



SPIDERWEB LIGHTPAPER

VOL1, SEPTEMBER 2022



WWW.SPIDERWEB.AI

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ABSTRACT

A decentralized AI marketplace, uniting communities



Artificial Intelligence demonstrated immense potential to solve real-life problems in almost every space. However, current practices for creating and running AI models have limitations, such as a lack of model reusability, interoperability, and monetization method for creators. For example, once a creator builds a model in one organization, they cannot use it in another due to IP limitations. As a result, AI creators cannot leverage their models, and enterprises struggle to access the best performing models and skilled AI developer at an affordable price.

As per Gartner survey, the average Failure-Rate of AI projects since 2019 is more than 70%. Thus, AI has become complex, expensive for enterprises, and less rewarding for creators with broken community ties.

SpiderWeb strives to solve the reusability, interoperability, and community gap issues, with a decentralized AI marketplace, leveraging the existing developer community and ecosystem.



INTRODUCTION

SpiderWeb is a Decentralized Marketplace of AI and ML models empowered by a creator economy.



AI creators benefit from Build-to-Earn token incentives. In addition, a dedicated developer's Integrated Development Environment will facilitate creating and submitting models on the SpiderWeb blockchain, rewarding AI developers whose models are leveraged by a dApp or enterprise looking for state-of-the-art AI capabilities.

Enterprises can securely upload their data and get tailored AI predictions by seamlessly interacting with smart contracts; the entry points to ML models on the SpiderWeb blockchain. Our proprietary Perfect-Fit-Model algorithm will automatically identify the best model for any use case. And our proof of training and proof-of-inference proprietary consensus mechanisms validates the model and run it on-chain network.

The Core Mission of SpiderWeb is to enable a new era of AI-driven business applications by building a community that empowers AI developers as creators, simplifies AI development and deployment, and makes AI/ML models readily available for businesses at a lower cost



CHALLENGE

AI/ML is pricey for enterprises and less rewarding for
creators



A Decentralized AI Marketplace aims to respond to several issues within the current AI community. Specifically, for AI to diffuse and achieve widespread adoption, it is necessary to address the following concerns:

Weak community ties: AI creators cannot leverage their models, and businesses struggle to access the best developers and models at an affordable price. As a result, both communities are working in silos. Employment is the only connecting dot.

Lack of interoperability and reusability: Multiple frameworks for developing diverse AI models exist. Different developers use different frameworks (TensorFlow, PyTorch, Caffe2), other languages (Python, Java, C/C++), and different target environments (powerful Linux server, smartphone, minimalist IoT device) depending on the use-case. For example, a small AI company may want to pipeline a server-based

PyTorch AI model with an externally developed smartphone-based TensorFlow AI model. However, the current lack of interoperability standards dramatically limits such opportunities, and adapting existing models is tedious.

Lack of infrastructure: Many state-of-the-art AI models, especially those based on deep learning, require enormous datasets. Unfortunately, the creation, management, and sharing of massive datasets are often complex for many AI developers. As a result, AI development with large data is dominated by researchers in large organizations with significant capabilities and resources.

Expensive: According to a Teradata survey, the lack of infrastructure (40%) and the lack of talent (34%) are the two most significant barriers to AI realization. As a result, enterprises spend majority of R&D and engineering budget on building AI and infrastructure instead of actual use-case.



SOLUTION

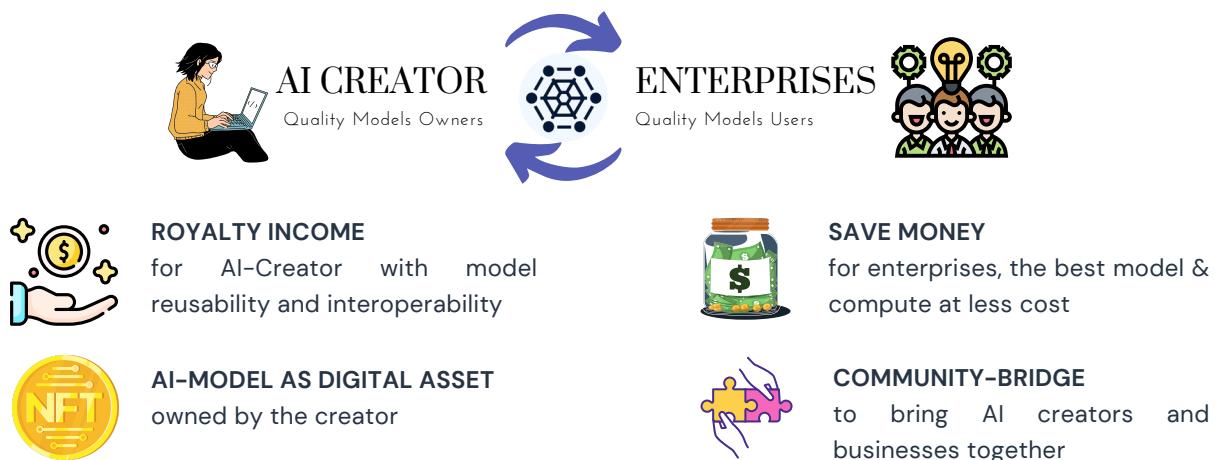


A next-generation decentralized Marketplace of Artificial Intelligence and Machine Learning models, connecting communities. It facilitates AI creators to monetize their non-fungible models, and enterprises to procure and operate using SPAI token or fiat at a low cost.

SpiderWeb's Marketplace can make AI models and datasets accessible to end-users with smart contracts and developers and give developers a way to monetize their models. It operates autonomously on the blockchain and uses an immutable public distributed ledger that stores all operations and models.

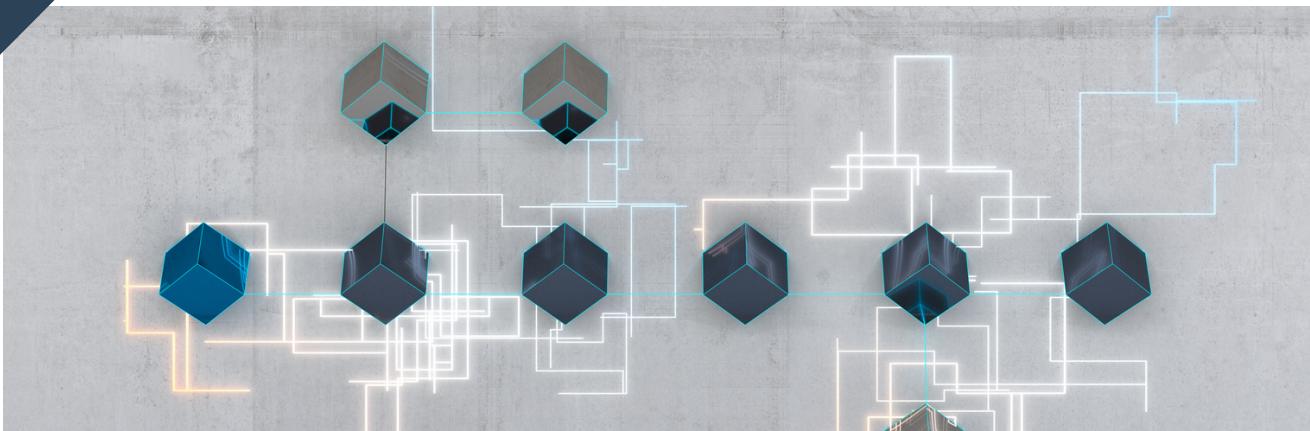
In addition, we introduced a proprietary consensus mechanism to set a peer-to-peer link between creators and enterprises to foster trust, privacy, security, and quality of models.

The decentralized AI marketplace delivers a new ecosystem:



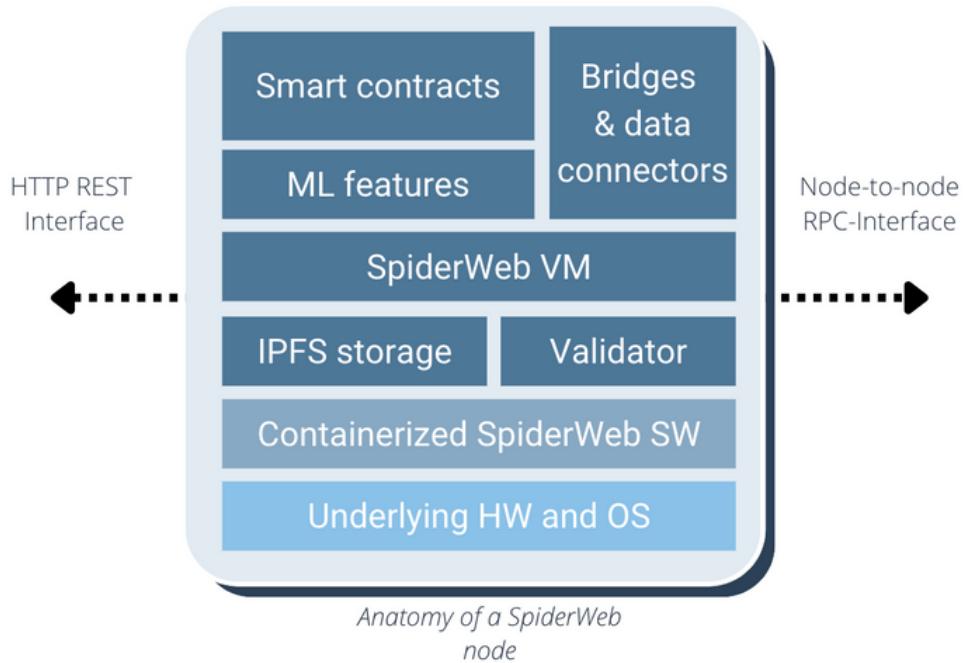


ARCHITECTURE



SpiderWeb Node

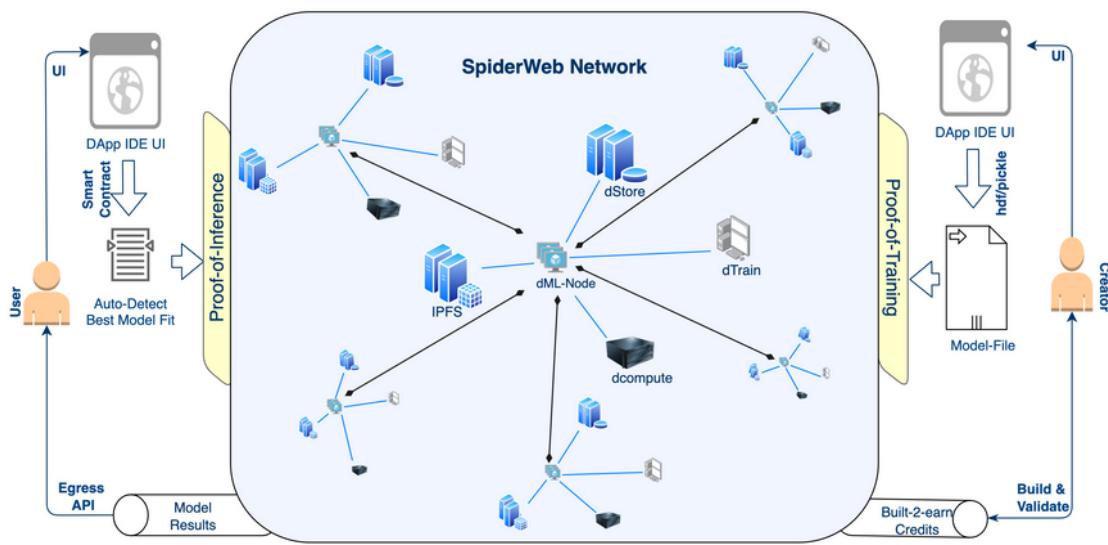
The SpiderWeb infrastructure relies on on-chain and off-chain components to support the AI/ML features needed by AI developers, data scientists & business users. Most of the computation happens throughout on-chain checkpoints as part of the Machine Learning pipeline, allowing for verifiability and consensus among nodes.





SPIDERWEB CHAIN

SpiderWeb Network consists of following key components



Deterministic ML-Node

SpiderWeb core consists of a custom "SpiderWeb ML-node" responsible for accepting, training, and running deterministic Machine Learning models, which ensures that a given input passed to a model would always be inferred into the same output.

Decentralized trainings & Inference

SpiderWeb nodes decentralize training and inference workloads among themselves, according to node availabilities and performances. Based on an asynchronous distributed training strategy, some nodes will be elected as workers, training over different slices of input data off-chain and then aggregating gradients at each checkpoint on-chain.

Private IPFS cluster

SpiderWeb data storage needs data scientists to upload models, for business users to upload training data sets, and for nodes to share checkpoints during training, supported by an IPFS-Cluster deployed on top of an IPFS network run privately between SpiderWeb nodes.

Proof-of-Training & Proof-of-Inference

The distribution strategy is customized to implement *proof-of-training* on the SpiderWeb chain, with:

1. A worker-selection mechanism is driven by business users' requirements.
2. Model training checkpoints to report on-chain for visibility, consensus, and reward purposes.
3. Redundancy between workers allocated the same slice of input data.

Similarly, proof-of-inference distributes prediction workloads off-chain to multiple overlapping nodes, which need to report the exact predictions to reach a consensus.

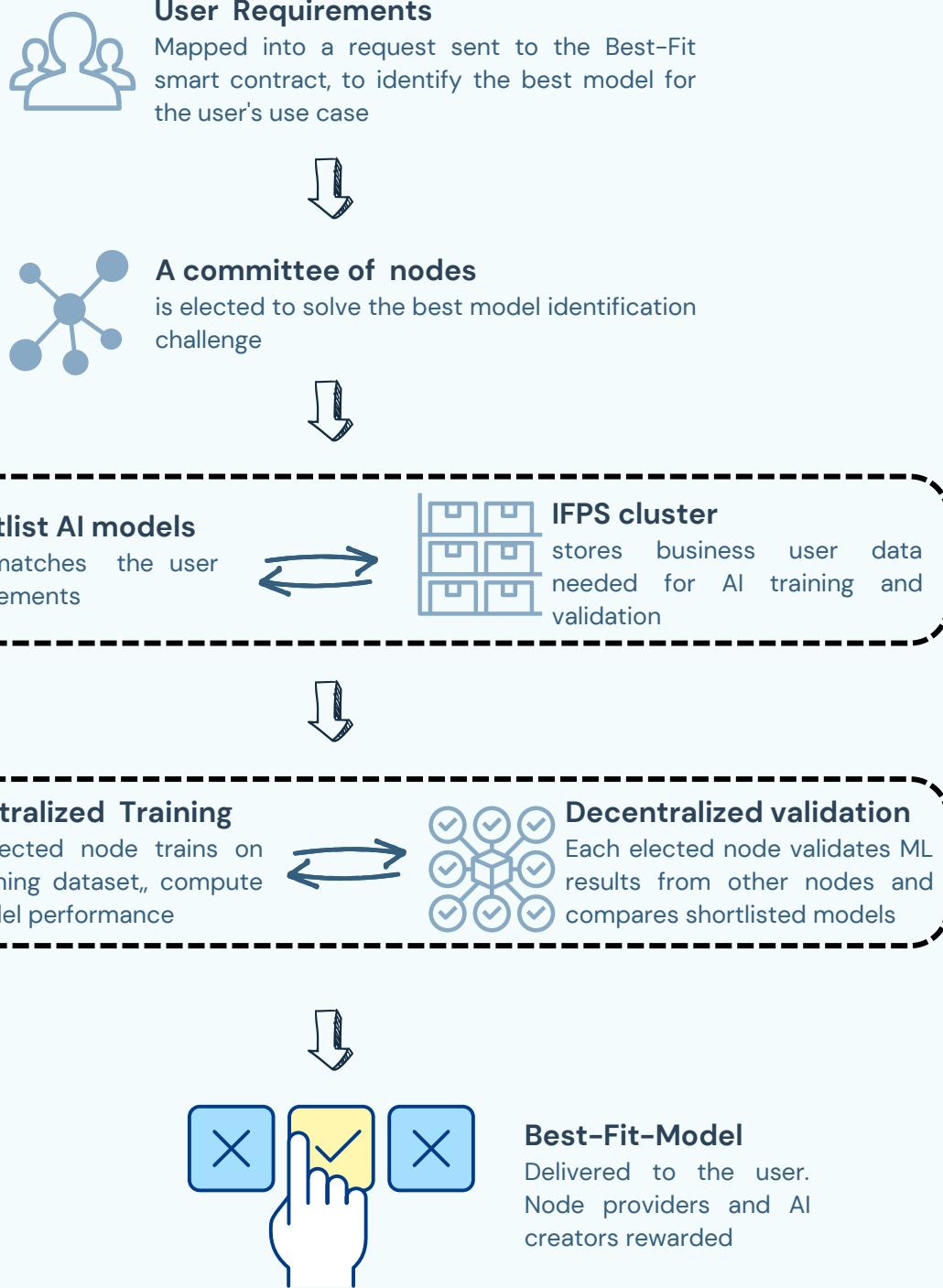
Integrated Development Environment

SpiderWeb's Integrated Development Environment (a.k.a IDE) facilitates the AI/ML model development and on-chain validations with inbuilt proprietary features for AI creators. It boosts enterprises to concentrate on their use case instead of AI/ML and build quick AI-driven decentralized applications employing smart contracts and best-model-fit algorithms.



BEST FIT MODEL

SpiderWeb's Best-Fit-Model algorithm, enables business users to automatically identify and auto-run machine learning or Artificial Intelligence model that best fits their requirements.





PRODUCT FEATURES



Build to Earn

First marketplace to enable peer-to-peer relation between AI creators and enterprises, through decentralized nodes



Proprietary Consensus

Scalable consensus for validation and verification of AI Models, customizable & secure environment



Developer Experience

Interactive user interface for AI creators and DAPP developers, in-build tools, tech stacks, standards



Bounties & Rewards

Business users can announce bounties and rewards for AI creators & access the best data scientist community



Perfect-Model-Fit

A proprietary algorithm to identify the best model automatically with a smart contract



Data Connectors

In-build IPFS and web2 connectors, ingest and integrate dataset seamlessly in models, encryption, privacy



Flexible Computing

Automatically computing resource allocation for the model training and predictions empowered with dedicated throughput



Modularity

High stability, short lead time to value, scalability, elasticity, upgradability, reliability, community collaboration



Interoperability

Layer 0 bridge to external chains, chain agnostic AI, Native support for smart contracts, tokens etc

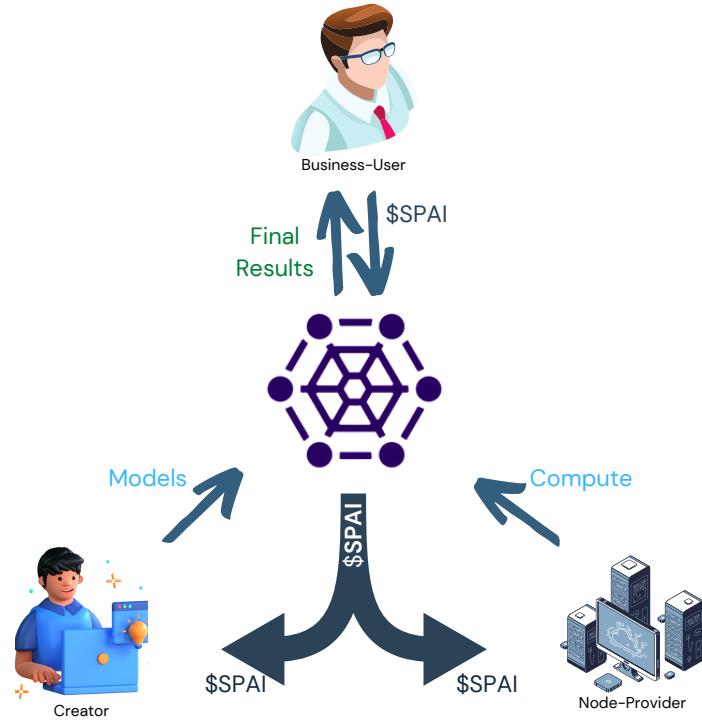


SPAI TOKEN



Spiderweb enables Peer-to-peer trading of ML/AI models and datasets over the Marketplace. Business users pay for the consumption of ML models and computing resources in the \$SPAI token.

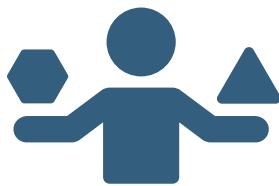
Gas fees and embedded royalties in Smart-Contracts are rewarding nodes, model owners & data providers.



As part of the blockchain maintained by nodes, SpiderWeb smart contracts charge service fees per transaction.



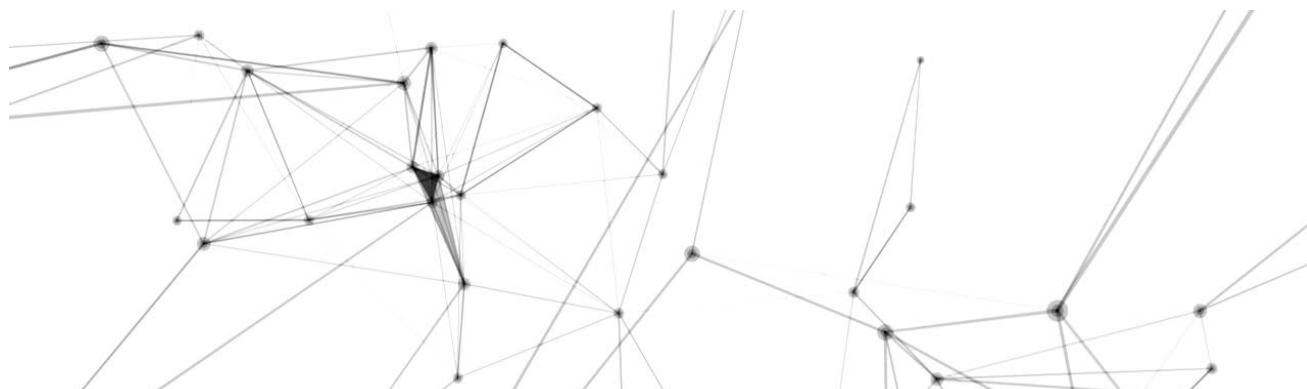
POSITIONING



SpiderWeb	Google	Amazon	CortexLabs	SingularityNet
Community Driven			●	●
Pre-Trained Models	●	●	○	●
Tailored Models	○	○		
Marketplace				○
Data Connectors	●	●		
Creators IDE	○	○		
AI Specific Consensus Machnism				
Flex-Computing	○	○		
Creator Incentivization			●	●

● Fully Supported

○ Partially Supported





ROADMAP

Q1, 2023



- Inter-node communication protocols
- IPFS / Data Connector Integration
- RPC endpoint for off-chain workers
- On-chain ML-model training and activation
- ML/AI Model Wardrobe

Q2, 2023



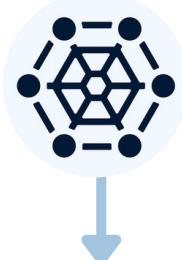
- Consensus Pol, PoT, and PoV&V
- Model Submission feature for creators with PoT
- Perfect-Model-Fit Algorithm
- E2E transaction flow
- TestNET dev

Q3, 2023

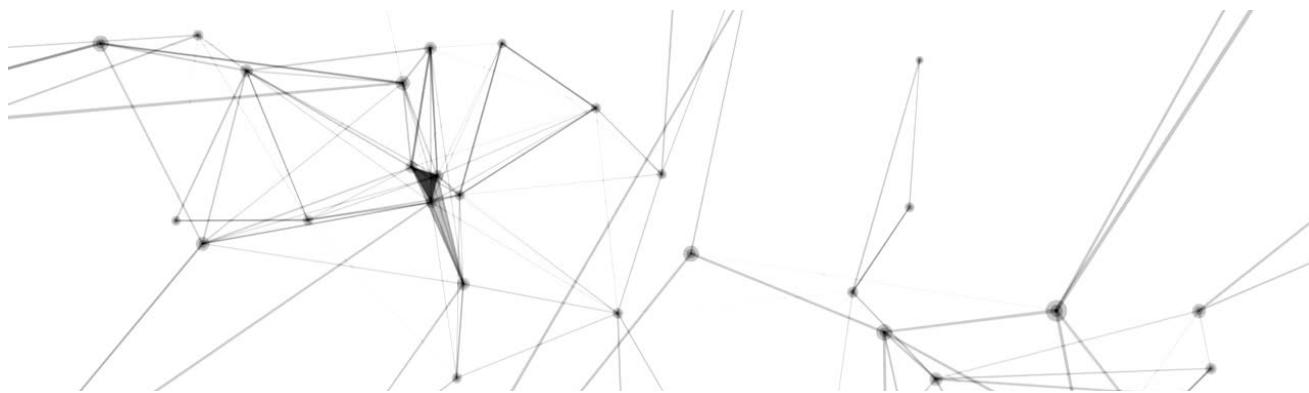


- User portal with Smart contract Integration
- Marketplace Model:
 - 10 Machine learning and, 2 DeepLearning
 - Predictive Analysis & NLP support
- Decentralized AI/ML training, and activation

Q4, 2023



- AI Creator Integrated development environment
- ML Model featured as a fungible and non-fungible asset
- Explorer Launch
- TestNet Launch
- ICO Launch





TEAM

True believers in decentralized software's ability & creative freedom. Sharing over 100 years of combined experience with **60+ Patents**.



Baljit Singh
CEO
Founder / CTO @ IntelliSON (AutoAI), VP R&D @ Tomorrow.io, Pr. Eng/Arch @ Intucell /Cisco (acq'd by Cisco for \$475 mn),



Prakash Suthar
CTO
Head of MLOps @ Google, Distinguished Sol Arch @ Cisco, Technology Advisor @ Rakuten 5G

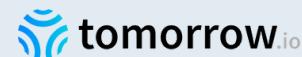


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THANK YOU

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