar 2018. [Online]. Available: <https://blog.oceanprotocol.com/towards-a-practice-of-token-engineering-b02feeeff7ca>