Algorithms for constructing society organizations, and also for lives

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Abstract

In the past, society organizations (governments, companies, etc.) relied on natural experience, without a solid set of mathematical logic ways to explain how to organize and optimize their organization.This paper describes the forms of various organizations in society, which simulate deep neural network structure, showing extremely powerful intelligence. And the current ability to deeplearning has achieved astonishing results. This paper also introduces the transfer of various optimization structures and algorithms in deeplearning into the social organization structure, so as to achieve the purpose of optimizing the construction of social organization methods. Finally, this paper also discusses that neural networks are the algorithms for lives, the whole natural system is a huge neural network, idealism and materialism bridge, and just for fitting.

1 simulate neurons

Social organizations simulate neural network structure.

1.1 election vs. M-P neuron model

In the election process, if there is a candidate named as A, ordinary voters vote for A. Let X_i be the voting value of the ith individual for A (vote is 1 or 0), then the number of votes obtained by the candidate is

$$Sum(A) = \sum_{i=0}^{K} X_i \tag{1}$$

In human history, there has been a debate about whether everyone has the same right to vote, because everyone has different abilities, the number of their voting rights X_i should be different. And each person in different industries, environment, knowledge, moral character are different, and the weight of the vote W_i is also different. Therefore, the method can be extended that the number of votes received by the promoted candidate is

$$Sum(A) = \sum_{i=0}^{K} W_i \cdot X_i \tag{2}$$

The M-P neuron model is shown below.[2] (Fig. 1). Thus, it can be seen that the election process and the M-P neuron model is similar. And the process of selection by region is similar to the process of convolution.[17]

1.2 selection vs. relu

In daily life and work, people usually need to take part in learning and education, take part in examinations, participate in various competitions and so on to obtain the qualification of the best

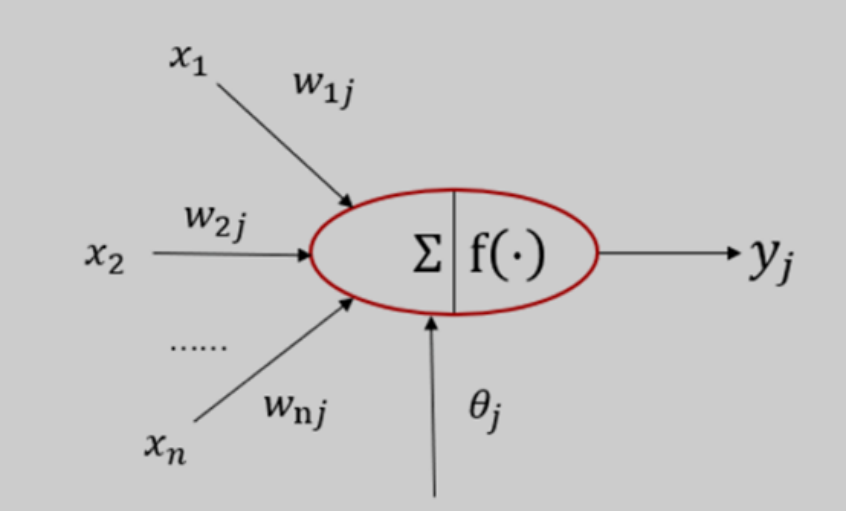

Figure 1: The M-P neuron model was proposed in 1943 by Warren McCulloch and Walter Pitts.

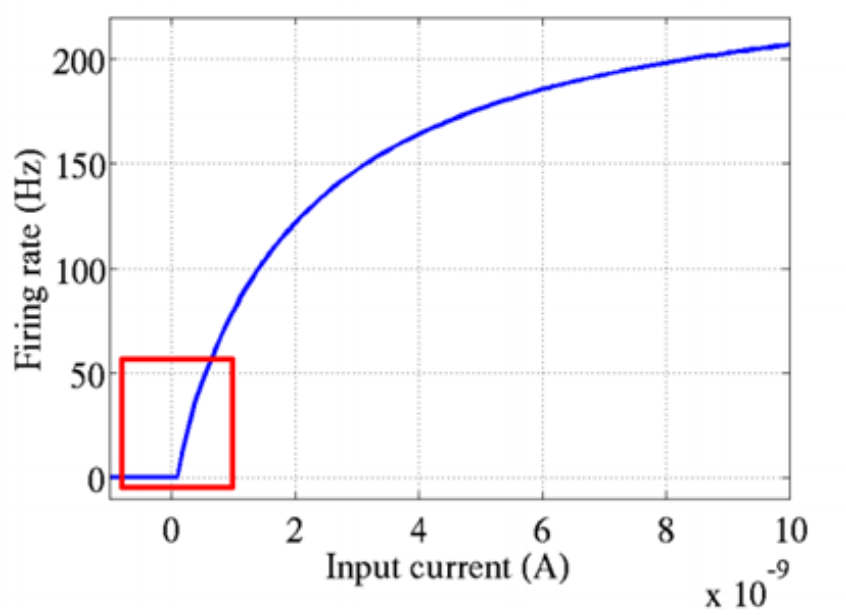

Figure 2: In 2001, neuroscientists Dayan and Abott simulated a more accurate activation model of brain neurons to receive signals from a biological perspective.

through selection. By selecting and selecting talents at all levels, some talents exceeding a certain level will be selected and appointed.

This process is the same as relu.(Fig. 2)[5][6]

Relu is more suitable than natural selection [4] in terms of words and methods. There may be better ways to adapt here in the future.

1.3 multilayer

Often in social organizations, a mixed operation of election and selection presents a multi-level alternating pattern. The operation is consistent with the structure of today's popular deep neural networks.[3] [1]

1.4 organization plan goal vs. loss function

In social organizations, the performance results of the organization are usually inconsistent with expectations. In this case, it is often necessary to provide feedback to the internal organization through the difference between the performance results and expectations. In this case, it is often necessary to provide feedback to the internal organization through the difference between the performance results and expectations. This is very similar to the loss function at the end of the deep neural network.

However, some organizational plans in reality are not errors between performance and expectations, but only have some targets, and these targets do not have a good built-in mechanism to adjust, so it is difficult to directly achieve the target. It's not that we can't achieve the goal, but it's more difficult. Without smooth adjustment step by step according to the error, it's more difficult to learn.

In reinforcement learning, the final cumulative reward is similar to the goal, which is to expect the final reward. However, reward is often sparse or even delayed in the interaction between the individual and the environment, which is similar to the nature of the target.

In the deep learning task of image target detection, the internal mechanism of proposal box such as anchor is adopted to make the regression more fast and smooth learning.[9]

The organization of the plan targets, not only to consider the poor expectations of one aspect, but also to consider the impact of more aspects (such as the geographical transfer payments in a national policy, etc.); Similar considerations are often made when designing loss functions in deep neural networks.

1.5 forward process

In social organizations, some departments collect data and then report it to superior departments. Departments at each level analyze and integrate data and information. Iterate and report to the superior department.

The process of information analysis and information integration is usually through selecting the best people, who receive the information to be processed by the human brain (brain neural network), and then report the data information through the social organization structure. And social organization mimics neural networks in the brain, so that neural networks are nested within neural networks. We can think of them together as structures that are still neural networks.

However, people in social organizations sometimes terminate the forward process at the middle node of the network due to their high degree of intelligence. Some information is not important enough to stimulate further reporting of data to superiors (there are also cases of misjudgment), stopping the forward process. Some information is important, but a node in the middle of the network analyzes the information, terminates the forward process, and has the right to directly generate the expected difference and carry out the reverse process.

However, in the current artificial neural network, the intermediate node often has no right to directly reverse the process. In general, the reverse process is carried out through the loss function of the last layer. Of course, there are such examples in deep learning. The intermediate node of object detection ssd [11] can be reversed, but it is carried out at certain fixed nodes. However, the power node of the reverse process in social organization is more flexible.

1.6 organizational feedback vs. backpropagation algorithm

In social organizations, it is usually the toppest think tank analysis team of the organization that gets the difference between the performance result and expectation and feeds the difference back to the Lower level node of the next layer of the organization. The Lower level node of the next layer adjusts the professional behavior of each node according to the difference, so as to expect better behavior in the future. In this way, the organization of continuous feedback adjustment from the top down is consistent with the purpose of the back propagation algorithm, which is to make the parameter information of the whole network feedback according to the difference.[15][18]

1.7 I/O of social organization vs. I/O of deep neural networks

The input of social organization is the data information of all aspects of daily life and work. For example, a company is the information of this industry, and the output is the performance of the company. For example, in the national economy, the input is people's consumption, work income, education, etc., and the output is the statistical results of the national economic data.

In terms of relativity,

$$\|organizationinput \longrightarrow organizationoutput\| \sim \|Netinput \longrightarrow Netoutput\| \tag{3}$$

1.8 underfitting and overfitting

People at each node may be incompetent or derelict in their duties; May abuse their power, may form parties for personal gain. The corresponding artificial neural network has underfitting and overfitting. Better architecture should be designed to make the model convergence faster and more robust. People are relatively flexible.

But people are also limited, being small relative to the whole group, just as a node of a deep neural network is small relative to the whole vast network. When the whole group is large enough, the person is small relative to the whole group. By contrast, a node of a deep neural network is small relative to the whole large network.

1.9 Conclusion

According to the above description, in human history, the structure of social organization simulates the neural network, and the results obtained by this structure are more intelligent. The current network communication is very developed, data and information transmission is efficient, so that its intelligence is more usable, more can realize its potential.

1.10 The optimal structure and algorithm of artificial neural network are transferred to the social organization structure

(1) **transfer component**. residual unit [7], Attention [13], different field of perception, normlization [10], recurrent, lstm[14] and so on have been introduced into the local structure of deep learning under appropriate scenes, which have greatly improved the effect of the whole model. The local structure of social organization can be introduced or designed according to the need;

(2) **transfer different model to different task**. deep neural networks combine different algorithms to great success. For example, classification, object detection, object segmentation, reinforcement learning[19], GAN[12], etc., can introduce or design corresponding social organization structure.

For example, the application points of reinforcement learning in social organizations are as follows: taking the industry as the environment and the company as the agent, seeking the optimal strategy and the optimal value function, constantly exploring the greater and more application potential of existing products, and also developing new product lines to explore new businesses. With the earth as the environment and the country as the agent, it also constantly explores its own potential and conducts exploration in different pilot cities or regions..

1.11 prospect1

By studying the structure of social organization, we hope to discover the working mode of some biological nerves.

It may be that psychologists and neuroscientists and computational scientists have difficulty studying aspects of the way biological neurons work that can be better observed in the larger structure of social organization. Studying the structure of social organization may be helpful for studying biological neurons and artificial intelligence. Similarly, the study of artificial intelligence is helpful to the study of social organization.

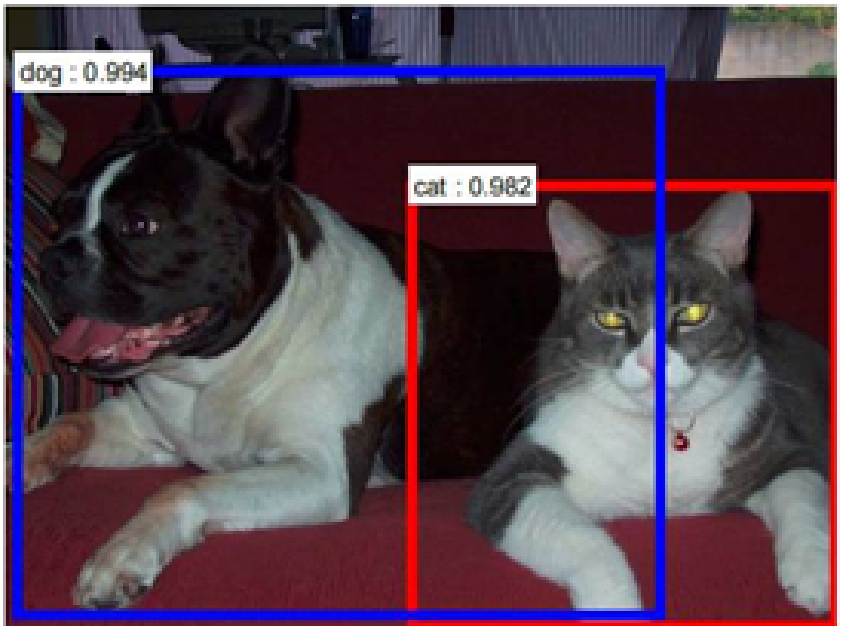

Figure 3: detect task

2 Algorithms also for lives

Neural networks and learning algorithms are for lives.

In order to better read the following, here are some concepts:

Environment: It includes everything in the world, such as matter, law, celestial bodies, Biological individual and so on. It includes Biological individual here because the actions of Biological individual will change himself and thus the environment.

Mental environment: the current biological information from the environment, combined with historical memory, knowledge, physiology, ideas, emotions and so on through their own neural network generated mental environment. I prefer to call it the internal environment, when it extends to a wider range of optimized learning algorithms.the behavior of underfitting and overfitting is related to internal environment.

Feedback: The environment before and after the biological action is the difference between ENV, $ENV^{'}$, ENV and $ENV^{'}$ in the Mental environment, and this difference is reflected in the whole neural network.

2.1 Neural networks are extremely adaptable

Through many experimental results, it is found that neural network can adapt to many tasks, such as object detection(Fig. 3), segmentation(Fig. 4), translation, speech recognition, reinforcement learning tasks, natural language and so on. These are all different forms of neural network organization, splicing different input and loss functions. These suggest that neural networks are extremely adaptable, almost as adaptable as life in nature. Not only the neural network itself can change to adapt, but also humans can change its proper shape to help the neural network adapt. However, the environment and feedback should not change too quickly. Life needs to be given the appropriate scope of change to learn and adapt to. During the training of deep neural network, it is also found that the environment and network itself should not change too fast during the learning of neural network, otherwise it will fail to learn.

Similarly, life in the too fast changing environment, will not adapt to the environment and be eliminated; Life in the fixed environment itself changes too fast, will not adapt to the environment

Figure 4: segment task.

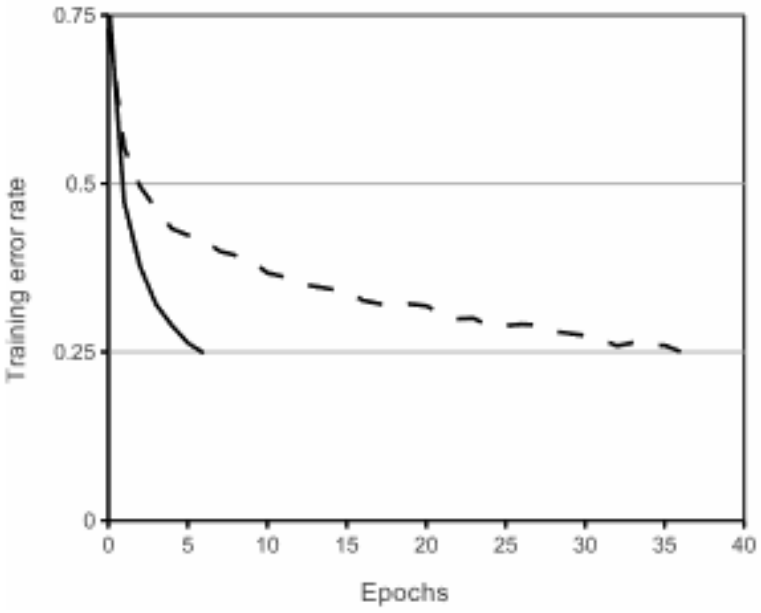

Figure 5: trainloss in learning process.

and be eliminated. Neural networks have a very strong ability to adapt, but they just need to learn to adapt as the environment changes more smoothly (not beyond the limits of adaptability). Neural networks don't get better or worse, they just adapt to their environment. And the environment of the neural network is the data information he receives, and the loss function imposed on him. This is a more formulaic explanation than evolution [4].

The figure (Fig. 5)above shows the downward trend of train error in neural network AlexNet training task, which is very common in neural network training tasks after 2012. We now have that the neural network with subscripts identifying epoch is A_0, A_5, A_{10}, A_{15}, A_{20}, A_{25}, A_{30}, A_{35}. Along with

learning, the initial neural network is not well adapted to the current environment and feedback (analog adapt to input and loss function), and through long learning to adapt to the environment and feedback (analog adapt to input and loss function). By changing the environment and the feedback (by analogy, changing the input and loss function), the neural network can learn until it adapts to the different environment. Neural networks change the environment while adapting to it. And in an environment where the A_5 and the A_{35} exist together, obviously the A_5 is lagging behind. A_{30}, A_{25}, A_{20}, A_{15}, A_{10}, A_5, A_0 Their chances of being eliminated are increasing. A similar process can be seen in Darwin's On the Origin of Species.[4]

Other machine learning algorithms have similar learning curves, but their capabilities are not as adaptable and perform as well.

At the same time, I observed that from the trainloss curve, the general direction of the curve was down, and there were often jitter jumps in the middle.

It can be inferred from the epoch diagram that, at the beginning, the primitive form of biological individual changes for adaptation at the fastest rate, the bottom line of survival is very low, survival is easy, and plasticity is particularly strong. When the epoch is larger, the individual changes slightly and slowly, but the whole still has room to improve and adapt to progress. The training curve illustrates the process of adapting to the environment and feedback in the course of biological evolution. Among them, the speed of morphological change and the jitter problem can be seen from the training curve. Morphological changes are most active at the beginning, and slow in the middle, sometimes shaking and suddenly changing.

Similar learning processes occur from birth, infancy, childhood, and adulthood. And humans and the current artificial neural network is very different. In the process of adapting to the environment, humans are flexible enough to change their expectations, change their handling methods, and choose different directions to understand the environment and feedback.

2.2 The whole natural system is a huge neural network

Human society is a neural network with nested brain nerves. Animals also have brain nerves. Plants can transmit dangerous information through a system similar to the nervous system of animals. It can be inferred that the whole natural system composed of people, animals, plants and microorganisms is also a neural network. It can be said that the individual organisms on the earth contain neural networks, and all organisms also form neural networks among themselves. There is a huge neural network on the earth.

Reproductive system and genetic variation are to supplement new individuals due to death to maintain the population quantity and diversity as much as possible. Death is also to avoid the collapse of the whole neural network caused by the rapid increase of a certain population to the point that the whole system can not afford, so as to ensure that the connection of the whole neural network will not be broken, so that the whole neural network will be stable. The cranial nerve and this huge neural network are the same thing, and I see them all together. But whether the human brain is a nested neural network is unknown.

2.3 Neural networks are the algorithms of lives

Neural networks are the algorithms of lives, and lives try their best to adapt to their environment. The current formula and training process of artificial neural network can be compared with the real world. If the environment is bad, and constantly get negative feedback, people and animals will become bad and cruel. If the environment is improved and the positive feedback is sustained, the evil will be reduced. The same person who is in a poor environment and constantly gets negative feedback will fall into the abyss. If his environment is good and he gets positive feedback consistently, he will see stars in the universe. It's important to develop grit because learning and improving will eventually result in positive feedback. But at the same time, you may waste time in your life by clinging to one thing and not being able to solve it. It's good and bad together. Biological body and nerves are learning to adapt to the environment and feedback, can not adapt to the time will feel suffering setbacks, adaptation is the clear sky and relaxed body and mind. we can believe it more, but not too much more. This is the adaptive ability of neural network, it is a strong ability to adapt, adapt the way is also all sorts of strange. The spirit of Ah Q will help us temporarily when we cannot adapt.

2.4 There is a bridge between idealism and materialism

Extremely objective and realistic objects can not be completely observed by the human brain, and can only be adapted to fit as much as possible. Limited by the biological senses, some frequency segments of light, sound, touch, etc. (and perhaps more information) cannot be processed by the senses; Perhaps it can be received by the senses, but in the long term human history of survival does not help the current ability to survive and adapt, and may be ignored by the nerves. And objects in this world can be biologically modified, such as cars, airplanes and so on.

Materialism through the neural network learning to adapt to the environment and feedback, will become idealistic. Everyone in the world looks at the same thing, or sees the same thing at different stages of life and growth, and doesn't necessarily think the same thing; But it can build consensus over time. Spiritualism is the product of the brain nerve, constantly learning progress and adapt to the environment and feedback, failure is eliminated. Spiritual consideration should not be too far away from the real environment and feedback. Discussion must be limited to a certain boundary. Only by exploring and learning step by step and constantly adapting to the progress can we go further. Objects that do not exist can be created, or acted upon, in the mind. Spiritual distance beyond the boundaries of the adaptive capacity of the whole network, in terms of the current adaptive capacity is not much significance; If it does not contribute to adaptation, it will be eliminated. But don't deny the huge role of idealism within borders.

Human beings are now at a higher stage of natural life, a form of adaptation to the world. Human beings can try to trust their own feelings without worrying too much.

2.5 Just to fit

Just as an optimization algorithm is designed to fit a model to a target function, all living things on earth are designed to fit some function on the environment, and this function allows living things to adapt, and the better the fit, the more adapted.

The whole network is collaborative, just to fit in; There is also competition, competition is the perceived optimization in the subspace of the environment and its feedback to find a better solution, is just one of many ways in the process of constantly adapting to the environment and feedback, because there is unknown outside the subspace to explore; Competing in a known subspace, exploring outside it, is all about adaptation. Gene combination and mutation is one way to explore, and exploration is also to adapt to the environment and feedback. Gene combinations and mutations that exceed the adaptive boundaries will be eliminated. Spiritualism can also help us adapt.

It is found that a child does not know anything at birth and is very plastic. When he was born, he did not know what oxygen and air are because of the lack of oxygen. The environment and the feedback of his body reaction gave him, but he cried instinctively in order to adapt and get breathing. He does not know what milk is, his body's hunger feeds back to him, but he will instinctively learn to drink milk. Later, he gradually learned to understand the world of people, apples, trees, flowers and so on, with eyes, skin, ears, nose, brain centers and other neural networks from the environment and feedback (including the natural environment, feedback from parents and relatives, he explored by himself) to adapt. These demonstrate the great adaptability of neural networks.

Various adaptation stages of neural network and environment will make neural network produce different behaviors. At the beginning, the adaptive ability of neural network is very poor, which will produce relatively chaotic behavior. Through continuous adaptation, more adaptive behavior can be produced gradually. Just as a child is born knowing nothing, by gradually adapting to the world, it can also gradually produce more reasonable behavior.

Neural networks are just for adaptation. It can be observed that there are thieves, robberies, violence, lawbreaking, etc. in the world, because in some cases these actions allow the individual or the individual's spiritual feelings to adapt to the environment and feedback. In the same way, there are scientists in physics, medicine, etc., to explore and discover new knowledge, and this new knowledge makes human beings more adaptable to the environment and feedback. Human knowledge tries to adapt to the environment and feedback, and when exceptions exist, people adapt to fit better knowledge. There are all kinds of countries and companies in the world, they are nested neural networks, but also constantly adapt to the environment and feedback; Those who adapt to failure will

be eliminated. It's not just individuals adapting, it's whole vast neural networks trying to adapt to the environment and feedback, both in the short term and the long term.

From the point of view of human history, at the beginning, human only knew the stone, repeatedly pounding, found that the stone is very hard and can be used as a weapon to attack animals, later domesticated plants, stone can be used to grind rice, later found that some stone is ore, stone can be used to iron, copper and so on, later can use SiO2 to make silicon wafer wafer. The accumulation of feedback in the environment will lead to the accumulation of a lot of understanding. By combining these understandings, the neural network will interact with the environment and get feedback constantly. Historically, this has been a cumulative process of continuous adaptation. Each present and combined with the historical memory of the mind, will think what it is. Whether the understanding is wrong or correct, but adapt to the moment is conducive to further interaction. Fortunately, the rules of physics, nature, biology, and so on hardly change, but the understanding of organisms as they adapt is constantly changing.

Another example is what is the economy, people can not use the human senses to detect. However, a large neural network, such as a large neural network of social organization, can indeed gradually adapt to feel, almost every human neural network can feel from the whole neural network of books, language, media and other information. But a newborn baby doesn't feel it, children don't feel it as deeply as adults, experts understand it more deeply; These are the different degrees of adaptation of different neural networks to the environment and feedback.

For example, playing games, from the beginning to explore, and then constantly develop different strategies and gameplay, constantly improve the competitive ability; Even find bugs in the gameplay. This is where human and neural networks adapt to the game environment and feedback.

2.6 prospect2

What kind of adaptive ability does neural network have? The boundary of adaptive ability is still unclear, which needs more discussion and research. My personal guess is that every node needs to adapt, so the overall adaptability is limited by the adaptability of all nodes. It is necessary to avoid the complete extinction of a population in the middle of the network and the collapse of the whole network. Life's vision, hearing, touch, taste, natural language and so on are designed to adapt to the environment and feedback, and the information they interact with the environment as a whole should speed up learning. Sensory systems that are more attuned to environment and feedback, because sensory systems also take a long time to adapt to environment and feedback, allow neural networks to adapt faster.

It's possible that the oldest learning algorithms were crude, adapting to the environment and feedback to become the neural network algorithms of today. There may be other, more life-related algorithms out there that need more discussion and research. Life algorithms that are more adaptable than neural networks may also appear in the future. These vaguely correspond to the ancient Chinese philosophy - Fuxi BaGua(Fig. 6). Confucius explained the eight diagrams mostly in terms of heaven and earth and people [20]. "Tao gives birth to one, life two, two gives birth to three, three gives birth to all things"[21]. Personal guess "three" contains "neural network algorithm" and other life algorithms. More of the phenomenal nature of life awaits discovery.

3 Declaration

Due to limited personal abilities and time, many details in the article may not have been specifically verified, and there may also be some omissions. But from the overall thinking framework, I personally believe there is no problem.

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Figure 6: fuxibagua.

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