

Gradually

**G**rowing

**A**rtificial

Intelligence On Collective  
Intelligence Through

**P**redictive

Discussion Community

**S**ervice Platform

Based On Blockchain Technology.

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# GAPS

Gradually **G**rowing

**A**rtificial Intelligence On Collective Intelligence Through

**P**redictive Discussion Community

**S**ervice Platform Based On Blockchain Technology.

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## **“Artificial intelligence system platform for future prediction based on consensus, reward, responsibility, collective intelligence, argument, and bigdata”**

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**GAPS** is a platform to enable service for predicting event of future by continuously training artificial intelligence based on collective intelligence, that is training with data generated through argument related with prediction.

The data related with prediction for training artificial intelligence is acquired through argument of collective intelligence, whose start point is based on the question that can be determined at future.

Here, the question that can be determined indicates that when the actual event occurred after pre-defined predictable time, anyone can refer the data or answer for that result using Oracle middleware provided by GAPS system. Also, we assume that there is no error in data itself.

When the generator opens a channel for training with a question for prediction, that question becomes a topic of the channel and participants of the channel propose their opinion about prediction for given topic. Finally, they take issue by joining to argument.

In this process, they may enhance the responsibility and reward for their opinion by expressing their opinion several times. Also, the logically well-written opinion receives the logic point, which is similar with recommendation in general community, from other participants. In the opposite case, the opinion may lose its point. According to the participation to the training, the point affects the reward and responsibility after argument.

The training is completed when result is noticed after certain time that is determined at channel open and consensus is made. When any participant of channel has objection about the result, the adjustment can be done through the poll.

Most of existing online communities are operated based on anonymity. This, of course, has strong point but the side effect is not trivial.



Especially, the irresponsibility for own opinion due to anonymity is the major cause. In addition, the opinion without responsibility is not worth as data at all.

To address this issues, GAPS platform resolves these problems through argument and questions for all participants, as well as consequent responsibility and rewards.

In GAPS platform, the responsibility and rewards are related with the success or failure of artificial intelligence's training. All of these processes are completely automated by smart contract that runs on the decentralized platform. Consequently, intervention at the middle of process or fabricating result is fundamentally impossible.

Among these various features, the most distinguishable point compared with other predictive platform is the virtuous cycle architecture that predicts not only the possibility of the event but also the various reasons of that event using collective intelligence, trains the artificial intelligence with all of these data, and finally enables the more accurate prediction.

In summary, GAPS platform is a system that gradually trains the artificial intelligence through collective intelligence's arguments for prediction, where various opinions themselves improve the accuracy of prediction, and provides the prediction of artificial intelligence trained above certain threshold as service for the participants who need it.

## Necessity

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### **“Who predicts the future controls the current”**

Predictive system indicates a system to predict the event of future or unknown event using various technology such as modeling, machine learning, and data mining with the facts of current and past.

Among such predictive systems, artificial intelligence-based bigdata analysis is the most distinguished technology.

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By using the artificial intelligence, one may analyze a huge amount of data generated from various source and use it efficiently to produce a creative and new value.

Therefore, along with block chain, the bigdata analysis based on artificial intelligence stands out among technology of the fourth industrial revolution.

## Problems

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**“One man sows and another man reaps.”**

**“Every word and action imply a responsibility.”**

However, although it is essential technology, there are several problems as follows.

### I. Problem due to centralization

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The most intuitive problem is a problem due to centralized system.

Only major companies who have platform for gathering massive data can collect the bigdata required for predictive artificial intelligence system.

However, that data is not validated, and in most cases, the data provider are not responsible for the data. Moreover, the platform operators may manipulate the database as they want. Hence, the artificial intelligence’s prediction with such data is likely to be inaccurate or biased.

Also, even assume that the prediction result is correct, the right of that result completely belong to the company.

This is ironic, because no reward is given to the platform users who generate and provide data required for prediction.

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## II. Solution with decentralization but misunderstanding about prediction system

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Another problem is project related with biased prediction.

Recently, various projects related with decentralized prediction are launched to solve the problem due to centralized predictive system, but most of them are limited to the prediction market.

Of course, they solve several problems of previous centralized prediction market, but other problems occur such as user's inconvenience, slow speed from opening the market to balancing account, and illegalization issue.

Moreover, the problem and limitation of these prediction market is that after result of prediction for certain event comes out, only balancing account between persons with correct and incorrect prediction is made. The event and related prediction data are not used to other field and it is not helpful at all for predicting next similar events.

Due to these reasons, people often misunderstand the system as a betting system where only name is different.

In this situation, more troubling is making people misunderstand the predictive system. For most of people, the project related with prediction reminds them of one in prediction market. Therefore, they cannot recognize the real meaning of predictive system, as described above, "assume for the event of future in advance based on the past and current data".

### GAPS Platform

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GAPS platform is a artificial intelligence prediction system to enable predictions about various results at the future which people wonder by solving these problems and misunderstanding, and consequently help people to select correction answer for given problem using these predictions.

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## Solution

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**“Anonymity, irresponsibility, swearing, useless data, and waste**

**VS**

**rewards, responsibility, argument with collective intelligence, and training with agreement”**

GAPS solves these problems by using several tools as follows.

### I. Beginning of all training, question and training channel

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All trainings begin from the question that requires prediction. Here, the question should be about the event of future and its answer always must be determined.

In GAPS platform, a participant who opens the channel with the question that is beginning of training is called as creator.

When the creator specify the question for prediction, staking the GAPS coin that undertakes the responsibility of the training channel, and input the expiration time of argument and source information of oracle data to collect the result of prediction, the training channel is opened and other participants can join. The number of participants of channel is proportional to the amount of staked GPAS coin.

To make a greater number of collective intelligence join to the argument for more accurate prediction and training, greater responsibility is also required, hence more GAPS coin should be staked.

When training of artificial intelligence is completed through argument of participants after opening the channel, the creator receives awards for successful participation of artificial intelligence’s training by redistributing GAPS coin which is staked when opening the channel.

If the number of actual participants are under 10% of the number of available participants that is determined at the opening after certain time, that channel is closed automatically.

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## II. Collective intelligence

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It means that the integrated intelligence of group with variety and independence is more likely to be close to correct answer compared with the ability of a few superior persons or experts.

We focused on the keywords of variety and integrated, hence we decide to collect the data about cause and reason for the result through argument, not simple prediction data of result for various and rich data required for artificial intelligence's training.

## III. Argument

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This is a process where training channel's participants with different selection come up against each other about prediction.

Participants who select correct prediction and proposed opinion related with it receives the rewards for helping the training. However, the others who fail for prediction cannot receive award and their GAPS coin, a substitute of responsibility, is redistributed to the creator and successful participants with certain ratio.

This distribution policy is explained by the POW (Proof Of Work), one of the consensus algorithm of block chain, where all participants of argument are same as node for mining and similar with providing computing power for mining, participants should provide staking coin for responsibility of their opinion. Also, as reward is given after solving the problem, only participants success with training win rewards after argument.

Due to above reason, the consensus algorithm of GAPS platform is named as POD (Proof of Discussion for Learning), meaning that all consensus are made through the training with argument.

Also, one may receive or lose logic points from the participant who selects the same prediction. According to the logic points, reward becomes greater or less.



## IV. Oracle

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The question about prediction that becomes topic of training channel is limited to the one where its answer is always be determined after certain period of time. Hence, it is necessary to get the prediction result from outside of chain. The problem during this process is called as Oracle problem. We also tried to solve this problem by responsibility and rewards.

Artificial intelligence system trained in the GAPS platform focuses on solving the prediction problem for the specific range of events. Here, the specific range of events indicate that the events where anyone can figure out its result accurately after certain period of time. For example, exchange rate, stock price, coin price, result of match, election result, and weather belong to that events.

Various oracle data about specific event is provided as middleware from the platform, and when the actual result of specific event comes out after pre-defined time, the creator can acquire the data to the own channel.

At this point, to prevent wrong result notice due to mistake or on purpose, participants of channel can claim for the result for certain period of time after result announcement. However, when claiming, the data for rebuttal and its accurate source should be provided as well.

When the claiming starts, new question to solve that situation is newly created and the coin is redistributed according to the poll result. At this point, when the creator receives less votes, the final training fails and the coin staked at the opening the channel is distributed to the participant who completes the training by input correct notice after claiming.

To prevent this problem, the creator always concerns about result announcement, and GAPS platform solves the oracle problem by these responsibility and rewards.

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## **V. Blockchain (Decentralization, Responsibility, Reward, Consensus, and Smart Contract)**

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GAPS platform is a system to solve the problems of centralized system and irresponsibility due to anonymity of general community, and automatically process all jobs through smart contractor, without any intervention, in training artificial intelligence with argument of truthless participants for collecting responsible opinions of collective intelligence.

The most appropriate technology to implement this system is block chain-based technology. Especially, we solved all of these issues by using responsibility and reward of each participants for eco system, POD consensus algorithm, and coin economy.

## **VI. Artificial intelligence with machine learning**

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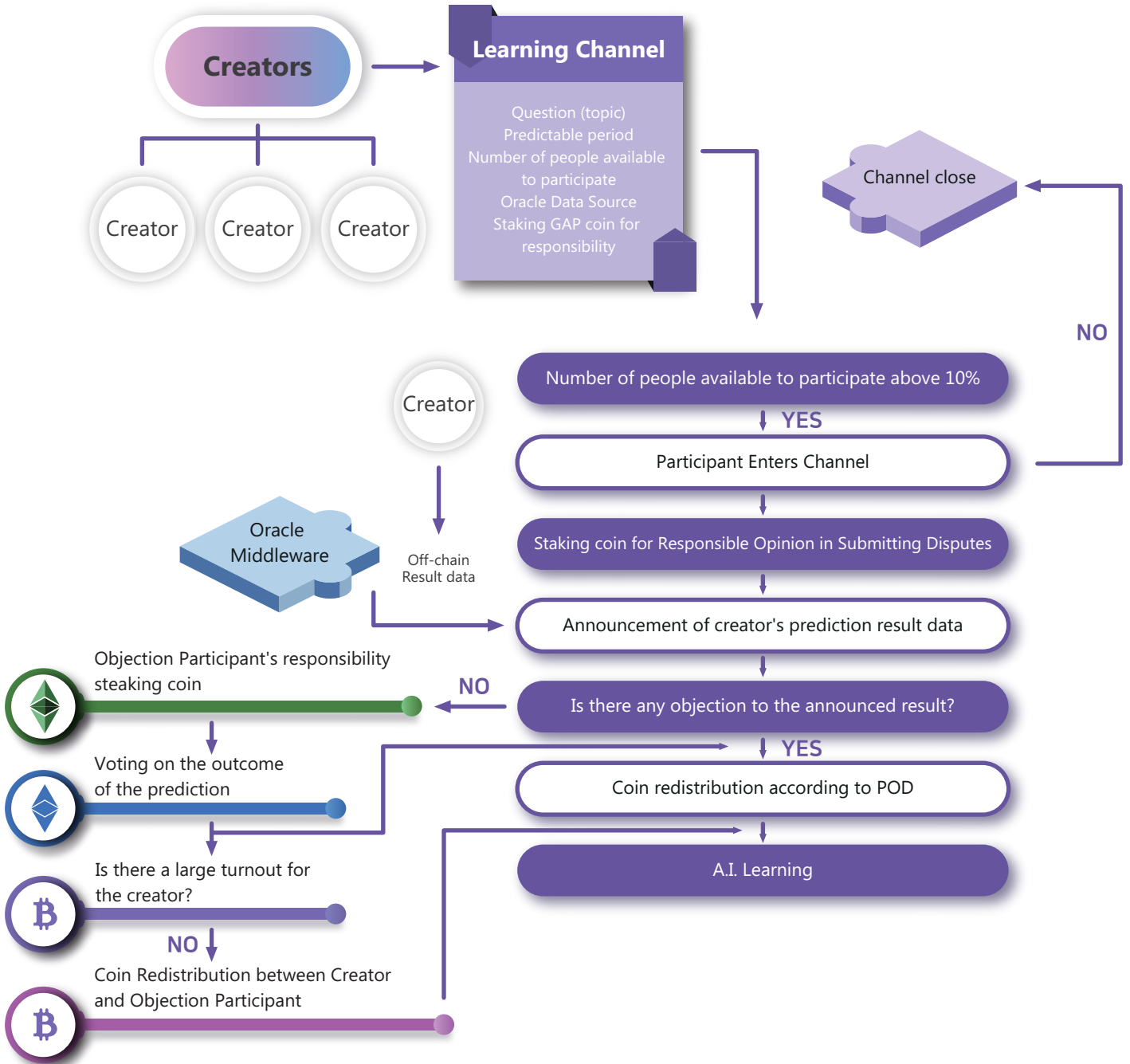
The final goal of GAPS platform is to find out the prediction-based data that causes the resulting number, not to merely predict the number. In addition, GAPS aims to generate new predictive system that is not possible previously by combining the artificial intelligence training with prediction-based data and existing trained artificial intelligence.

Specifically, we try to make virtuous cycle as question - argument based on prediction - consensus - training - artificial intelligence's prediction - argument based on prediction....

In the beginning of the service, the depth of training data should be grown first by limiting the topic of training as a few most interesting topics. However, as the number of participants to eco system increases as well as various topic and data are generated accordingly, we expect that the field and contents required to be predicted using artificial intelligence will be extended exponentially.

# Consensus algorithm and process

"All truth are simple."



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The process of GAPS platform begins from the creator's question. The channel is created from the question, followed by argument with participants, announcement of result for question, consensus, and training.

The creator's question for opening the training(argument) channel is limited to the questions where its result can be referred by oracle middleware in GAPS platform and is no doubtful. Also, by staking the creator's GAPS coin, the responsibility of question, channel, and result of later is undertaken. The amount of staked GAPS coin determines the scale of channel to create.

For the question which requires argument with a large number of participants, if the creator does not has enough coin, the channel can be created by a group of creators. In this case, after completing training, the coin is distributed to each creator according to their staked coin.

If the number of actual participants is much less than the number of available participants after generating channel, that channel is closed automatically.

After channel is generated, the participants can contribute the basis of prediction to the side where they believe by uploading their opinion with staking coin ,the responsibility of system training. At this point, the upload can be done several times to emphasize the confidence of own prediction, and it leads greater rewards after training successes.

Good prediction can receive logic points, and it may lose them in the other hand. When training successes after argument, the prediction with higher logic points win greater rewards proportional to the points.

When the creator announces the result value after expiration time of argument using the oracle middleware provided by system, training process is conducted following POD, and all process about that channel is finished. If the creator notices wrong result during this process, any participant can claim to the result with correct oracle data, then the result of the creator and claimer are judged by votes of other participants.

For such process, when consensus is made, staked coin is redistributed according to each responsibility and reward logic.

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Lastly, when the result for the creator's question is announced without any issues after all training processes, the opinions of successful participants are transformed to the data for artificial intelligence's training and then the training is performed. The opinions of the others are excluded from the training.

Staked coins, a substitute of responsibility for all participants in argument, is redistributed to the creator who made channel for training and the participants who are helpful for training by successful prediction as rewards with pre-defined ratio.