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A shallow evaluation of ideological and political work in the network environment on the basis of bp neural network

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ABSTRACT

There has been higher and higher usage of the internet and it has gradually become part of our life and work. In the education of ideology and politics of higher education, the internet has provided the teaching staff with a more convenient condition. This paper aims at studying the features of ideological and political work in the network environment and classifies the subjects researched by these features. After having a survey on network utilization and current learning situation of the colleges and universities in Beijing, Shanghai, Tianjin, Shenzhen, and Guangzhou and those in Guizhou, Gansu, Yunnan, Inner Mongolia, and Xinjiang, we can conclude the eigenvalues of ideological and political work in developed region and that in developing region. The research subjects will be classified by the BP neural network model, and with the two different eigenvalues, we can compare the results with the reality and thus prove the reasonability of the model.

KEYWORDS

BP neural network;
Network environment;
Ideological and political work;
Mathematical model.

INTRODUCTION

In this information age, the internet has brought convenience in every aspect of life. With regard to ideological and political work in higher education, the internet is an important access to obtaining teaching information. And to students, it is also a significant platform to get further knowledge. However, it brings us opportunity as well as challenge.

In 2013, Lu Peizhong, in this article *the Study of Ideological and Political Work in the Network Environment in Vocational Colleges* has illustrated that internet can have influence to students in thoughts, values, orientation, and behaviors, etc.. Under the new circumstances, there are still many flaws in the ideological and political work in vocational colleges. It has been the most pressing issue to improve the teaching level of the teachers with the help of the internet. In the article, he elaborated in five aspects——the innovation and development of the network, the emergence and development of vocational college and the features of its students, the current status of work in vocational colleges, the influence of the network to ideological and political work, and the improvement of teaching quality of the course in vocational colleges. And at the same time, he has also given his opinions and advice. In 2012, Zeng Jiping, in his article *the Study of Ideological and Political Education to Poor College Students in Vocational Counsel,* pointed out the meaning of ideological and political education to poor college students

in vocational counsel. He has done researches on the features of this kind of education and explained the meaning to college students to have a correct view of employment. Meanwhile, he has also analyzed the current situation of it. Based on the actual situation, he has made comments and pointed out the aspects that could be improved. In the same year, in his article *Confidence Development and Ideological and Political Education to the Poor Ethnic Minority Students in Guizhou Province*, Zhou Hua showed us the situation of the long-last development lag of the developing Guizhou province, regarding the poor college students as the research subject. With the great achievement of universal education, poor ethnic minority students can get the chance to college. However, in the process, those poor students might feel a sense of anxiety, depression, and self-contempt. The author emphasized that giving humanistic concern in the education of ideology and politics was an important method to solve the problem. In 2004, Hao Pengfei has explained, in his article *the Analysis of the Influence of the Internet to Ideological and Political Work and the Countermeasures*, the dual role of the internet. As it could explore new channels for ideological and political work, it has also brought severe challenges. In the paper, he said that the internet has fastened the socialization process of the ideological and political work in colleges and universities and has become an essential access for students to obtain more knowledge. And he has listed some measures to lessen the negative effects.

In this paper, we adopt the strategy of diving ideological and political education on the basis of developing and developed regions. In developing regions, the utilization rate of ideological and political education network is low while in developed regions it is higher. On this ground, we can set up an evaluation standards.

THE ESTABLISHMENT OF THE MODEL

Data investigation and processing

Based on the relative information, we choose the colleges in Beijing, Shanghai, Guangzhou, Shenzhen and Tianjin province as the targets of investigation and take the results as the eigenvalue of the effect of ideological education work in the developed area. The investigation in this passage shows in two different points, one is network utilization and the other is learning situation. We also choose the colleges in Guizhou, Yunnan, Gansu province and Inner Mongolia, Tibet as the targets of investigation and take the results as the eigenvalue of the effect of ideological education work in the poverty-stricken area.

We randomly selected 100teachers and 100students in these ten areas and let them mark the network utilization and learning situation. The full mark is two. And then calculate the average of the results. Thus, there are ten groups' data of the eigenvalue of the poverty-stricken area and the developed area. As shown in TABLE 1 and TABLE 2.

The data of the estimated target is showed in TABLE 3.

BP neural network model

Neural network model is originated in biology. Its

TABLE 1 : The eigenvalue of the developed area

Network utilization	Learning situation
1.13	1.33
1.24	1.41
1.17	1.51
1.21	1.37
1.31	1.45
1.29	1.42
1.35	1.39
1,18	1.50
1.17	1.36
1.30	1.42

TABLE 2 : The eigenvalue of the poverty-stricken area

Network utilization	Learning situation
0.99	1.51
1.01	1.53
1.13	1.54
1.03	1.61
1.08	1.57
1.11	1.52
1.10	1.55
1.04	1.59
1.07	1.56
1.05	1.58

TABLE 3 : The data of the estimated target

number	Network utilization	Learning situation
1	1.11	1.62
2	1.20	1.49
3	1.09	1.54
4	1.32	1.32
5	1.35	1.44

counting process is similar to the reaction process of the neuron. As is shown in Figure1.

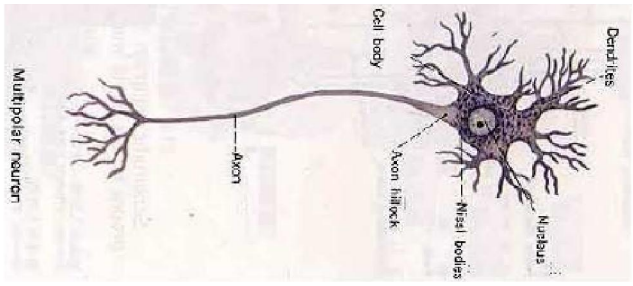

Figure 1: The structure of neurons

In neural network, many different neuron including axonal terminals can go to the same dendrite of neuron and form multiple synapses. The neurotransmitter that was released by the synapses which come from different areas can make effects on the changes of membrane potential of the same neuron. From that we can know, the ability of the neuron integrated spatial, which means that the neuron can integrate messages from different sources on the dendrite. Based on this ability, people simulate the reaction process of the neuron to make the schematic of mathematical models of neurons. As is shown in Figure 2, the symbol in the Figure is shown in TABLE 4.

$f[u_1]$ leads to the output of threshold θ_i in the combined action of the input of $x_1, x_2, \cdots, x_n$. Figure 3 show two kinds of excitation function. The model we choose is based on the second excitation function

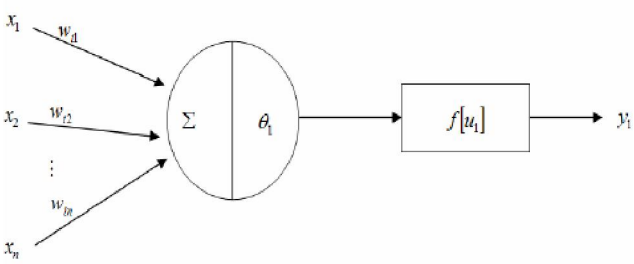

Figure 2 : The schematic of mathematical models of neurons

TABLE 4 : The explanation of symbols in the mathematical models

symbol	explanation
$x_1, x_2, \cdots, x_n$	The input part of the neuron, that is the message sent by the last level
θ_i	The threshold of neuron
y_i	The output of the neuron
$f[u_1]$	excitation function

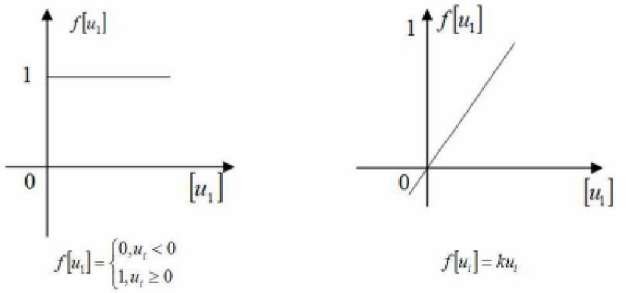

Figure 3 : Typical excitation functions

TABLE 4 : The explanation of symbols in the mathematical models

symbol	explanation
$x_1, x_2, \cdots, x_n$	The input part of the neuron, that is the message sent by the last level
θ_i	The threshold of neuron
y_i	The output of the neuron
$f[u_1]$	excitation function

Among them:

$$u_i = \sum_j w_{ij} x_i - \theta_i \quad \textbf{(1)}$$

Thus:

$$y_i = f[u_i] = f\left(\sum_j w_{ij} - \theta_i\right) \quad \textbf{(2)}$$

(2) Function is a complete expression of mathematical model of the single neuron.

BP Neural network is a kind of multi-layer forward network which uses the compute mode of minimum mean square error. When the Back propagation

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is applied in the multi-layer forward network, we take the *Sigmoid* as the excitation function and use the following steps to get the w_{ij}, which means the weight coefficients of network. Every layer has n neuron, and layer k has i neuron, thus there is n weight coefficient $w_{i1}, w_{i2}, \cdots, w_{jn}$. Besides, we pick one more w_{jn+1} as θ_i. When we input sample x, we take $x = (x_1, x_2, \cdots, x_n, 1)$.

- Assign w_{ij}. Assign rather small nonzero random number to w_{ij} in different layers, in the same time $w_{jn+1} = -\theta_i$. Because this model is operated in Matlab, the process of assignment is a random process of the computer, and also due to that, the same program code operated in different running processes may come to difference.
- Input sample $x = (x_1, x_2, \cdots, x_n, 1)$, and output expected correspondence $y = (y_1, y_2, \cdots, y_n, 1)$.
- As for the output of different layers, for the i neuron in the layer k output x_{ik}, thus:

$$y_i^k = f\left[u_i^k\right] \quad (3)$$

And:

$$u_i^k = \sum_j w_{ij} x_j^{k-1} - \theta_i^k \quad (4)$$

So: $x_{n+1}^{k-1} = 1$ ÿ $w_{i(n+1)} = -\theta$

④get calculation error of every tier d_i^k, with output tier $k = m$, then:

$$d_i^m = x_i^m \left(1 - x_i^m\right)\left(x_i^m - y_i^m\right) \quad (5)$$

For the other tiers:

$$d_i^k = x_i^k \left(1 - x_i^k\right)\left(\sum_j w_{ij} x_j^{k-1} - \theta_i^k\right) \quad (6)$$

⑤correct w_{ij} and θ_i, we get:

$$w_{ij}(t+1) = w_{ij}(t) - \eta d_i^k x_j^{k-1} \quad (7)$$

⑥After we get the result of every weight coefficient of every tier, we can judge whether it fit the standard we set before or not. If not, then go back to step ③, else end calculation

Matlab calculation and the result

Matlab operational program:

```
P = [1.13 1.24 1.17 1.21 1.31 1.29 1.35 1.18 1.17
1.30 0.99 1.01 1.13 1.03 1.08 1.11 1.10 1/04 1.07
1.05;
1.33 1.41 1.51 1.37 1.45 1.42 1.39 1.50 1.36 1.42
1.51 1.53 1.54 1.61 1.57 1.52 1.55 1.59 1.56 1.58];
t=[1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0];
plot(p(1,find(t>0.5)),p(2,find(t>0.5)),'o');hold on;
plot(p(1,find(t<=0.5)),p(2,find(t<=0.5)),'*'); hold on;
net=newff(minmax(p),[2,1],{'tansig','purelin'});
net.trainParam.show=50;
net.trainParam.epochs=300;
net.trainParam.goal=1e-2;
net=train(net,p,t);
pp=[1.11 1.20 1.09 1.32 1.35;1.62 1.49 1.54 1.32
1.44];
y=sim(net,pp);
plot(pp(1,find(y>0.5)),pp(2,find(y>0.5)),'ro');hold on;
plot(pp(1,find(y<=0.5)),pp(2,find(y<=0.5)),'r*');hold
on;
plot([0.8 1.6],[1.3 1.7],'k')
```

It is the *Matlab* operational program above. Through the code we can get that the program operating select train error made 10^{-2} as the program ending. Because the extent of the running loving disabled students and the comprehensive event loving disabled students is between the data of $0 \sim 2$, so the program ending is in the right place. In the figure following, "*" stands for the politic working result in the impoverished region, and "o" stands for the politic working result in the developed region.

TABLE 1 and TABLE 2 showed the eigenvalue of the result of the politic working in the two regions, we can use *Matlab* to make the distribution of work results in two regions in Figure 4. And Figure 5 is the schematic of discrimination results.

In Figure 4, we can see that there is an obvious demarcation line between the loving sports events of the two kinds of disabled students. And depend on the situation in Figure 4, we can locate the discriminant linear $(0.8,1.3)$, $(1.6,1.7)$.

We can easily find that in figure 6, No. 1 and No.3 are the impoverished regions, and No. 2, No. 4 and

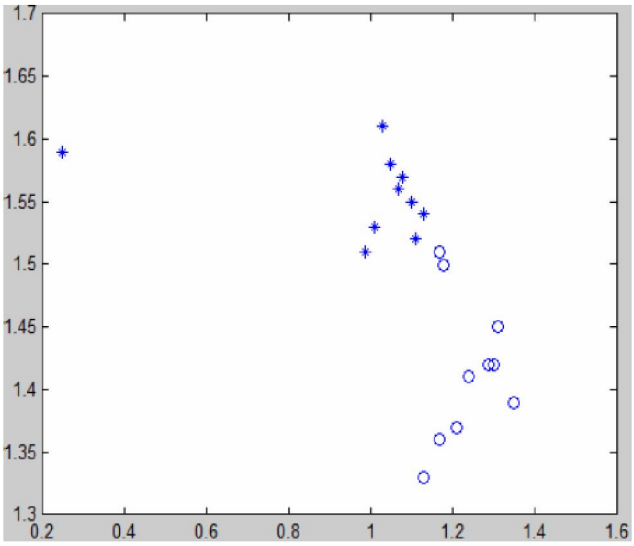

Figure 4 : Distribution of work results in two regions

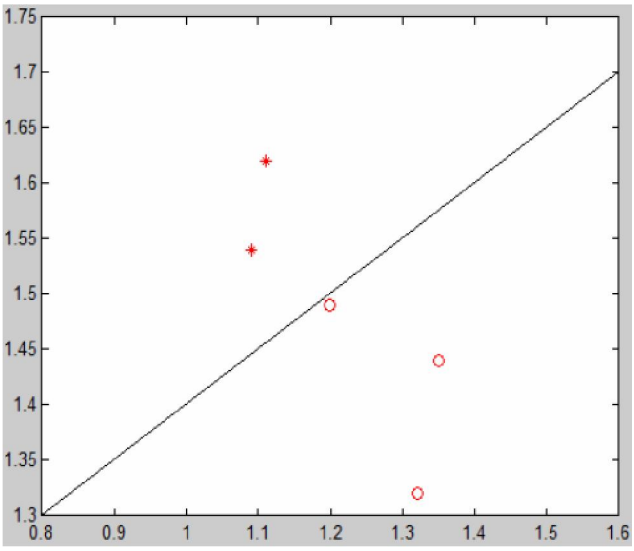

Figure 5 : The schematic of discrimination results

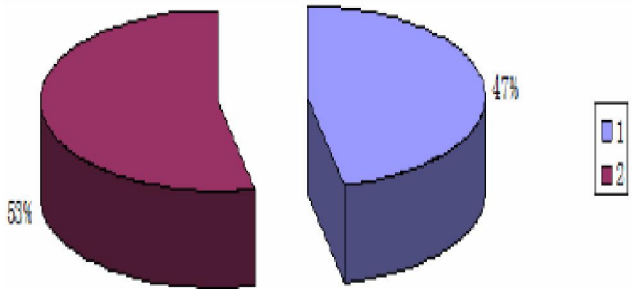

Figure 6 : Developed regions eigenvalues pie

No. 5, are the developed regions. And in the real life, No. 1 is FuPing County, No. 2 is ZhengDing County, No. 3 is LanKao County, No. 4 is city of ShaoXing, No. 5 is city of YiWu. And in that, we proved the calculation result by model calculates is agreed to the actual situation.

Compare Figure 6 with Figure 7, we can see that the disparities between the politic working in developed region and impoverished region are the proportion in the internet using and leaning situation. For the developed region, there is bigger proportion in the internet using of the politic working.

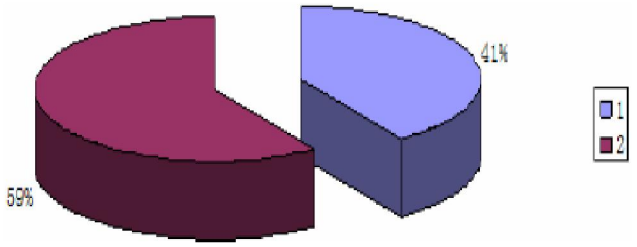

Figure 7 : Poor areas eigenvalues pie

CONCLUSION

This essay examined the rationality of model building in the actual survey point of view. In the real life, some of the people of the impoverished region have the inferiority complex, and we can classify them by their evaluation in the internet using and learning situation in politic working.

BP neural network made the process of the information input to result output come true. BP neural network can manage several of input massages comprehensively, and make the process of the result getting in complex questions come easier and more convenience. However, if you have a mass amount of data to analyze, the BP neural network model may not reflect the actual situation objectively because of the complex calculation process. In addition, we need to estimate the train error in BP neural network reasonably. If we could not make the estimate reasonable, we may lead the result of the calculation incorrect.

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