

Myriads.IO

Decentralised Peer-to-Peer Machine Learning Network
Based on Blockchain and Developed for GPU Owners

The White Paper, version 0.2.4 beta written by

Jack Huang [jack.huang@myriads.io]

Liu Peng [liu.peng@myriads.io]

Qiang Qu [qiang.qu@myriads.io]

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1. Summary

According to a new market research report *"Machine Learning Market by Vertical (BFSI, Healthcare and Life Sciences, Retail, Telecommunication, Government and Defense, Manufacturing, Energy and Utilities), Deployment Mode, Service, Organization Size, and Region - Global Forecast to 2022"*, published by MarketsandMarkets™, the market size is expected to grow from USD 1.41 Billion in 2017 to USD 8.81 Billion by 2022, at a Compound Annual Growth Rate (CAGR) of 44.1%.

Technological advancement and proliferation in data generation are some of the major driving factors for global machine learning market. Furthermore, increasing demand for intelligent business processes and rise in adoption of modern applications are expected to provide opportunities for the growth of the machine learning market.

Myriads.IO team is creating new hardware and software approach to machine learning. It is project that aims to decentralise artificial intelligence by leveraging blockchain technology. We believe that decentralised machine learning is a new technological revolution.

Tech giants like Amazon, Microsoft, Alphabet sell machine learning GPUs powers with superprofits. We want to decentralize this process and send superprofits to GPUs miners to make useful computations (do not wasting kW for unuseful calculations).

2. Market Overview

The various coloured bars reflect the performance of different approaches to machine learning using a dataset of 80 fundamental and technical factors about an average of 1,000 listed stocks from December 1989 through to September 2017.

Machine learning in stock selection (long-short performance)

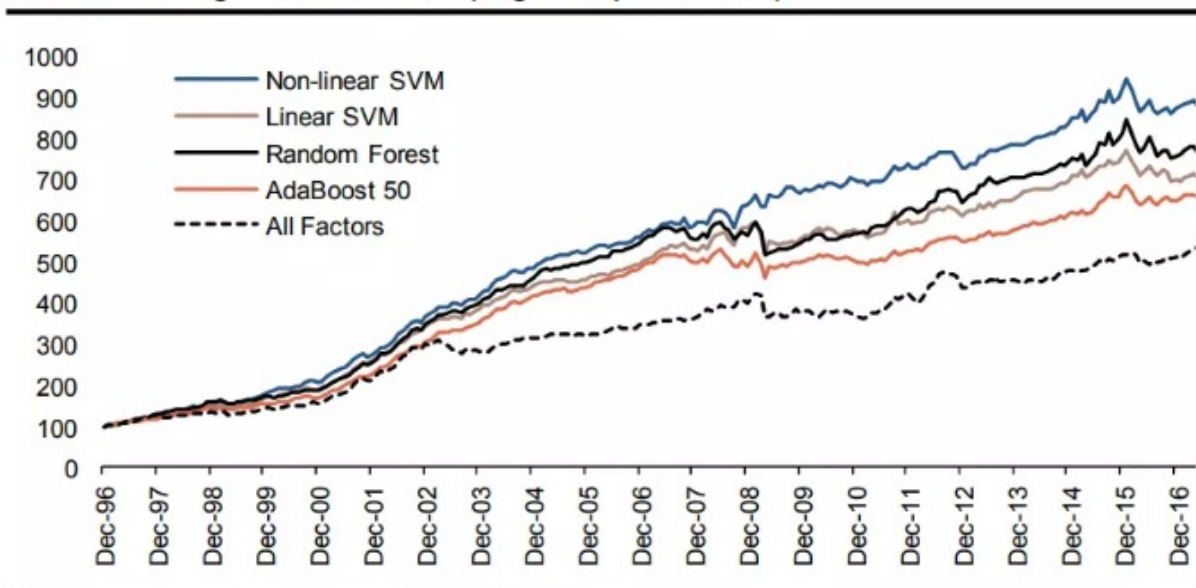


Figure 1: Stock selection

Computer Vision

Image classification is still a very challenging field in computer vision and machine learning. According to a [new report from Tractica](#), the global market for computer vision hardware and software will increase from \$6.6 billion in 2015 to \$48.6 billion annually by 2022.

Language Processing

Challenges in natural language processing frequently involve natural language understanding, speech recognition, natural language generation, etc. Natural Language Processing Market worth [16.07 Billion USD by 2021](#).

Pharm & Medicine

[McKinsey estimates](#) that big data and machine learning in pharm and medicine could generate a value of up to \$100B annually, based on better decision-making, optimized innovation, improved efficiency of research / clinical trials, and new tool creation for physicians, consumers, insurers, and regulators.

Fraud Detection

Fraud detection and prevention market worth 41.59 Billion USD by 2022. As reported in [the Global Forecast to 2022](#). ML especially good at recognising patterns in data and therefore equally good at spotting anomalies in those patterns. This makes it a great approach for preventing fraud.

Machine learning is perhaps the hottest thing in Silicon Valley right now. Especially deep learning. The reason why it is so hot is because it can take over many repetitive, mindless tasks. Every company wants to do machine learning on a bigger scale and for less cost. Cloud service providers will continue to compete to drive down the costs and increase the capacity of machine learning systems.

3. The Problem

All machine learning GPU machines controlled by centralised cloud services authorities like Google Cloud, Amazon Machine Learning, Microsoft Azure Machine Learning. Pricing of machine learning servers is overrated and corporations earn superprofits and control all industry.

Computation power of centralised services is much lower than possible GPUs power of decentralised Myriads.IO network with "myriads" of computers with GPUs.

Security of centralised platforms depends on governments centralised IT security and could be controlled by central authority. It could be hacked or your data could be stolen by employees or hackers.

3.1. Myriads.IO Solution

Myriads.IO is the decentralized protocol producing a distributed machine learning architecture using blockchain technology. Our system allows idle GPUs computing power to analyse big data and predict the future, while rewarding miners for the accuracy of their predictions.

3.2. Benefits

1) Lowest price based on a perfect market. No humans setting prices for ML services, the network incessantly regulates prices at the lowest possible costs based on existing resources and users demand.

2) Myriads.IO - autonomous, open sourced and decentralised P2P network based on blockchain. Transparent, reliable and secure solution. No central authority or intermediaries.

3) Superior Incentivization Structure.

Users pay with MRDS tokens for massive amounts of computational power for AI learning. Miners earn money through Myriads.io by leasing their hardware.

4. How does Myriads.IO Work?

End-Users (individuals and companies) require huge GPU computation power for machine learning algorithms. They pay with MRDS tokens for learning network power.

Large models in machine learning can dramatically improve overall performance. With the advent of deep learning, the field is rapidly expanding. However, large neural network models face infrastructure limitations. These limitations can be overcome in several ways. One approach is to develop more powerful graphical processing units (GPUs) that can handle the computational load. Another approach is to distribute the load to clients speaking to a central server for batch training updates. Thus it is possible to crowdsource the computational power necessary to train models and incentivize participation via a Myriads.IO token-based network.

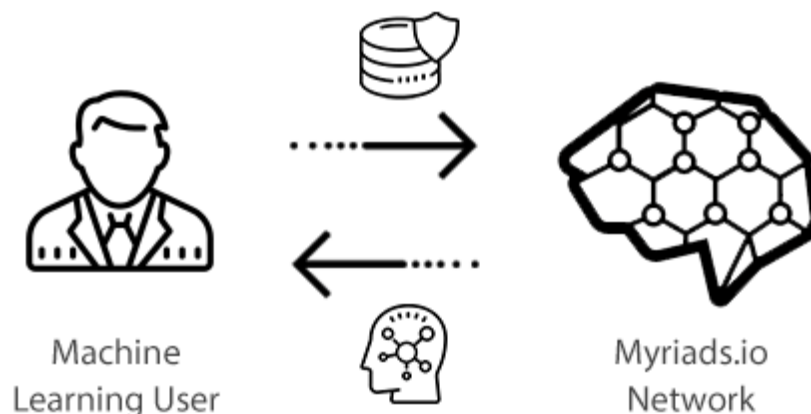


Figure 2: Machine Learning

End-User send data and machine learning algorithm to Myriads network. Myriads network generate multiple tasks for all miners over the network, blockchain algorithm split all data into chunks. A chunk is a portion of an encrypted data to be stored on Myriads.IO network.

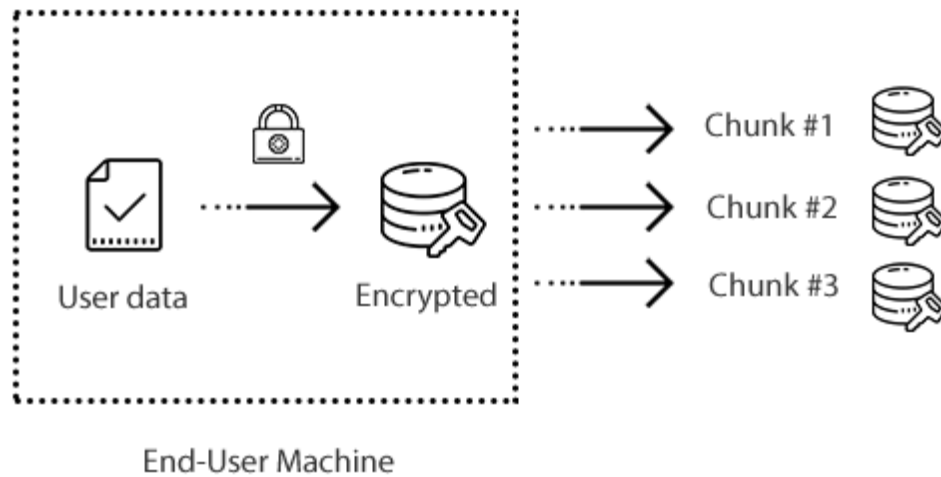
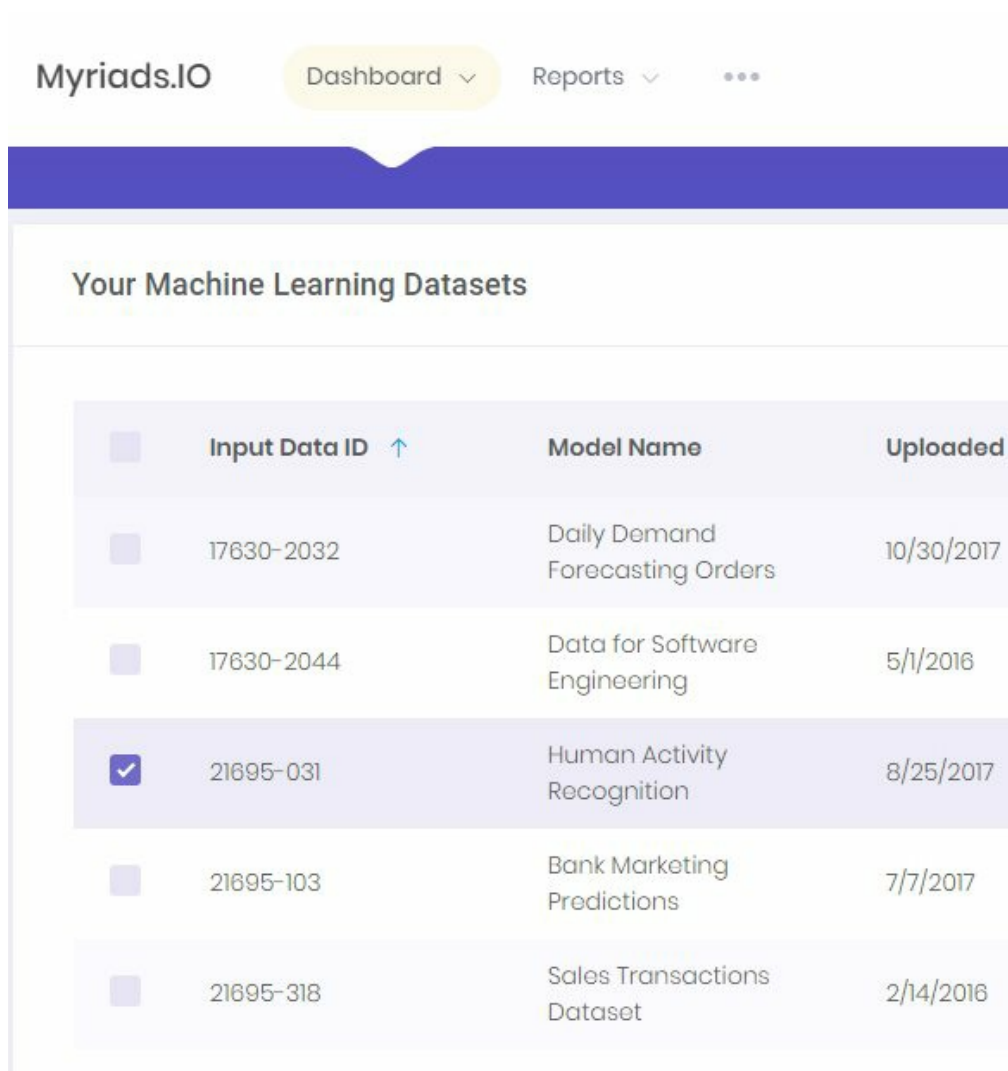


Figure 3: Data chunks

Chunking has a number of advantages to security, performance, privacy and availability. Files should be encrypted client-side before being chunked. This protects the data from revealing unauthorized extraction of information. The data owner retains complete control over the encryption key, and thus over access to the data.

4.1. Build and Train a Predictive Model

End-users can create and train predictive ML models and host own applications in a scalable Myriads.IO network solution. They will create machine learning models from data sources, from which users can evaluate and adjust the ML model's performance, and then use it to generate predictions.



The screenshot shows the Myriads.IO dashboard with a navigation bar at the top containing 'Myriads.IO', 'Dashboard', 'Reports', and a menu icon. Below the navigation bar is a section titled 'Your Machine Learning Datasets' which contains a table with the following data:

<input type="checkbox"/>	Input Data ID ↑	Model Name	Uploaded
<input type="checkbox"/>	17630-2032	Daily Demand Forecasting Orders	10/30/2017
<input type="checkbox"/>	17630-2044	Data for Software Engineering	5/1/2016
<input checked="" type="checkbox"/>	21695-031	Human Activity Recognition	8/25/2017
<input type="checkbox"/>	21695-103	Bank Marketing Predictions	7/7/2017
<input type="checkbox"/>	21695-318	Sales Transactions Dataset	2/14/2016

Figure 4: End-User Interface

End-users will use the visualization tools and wizards of Myriads.IO ML to guide through the process of creating a new machine learning model without having to learn complex ML algorithms and technology.

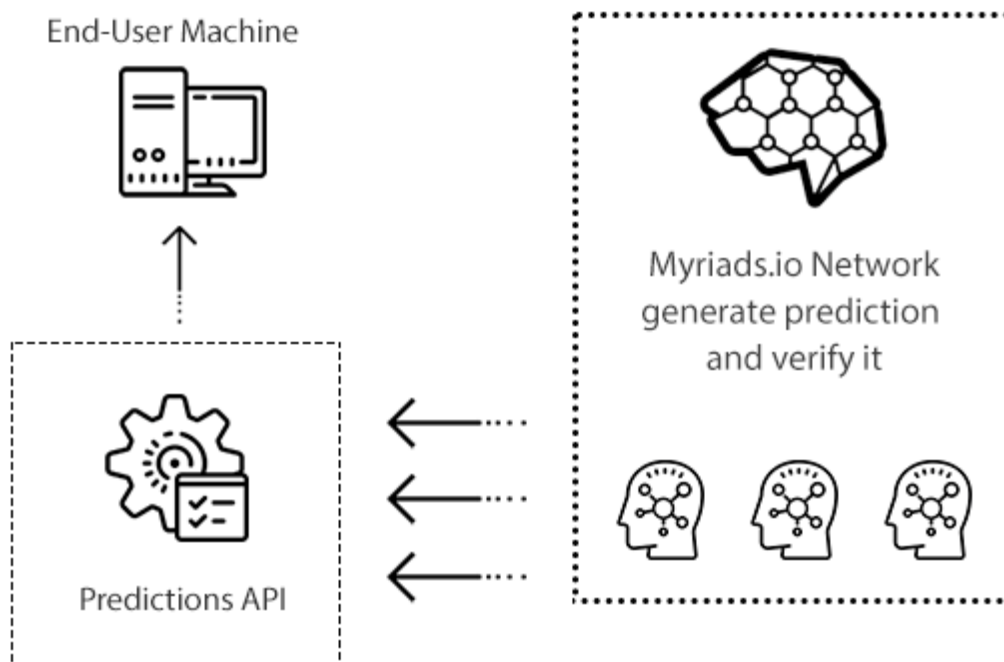
4.2. Measure Model Accuracy

The goal of the machine learning model is to find and learn patterns that generalize well for unseen data. Once end-users have a model, it is important to check if their model is performing well on unseen examples that they have not used for training the model. To do this, end-users use the model to predict the answer on the evaluation dataset (held out data) and then compare the predicted target to the actual answer (ground truth).

Three supervised learning scenarios are presented in Myriads.IO platform:

- multiclass classification
- binary classification
- regression

Myriads.IO Network provides model evaluation through two of its main ML modules: *evaluate model* and *cross-validate model*. These modules allow you to see how your model performs in terms of a number of metrics that are commonly used in machine learning and statistics.



4.3. Predictor's Mining Software

Myriads.IO Network's mining differs from how the term is used in bitcoin and other cryptocurrencies. In Myriads, mining means using data to make predictions and there are different strategies and algorithms to do so.

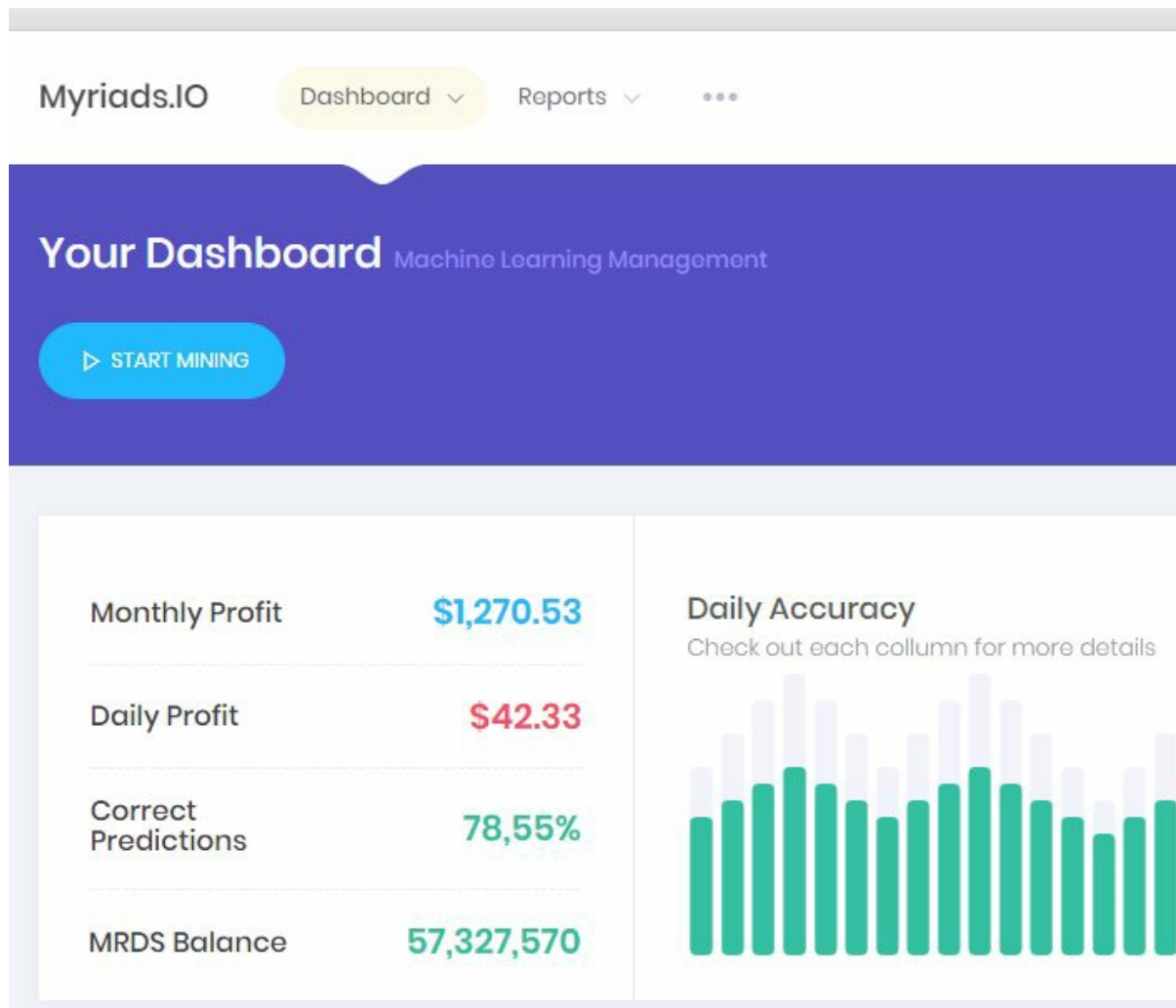


Figure 5: Miner Dashboard User Interface

Myriads.IO Network's MRDS coins is used for rewarding miners for the accuracy of their predictions.

4.4. Proof of Work

1. The work must be provably not fake. If not, predictors can send fake data and Myriads.IO Network will pay them for something that they have not actually done. Predicting the future accurately in the blockchain and having one's predictions compared to what occurred in reality satisfies the requirement of being provably not fake.
2. The work must be easy to verify. A rapid verification process guarantees no lag on the network. Once the time has past in which a predicted event occurred, it becomes very easy to verify which predictor had the best prediction: the predictor with the least deviation from what occurred in reality.



Figure 6: Prediction Deviations and Rewards

4.5. API for ML developers

There are API for businesses and individual developers which provides machine learning services with pre-trained models and a API to generate your own ML models. Services will be scalable, fast and easy to use. Myriads Machine Learning platform brings the power and flexibility of Torch and TensorFlow to the decentralized network of GPUs machines.

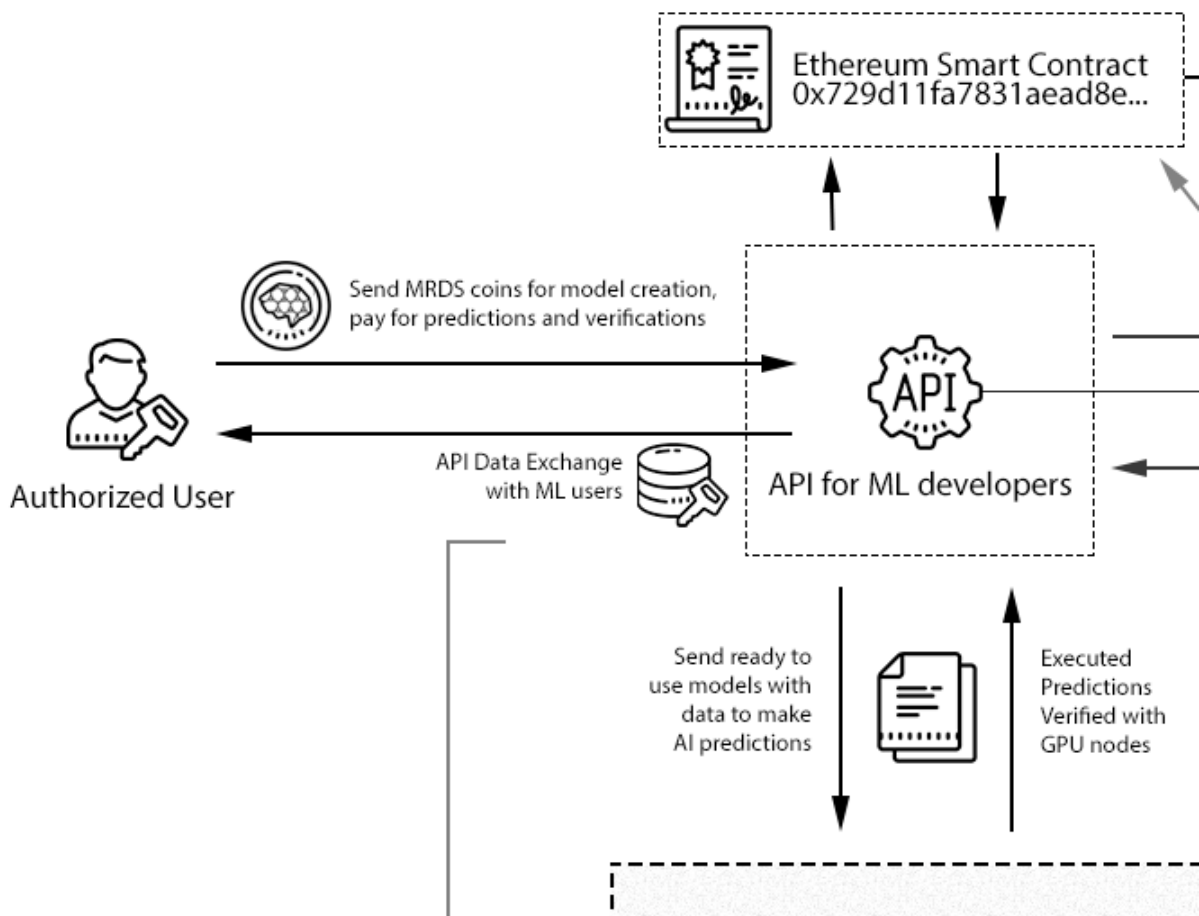


Figure 7: API for ML developers

(Full source: <https://myriads.io/scheme.jpg>)

4.6. Nodes in Myriads Network

There are three types of nodes in Myriads Network

1. Machine Learning Nodes (PoW)
2. Prediction Nodes (PoW)
3. Verification Nodes (PoW + PoS)

4.6.1 Machine Learning Nodes (PoW)

Machine Learning Nodes (PoW) use powers of GPUs machines to create viable ML models. End-Users able to build and train machine learning models without writing a single line of code. Training models on Myriads is just a 5 steps process.

1. Data type selection (Images/Text/CSV)
2. Data upload via BitTorrent protocol
3. Choose category/label for the files
4. Start model training

Start selecting the best Machine Learning or Deep Learning algorithm to train the best model with the highest accuracy.

5. Model is ready to testing. You can use it via UI or by integrating it via API.

Rewards for Machine Learning Miners (PoW) - the successful PoW miner will receive a static block reward that is equal to N MRDS coins. Static block generates every 2 minutes. The successful miner will also receive the gas that it generates from the Machine Learning or Deep Learning transactions in the block that it verifies. All rewards split between all type miners. Strict formula and algorithm currently under development and negotiation.

Every 4 years, the number of MRDS obtained from machine learning,

predictions and verifications will be halved. In the first 4 years, there will be a total of 60,750,000.

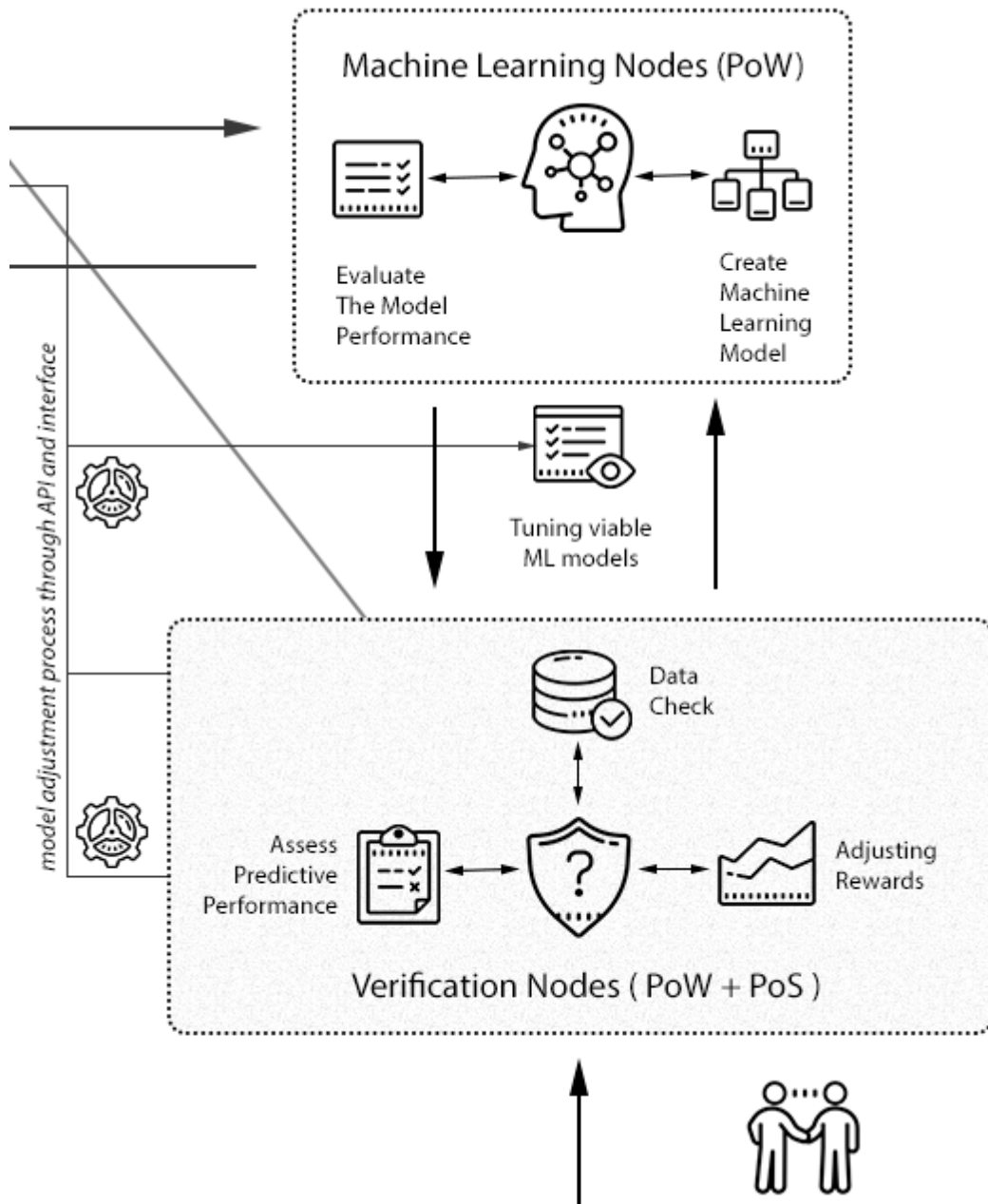


Figure 8: Machine Learning Nodes
 (Full source: <https://myriads.io/scheme.jpg>)

4.6.2. Verification Nodes (PoW + PoS)

Verification Nodes used for checking and verifying work done by Machine Learning Nodes and Prediction Nodes. It is critically important to verify work because miners can send fake results, fake predictions and get rewards for nothing. Miners should get rewards for useful job, for models creation and verifications according to special Ethereum smart contract.

Verification Nodes use combination of PoW + PoS, we add proof-of-stake acting as a second authentication mechanism to prevent fake verifications. The incentive of the miner is only to maximize their own profits.

So anyone of verifications miners could send illegal fake approves for machine learning work. But stake holders not interested to make fake verifications to prevent MRDS coins price drop. Also we add algorithm that can use the set some circumstances under which a bad validator might lose their deposit. It is the most advanced protection technology.

End-Users can assess predictive performance and Verification Nodes adjust rewards according to ML model that End-Users use.

4.6.3. Prediction Nodes (PoW)

Prediction Nodes use proof of work algorithm and generate predictions based on models and data that End-Users upload to network. All predictions should be verified by Verification Nodes (PoW + PoS). Authorized User send data and model via API to Prediction Nodes - they split work between all miners and analyse data + models. There are two common AI framework used in Myriads Network - TensorFlow and Torch. End-Users can use any of them or use UI with step by step process.

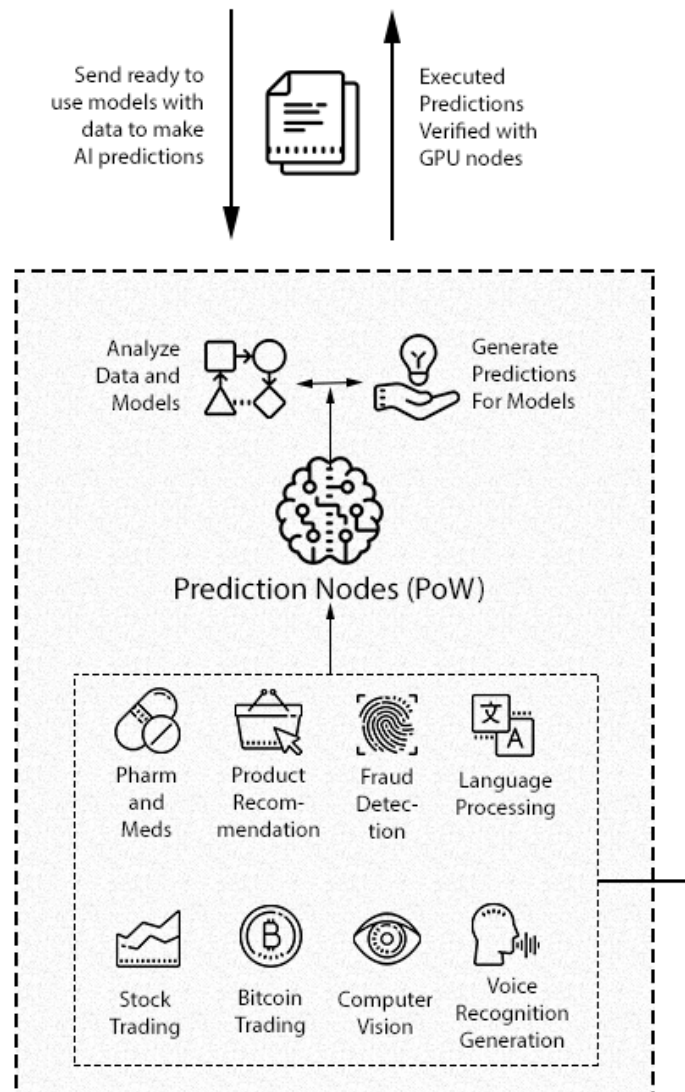


Figure 9: Prediction Nodes
 (Full source: <https://myriads.io/scheme.jpg>)

4.6.4. Spam Prevention

End-Users (individuals and companies) who require GPU computation power for ML send MRDS coins for rewards for model creation, pay for predictions and verifications. For spam transactions prevention we use GAS commissions - special unit used in Myriads Network. Every operation that can be performed by a transaction or ML contract on the Myriads platform costs a certain number of gas, with operations that require more computational resources costing more gas than operations that require few computational resources. It's important to measure the work done directly instead of just choosing a fee based on the length of a transaction or contract. Myriads platform's GAS price is 0.00000001 MRDS. Every operation in the Myriads platform consumes a pre-defined amount of gas.

5. Myriads.IO Token Sale

Myriads.IO Project has received over USD 1,100,000 in venture capital funding from private Chinese VC fund and bank. According to non-disclosure agreement, we can not name investors. Before Myriads.IO Project launches as a full-fledged service it will undergo an token sale exercise.

5.1. What is a MRDS Token?

The MRDS Tokens are based on the Ethereum platform and conform to the widely-used ERC20 standard. The token is a part of our ecosystem and is used inside it. Since the token is the fuel of the Myriads.IO system, our customers will want to use it more, they should buy it on exchanges at the market price. End-Users have to pay for machine learning with MRDS Tokens that is stimulate and boost demand.

MRDS Token Crowdsale Structure

The MRDS Tokens crowdsale and the corresponding token creation process will be organized around smart contracts running on Ethereum. The token sale will be launched at 14:00 UTC on March 20, 2018 and closes at 14:00 UTC on May 19, 2018 (60 days). Below are details of the token sale.

Company name: MYRIADS IO LP

Head office address: 101 Rose Street Lane, Edinburgh, United Kingdom, EH2 3JG

Blockchain platform: Ethereum

Token name: MRDS

Min transaction amount: Unlimited

Max transaction amount: Unlimited

Total Token Supply: 270,000,000 MRDS

Hard cap: 108,000,000 MRDS

Soft cap: No soft cap is set

Initial rate: Token price is locked to 1 ETH = 25,000 MRDS

Whitelist is limited to:

- 1500 KYC Verified Contributors

- 7500 Unverified Contributors

6. Tokens Details

- ✓ MRDS Tokens are strictly limited and burnable
- ✓ Tokens that are not sold during the token crowdsale will be burned (destroyed).
- ✓ MRDS Tokens will appear on Crypia, Evercoin, Coinexchange, and Coinlink Korea after negotiations.
- ✓ 15% of Myriads.IO profits from commissions will be used to fund buybacks and burn(destroy) tokens
- ✓ The buyback of MRDS Tokens will occur every two months, thereby increasing the price of remaining MRDS tokens.
- ✓ The total number of Myriads.IO tokens will be 270,000,000
- ✓ 40% of total number of tokens will be sold for contributors.
- ✓ 45% of tokens will be used as incentives for GPUs miners
- ✓ 10% will be held by Myriads.IO team as incentives for development
- ✓ 5% - rewards for early adopters (advisors and community)
- ✓ Every 4 years, the number of MRDS obtained from machine learning, predictions and verifications will be halved. In the first 4 years, there will be a total of 60,750,000.

Funding Breakdown Summary

- ✓ Core Development — 40%
- ✓ Marketing and Sales — 35%
- ✓ Security and Legal — 20%
- ✓ Operating Costs — 5%

6.1. Time-bonuses for early buyers

- ✓ 20 March 2018 - 4 April 2018 — add 50% bonuses
- ✓ 5 April 2018 - 20 April 2018 — add 25% bonuses
- ✓ 21 April 2018 - 6 May 2018 — add 10% bonuses

6.2. Bounty Program

- ✓ Bitcointalk Signatures Campaign — 40%
- ✓ Facebook Campaign — 20%
- ✓ Twitter Campaign — 20%
- ✓ Publishing Campaign — 20%

7. Board of Directors

Liu Peng | *CEO, Investor and Co-founder*

Email: liu.peng@myriads.io, LinkedIn: <https://www.linkedin.com/in/liu-peng/>

Graduated from The Hong Kong University of Science and Technology Executive MBA (EMBA) program. Last experience work at China Jianyin Investment - an integrated investment group focused on equity investments.

Company: China Jianyin Investment Securites, Beijing City, China

Title: Head of Private Equity Investments

Dates Employed: Jul 2015 – May 2017

Company: SenseTime 商汤科技, Beijing City, China

Title: Business Development Executive

Dates Employed: Jul 2013 – Jun 2015

Experience: AI and big data business development to global market including: China, US, Australia

Company: Hang Lung Properties, Hong Kong

Title: Project Leader and Managing Director

Dates Employed: Apr 2011 – Apr 2013

Experience: Global Hang Lung Group Ltd. IT project leader & managing director for property development business. Budget : 5 M\$+ and team 30+ people. Management of a global team and full reengineering of business IT.

Company: Wanda Cultural Industry Group, Beijing City, China

Title: Vice President, Analytics

Wanda Cultural Industry Group

Dates Employed: Apr 2008 – Nov 2011

Jack Huang | *CTO, AI and Blockchain Expert*

Email: jack.huang@myriads.io, LinkedIn: <https://www.linkedin.com/in/jack-huang-m/>

Graduated from Harbin Institute of Technology (HIT), where he majored in Physics and Electronics. Last experience work at China Construction Bank (CCB). Blockchain applications development expert and face recognition research scientist.

Company: China Construction Bank (CCB), Beijing, China

Title: Head Of Software Development

Dates Employed: Apr 2014 – May 2017

Experience:

Development and implementation of a central bank digital currency (CBDC). Large-scale blockchain development in the bank industry with a blockchain solution developed by several Chinese companies.

Company: Face++ Cognitive Services, Beijing City, China

Title: Software Architect for Face Recognition Software

Dates Employed: Mar 2010 – Jan 2014

Experience:

Algorithm Architect for:

- Detect and locate human bodies
- Analyse face related attributes: age, ethnicity, gender, emotion
- Finding similar faces and face detection

Qiang Qu | *CFO, Investor & Co-founder*

Email: qiang.qu@myriads.io, LinkedIn: <https://www.linkedin.com/in/qiang-qu/>

Graduated from National University of Singapore (NUS). Business and Economics. Last experience work at CSC Financial - Chinese investment bank and brokerage firm. Position: director, accounting and financial control.

Company: China Pacific Insurance Company, Shanghai City

Title: Head of Fraud Risk Analyst Department.

Dates Employed: Apr 2014 – Jan 2018

Company: Tiger Seng Pte Ltd

Title: Chief Executive Officer & Chief Financial Officer

Dates Employed: Oct 2011 – Feb 2014

Company: Vertex Venture Holdings, Singapore

Title: General Manager of Risk Systems and Validation

Dates Employed: Apr 2008 – Aug 2011

8. Other Members of Our Team

Shi Meng, *machine learning expert*

Ends Shandong University of Science and Technology in 1989.

He is now an active researcher as part of the Computational Science and Engineering Group MYRIADS IO LP.

Liang Hu, *blockchain talent, ethereum developer*

Experienced developer with 13 years experience in FinTech.

Extensive Solidity / Ethereum developer with experience, including security audits and strategy.

Ning Chiu, *professional advisor*

Chartered accountant (ACA) with 5 years post qualified experience in corporate finance/M&A delivering complex projects to senior stakeholders. Recently delivered full ICO for business: coded smart contracts, forecasts/modelling, whitepaper, investor presentations.

Gang Pan, *AI Computer Scientist*

Software developer with experience working for top Chinese companies. Blockchain developer with a passion for Ethereum DApps development in the Solidity programming language.

Jack Lo, *blockchain architect*

He has 2 years of experience of creating ICOs, ERC20/ERC223 tokens, decentralized web and mobile apps, secure Ethereum smart contracts.

Li She, *software architect*

Senior software architect and engineer with 10+ years on the tech industry and data-structures. Blockchain technologist, experienced software developer and mentor.

9. Our Partners



iFlytek (Chinese: 科大讯飞), is a Chinese information technology company established in 1999. It creates voice recognition software and 10+ voice-based products covering. Together we are developing special machine learning interface implementation in Myriads.IO Network.



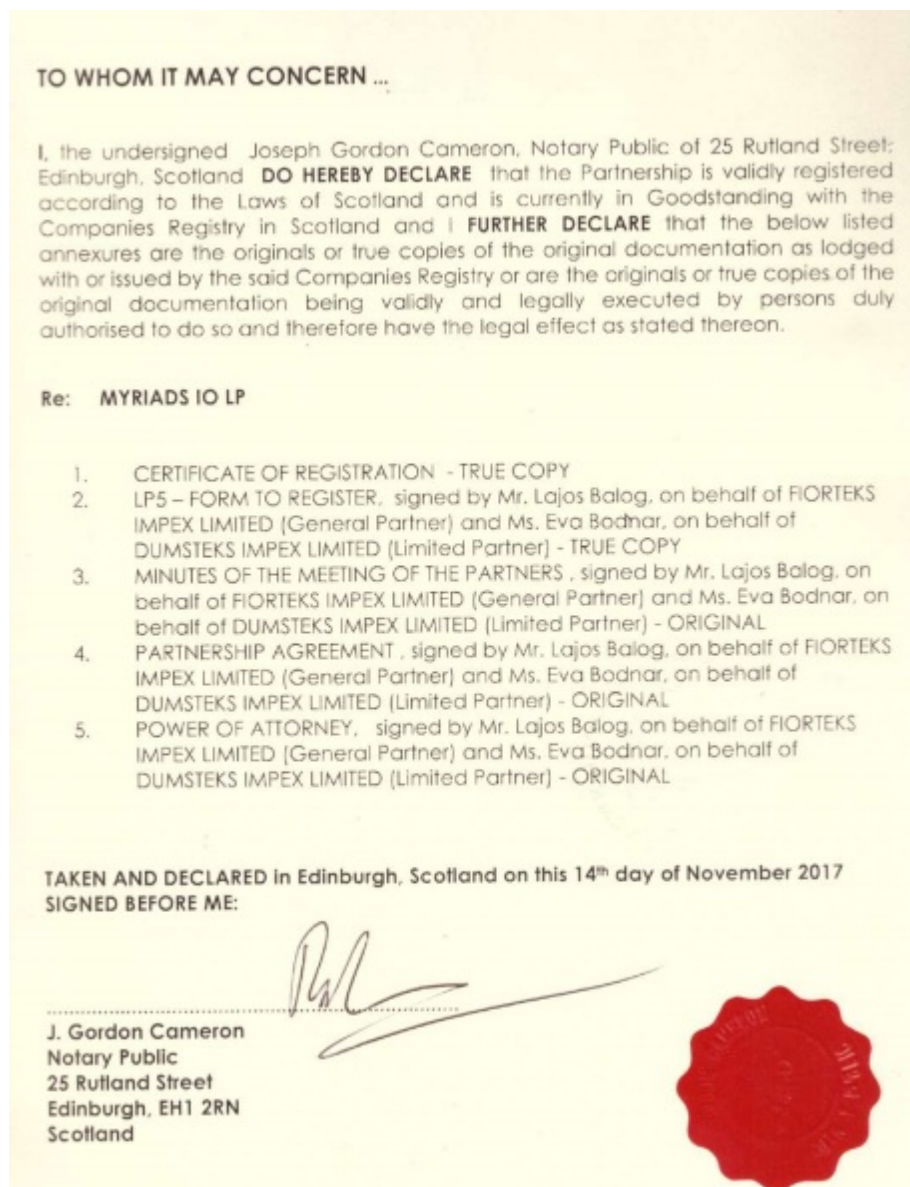
TeleEye Group is a Hong Kong based audio-visual, information technology company, founded in 1994. The primary products of the group are network CCTV and DVR applications. Together we are creating new AI algorithm for computer vision tech and implementing it in Myriads.IO platform.



Neusoft Corporation is a Chinese multinational provider of software engineering services, Information Technology services, product engineering services, IT education and medical equipment headquartered in Shenyang, China.

10. Legal Documents

Our talented international team focused and inspired with blockchain and AI innovations, we have registered our company in Scotland. Scotland is a part of the United Kingdom, a leading global financial and business centre and an important jurisdiction for international tax planning. The UK is known internationally as a jurisdiction with a standard level of taxation. We have choose Scotland as trusted and reliable financial centre with liberal law for blockchain projects.



Tokens were not registered and will not be registered under the US Securities Act of 1933 as amended (the "Securities Act") and may not be offered or sold in the United States to the person or in the interests of a person who is a US citizen or company (as defined in Regulation S in accordance with the Securities Act), unless they are duly registered or represented in the register in accordance with the requirements of this Law.

10.1 Certificate Of Registration



CERTIFICATE OF REGISTRATION OF A LIMITED PARTNERSHIP

Limited Partnership Number **SL32410**

The Registrar of Companies for Scotland hereby certifies that:

MYRIADS IO LP

is this day registered under the Limited Partnerships Act 1907 as a Limited Partnership.

Given at Companies House on **8th November 2017**.



Citizens of countries that have banned token sale are not allowed to participate.