SAHARACHAIN: AI-DRIVEN CRYPTOCURRENCY EXCHANGE AND PAYMENT GATEWAY

WHITEPAPER

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2 INTRODUCTION

Dubai government plans to be one the first cities to fully adopt blockchian technology by 2020. The government of Dubai announced that all its government entities will conduct their business using the blockchain technology.

"We want to make Dubai the first blockchain-powered government in the world by 2020," says Aisha Bin Bishr, director general of Smart Dubai.

Dubai is one of the leading business center in the Arab world and the region. The decision of Dubai government is destined to fuel innovation and mass adoption of the blockchain technology in UAE and the region.

3 PROBLEM & OPPORTUNITY

It is estimated that 2 billion of working people worldwide still do not have a bank account or banking services. In the MENA region (Middle East & North Africa), the majority of the population without banking services have access to smartphones and internet access.

Cryptocurrency and blockchain adoption in the MENA region still in its infancy stage. The cryptocurrency usage and exchange is expected to grow substantially in the coming years.

With your support, SaharaChain will build AI-driven Cryptocurrency Exchange and Payment Gateway that would enable the MENA region for the future of Cryptocurrency and value based economy.

4 LOCALIZATION & LANGUAGE SUPPORT

Most of the worldwide Cryptocurrency exchanges are focused only on one language or one region.

As an enabler of the new blockchain technology, SaharaChain is multi-lingual Ecosystem offering support for many of the local languages. The initial release will support English and Arabic only. More languages will be added over time.

5 SAHARACHAIN ECOSYSTEM

Built on top of the Ethereum blockchain. SaharaChain Ecosystem is designed as a Service Oriented Architecture. The SaharaChain Ecosystem relies heavily on Artificial Intelligence for providing insights on cryptocurrency across the blockchain. SaharaChain services will be available on Web and Mobile (Android & iOS). The SaharaChain Ecosystem services include:

1. SaharaEx - Exchange for Cryptocurrency
2. SaharaGate - Payment Gateway for Cryptocurrency
3. SaharaWallets:
    - Consumer Daily Wallet
    - Consumer Saving Wallet
    - Consumer ICO Wallet
    - Business Wallet
4. SaharaAnalytics tools

6 SAHARAEX - EXCHANGE FOR CRYPTOCURRENCY

SaharaEx is a cryptocurrency exchange where cryptocurrencies can be exchanged with each other. To increase security, SaharaEx uses third party verification to verify all transaction.

SaharaEx is designed in a user-friendly approach in order to expedite the adoption and use of the SaharaEx service.

Through SaharaWallets, SaharaEx removes the difficulties associated with managing public and private keys and other technicalities that would prevent the average user from embracing the blockchain technologies.

7 SAHARAGATE – PAYMENT GATEWAY FOR CRYPTOCURRENCY

SaharaGate is a full payment solution enabling Corporate & Individual sellers to trade their products and services against cryptocurrencies.

Buyer uses his Daily Wallet to pay for goods and services while the seller accepts the payments in cryptocurrency using their Business Wallet.

Business Wallet integration and features discussed below.

8 SAHARAWALLETS FOR CONSUMERS

SaharaWallets handle multiple cryptocurrencies to ensure best user experience. Tokens can be moved between wallets in a user-friendly way. The wallets are designed to enable non-technical users to use their tokens without the hassle of knowing how to use public and private keys.

Daily Wallet: As the name implies, it is the day to day wallet where the customer uses it to do the daily purchasing and trading. The daily wallet can be used at merchants using SaharaGate payment gateway.

Savings Wallet: You can think of it as a saving account with no limitations. The Saving Wallet is used to store tokens the user wishes to hold on to for a longer period of time.

ICO Wallet: The ICO wallet enables users to participate in ICOs without having to be technical and knowing how different keys in order to participate in an ICO. Simply, the user will select the ICO to participate in, the amount of participation and participation criteria and the ICO Wallet will handle the rest. SaharaChain customers can recommend ICOs to be added to the ICO Wallet. All ICOs added to the ICO wallet are crowd sourced and selected by SaharaChain stakeholders.

9 SAHARAWALLETS FOR BUSINESS

SaharaChain Business Wallets handle multi cryptocurrencies to ensure best user experience.

Merchants can use the SaharaGate and Business Wallet to sell their products against cryptocurrencies. The Business Wallet offers API integration with Online Stores, Merchant's website and Merchant's POS.

10 DATA COLLECTION, STREAMING AND STORAGE SERVICES – DESIGN OVERVIEW

10.1 MODULAR UNIFIED DATA INTERFACE - MUDI

This is the main interface of SaharaAnalytics with the external world. The MUDI service is designed to allow the flexibility of adding new data sources easily and quickly. This design enables the collection of data from external sources such as other exchanges and other performs. The MUDI service handles all needed data wrangling ahead of ingesting the data into our Ephemeral Data Storage. The Ephemeral Data Storage will be discussed in more details below.

10.2 MUDI - DATA SOURCES INPUT STREAM - DSIS

The MUDI-DSIS service collects data from several data feeds such as:

- Textual Data Feed: Monitor and collects data from sources such as news, blogs and articles.
- E2W - External Exchanges Watcher: Monitors and collects data on tracked tokens being traded on external exchanges.
- Blockchain Feed: Monitors and extracts all transactions to be tracked from the blocks on the blockchain.

10.3 MUDI - UNIFIED DATA OUTPUT STREAM - UDOS

This is the Data Output Stream of MUDI service. The output data format consists of standardized stream of data packets. The data pockets are decoded as they enter the Ephemeral Data Storage. The Ephemeral Data Storage will be discussed below.

10.4 EPHEMERAL STORAGE

The is the hot-data storage. It contains freshly produced streams of date flowing from MUDI service. For each type of data packets, there is a decoder that is responsible for gathering and transferring it to the appropriate listeners.

10.5 EPHEMERAL DATA FEED SERVICE

This feed flows into three services: Eternal Storage Service, Upper-AI Service and Lower-AI Service.

10.6 ETERNAL STORAGE SERVICE

This is a repository for where all the Ephemeral feeds are saved. The Eternal Storage is used to for generating analytics over long period of time as well as training various AI components. The Upper-AI components uses Eternal Storage Service to learn and built its strategies whereas Lower-AI components use the Eternal Storage Service provide historical market analysis.

11 SAHARAANALYTICS DESIGN OVERVIEW

To empower our users with insights regarding the cryptocurrency they are interested in exchanging, we track the cryptocurrency movements and trends not only on our exchange but across all exchanges in real-time.

SaharaAnalytics is a data-driven analytics engine empowered by a wide spectrum of machine learning models ranging from simple insights to advanced deep-reinforcement-learning-based modules.

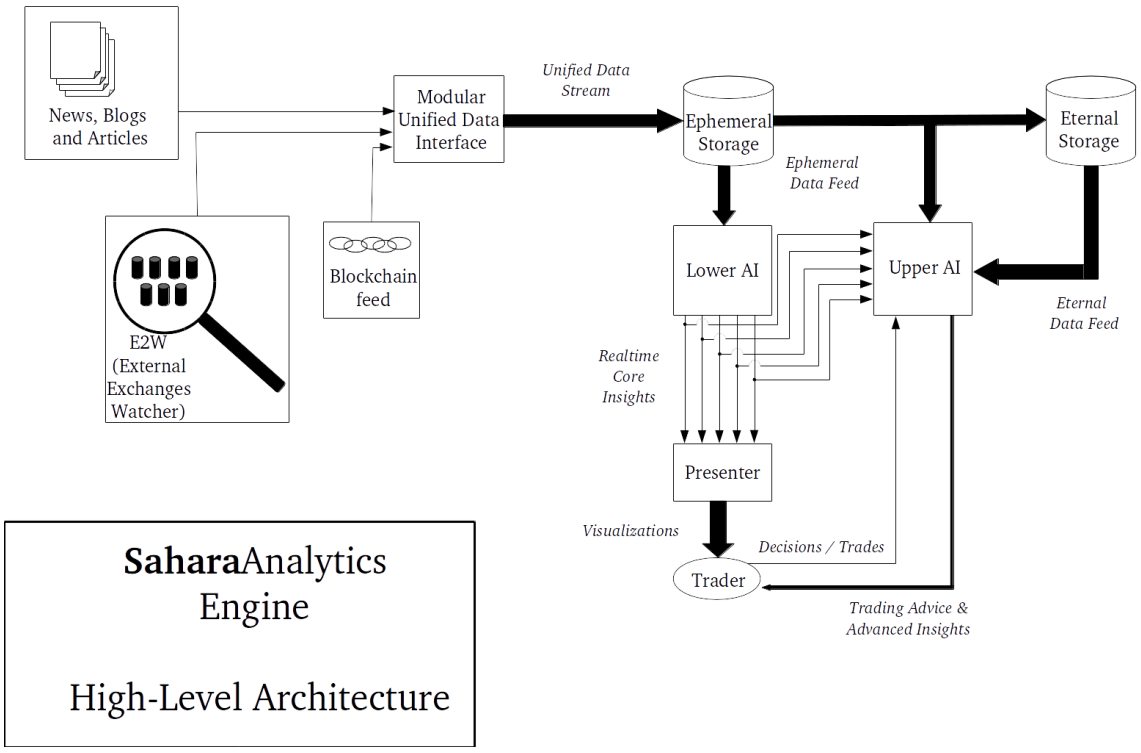

Figure 1: The conceptual outline and architecture of SaharaAnalytics engine.

Building the SaharaAnalytics engine is not a short-term project. However, because of our service-oriented architecture and modular design, building and deploying the AI models will be achieved in parallel and independently.

This allows us to progressively build the engine.

The Lower-AI module will be the first module to roll out followed by the Upper-AI module. The Upper-AI module is a Reinforcement-Learning-based model.

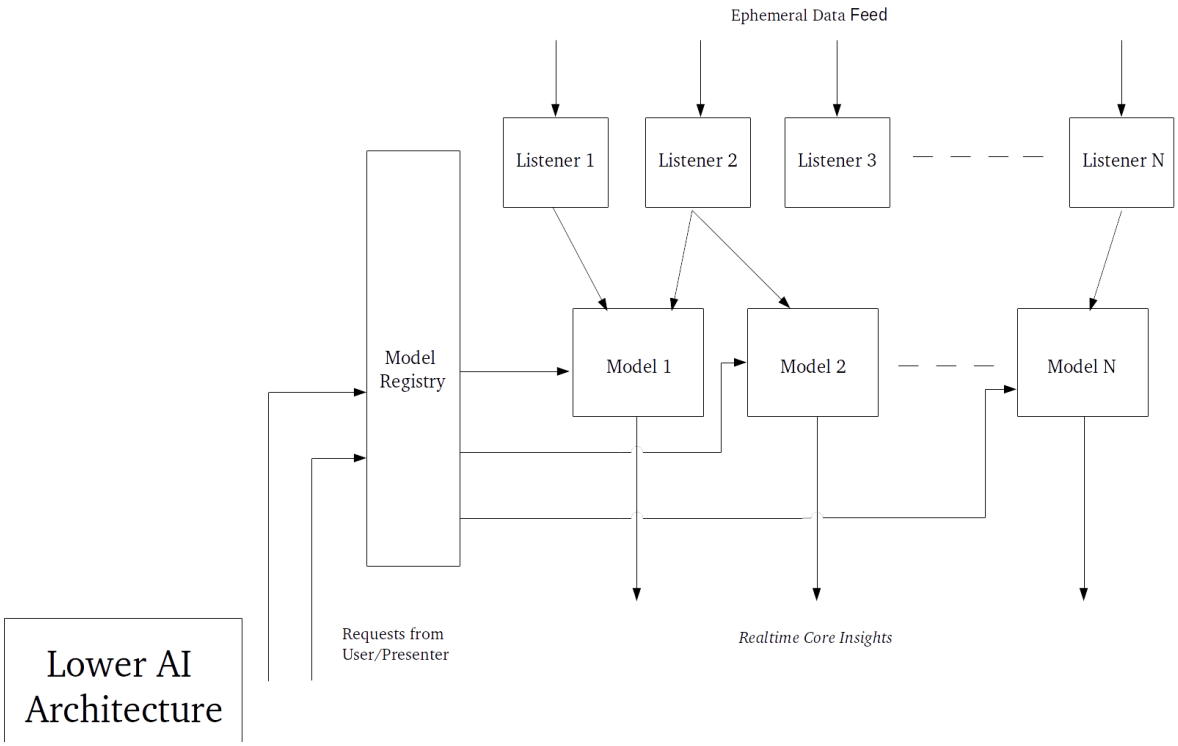

Figure 2: The conceptual outline of Lower-AI architecture

11.1 LOWER-AI SERVICE

One of the two main AI components in SaharaAnalytics. On a high level, Lower-AI services consist of serval listeners and models that are managed by the model registry. The modular architecture allows the smooth inclusion and modification of different models.

11.2 LOWER-AI LISTENERS

Their purpose is to collect the data and make it ready for ingestion by models.

11.2.1 Lower-AI Models

Each is used to generate certain type of analytics. For example, one model could be used to generate insights related to the similarity of external exchanges from products' perspective. The model in this case will pre-

process the data to generate a similarity matrix for the exchanges, then will use a community detection algorithm (Modularity Maximization, for instance) to find the communities of exchanges that trade similar products. The output, represented by the Realtime Core Insights, will be forwarded for presentation through the Presenter. Check figures 3 and 4.

The training of the models is done on a development platform which has a secure access to the eternal data feed.

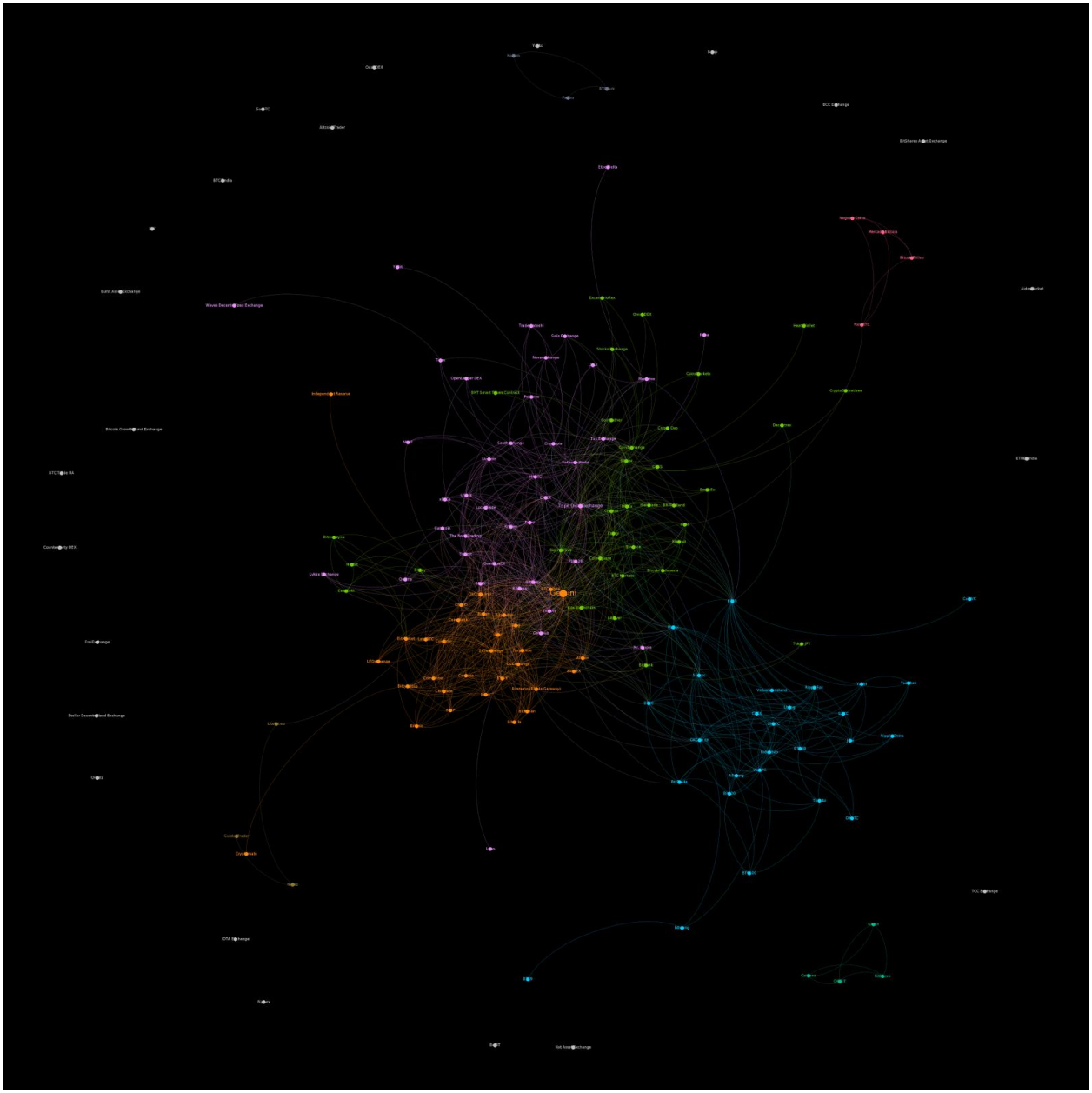

Figure 3: A sample of graph analytics using real data. Each circle (node in graph theory jargon) represents an exchange. Each arc (edge in graph theory jargon) indicates a similarity between the two exchanges. You can see from the data that the universe of exchanges is organized into groups, each group trade similar product. Notice also the peripheral exchanges, which are very unique.

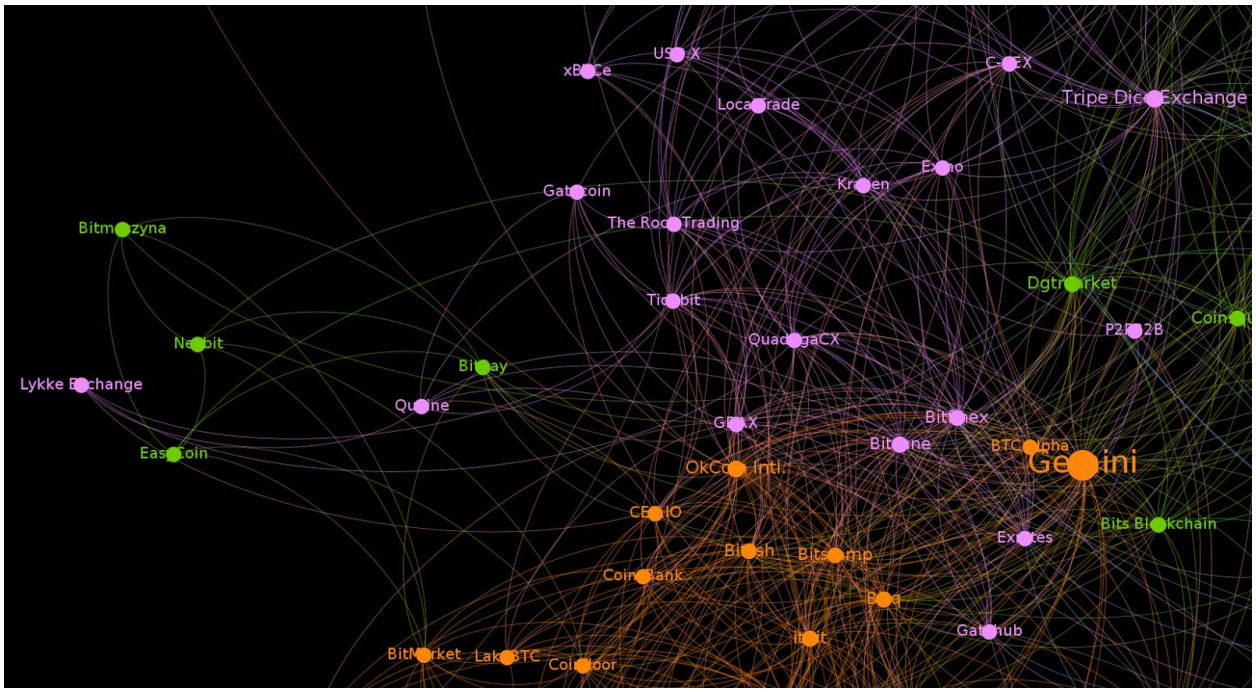

Figure 4: Part of the exchanges universe. At this region, Gemini exchange is important because it's at the boundary of multiple clusters.

11.2.2 Lower-AI Registry

This is the entry point for the Presenter to "talk" to Lower-AI service. The presenter sends a request along with its parameters. The model registry interprets the request and forward it to the appropriate model.

The model registry has another advantage, which is the version-control of the deployed models. Using it, it's very possible to use different versions of the same model. This allows us to easily launch a new model as a beta-version, and then smoothly deploy it as working one, while keeping at the same time the previous versions. This ability of smooth switching between different versions is extremely useful in deploying machine-learning models, especially if we want to compare the performance of multiple versions.

11.3 Upper-AI Service

A deep-reinforcement-learning-based agent. The decision of building this type of AI service is supported by the recent advances in deep learning and

reinforcement learning in many areas: (Atari agent, AlphaGo, JPMorgan, etc..). High level architecture is presented in Figure 5.

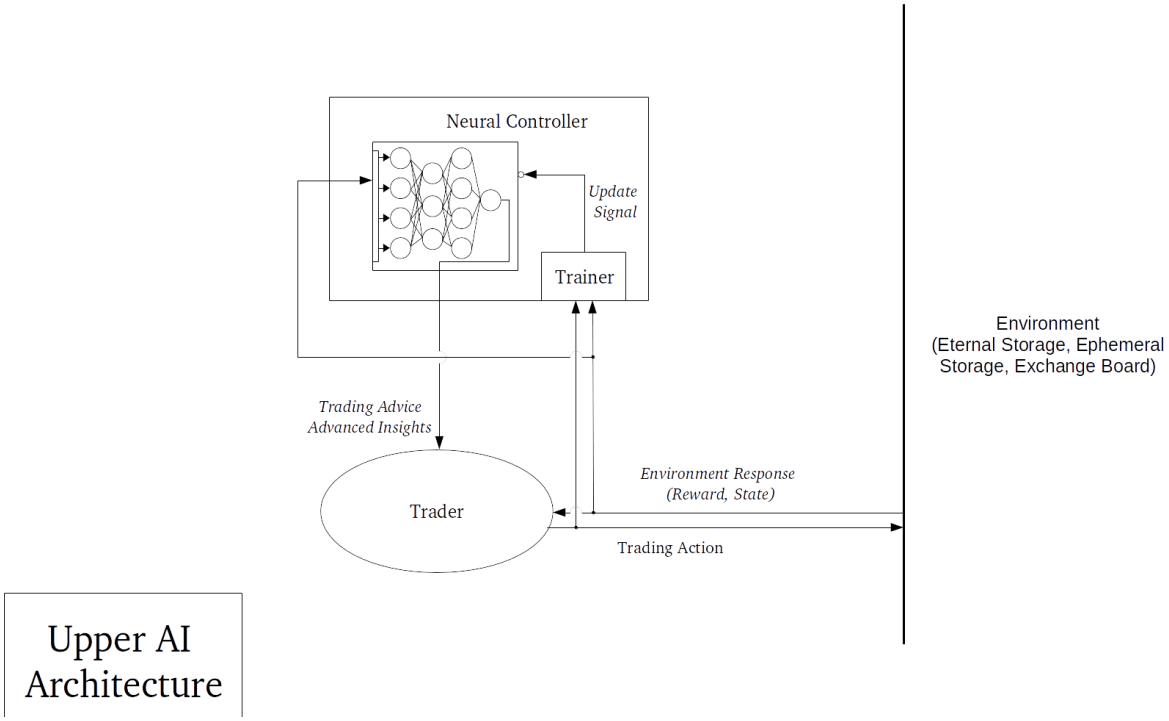

Figure 5: Upper-AI architecture

11.3.1 Controller

A neural-network-based service. The parameters of the controller are tuned by the Trainer using the eternal data feed and off-line learning algorithm (like Q-learning).

The controller is also responsible for generating real-time insights for the traders using the Ephemeral Data Feed.

11.3.2 Trainer

Responsible for tuning the parameters of the model according to the available data. The tuning will be performed using a gradient-descent-based algorithm. However, in the special case of using linear controller, a better algorithm can be used, like LSPI (Least Square Policy Iteration).

12 SECURITY

The SaharaChain Ecosystem is designed with the highest security standards where encryption, auditing and penetration testing is an integral part of the design.

SaharaChain uses a second verification technology to verify access and confirm transactions conducted on the platform.

The secondary services offered by a third party such as BitGo is used to prevent fraudulent transaction. The third-party verification is done by an automated phone call or other communication tools asking to confirm and approve the transaction.

13 SAHARACHAIN TOKEN - SAND

SaharaChain will issue a token called SAND. The full details are in the Terms & Conditions paper.

There will be a fixed token supply of 2,000,000,000 SAND tokens issued in the following structure:

- 1% (20,000,000) will be issued in the Pre-ICO.
- 33% (660,000,000) will be issued during the ICO.
- 33% (660,000,000) are allocated to incentivize participation.
- and 33% (660,000,000) are retained by SaharaChain Ecosystem Foundation.
- Participation in the ICO is possible through ETH.
- SAND tokens are based on Ethereum ERC20 token standard.
- 1ETH = 10000 SAND.

14 REVENUE MODEL & TOKEN HOLDER REWARD DISTRIBUTION

Whenever any transaction is conducted on the SaharaChain Ecosystem, the following occurs:

- A transaction fees is deducted for all transactions conducted on the SaharaEx & SaharaGate.
- The transaction fees will be structured competitively in accordance with the market pricing landscape and will be announced of the SaharaChain Ecosystem website.
- 20% of the SaharaEx & SaharaGate transaction fees will be distributed to all SAND token holders in accordance with their SAND token amount.
- The distribution is done daily and managed by a smart contract.
- The smart contract will post to the blockchain all distributions that exceed the minimum threshold amount. The minimum threshold amount should exceed gas fees by at least ten times.
- The remaining SaharaEx & SaharaGate fees will be used for SaharaChain Ecosystem operational and maintenance needs.

15 FINAL PROVISIONS

The Terms & Conditions document contains additional details on the ICO participation.

For further details, contact us by e-mail at info@SaharaChain.com