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Analysis of the U.S. economy using mathematical modeling

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Abstract: *In recent years, China's economy and society have witnessed a considerable degree of growth and development. The industrial structure has been constantly adjusted, regional economic coordination has been continuously enhanced, and the overall economic quality has also been greatly improved. 2020 is the year of the U.S. election, and the attention of each U.S. election is undoubtedly worldwide. The world is watching to see which candidate is elected President of the United States. Because different candidates have different ideas about American policies. As the only superpower in the world, the various actions of the US will have a great or small impact on the world economy. What policies will different us candidates adopt and what impacts will they have on the US economy, finance or other fields, we need to analyze them according to the data. We quantified the relevant data of the US economy by means of quantitative methods such as statistical accumulation, statistical calculation, percentage quantification and fractional quantification. For the data such as GDP, total fiscal expenditure, public construction expenditure, medical insurance, etc., we directly made statistics, and then quantified them by summative calculation and other methods. This paper establishes a model of factors affecting economic vitality, makes use of fuzzy comprehensive evaluation, and finally analyzes the quantitative results, showing that the election of different candidates as US President stimulates the US economy. Through the analysis of the relevant economic data of the United States in the four years before and after 2016, we assessed the impact of the economic policy changes of different candidates on the economic vitality of the United States. By comparing and analyzing the relevant economic data of China in the first four years of 2016 and the last four years of 2016, after index processing, MATLAB is used to draw a comparison, and regression analysis model data is combined to compare the influence of different candidates' election in the US on China's economic politics. We will combine the data models of question 1 and question 2, and make Suggestions on China's economic countermeasures and policies in relevant fields by using models and qualitative assessment based on the relevant data of different candidates. To solve this problem, we will combine the results and influences of the models established in the first two questions, how to increase economic competitiveness and maintain sustainable development of economic vitality. Analyze the impact of these results on various aspects of China's development and make recommendations.*

Keywords: *US election, economic vitality, AHP, fuzzy comprehensive evaluation, MATLAB*

1. Introduction

1.1 Current Status

2020 is the year of the U.S. election, and the attention of each U.S. election is undoubtedly worldwide. The world is watching to see which candidate is elected President of the United States. Because different candidates have different ideas about American policies. As the only superpower in the world, the various actions of the US will have a great or small impact on the world economy. What policies will different us candidates adopt and what impacts will they have on the US economy, finance or other fields, we need to analyze them according to the data. In recent years, China's economy and society have witnessed a considerable degree of growth and development. The industrial structure has been constantly adjusted, regional economic coordination has been continuously enhanced, and the overall economic quality has also been greatly improved. Different CANDIDATES in the United States have different policies towards China. What impact will different candidates have on China's economy after they are elected President of the United States? We need to look at the data from the two countries' policies, finance, trade and other fields comprehensively The election of which candidate is good for China needs specific data and analysis.

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(1) A mathematical model was established to quantitatively analyze the impact of the election of different candidates on the US economy using relevant data.

(2) A mathematical model was established to quantitatively analyze the impact of different candidates' election on China's economy using relevant data.

(3) Suppose you are a member of the Chinese Economic development think tank. According to the mathematical model of Question 1 and question 2, what do you suggest China's economic strategies and policies in related fields under both conditions.

1.2 Problems Faced

It is a question of how different policies affect the economic vitality of the United States and the eco nomic vitality of China by looking for different candidates. Before establishing the model, we first need to look for data on the key development areas of the United States in recent years, such as finance, trade, economy, financial governance, prevention and control measures, infrastructure, taxation, environmental protection, medical insurance, employment, trade and migration. The corresponding quantization method is given, the final quantization result is obtained and analyzed. Then, the model is built, and the quantitative results are brought into the BP neural network model after genetic algorithm optimization, and then the problem is analyzed according to the results obtained.

First of all, we should collect relevant data such as financial trade, economic and financial governance when different candidates are elected. Here we collect relevant data of the US from 2007 to 2020, including GDP, infrastructure expenditure, medical expenditure, environmental expenditure, etc. We quantified the data in these areas and then built models to fuse to illustrate the impact on the U.S. economy. Special Note: The data for trump's presidency is from 2016 to 2020. Since Biden has only served as vice President, we use data from when he was vice President and from when he spoke during the election.

We need to collect data on changes in China's economy, analyze the short-term and long-term impact of the us economic policy after the election on China's economic vitality based on appropriate survey data, and at the same time conduct a comprehensive analysis using other data, including GDP, infrastructure expenditure, medical expenditure, environmental expenditure, etc. We will build a model, and through linear fitting of the data of different candidates when they are elected, the comparison coefficient can explain the impact of different candidates on China's economy after they are elected.

For question 3, we should comprehensively analyze the current situation of the ECONOMIC development of the United States, combine the models established in the first two questions and draw conclusions, and give corresponding policies and Suggestions from the perspective of various indicators, so as to enhance the competitiveness of China's economy and maintain the sustainable development of China's economic vitality.

2. Implement

2.1 Acquisition of data

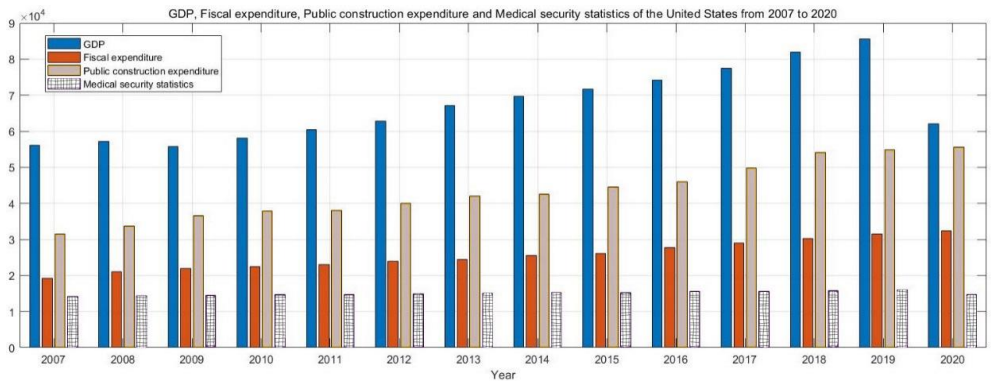

Figure 1: Statistics of GDP, fiscal expenditure, public construction expenditure and health care in the United States from 2007 to 2020

First of all, according to the first question, we consulted relevant materials to obtain the data of the

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United States from 2007 to 2020, extracted and preprocessed the data, adopted the method of partial reaction and whole, and made a comparative analysis of the total GDP, fiscal expenditure, public construction expenditure, medical security and other data. As shown in Figure 1.

2.1.1 Changes of US economy

We divide the changes of US economic data into the number of enterprises and the GDP of enterprises, and find the changes of US economy by analyzing the trend of GDP from 2007 to 2020 and other data. As can be seen from the bar chart, the TOTAL GDP of the United States increases year by year, but it increases slightly in the first one or two years after a candidate is elected, while the trend of the amount of medical insurance expenditure increases slightly every year, which can be regarded as basically unchanged in the chart; In this case, fiscal expenditure and construction expenditure on the whole show an increasing trend. Therefore, the influence of different candidates on the economy and other fields is positive after they are elected.

Therefore, the data analysis, the establishment of mathematical models, data analysis, we draw the following conclusions:

(1) Compared partisan replacement, re-elected ruling party is more conducive to economic development.

(2) We find that republicans are more conducive to stock market gains than Democrat.

(3) Based on the relevant policies and data of different candidates, we find that the economic growth rate and employment rate of the United States are low in recent years.

Taking into account the policies and projections of different candidates across a wide range of areas, we conclude that the election of different candidates to the US presidency will provide a short-term but effective stimulus to the US economy. This is because new candidates will absorb the policies of the previous President and add their own decisions, which will have a positive impact on the US economy.

2.1.2 Preprocessing of data

Through single-factor and double-factor an OVA and correlation analysis, missing points and abnormal points need to be dealt with to give full play to the response effect of data. Therefore, we apply the fuzzy set algorithm to process the redundant data and abnormal data of various influencing factors, and analyze the linear relationship between the gross GDP, fiscal expenditure, public construction expenditure, and medical security, reflecting the economic vitality of the United States.

The basic idea of fuzzy control is to use the computer to realize the control experience of human beings, and these experiences are mostly expressed in language with quite fuzzy control rules. Model-based control algorithms and system design methods tend to differ greatly due to different starting points and performance indicators; However, the language control rules of a system are relatively independent, and it is easy to find the middle choice by using the fuzzy connection between these control rules, so that the control effect is better than the conventional controller.

The fuzzy comprehensive evaluation method applies the principle of fuzzy relationship synthesis to comprehensively evaluate the status of house price membership grade from multiple factors. The specific steps are as follows:

① Set of factors:

Factor set U is a set composed of various factors that affect the economy u_i , namely:

$$U = \{u_1, u_2 \dots, u_n\} \tag{1}$$

② Set up alternative set:

The alternative set V is a set of elements v_i composed of various possible total evaluation results of the evaluator on the evaluation object, namely

$$V = \{v_1, v_2 \dots, v_m\} \tag{2}$$

③ Single factor model evaluation

Single factor fuzzy evaluation means to evaluate a single factor in factor set U. The membership degree of the evaluation object to the chromium element in the alternative concentration is determined . If the evaluation object makes u_i evaluation according to the i factor in the factor set, the membership degree of v_j of the JTH element in the candidate set is r_{ij}, then the result of u_j evaluation according

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to the i factor can be expressed as:

$$R_i = \frac{r_{i1}}{v_1} + \frac{r_{i2}}{v_2} + \ldots + \frac{r_{im}}{v_m} \quad (3)$$

In Formula 5-1, $R_i$represents the single-factor evaluation set, which can be expressed as:

$$R_i = (r_{i1}, r_{i2}, \ldots, r_{im}) \quad (4)$$

④ Build the weight set

Usually, the importance of each factor is not the same. In order to reflect the importance of each factor, a corresponding weight should be given to each factor u_i,that is:

$$W = (\omega_1, \omega_2, \ldots, \omega_n) \quad (5)$$

⑤ Fuzzy evaluation

According to the weight set, the influence of each factor is considered comprehensively, so as to make an accurate judgment. When the weight set S and the single factor evaluation matrix L are known, the comprehensive evaluation can be carried out by fuzzy transformation

$$B = S\,L = (b_1, b_2, \ldots, b_m) \quad (6)$$

In Formula 5-2, B is the fuzzy comprehensive evaluation set, and b_j is the fuzzy comprehensive evaluation index.

⑥ Evaluation index assessment

Take b_j as the weight, and carry out the weighted average of each alternative element v_j, namely

$$v = \frac{\sum_{j=1}^{m} b_j v_j}{\sum_{j=1}^{m} b_j} \quad (7)$$

Then V is the result of fuzzy comprehensive evaluation.

2.1.3 Data normalization

We will normalize the data processed by fuzzy set theory, convert dimensionless data into dimensionless index values in [0, 1], and then use the data after normalization method for data analysis to improve the convergence speed and accuracy of the model.

We adopt the min-Max standardized method for data processing, that is, the linear transformation of the original data. The transformation function is as follows.

$$x' = \frac{x - x_{min}}{x_{max} - x_{min}} \quad (8)$$

X and X 'are the values before and after conversion, where Max is the maximum value of the sample data and min is the minimum value of the sample data. The pre-processed data are shown in Table 1:

Table 1: Standardized data table

Year	GDP	Fiscal spending	Public construction expenditure	Health care	The number of jobs	tax
2007	56012.46	160943.3	10546.5	4691.63	9869	13510
2008	57407.78	170192.5	11264.5	5271.06	9918	18700
2009	55480.46	178954.6	12354.6	5700.91	9967	18105
2010	58092.36	192843.82099	13226.4	6607.89	10437	19584
2011	61931.03	04.1	14837.1	8653.50	10489	18328
2012	64599.31	220767.8	15898.3	10008.5	10543	19237
2013	67191.30	224226.5	16742.9	11475.7	10601	19773
2014	69938.24	230505.62401	17816.5	12961.7	10662	21748
2015	71726.35	53.1	18545.5	13545.5	11275	22757
2016	74171.56	244585.4	19557.5	14754.7	12574	23755
2017	77468.75	255322.1	20272.4	15757.1	14757	24757
2018	81918.76	262007.9	22757.7	17572.1	17453	26874
2019	85661.42	277323.7	25574.5	20757.7	20717	30751
2020	62104.53	290962.2	25471.1	20014.4	20447	30741

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2.1.4 Analytic hierarchy process (AHP)

Analytic hierarchy process (AHP) is a simple method to make decisions on some relatively complex and fuzzy problems. In the systematic analysis of social, economic and scientific management problems, people are often faced with a complex system composed of many interrelated and mutually restrictive factors and often lack of quantitative data. Analytic hierarchy process (AHP) provides a new, concise and practical modeling method for the decision making and ordering of such problems.

The analytic hierarchy process (AHP) modeling can be generally carried out in the following four steps:

(1) Build a hierarchical structure model;

(2) Construct all judgment matrices in each level;

(3) Hierarchical single sorting and consistency check;

(4) Total hierarchy sort and consistency check.

When AHP is used to analyze a decision problem, the problem should be organized and layered first, and a hierarchical structure model should be constructed. Under this model, complex problems are decomposed into components of elements. Thes The elements at the upper level act as guidelines that govern the elements at the next level.e elements in turn form several levels according to their attributes and relationships.

These levels can be divided into three categories:

(1) The highest level: There is only one element in this level, which is generally the intended goal or desired result of the analysis problem and is therefore also called the target layer.

(2) Intermediate level: This level contains the intermediate link involved in the realization of the goal. It can be composed of several levels, including the criteria to be considered, sub-criteria, so it is also called the criteria level.

(3) The lowest level: This level includes various measures, decision schemes, etc. that can be chosen to achieve the goal, so it is also called the measure layer or the plan layer.

The number of layers in the hierarchical structure is related to the complexity of the problem and the degree of detail that needs to be analyzed, and the number of layers is not limited. In general, no more than 9 elements are dominated by each element in each level. This is because too many dominant elements make pair-to-pair comparisons difficult.

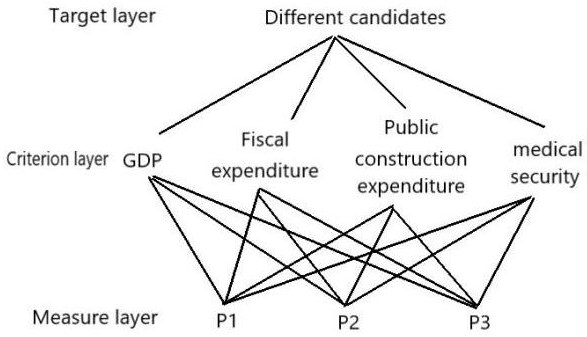

Figure 2: Analytic hierarchy process

2.2 Data analysis methods

2.2.1 Data processing and analysis

Through consulting materials, we get the following data, including China's GDP, fiscal expenditure, total import and export value, and household consumption level from 2007 to 2020. As Trump was elected in the 2016 US presidential election, 2016 was taken as a watershed year to compare the changes of China's GDP, fiscal expenditure, import and export value and other data in the four years before and after 2016, and forecast the data explained by Biden in the election, so as to analyze the impact of different candidates' election on China's economy.

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2.2.2 Regression analysis

Through comparative analysis, the pie chart and the bar chart are drawn by MATLAB. By using the regression analysis model data analysis, the changes of China's GDP, fiscal expenditure, total import and export as well as the proportion of total GDP in the four years before and after 2016 were compared. As shown in the figure below:

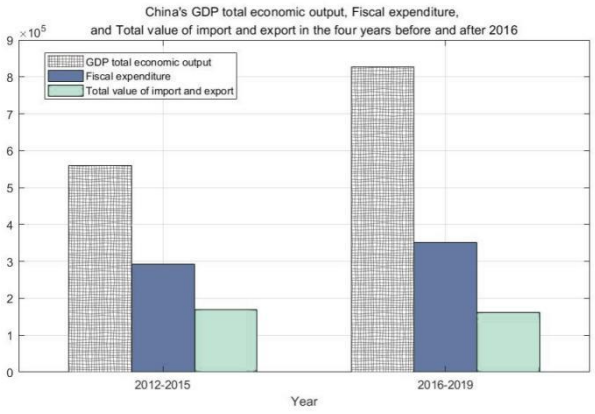

Figure 3: China's GDP, fiscal expenditure and total import and export in the four years before and after 2016

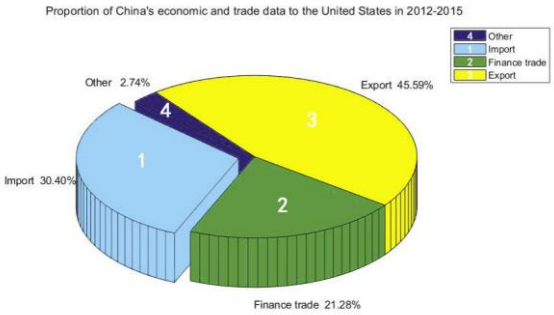

Figure 4: Proportion of China's economic and trade data to the United States in 2012-2015

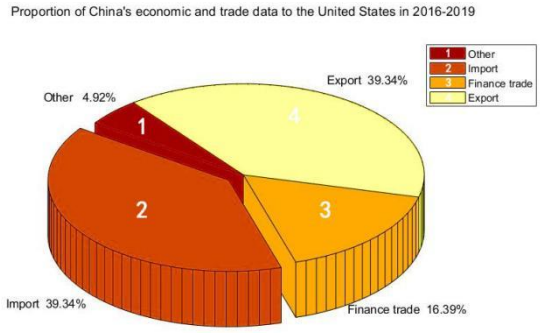

Figure 5: Proportion of China's economic and trade data to the United States in 2016-2019

2.2.3 The impact on China's economy

Through the comparison of regression analysis, we find that during the election period, different candidates always specify some policies against China. Two completely different countries are very different from each other in terms of public sentiment, politics and economy. The US election will have an impact on China's economy, in the final analysis, because of the popularization of economic globalization.

With the growing economic and trade imbalance between developed and developing countries and the constant changes in political and military patterns, emerging economies will continue to grow themselves on the basis of globalization. If want to rapid economic development is bound to, political

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power and the great pattern of emerging economies in the world economy occupies a very high position, is bound to be asked in the international affairs and its relative said they obtain say, this trend will also promote the rise of regional power forces, thus the biggest impact on the formation a unipolar world.

Economic globalization to the huge productivity developed country foreign expansion needs, provide a broader space for developed countries economic development and the best allocation of resources, thus greatly improve production efficiency and international competitiveness, therefore, the biggest beneficiaries of economic globalization in the developed countries, this greatly enhances the developed countries in the world economic pattern of the status and role. From a general perspective, as a superpower, the United States occupies the first place in the world both economically and politically. Therefore, the American election has a huge impact on China.

At the same time, the vast majority of Americans still enjoy friendly cooperation with China. Today, Although China is seen as the main strategic rival of the United States, it does not necessarily mean that China will become the strategic enemy of the United States. Despite potential differences and conflicts in the areas of military affairs, human rights, exchange rates, intellectual property rights and product safety, the two countries also have huge space for cooperation in education, trade, finance, energy demand and environmental protection. China remains America's fastest-growing export market, and it also needs American products, technology and talent. Situations are better than people. In the early 1870s, America overtook Britain to become the world's largest economy; Thirty years later, America's income per head has also overtaken Britain's. During this transition of power, Britain tried to control the rise of the United States, but it eventually accepted its diminished position. China's peaceful rise requires the joint efforts of many parties to ensure its development space and international status. Engagement rather than containment, despite the campaign rhetoric, will probably remain, and should be, the basic direction of relations with China in the next US administration.

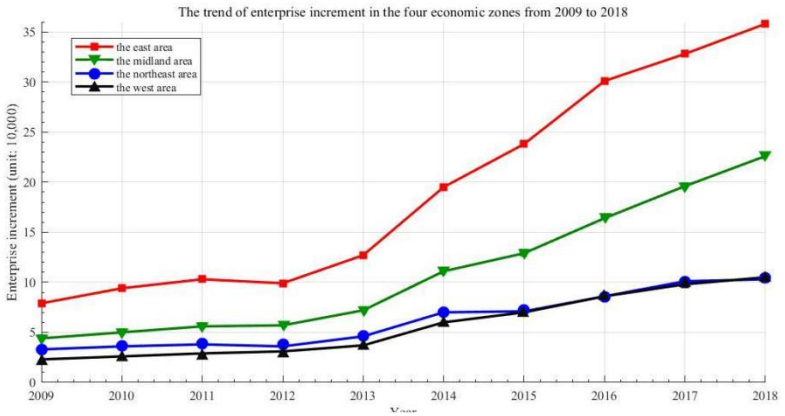

Figure 6: The incremental change trend of enterprises in China's four economic zones from 2009 to 2018

2.2.4 Establishment of the model

It is a multi-factor, multi-variable and fuzzy nonlinear problem to establish a reasonable model to predict people's traffic behavior in a city without Shared bikes. There are many shortcomings in the evaluation of conventional methods. The emergence of artificial neural network theory provides a new way to solve this kind of problems. With its characteristics of nonlinear processing, adaptive learning and high fault tolerance, artificial neural network has strong information processing ability and has been widely used in the fields of classification, combinational optimization and prediction and evaluation.

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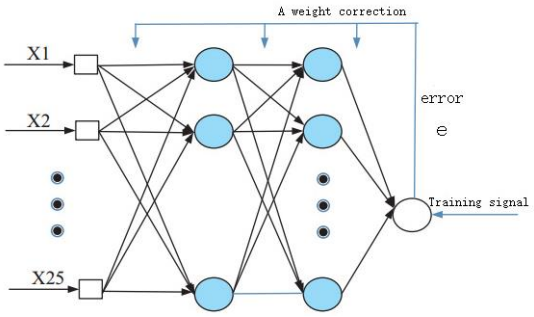

Figure 7: BP neural network structure diagram

BP neural network is widely used as a multi-layer feedforward neural network. This neural network first obtains the estimated value through forward propagation, and then USES error for back propagation through gradient descent to constantly update the weight so as to obtain the minimum error and learn the best weight coefficient. Kolmogorov theorem shows that three-layer forward BP neural network can approximate nonlinear system with arbitrary accuracy under the condition of unlimited number of hidden layer nodes. Therefore, this paper selects a three-layer network structure with a hidden layer to construct the model, as shown in Figure 7.

Input signal XI ACTS on output node through intermediate node (hidden layer point) and generates output signal through non-linear transformation, each sample of network training includes the input vector X and the expected output value T, the deviation between the network output value Y and the expected output value T, by adjusting the value of the connection strength between the input node and the hidden node w_{ij}, and the connection strength between the hidden node and the output node T_{kj} and threshold, the error will decline along the gradient direction. After repeated learning and training, the network parameters corresponding to the minimum error (weight and threshold) will be determined, and the training will stop immediately. At this time, the trained neural network can process the input information with the smallest output error by itself.

BP algorithm steps are shown in Figure 8 Neural network algorithm flow chart:

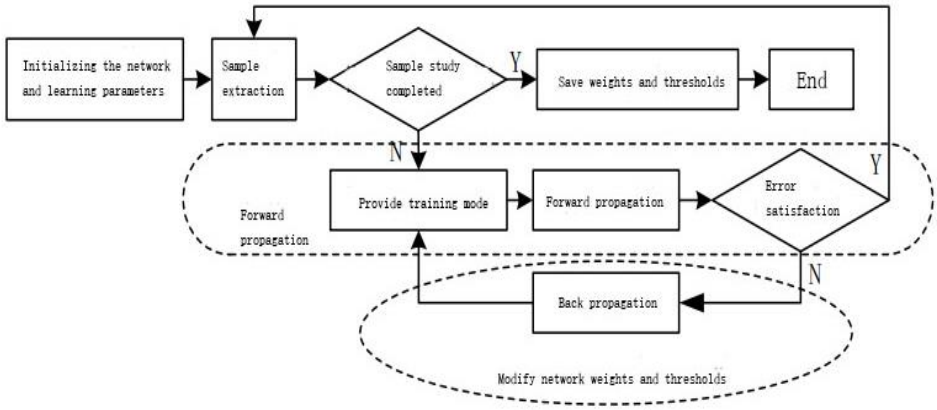

Figure 8: Flow chart of BP neural network algorithm

(1) Initialize network weights: Randomly generates the connection weight from the output layer to the hidden layer w_{ij} ,The connection weight of the hidden layer to the output layer v_{jt} ,The output threshold of each node in the hidden layer θ_j and the output threshold of each node in the output layer γ_t ,the value ranges between [0,1].

(2) Samples provided: Give the network a random set of input samples$P_k = (a_1^k, a_2^k, \dots, a_n^k)$ and the target sample$T_k = (s_1^k, s_2^k, \dots, s_n^k)$.The sample data used for network training is normalized to the dimensionless interval [0,1] and input into the initialized network together with the determined expected output.

(3) Calculate the input vectors of each node in the hidden layer s_j and the output vector b_j:

$$s_j = \sum_{j=1}^{n} w_{ij}\, a_i - \theta_j \qquad \text{j=1,2,…} \tag{10}$$

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$$b_j = f(s_j) \qquad \text{j=1,2,…,p} \tag{11}$$

(4) Calculate the output variables of each node in the output layer L_t and the response variable C_t:

$$\sum_{j=1}^{p} v_{jt} b_i - \gamma_t \qquad \text{t=1,2,…} \tag{12}$$

$$C_t = f(L_t) \qquad \text{t=1,2,…,q} \tag{13}$$

(5) Calculate the error of each node in the output layer d_t^k ,where $T_{kj} = (y_1^k, y_2^k, \dots y_q^k)$ is the target vector:

$$d_t^k = (y_t^k - C_t) C_t (1 - C_t) \qquad \text{t=1,2,…,q} \tag{14}$$

(6) Calculate the hidden layer error e_j^k:

$$e_j^k = \left[\sum_{t=1}^{q} d_t * v_{jt}\right] b_j (1 - b_j) \qquad \text{t=1,2,...,q} \tag{15}$$

(7) Fixed connection weights and thresholds:

$$v_{jt}(N+1) = v_{jt}(N) + \alpha d_t^k b_j \tag{16}$$

$$\gamma_t(N+1) = \gamma_T(N) + \alpha d_t^k \tag{17}$$

$$w_{ij}(N+1) = w_{ij}(N) + \beta e_j^k a_i^k \tag{18}$$

$$\theta_j(N+1) = \theta_j(N) + \beta e_j^k \tag{19}$$

t=1,2,…,q j=1,2,…,p i=1,2,…,n $0<\alpha<1$ $0<\beta<1$

(8) Repeat the above steps until the error meets the preset value and the training is over.

2.2.5 Model training

First we assign a weight to each input, which can be positive or negative. Its absolute value represents the decision on the output. Since the model will be trained before use, we set the weight of each input as a random number before starting, as shown in Table 2, the initial weight table.

Table 2: Initial weight table

Weight significance	The initial weights
GDP	0.17525990
Import and export trade	-0.44065699
Financial trade	-0.89977125
Fiscal spending	-0.73248822

The specific training steps are as follows:

(1) Compute the neuron's output equation

First, we take the weighted sum of neuron input:

$$\sum weight_i \cdot input_i = weight_1 \cdot input_1 + weight_2 \cdot input_2 + weight_3 \cdot input_3 + weight_4 \cdot input_4 + weight_5 \cdot input_5 + weight_6 \cdot input_6 + weight_7 \cdot input_7 + weight_8 \cdot input_8 + weight_9 \cdot input_9$$

2-15

Next, we normalize and limit the result to between 0 and 1. Here, we use the Sigmoid function:

$$Sigmoid = \frac{1}{1+e^{-x}} \tag{20}$$

obtain the output equation of the final neuron:

$$Outputfneuron = \frac{1}{1+e^{-(\sum weight_i \cdot input_i)}} \tag{21}$$

(2) Calculate the equation for adjusting the weight

In the training process, we need to constantly adjust the weight, and we hope that the adjustment amount can be proportional to the error amount, and then multiplied by the value of the input evaluation index, so we use the equation of "error weighted derivative" :

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$$Adjustweightsby = error \cdot input \cdot SigmoidCurveGradient(input) \quad (22)$$

When the input is 0, the weight is not adjusted. Then multiply by the Sigmoid curve gradient, namely:

The Sigmoid curve is used to calculate the neuron output. If the absolute value of the output is large, then the neuron is certain. If the neuron determines that the current weight value is correct, then not much adjustment is needed. You multiply it by the gradient of the Sigmoid curve.

The gradient of Sigmoid can be obtained by derivative:

$$SigmoidCurveGradient(output) = output \cdot (1 - output) \quad (23)$$

The final weight adjustment equation can be obtained by substituting into the formula:

$$Adjustweightsby = error \cdot input \cdot output \cdot (1 - output) \quad (24)$$

There are also ways to make the neural network learn faster, but here is mainly to take its simple, not optimized.

(3) Use samples for training

After the establishment of the model, we collected and processed the data of enterprises and established training samples, as shown in Table 3.

Table 3: Training sample Table

indicators / field	1	2	3	4	5	6	7	8	9
GDP	10	40	13.3	99.5	58	38	90	90	90
	9	35.1	13.5	99.1	54	36	85	85	85
	8.5	33.5	13.8	98.6	52	34	82	82	82
Import and export trade	8	28.4	14.5	98	45	30	78	78	78
	7.5	26.3	14.8	97.5	44	27	77	77	77
	6	22.3	15.2	97.1	42	25	75.8	75.8	75.8
Financial trade	6.3	20.8	15.9	96.4	38	23	74	74	74
	5.2	17.6	16.5	96.2	36	20	73.2	73.2	73.2
	5	16.7	16.8	95.6	35	19.9	71.6	71.6	71.6
Fiscal spending	4.9	13.9	17.5	94.7	30	16.3	68.8	68.8	68.8
	3.6	12.9	17.9	94.4	28	15.5	67.2	67.2	67.2
	2.5	11.1	18.2	94.2	27	14.2	65.8	65.8	65.8

After obtaining training samples, we trained the neural network for 3000 times, 6000 times, 9000 times and other different times, so as to minimize the variance between the actual output and the expected output of the neural network.

After many times of training, the error between the actual output and the expected output becomes smaller and smaller. Its weight gradually converges to the following values.

Table 4: Weight table after training

Weight significance	Weight after training
GDP	1.53613584
Import and export trade	5.53100613
Financial trade	-1.68858521
Fiscal spending	-1.63545317

2.2.6 Model solution

After model training, the quantitative data of GDP, import and export trade, financial trade and fiscal expenditure were standardized. After the processing is completed, the data is imported into the neural network, the BP neural network is used to calculate the results, and then the data is processed in descending order to directly reflect the economic vitality of the city.

The solution results are shown in Table5:

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Table 5: Influence degree ranking

city	Neural network comprehensive evaluation	Priority influence degree
GDP	0.99378849	senior
Import and export trade	0.65429482	The intermediate
Financial trade	0.62439792	The intermediate
Fiscal spending	0.59932577	low-level
Criteria for Priority influence degree: senior:>=0.8;The intermediate:>=0.6,<0.8; low-level:>=0.5,<0.6		

From the above table, it can be concluded that the city with the highest influence of GDP is followed by the import and export trade, followed by the other order.

2.3 Data analysis results

From the above analysis, it can be seen that the election of different candidates will have a stimulating effect on the US economy, which is positive. According to both sides in the 2020 election speech inside for economy, finance and other relevant policies, as well as the two sides to the outbreak of attitude and attitude and measures in China, based on mathematical model in the problem first, second, we come to the conclusion that if the DPP candidate Joe Biden was elected President of the United States, the positive impact of China's economic development and policy toward China is greater than the republican candidate Donald trump. In light of China's divergent economic development, the following problems should be solved to promote coordinated economic development.

(1) Stepping up efforts to prevent and control coVID-19

The coVID-19 is a serious epidemic in the world. The situation in various countries is grim. The coVID-19 has a huge impact on their economies and the global economy. Although the situation of coVID-19 in China is good, we should not take it lightly. We still need to do a good job in epidemic prevention and control. We need to step up testing of people imported from abroad and strictly control imported food to ensure nothing is lost and prevent the outbreak of the epidemic again.

(2) Promoting coordinated development of industries among regions

While continuing to develop economically developed regions, we should expand investment in infrastructure construction in less developed regions and improve conditions for foreign exchanges. Under the same conditions, priority should be given to key construction projects of regional significance in less developed areas; We will increase financial transfer payments to less developed regions, increase investment in their education, research and development, and guide foreign capital to invest in less developed regions.

The coordinated development of regional industries is one of the important factors for the coordinated development of regional economy. Through the development competition among regional industries, the market can effectively play the role of guiding and selecting the development of regional industries, guide the development of advantageous industries suitable for each region, and realize the reasonable division of labor among industries. At the same time, through grasping the relevant industries between the relevant regions connected into a whole, give play to their comparative advantages, complementary advantages, improve the competitiveness and economic benefits, and then promote the coordinated development of regional economy.

(3) Promoting regional economic cooperation among local governments

Regional economic cooperation between local governments plays an increasingly important role in promoting the coordinated development of regional economy and building an interconnected and orderly economic region. Relevant laws, regulations and policies should be formulated to protect the legitimate rights and interests of all parties so as to ensure smooth progress of regional cooperation, draw on each other's strengths and draw on each other's strengths, promote and standardize regional economic cooperation and achieve common development.

(4) Promoting regional market unification

The free and reasonable flow of elements between regions is an important way to promote the coordinated development of regions. Therefore, it is necessary to eliminate the system and barriers restricting the flow of factors between regions and increase the degree of regional openness, so as to realize the optimal allocation and reasonable flow of factors under the action of market supply and demand and price mechanism, so as to realize the common development of regional economy.

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3. Model evaluation and promotion

3.1 Model Evaluation

3.1.1 Advantages of the model

(1) BP neural network model can solve arbitrary complex nonlinear relations well.

(2) BP neural network model has the function of self-learning. By learning the historical data in the past, a specific neural network which can generalize all the data is trained. The function of self-learning is of great significance for prediction.

(3) The BP neural network model after genetic algorithm makes up for the defects of BP neural network model. It has a high parallel structure and parallel implementation ability and the ability to search for optimal solutions at a high speed. It can give full play to the high-speed computing ability of a computer and possibly find optimal solutions soon.

3.1.2 Shortcomings of the model

(1) Because BP algorithm is essentially a gradient descent method, and the objective function to be optimized is very complex, there will be "jagged phenomenon".

(2) The ability of network approximation and generalization is closely related to the typicality of learning samples, and it is very difficult to select typical samples from the problems to form training sets.

(3) There is a contradiction between network prediction ability and training ability, and the newly added samples will affect the network that has been learned successfully, so there is the possibility of network training failure.

3.2 Model Generalization

Through the interpretation of this title, we can easily find that this is a kind of multi-index evaluation problem. A comprehensive evaluation model based on BP neural network is established. Through careful observation of the model established by us, it is not difficult to find that this model is not only applicable to the evaluation of education quality in a region, but also can play a guiding role in solving evaluation problems.

The establishment of this model is to solve the problem of comprehensive evaluation under a certain index. Our model involves a wide range of aspects, such as whether a city is livable, evaluation of a school teacher, decision-making... These kinds of problems can be well solved. BP neural network comprehensive evaluation model can be widely used in education, economy, administration and other fields.

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