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Research Article

Genetic Neural Network-based Study on the Impact of Sports on the Social Adaptability of Mentally Challenged Children

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Abstract: Many researches have show that sports play a significant role in increasing the social adaptability of mentally challenged children. Because people's social adaptability is impacted by multiple factors and its mechanism of action is very complicated, based on the genetic neural network, this study used the genetic algorithm to improve the method and study the impact of sports on the basic athletic ability, language ability, social skills and working ability of mentally challenged children. We conclude that it bears important significance to study the impact of sports on the social adaptability of mentally challenged children.

Keywords: Genetic neural network, mentally challenged children, social adaptability

INTRODUCTION

Due to intellectual defects, the mentally challenged children have been discriminated against by the society for a long time. However, with deepening studies on mental challenges, the mentally challenged children have received more and more attention and help from the whole society. Researches have shown that appropriate sports can help the mentally challenged children to increase their social adaptability and integrate into the society (Kain *et al*., 2000).

There are many factors that impact the social adaptability of mentally challenged children, which mainly includes the level of intelligence and age of and the time of receiving special education by the mentally challenged children (Goldfarb-Rumyantzev *et al*., 2012). These multiple influencing factors are complicated and their impact on the social adaptability demonstrates obvious nonlinearity. Under this circumstance, traditional research methods such as the regression method, analogical method and serial method do not apply to studies on this subject, because in traditional methods, it is required to write a specific function model or a function expression, or even to make assumptions of certain parameters in the function (McArdle *et al*., 2007). Therefore, we chose the neural network algorithm to study this subject.

The neural network algorithm built in accordance with the structure and functions of human brain has the characteristics of nonlinear mapping, learning distribution, a high degree of parallelism and generalization ability, which can approximate a nonlinear function in accordance with a given accuracy (Hojjat and Ashif, 2009). Therefore, neural network has become an important data processing and research approach widely used in scientific researches (Ichiro, 1992), which also applies to this subject-Study on the Impact of Sports on the Social Adaptability of Mentally Challenged Children.

The objective of this study it that genetic algorithm are used to improve the method and study the impact of sports on the basic athletic ability, language ability, social skills and working ability of mentally challenged children. This study has used the BP neural network and genetic algorithm to conduct prediction respectively: after different cycles of sports training of the research objects, their social adaptability was predicted and accuracy of the two predicted results was compared. Data show that the genetic algorithm is more accurate than the BP neural network in the prediction, which has faster rate of convergence and the required time is also shorter.

BP NEURAL NETWORK AND GENETIC NEURAL NETWORK

The structural features of the neural network have caused various defects of this algorithm, such as slow rate of convergence and the existence of local minimum (Qingsong *et al*., 2012). Therefore, since the neural network algorithm was proposed, many researchers have adopted various methods to improve this algorithm and optimize the threshold value and weights of the neural network in order to accelerate the convergence rate of the neural network. BP neural network and genetic neural network are two common methods and they are widely used due to their certain advantages on the aspects of the threshold value and weights of convergence and acceleration of the

Table 1: Topological structure of the BP neural network

Layer	Name	Function
1	Input layer	Receive outside information and deliver it to the middle layer
2	Hidden layer	Information processing and conversion
3	Output layer	Output the results information processing

convergence rate of the neural network (Li and Qinghua, 2011).

BP neural network: In 1986, the team led by Rumelhart proposed the BP (Back Propagation) algorithm, i.e., the error back propagation algorithm. The topological structure of the BP neural network model consists of the input layer, the hidden layer and the output layer (Xuefei and Chen, 2012). The main functions of various layers are shown in Table 1:

Processing of this algorithm includes the two processes of the forward propagation of information and the back propagation of error. When the actual output is not consistent with the expected output, it enters the back propagation process of error. Error passes the output layer, the weights of each layer are revised in accordance with the method of error gradient descent and the error is propagated backward to the hidden layer and input layer. Continue this process until the error of network output is reduced to an acceptable degree, or the preset learning frequency has been achieved.

The BP neural network model includes its input and output model, the action function model, the error calculation model and the self-learning model (Hassan and Habeb, 2012).

Node output model: The output function of the hidden nodes is:

$$O_j = f(\sum W_{ij} \times X_i - q_j) \quad (1)$$

The output function of the output nodes is:

$$Y_k = f(\sum T_{ij} \times O_j - q_k) \quad (2)$$

In (1) and (2), f represents a nonlinear action function; q refers to the threshold value of neural node.

Stimulus function model: The stimulus function is used to express the stimulus impulse strength of the lower layer input to the nodes on the upper layer. The Sigmoid function is generally used as the stimulus function:

$$f(x) = \frac{1}{e+1} \quad (3)$$

Error calculation function: The error calculation function to express the error between the actual output and the expected output in the neural network and its expression is":

$$E_p = \frac{1}{2} \times \sum (t_{pi} - O_{pi}) \quad (4)$$

In which,

t_{pi} : The expected output value

O_{pi} : To the actual output value

Self-learning function: The setting and error correction process of the weight matrix which connects the nodes on the lower layer and the upper layer is called the self-learning process of the neural network. The self-learning function expression is:

$$\Delta W_{ij}(n+1) = h \times \phi_i \times O_j + a \times \Delta W_{ij}(n) \quad (5)$$

In which,

h : The learning factor

Φ_i : The calculation error of corresponding output node

O_j : To the calculation output of corresponding output node and a is the momentum factor

Genetic neural network: During practical application, the BP neural network has certain defects, which mainly includes the following two aspects:

- Due to fixed learning rate, the convergence rate of the neural network is slow, it requires a long time to realize convergence and for some complicated problems, the BP algorithm might need a very long time.
- By using the gradient descent method, it might result in a local minimum, which makes it possible for the BP algorithm to converge the weight to a certain value, but it cannot ensure that it is the global minimum of the error plane.

In this study, a genetic neural network was build to study this subject (Mantzaris *et al*., 2011).

The calculation model of genetic algorithm can be used to simulate the natural selection process of Darwin's biological evolution theory and the biological evolution process of genetics mechanism and the optimal solution can be sought by simulation of the natural evolution process (Blanco *et al*., 2001). The principle of genetic algorithm is to preserve the individuals who satisfy the condition and eliminate those who don't by simulating the jungle rule of survival of the fittest, so that individuals of the whole population will develop toward the direction of a higher fitness and solution to the problem will be more optimized (Mohamed, 2011).

The general procedure of the genetic algorithm is:

Population initialization: W is used to express the weight matrix from the input layer to the

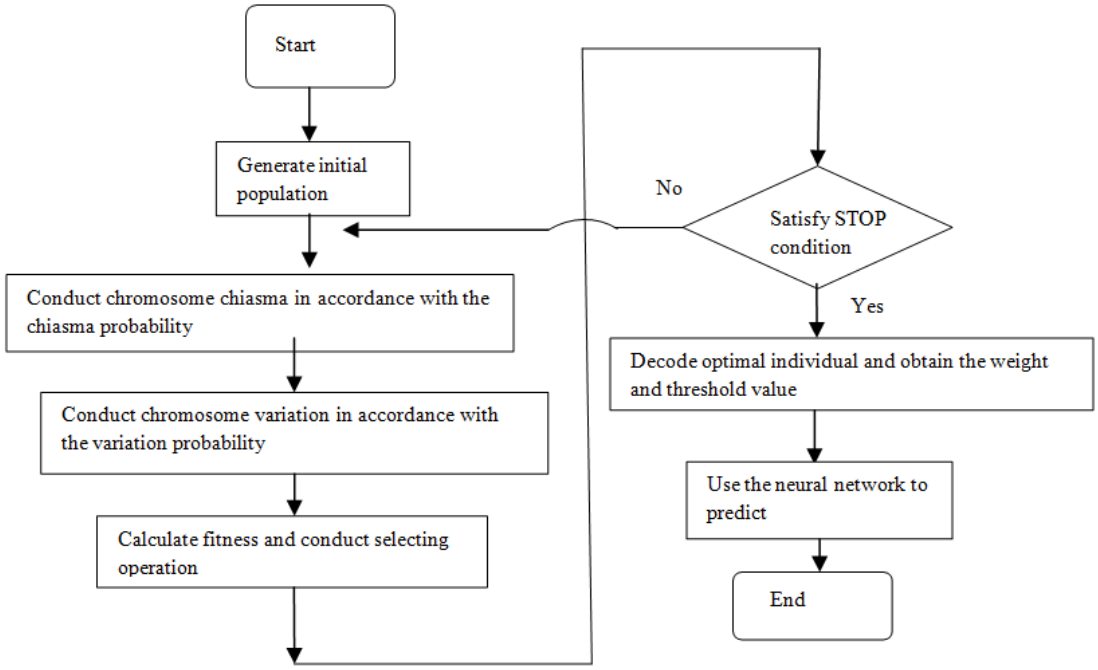

Fig. 1: Flow chart of the genetic algorithm

middle layer, B is the threshold matrix, V represents the weight from the hidden layer to the output later and s refers to the threshold value of the output layer. Map the element sum-s-of the three matrices of W, B and V to the chromosome string of GA and the mapping relation is:

$$\{W_{11},W_{12},\ldots W_{mn},b_1,b_2,\ldots b_n,v_1,v_2\ldots v_m,s\} \quad (6)$$

C(t) refers to the i^{th} chromosome of the t^{th} evolution generation, then:

$$C_i(t)=(c_{i1}(t),c_{i2}(t),\ldots, c_{il}(t)),\ i=1,2\ldots M \quad (7)$$

where,

t = 1, 2, …, t_{max}
t_{max} = To the maximum evolution generation
l = To the length of chromosome, i.e., the number of variables
M = The population scale

Fitness function: For a given chromosome $C_i(t)$, the calculation formula for its fitness function is:

$$fit(C_i(t))=Y_{max}-Y_i \quad (8)$$

$$Y_i=(y_i-\bar{y}_i)^2 \quad (9)$$

In which,

y_i = The actual value of the sample
$\bar{y}_i$ = The predicted value of the neural network
Y_{max} = The maximum value of $C_i(t)$ in generation Y_i

Chromosome chiasma: Formula (10) provides the calculation formula for the selective probability of chromosome and chromosome chiasma is conducted in accordance with the given chiasma probability. The chiasma strategy is to randomly select two points on the chromosome to divide it into three parts and then conduct exchanging chiasma operation to the middle part of the chromosome:

$$P(C_i(t))=fit(C_i(t))/\sum_{i=1}^{M} fit(C_i(t)) \quad (10)$$

Chromosome variation: Randomly choose one chromosome and randomly pick a value within its range of values to conduct variation operation.

Selecting operation: Use the greedy selection strategy to select chromosome. Calculate the average fitness difference of five successive generations of chromosomes, if the maximum difference is smaller than the lower limit of the difference or the evolution generation has reached the maximum value, stop the operation and output the optimal solution of the population as the result; otherwise, return to Step (2) for another cycle.

Flow chart of the genetic algorithm is as shown in Fig. 1.

RESEARCH METHODOLOGY

Literature research method: During the research of this subject, the author has searched and read many academic books and materials in the fields of mental disability science, special education, social adaptability and brain science and has also found the Ministry of Health's scientific research report of the mentally challenged children in China to understand the status quo of the mentally challenged children in China and their receiving of special education. These literatures have laid down a solid theoretical foundation for research in this study.

Interview method:

Interview with experts in relative fields: In accordance with the research subject, the author chose 25 experts on PE (Physical Education) theory, brain science, psychology and sociology for interview and the relation between participation into physical activities by elderly people and their life quality was discussed. Composition of the interviewed experts is as shown in Table 2.

Table 2: Composition of the interviewed experts

Category	Title	Number	Proportion
Expert of PE (physical education) theory	Associate professor	6	24%
Expert of brain science	Associate professor	6	24%
Expert of psychology	Professor	5	20%
Expert of sociology	Professor	8	32%

Interview with the parents of mentally challenged children and teachers in the intellectual school: In accordance with the research objective, the author conducted a field visit to the intellectual school of XX city and talked to 20 parents of mentally challenged children to learn about the specific living situation, learning situation, language ability and action ability of the mentally challenged children. The author also interviewed 15 teachers in the intellectual school to learn detailed information on various aspects such as the curriculum setting, teaching method and learning effectiveness and effects were also made to learn the sports participation situation by the mentally challenged children in school.

Experimental method:

Questionnaire design: After communication with 25 experts, the author designed the questionnaire from five aspects of social adaptability: basic movement, self-care ability, language ability, social skills and working ability to investigate the social adaptability of mentally challenged children. The questionnaire is as shown in Attachment 1.

Questionnaire validity test: In order to ensure the questionnaire is accurate and reasonable, the author used the Delphi method to test validity of the questionnaire. The main content of the Delphi method is to compile the predicted questions and background information into an objective and scientific questionnaire, then deliver these questionnaires to the experts by delivery to home or by mail, make prediction by using the experience and knowledge of the experts and after multiple synthesis, induction and feedback, reach a basic consensus to increase the accuracy of prediction.

Table 3: Statistic recovery situation of expert survey

Round	Number of expert consultants	Number of recovered questionnaires	Recovery rate
1	10	8	80%
2	10	9	90%
3	10	7	70%

Table 4: Statistics of the questionnaire evaluation results by the experts

	Very effective	Effective	Basically effective	Not effective at all	Total
Number	1	6	3	0	10
Percentage	10	60	30	0	100

Table 5: Validity test questionnaire issuance and recovery situation

	Total number of issued questionnaires	Effective number	Effective rate
Round I	20	16	80%
Round II	20	18	90%

There were three rounds of expert consultation and the questionnaire recovery statistic situation is as shown in Table 3. Evaluation results of the questionnaire by 10 experts are as shown in Table 4.

In accordance with the investigation results in Table 4, we can see that the experts believe the questionnaire to be basically effective, which can be used to evaluate the social adaptability of mentally challenged children.

Questionnaire validity test: The author used the retesting method to test the questionnaire validity. This method requires two rounds of investigation: firstly, the author randomly selected 20 mentally challenged children in the intellectual school of XXX city and with help from the teachers in this school, the social adaptability test was conducted to these children; then, 22 days later, the author randomly selected another 20 mentally challenged children in the intellectual school of XXX city and conducted the social adaptability test to them. Although all 20 questionnaires were successfully recovered, some were not properly answered, so these questionnaires were eliminated. The total number of issued questionnaires and effective questionnaires in these two investigations are shown in Table 5.

Table 6: Statistics of the basic situation of the research objects

Gender	Total number	Highest IQ	Lowest IQ	Average IQ	Average age
Male	20	55	25	39.6	9.6
Female	20	50	25	38.8	10.2

Assume X is the score of the first round of questionnaires, Y is the score of the second round of questionnaires and N = 20 is the investigated number of people, then, the calculation formula of validity (i.e., the correlation coefficient of the two statistic results) is:

$$r=\frac{N\sum XY-\sum X\sum Y}{\sqrt{\left[N\sum X^2-(\sum X^2)\right]}\sqrt{\left[N\sum Y^2-(\sum Y)^2\right]}} \quad (11)$$

After calculation, we can obtain that the validity (i.e., their correlation coefficient) is r = 0.87, which means the designed questionnaire can be used in the subject research.

Experimental method: With mentally challenged children from 5 intellectual schools of XX city (including XXX1, XXX2, XXX3, XXX4 and XXX5) as the research objects and in accordance with the basic situation of each child, the author selected a sample of 40 children: 20 were boys between the age of 8-12 with an average age of 9.6 and their IQs (Intelligence Quotients) were between 25-55 with an average IQ of 39.6; 20 were girls between the age of 8-12 with an average age of 10.2 and their IQs were between 25-50 with an average IQ of 38.8. Table 6 shows statistics of the basic situation of the research objects.

With the help from teachers in the intellectual schools, the author conducted subject research. Because this study aims to study the impact of sports on the social adaptability of mentally challenged children, a one-year specialized sports training was conducted to the experimental objects. The specific plan is as the following:

- In this study, the specialized sports-training was from March 2011 to March 2012, one year long.
- Due to multiple categories of sports activities, after examining the real situation of various intellectual schools, the author decided to narrow down scale of the subject and only study the impact of ping-pong sports on the social adaptability of mentally challenged children.
- During the experiment, from Monday to Friday each week, the experimental objects would exercise from 14:00-15:00 in the afternoon and under the guide of professional PE teachers, the experimental objects would play ping-pong.
- A month was regarded as one cycle and results of the training would be fed back. Then, the attached questionnaire would be used to measure the social adaptability of the experimental objects.

Because the physiological and psychological characteristics of the experimental objects-mentally challenged children-are different from common people, during the subject research, the author adopted the following measures to ensure the experiment would be conducted accurately and in order:

- Before the experiment, the author firstly contacted the parents of the experimental objects, introduced the objective and method of the experiment in detail and obtained their support. In this way, we could ensure the experimental objects would have adequate time and energy to participate into the daily training and ensure the training quality.
- Due to the physiological specialness of the mentally challenged children, there might be communication problems during the training process by the professional coach and therefore, we hired professionals of special education to provide assisted instruction during the whole training experiment.

Data processing: After each cycle, the social adaptability of mentally challenged children would be measured, the measurement table is as shown in Attachment 1 and the evaluation was conducted on the five aspects of basic movement, self-care ability, language ability, social skills and working ability. Teachers from the intellectual schools assisted these measurements.

The author used the SPSS software and conducted statistical processing of the questionnaire results in the form of the five-grade marking system.

In the part of basic movement, the research table mainly evaluated from the aspects of eyesight, hearing, hands movement and lower limbs movement. In the first six cycles, results of the basic movement ability of boys and girls are shown in Table 7 and 8.

In the part of self-care ability, the research table mainly evaluated from the aspects of eating, putting on/taking off clothes, defecation and cleaning. In the first six cycles, results of the self-care ability of boys and girls are shown in Table 9 and 10.

In the part of language ability, the research table mainly evaluated from the aspects of pronunciation, communication, identification and writing. In the first six cycles, results of the language ability of boys and girls are shown in Table 11 and 12.

In the part of social skills, the research table mainly evaluated from the aspects of pronunciation, communication, identification and writing. In the first six cycles, results of the social skills of boys and girls are shown in Table 13 and 14.

Table 7: Statistical table of the measurement change of the basic movement ability of the boys during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Eyesight	3.25	3.29	3.35	3.42	3.53	3.55
Hearing	3.06	3.15	3.20	3.30	3.36	3.38
Hands movement	3.83	3.89	3.97	3.99	4.05	4.10
Lower limbs movement	4.02	4.15	4.25	4.29	4.35	4.38
Total score	14.16	14.48	14.77	15.00	15.29	15.41

Table 8: Statistical table of the measurement change of the basic movement ability of the girls during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Eyesight	3.23	3.25	3.29	3.35	3.42	3.48
Hearing	3.07	3.11	3.18	3.16	3.22	3.28
Hands movement	3.80	3.86	3.93	3.95	4.03	4.08
Lower limbs movement	4.00	4.08	4.16	4.19	4.25	4.31
Total score	14.10	14.30	14.56	14.65	14.92	15.15

Table 9: Statistical table of the measurement change of the self-care ability of the boys during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Eating	3.20	3.25	3.31	3.37	3.43	3.49
Putting on/taking off clothes	3.03	3.06	3.14	3.15	3.22	3.27
Defecation	3.75	3.80	3.88	3.92	4.03	4.12
Cleaning	3.88	3.93	4.02	4.11	4.20	4.26
Total score	13.86	14.04	14.35	14.55	14.82	15.14

Table 10: Statistical table of the measurement change of the self-care ability of the girls during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Eating	3.14	3.20	3.27	3.34	3.38	3.45
Putting on/taking off clothes	3.08	3.12	3.18	3.24	3.32	3.39
Defecation	3.82	3.87	3.94	4.05	4.11	4.17
Cleaning	3.87	3.95	4.03	4.13	4.23	4.31
Total score	13.91	14.14	14.42	14.76	15.04	15.32

Table 11: Statistical table of the measurement change of the language ability of the boys during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Pronunciation	3.23	3.29	3.34	3.39	3.46	3.53
Communication	3.13	3.17	3.23	3.29	3.34	3.39
Identification	3.78	3.84	3.93	3.99	4.07	4.14
Writing	3.92	3.97	4.06	4.15	4.24	4.32
Total score	14.06	14.27	14.56	14.82	15.11	15.38

Table 12: Statistical table of the measurement change of the language ability of the girls during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Pronunciation	3.27	3.33	3.39	3.43	3.49	3.58
Communication	3.18	3.23	3.29	3.35	3.42	3.49
Identification	3.79	3.85	3.97	4.04	4.11	4.17
Writing	3.96	4.05	4.11	4.18	4.26	4.38
Total score	14.2	14.27	14.46	15.00	15.28	15.62

Table 13: Statistical table of the measurement change of the social skills of the boys during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Pronunciation	3.26	3.32	3.38	3.42	3.48	3.52
Communication	3.10	3.15	3.19	3.24	3.29	3.35
Identification	3.73	3.80	3.88	3.94	4.04	4.10
Writing	3.87	3.92	4.00	4.09	4.14	4.18
Total score	13.96	14.19	14.45	14.69	14.95	15.15

Table 14: Statistical table of the measurement change of the social skills of the girls during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Pronunciation	3.28	3.36	3.43	3.49	3.54	3.62
Communication	3.16	3.19	3.24	3.29	3.36	3.42
Identification	3.78	3.84	3.89	3.96	4.08	4.14
Writing	3.83	3.95	4.02	4.11	4.18	4.26
Total score	14.05	14.34	14.58	14.85	15.16	15.44

Table 15: Statistical table of the measurement change of the working ability of the boys during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Room tidying	3.33	3.38	3.45	3.52	3.59	3.65
Clothes tidying	3.17	3.23	3.29	3.35	3.42	3.49
Tableware cleaning	3.79	3.85	3.94	4.03	4.09	4.17
Cooking ability	3.93	3.99	4.05	4.13	4.20	4.28
Total score	14.22	14.45	14.73	15.03	15.30	15.59

Table 16: Statistical table of the measurement change of the working ability of the girls during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Room tidying	3.38	3.43	3.49	3.56	3.64	3.72
Clothes tidying	3.22	3.27	3.34	3.39	3.45	3.54
Tableware cleaning	3.82	3.88	3.97	4.08	4.14	4.23
Cooking ability	3.97	4.04	4.09	4.17	4.24	4.34
Total score	14.39	14.62	14.89	15.2	15.47	15.83

Table 17: Statistical table of the measurement change of the social adaptability of the boys during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Basic movement	14.16	14.48	14.77	15.00	15.29	15.41
Self-care ability	13.86	14.04	14.35	14.55	14.82	15.14
Language ability	14.06	14.27	14.56	14.82	15.11	15.38
Social skills	13.96	14.19	14.45	14.69	14.95	15.15
Working ability	14.22	14.45	14.73	15.03	15.30	15.59
Total score	70.24	71.43	72.86	74.09	75.47	76.67

Table 18: Statistical table of the measurement change of the social adaptability of the girls during the first six cycles

Item	Before training	After first cycle	After second cycle	After third cycle	After fourth cycle	After fifth cycle
Basic movement	14.10	14.30	14.56	14.65	14.92	15.15
Self-care ability	13.91	14.14	14.42	14.76	15.04	15.32
Language ability	14.20	14.27	14.46	15.00	15.28	15.62
Social skills	14.05	14.34	14.58	14.85	15.16	15.44
Working ability	14.39	14.62	14.89	15.20	15.47	15.83
Total score	70.65	71.43	72.91	74.46	75.87	77.36

Table 19: Prediction results of the boys' social adaptability by the BP neural network and genetic algorithm

	After sixth cycle	After seventh cycle	After eighth cycle	After ninth cycle	After tenth cycle
Actual value	78.36	80.16	82.30	84.86	86.53
BP predicted value	76.56	77.87	80.12	82.63	83.85
Relative error	2.29%	2.86%	2.65%	2.63%	3.09%
Predicted value of the genetic algorithm	77.25	78.36	81.23	83.36	84.56
Relative error	1.42%	2.24%	1.30%	1.77%	2.28%

Table 20: Prediction results of the girls' social adaptability by the BP neural network and genetic algorithm

	After sixth cycle	After seventh cycle	After eighth cycle	After ninth cycle	After tenth cycle
Actual value	79.26	81.13	83.02	85.26	87.26
BP predicted value	77.01	79.56	81.78	82.97	85.06
Relative error	2.84%	1.94%	1.50%	2.68%	2.52%
Predicted value of the genetic algorithm	78.02	80.56	82.03	83.76	85.88
Relative error	1.56%	0.70%	1.19%	1.79%	1.58%

In the part of working ability, the research table mainly evaluated from the aspects of room tidying, clothes tidying, tableware cleaning and cooking ability. In the first six cycles, results of the working ability of boys and girls are shown in Table 15 and 16.

By adding scores of the five aspects mentioned above, we can obtain the total scores of the social adaptability of mentally challenged children, as shown in Table 17 and 18.

Prediction by the BP neural network and genetic algorithm: In order to study the impact of sports on the social adaptability of mentally challenged children, the author adopted the BP neural network and genetic algorithm. Four indices (age, IQ, time of receiving special education and time of participating into sports) which impact the social adaptability of mentally challenged children were chosen as the input of the neural network and data in Table 5, 17 and 18 were used as the sample data to predict the social adaptability of research objects by the end of the sixth cycle. Later, data in Table 5 and data of the first six cycles were used as the sample data to predict the social adaptability of research objects by the end of the seventh cycle. This method was also used to predict the social adaptability by the end of the sixth, seventh, eighth, ninth and tenth cycle.

Assume the learning rate of the BP neural network is 0.9, the maximum sample error is 0.01 and the maximum cycles are 1000.

Assume that in the genetic algorithm, there are 4 input nodes, 3 intermediate nodes and 1 output node, the population scale is 50, the chiasma probability is 0.75, the variation probability is 0.02 and the maximum evolution generation is 300.

Use the BP neural network and genetic algorithm to conduct prediction respectively. The prediction results and data comparison obtained by these two methods are as shown in Table 19 and 20.

By comparing the above calculation results, we can see that the predicted value by the genetic neural network is closer to the actual value than that of the BP neural network, its result is more accurate, the error is smaller, it has a faster rate of convergence and the required time is also shorter.

CONCLUSION

Research on the impact of sports on the social adaptability of mentally challenged children has important significance. This study has used the BP neural network and genetic algorithm to conduct prediction respectively: after different cycles of sports training of the research objects, their social adaptability was predicted and accuracy of the two predicted results was compared. Data show that the genetic algorithm is more accurate than the BP neural network in the prediction, it has a faster rate of convergence and the required time is also shorter.

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