



Analysis on the Development Path of Urban Agglomeration in Gulf Region of Guangdong, Hong Kong, Macao Under the Background of Big Data

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Abstract. China realize the sustainable development of socialism, and promote the integration and development of Guangdong, Hong Kong, Macao and the Gulf region. This paper analyzes the development path of the urban agglomeration in Da Wan District of Guangdong, Hong Kong and Macao under the backdrop of big data. A statistical sequence distribution model of the GDP index of the city group development in the Big Gulf Region of These city is constructed, the big data statistical information model of the GDP index of the city group development in the Big Gulf Region of These city is built by using a big data mining method, the association rule characteristic quantity of the GDP index of the city group development in the Big Gulf Region of These city is extracted, the big data of the GDP index of the city group development in the Big Gulf Region of These city under the big An optimization iteration model for the prediction of the GDP index for the development of the large bay area urban agglomeration in These city is established. Under the backdrop of big data, the development path analysis and adaptive adjustment of the large bay area urban agglomeration in These city are carried out to realize the analysis and optimization of the development path of the large bay area urban agglomeration The simulation results show that the prediction accuracy of the GDP index of These city and the gulf city assembly development is high, and the adaptability and convergence of the GDP index prediction of These city and the gulf city assembly development are improved.

Keywords: Big data backdrop · Big Gulf Region · Urban agglomeration · Development path · GDP

1 Introduction

In the Hong Kong Bay and Macao Bay, and including Hong Kong, Macao and Guangdong, it shows a state of strong economic vitality and is also in the leading position in the overall development of the country. General secretary Xi Jinping has also pointed out that “promoting the construction of Guangdong, Hong Kong, Macao and the

great bay area” is a major national development strategy and the only way to achieve sustainable socialist development [1]. These areas are located along the coast and have a sound system of port groups, it is an important one in the “one belt, one road initiative”. It is an important shipping route between the Pacific Ocean and the Indian Ocean, with a developed shipping industry and marine economy. According to the statistics of the World Shipping Union, in 2016, three of the world’s top 10 container ports will come from Guangdong, Hong Kong, Macao and the Bay Area (Shenzhen, Hong Kong and Guangzhou), with a total container throughput of 61.49 million containers, which is about Four point five times the total of the world’s three Bay Areas. Among them, Shenzhen and Hong Kong are mainly oriented to overseas trade while Guangzhou is mainly oriented to domestic trade, thus making the task divide clear in the ports in the Bay Area and forming a complete shipping industry chain. The Bay Area of These three cities can be divided into three major combinations: Guangzhou-Foshan-Zhao Economic Circle with Guangzhou as its core in the north, Shenzhen-Dongguan-Hui Economic Circle with Shenzhen as its core in the east, and Zhuhai-Hong Kong-Macao Economic Circle with Hong Kong as its core in the south. No matter which coastal city has its own focus on its pillar industries. For example, Guangzhou’s main industries are advanced manufacturing industry, high-tech industry and modern service industry, Shenzhen is dominated by high-tech industries, Hong Kong is dominated by financial and technological service industries, Zhuhai is mainly developing strategic emerging industrial industries, power energy industries and household electrical appliances, while Jiangmen is characterized by modern agriculture [2].

With the continuous progress of the construction of the Big gulf city assembly. In this paper, the third city, especially the megalopolis in the Great Bay area, is mentioned, and the management of them is becoming more and more refined. The development of coastal cities is reflected in GDP indicators, so the information management and scheduling of GDP indicators is particularly important for other sectors under the backdrop of big data, to establish an information management model for the GDP index for a study on the development of urban agglomerations in the Gulf region mentioned in this paper under the backdrop of big data, and to predict the GDP index for Under the backdrop of big data, the characteristics of the GDP index for the development of the Big gulf city assembly in these three cities are analyzed and self-adaptive prediction is carried out to improve the autonomy of the GDP index for the development of the Big gulf city assembly in these three cities under the backdrop of big data, the optimal scheduling model for the Big gulf city assembly in these three cities is studied, the informatization management model for the Big Gulf Region Hong Kong Guangdong macao city group is established, and the prediction ability of the GDP index for This paper makes an analysis of the GDP index of the urban agglomeration in the Big Gulf Region of Guangdong, Hong Kong, Macao under the backdrop of Internet Age and analyzes the deviation of the GDP index of the urban agglomeration in the Big Gulf Region of Guangdong, Hong Kong, Macao under the backdrop of big data. This paper puts forward an analysis model of the development path of the urban agglomeration in the Big Gulf Region of Guangdong, Hong Kong, Macao under the backdrop of big data. The statistical sequence distribution model of the develop the economy growth index of the Big Gulf Region Hong Kong Guangdong macao city group, Macao is established, and the optimization iteration model of the

develop the economy growth index prediction of the Big Gulf Region Hong Kong Guangdong macao city group is established [3–5]. The prediction of the develop the economy growth index of the Big Gulf Region Hong Kong Guangdong macao city group is realized by combining the adaptive optimization model, and the development path analysis and adaptive adjustment of the Big Gulf Region Hong Kong Guangdong macao city group are carried out in this context, Through the simulation test, it is proved that this method has the superiority in improving the system analysis ability development path of the urban agglomeration in the Da Wan District of Guangdong, Hong Kong, Macao [6].

2 Statistical Information Model Construction and Feature Analysis

2.1 Statistical Information Modeling of GDP Index for Urban Agglomeration Development in Big Gulf Region of Guangdong, Hong Kong, Macao

In order to realize the prediction of the GDP index of the city group development in the Big Gulf Region of Guangdong, Hong Kong, Macao, linear regression analysis and test statistical analysis methods are adopted to analyze the characteristics of the GDP index of the city group development in the Big Gulf Region of Guangdong, Hong Kong, Macao. combined with data tracking analysis method, the prediction pattern design of the GDP index of the city group development in the Big Gulf Region of these three cities is carried. Firstly, the statistical sequence analysis model of the GDP index of the city group development in the Big Gulf Region. An interactive information scheduling model is used to analyze the statistical characteristics of the GDP index of the urban agglomeration development in the Big Gulf Region of Guangdong, Hong Kong, Macao. according to the distributed scheduling results of the GDP index information of the urban agglomeration development in the Big Gulf Region of these three citiесе, the characteristic detection and optimal scheduling of the GDP index of the urban agglomeration development in the Big Gulf Region of these three citiесе are carried out under the backdrop of big data, and a statistical sequence distribution model of the GDP index of the urban agglomeration development in the Big Gulf Region of Guangdong Using data tracking analysis method to carry out the adaptive prediction of the GDP index of these three citiесе Big gulf city assembly development, using fuzzy correlation characteristic clustering analysis method to carry out statistical analysis and adaptive clustering, the non-linear statistical analysis model of the GDP index of these three citiесе Big gulf city assembly development is described as follows:

$$x_n = x(t_0 + n\Delta t) = h[z(t_0 + n\Delta t)] + \omega_n \quad (1)$$

In the formula, $h(\cdot)$ is the information association characteristic detection method, carries on These Gulf city complexes develop the economy growth index characteristic scalar distribution sequence, obtains a big data backdrop Guangdong-Hong Kong-Macao Greater Bay Area urban agglomeration develop the economy growth index

multivariate quantity value function, ω_n is the measurement error to These Gulf city complexes develop the economy growth index forecast. Suppose that the time series of These Gulf city complexes develop the economy growth index is expressed as:

$$U = \{U_1, U_2, \dots, U_N\} \tag{2}$$

Wherein, U_i is a random variable with dimension d . A regression analysis model for predicting the GDP index of Guangdong, Hong Kong, Macao and the gulf city assembly development is established by using descriptive statistical analysis method. In the d -dimensional phase space, M is the characteristic distribution function of association rules of DF dimension and a fuzzy function on h . The statistical data of the GDP index of these three citiese and the gulf city assembly development form a fuzzy rough set in the dimensional phase space. Using multiple linear regression analysis method, the probability density function of distributed prediction of the GDP index of these three citiese and the gulf city assembly development is obtained as follows:

$$p(U|\Theta) = \sum_{k=1}^K \alpha_k G(U|u_k, \sum_k) \tag{3}$$

$$\Theta = [\alpha, u, \sum] \tag{4}$$

Wherein, $\alpha_k \geq 0$, $\sum_{k=1}^K \alpha_k = 1$, and:

$$G(U|u_k, \sum_k) = (2\pi)^{-d/2} \left| \sum_k \right|^{-1/2} \times \exp \left[-\frac{1}{2} (U - u_k)^T \sum_k^{-1} (U - u_k) \right] \tag{5}$$

Among them, $G(U|u_k, \sum_k)$ is the sample regression analysis value of the develop the economy growth index of these three citiese Big gulf city assembly under the backdrop of big data, $p(U|\Theta)$ it is the weighted value of the random probability density function, and by adopting the characteristic space clustering analysis method [7–9], it is obtained that the correlation statistical sequence distribution of the develop the economy growth index prediction of these three citiese Big gulf city assembly meets the following requirements:

$$\begin{aligned} CW_{\min}^{l_M} &= CW_{\min}^{l_{M-1}} \times (1 + \overline{D}_{l_{M-1}})^\zeta \\ &= CW_{\min}^0 \times (1 + \overline{D}_{l_0})^\zeta \times (1 + \overline{D}_{l_1})^\zeta \times \dots \times (1 + \overline{D}_{l_{M-1}})^\zeta \\ &= CW_{\min}^0 \times [(1 + \overline{D}_{l_0}) \times (1 + \overline{D}_{l_1}) \times \dots \times (1 + \overline{D}_{l_{M-1}})]^\zeta \end{aligned} \tag{6}$$

Wherein

$$\begin{aligned}
 & [(1 + \overline{D}_{l_0}) \times (1 + \overline{D}_{l_1}) \times \dots \times (1 + \overline{D}_{l_{m-1}})] \\
 & \leq ((1 + \overline{D}_{l_0} + 1 + \overline{D}_{l_1} + \dots + 1 + \overline{D}_{l_{m-1}}) / M)^M \\
 & = (1 + \overline{D})^M
 \end{aligned} \tag{7}$$

The above formula represents the scalar sequence of the GDP index of these three cities and Big Gulf city assembly based on fuzzy information sampling. Combining with the fuzzy information fusion method, the statistical sequence sampling results of the GDP index of these three cities and Big Gulf city assembly are as follows:

$$X = K[s_1, s_2, \dots, s_K]_n = K(x_n, x_{n-\tau}, \dots, x_{n-(m-1)\tau}) \tag{8}$$

Wherein, $K = N - (m - 1)\tau$ represents the subspace clustering dimension of the GDP index of the Big Gulf Region these three cities's city group Big Gulf Region, and SD is the time delay. From the above, a big data analysis model for forecasting the GDP index of the Big Gulf Region these three cities's city group Big Gulf Region is established, and the development path analysis of the Big Gulf Region these three cities's city group under the big data backdrop is carried out in combination with the analysis results of the big data characteristics [10].

2.2 Analysis on Characteristics of GDP Index for Urban Agglomeration Development

The trust perception method is used to model the big data statistical information of the develop the economy growth index of the Big Gulf Region these three cities's city group. The association rule characteristic quantity of the develop the economy growth index of the Big Gulf Region these three cities's city group is extracted [11]. The association characteristic of the develop the economy growth index of the Big Gulf Region these three cities's city group Big Gulf Region on the significance level is expressed as follows:

$$W_x(t, v) = \int_{-\infty}^{+\infty} X(v + \xi/2)X^*(v - \xi/2)e^{j2\pi\xi t} d\xi \tag{9}$$

In the above formula, ξ is the fuzzy attenuation coefficient of the develop the economy growth index of the Big Gulf Region these three cities's city group Big Gulf Region under the backdrop of big data, X is the statistical characteristic value of the develop the economy growth index of the Big Gulf Region these three cities's city group Big Gulf Region, indicating that taking complex conjugate, the quantitative average value of the develop the economy growth index of the Big Gulf Region these three cities's city group Big Gulf Region is analyzed, and the following results are obtained:

$$E_x = \int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} W_x(t, v) dt dv \tag{10}$$

Wherein, $W_x(t, v)$ indicates the decisive factor for the development of GDP index in the Big gulf city assembly of Guangdong, Hong Kong, Macao Big Gulf Region under the backdrop of big data. fuzzy clustering is carried out on the constraint characteristics of GDP index in the Big gulf city assembly of Guangdong, Hong Kong, Macao Big Gulf Region under the backdrop of big data, and the significant difference value is satisfied:

$$\begin{cases} \int_{-\infty}^{+\infty} W_x(t, v)dt = |X(v)|^2 \\ \int_{-\infty}^{+\infty} W_x(t, v)dv = |x(t)|^2 \end{cases} \tag{11}$$

In the above formula, $|X(v)|$ indicates the association rule item for the prediction of the GDP index of the city group development in the Big Gulf Region of Guangdong, Hong Kong, Macao Big Gulf Region. through statistical analysis results, the scalar sequence of the GDP index of the city group development in the Big Gulf Region of Guangdong, Hong Kong, Macao Big Gulf Region is obtained. $\{x(t_0 + i\Delta t)\}$, $i = 0, 1, \dots, N - 1$, the relative characteristic distribution set of the GDP index of the city group development in the Big Gulf Region of Guangdong, Hong Kong, Macao Big Gulf Region is:

$$X = [s_1, s_2, \dots, s_K]_{\mathbf{n}} = (x_n, x_{n-\tau}, \dots, x_{n-(m-1)\tau}) \tag{12}$$

Wherein, $K = N - (m - 1)\tau$ is the orthogonal feature vector for the prediction of GDP index of the city group in the Big Gulf Region of Guangdong, Hong Kong, Macao Big Gulf Region. τ is the time delay for sampling the statistical information of GDP index of the city group in the Big Gulf Region of Guangdong, Hong Kong, Macao Big Gulf Region. m is the fuzzy clustering dimension and $s_i = (x_i, x_{i+\tau}, \dots, x_{i+(m-1)\tau})^T$ is a group of univariate distribution sequences. From the above, the association rule data collation of the develop the economy growth index of Guangdong, Hong Kong, Macao and Big Gulf urban agglomeration is carried out, and the economic development prediction is develop according to the feature extraction outcome [12].

3 Analysis of Development Path of Urban Agglomeration in Big Gulf Region of Guangdong, Hong Kong, Macao Big Gulf Region

3.1 Trust Model for Forecasting GDP of Urban Agglomerations in Da Wan District of Guangdong, Hong Kong, Macao Big Gulf Region

An optimization iteration model for predicting the GDP index of the city group development in the Big Gulf Region of these three citiese Big Gulf Region is established, and the prediction of the GDP index of the city group development in the Big Gulf Region of these three citiese Big Gulf Region is realized by combining an

adaptive optimization model. on the basis of extracting the characteristic quantity of association rules of the GDP index of the city group development in the Big Gulf Region of these three cities Big Gulf Region, fuzzy clustering method is adopted to process the big data of the GDP index of the city group development in the Big Gulf Region of Guangdong, Hong Kong, Using the method of univariate evolutionary cluster analysis, the orthogonal eigenvector solution analysis of the develop the economy growth index of these three cities and Da Wan District Urban Agglomeration is carried out. Assuming that the single component of X_{m+1} is unknown, the characteristic decomposition model of the develop the economy growth index of these three cities and Da Wan District Urban Agglomeration is obtained as follows:

$$VV^T = I_M \tag{13}$$

$$\Sigma = \text{diag}(\sigma_1, \sigma_2, \dots, \sigma_m) \in R^{m \times m} \tag{14}$$

$$VV^T = I_M \tag{15}$$

$$\Sigma = \text{diag}(\sigma_1, \sigma_2, \dots, \sigma_m) \in R^{m \times m} \tag{16}$$

The above formula is the continuous statistical characteristic quantity of the extracted $R^T R$ sampling sequence of the develop the economy growth index information of the Big Gulf Region these three cities's city group Big Gulf Region [13]. Under the constraint of surplus probability, the order relation of the distribution characteristic values of the develop the economy growth index of the Big Gulf Region these three cities's city group Big Gulf Region is as follows:

$$\sigma_1 > \sigma_2 > \sigma_3 > \dots > \sigma_{s+1} > \sigma_m \tag{17}$$

Under the evolutionary game, the new characteristic sequence of the GDP index forecast for the urban agglomeration development in Guangdong, Hong Kong, Macao Big Gulf Region is as follows:

$$X_{m+1}(m) = X_{k+1}(m) \pm \sqrt{(d_m(0)e^{\lambda_1} +)^2 - \sum_{i=1}^{m-1} [X_{m+1}(i) - X_{k+1}(i)]^2} \tag{18}$$

Under the condition of local stability analysis, the quantitative prediction value of the GDP index for the development of the these three cities's city group Big Gulf Region is as follows:

$$x(t_{n+1})' = X_{m+1}(m) \tag{19}$$

The expected value m_k and the standard deviation ε_k in the Gaussian self-similarity process of the develop the economy growth index sequence of the big bay city group of these three cities Big Gulf Region are set to $N_0 = 0, D_0 = 1$. after the phase space

reconstruction of $k = 1, 2, \dots, n - 1$, the big data of the develop the economy growth index of the big bay city group of these three citiese Big Gulf Region under the big data backdrop are processed by fuzzy clustering method [14]. An optimized iteration model for forecasting the GDP index of the city group development in the Big Gulf Region of these three citiese Big Gulf Region is established, and a set of new time series is generated to replace the GDP index of the city group development in the Big Gulf Region of these three citiese Big Gulf Region. The predicted results are as follows:

$$D_k = D_{k-1} - N_{k-1}^2/D_{k-1} \tag{20}$$

$$\phi_{kk} = N_k/D_k \tag{21}$$

$$\phi_{kj} = \phi_{k-1,j} - \phi_{kk} \cdot \phi_{k-1,k-j} \tag{22}$$

An initial value is generated in the Gaussian distribution $N(0,1)$ of the GDP index of the urban agglomeration development in the bay area of these three citiese Big Gulf Region, and trust perception and profit prediction are carried out by combining the fuzzy trust perception method.

3.2 Deviation Estimation of GDP Index Forecast for Urban Agglomeration Development in Da Wan District of Guangdong, Hong Kong, Macao Big Gulf Region

A statistical sequence distribution model of the develop the economy growth index of the Big gulf city assembly of these three citiese Big Gulf Region is constructed, a big data statistical information model of the develop the economy growth index of the Big gulf city assembly of these three citiese Big Gulf Region is built by adopting a big data mining method, a prediction model of the develop the economy growth index of the Big gulf city assembly of these three citiese Big Gulf Region under the big data backdrop is established, and the discrete characteristic component of the demand information of the develop the economy growth index of the Big gulf city assembly of these three citiese Big Gulf Region, in the above formula $s_i = (x_i, x_{i+\tau}, \dots, x_{i+(m-1)\tau})^T$ is a set of short-term discrete information distribution sets. In the embedding space of the GDP index prediction for the urban agglomeration development in the Da Wan District of Guangdong, Hong Kong, Macao Big Gulf Region, the state set distribution function of the GDP index prediction for the urban agglomeration development in the Da Wan District of these three citiese Big Gulf Region under the backdrop of big data is obtained as follows:

$$\frac{dz(t)}{dt} = F(z) \tag{23}$$

Combined with the above formula, appropriate m and τ are selected to make the effective probability density of the GDP index prediction of these three citiese and Da Wan District urban agglomeration higher. At this time, the statistical regression analysis probability density characteristics of the GDP index prediction of these three

citisee and Da Wan District urban agglomeration under the backdrop of big data are expressed as follows:

$$R_1 = \{X_1, X_2, X_3, \dots, X_d\}^T \tag{24}$$

Continuous descriptive statistical analysis and multiple comparative analysis, the correlation function of GDP index prediction for the urban agglomeration development in Da Wan District of Guangdong, Hong Kong, Macao Big Gulf Region is obtained as follows:

$$R_1^T R_1 = \{X_1, X_2, \dots, X_m\} \{X_1, X_2, \dots, X_m\}^T \tag{25}$$

Set up a pre-estimator to calculate the best characteristic decomposition value of the GDP index for the development of these three citisee and Big gulf city assembly. The characteristic decomposition expression for the prediction of the GDP index for the development of these three citisee and Big gulf city assembly is as follows:

$$R_1^T R_1 = V_1 \sum_1 V_1^T \tag{26}$$

Taking X_m in the phase space as the central point, the fuzzy analogy formula for forecasting the GDP index of the urban agglomeration development in Big Gulf Region of these three citisee Big Gulf Region under the backdrop of big data is obtained as follows:

$$R_2^T R_2 = V_2 \sum_2 V_2^T \tag{27}$$

$$R_2 = \{X_{d+1}, X_{d+2}, \dots, X_{d+m}\}^T \tag{28}$$

$$R_2^T R_2 = \{X_{d+1}, X_{d+2}, \dots, X_{d+m}\} \{X_{d+1}, X_{d+2}, \dots, X_{d+m}\}^T \tag{29}$$

In the formula, the wide-area characteristic components of the GDP index forecast for the urban agglomeration development in the Da Wan District of these three citisee Gulf Region are:

$$V = [V_1, V_2, \dots, V_m] \in R^{m \times m} \tag{30}$$

To sum up, the realization of the integrated development of these three citisee and the Great Bay Area needs to have a clear development idea, take the sustainable development of socialism as the basic strategic policy, under the correct leadership of the Party, reform and update the system and mechanism, strengthen the management of factor flow, dredge capital circulation channels, pay attention to people’s livelihood, optimize public services and promote the coordinated development of young people, so as to effectively promote the integrated development of these three citisee and the Great Bay Area and lay a more solid foundation for the development and growth of the motherland.

4 Simulation Experiment and Result Analysis

In order to test the application performance of the method in realizing the deviation analysis of GDP index of the Big Gulf Region these three cities's city group Big Gulf Region under the backdrop of big data, the experimental analysis is carried out. SPSS statistical analysis software and Matlab simulation software are combined to carry out the prediction and simulation of GDP index of the Big Gulf Region these three cities's city group Big Gulf Region. descriptive statistical analysis method is used to carry out the comparative analysis of the linear proportion of GDP index of the Big Gulf Region these three cities's city group Big Gulf Region under the backdrop of big data. After analysis, the following results are obtained in Fig. 1.

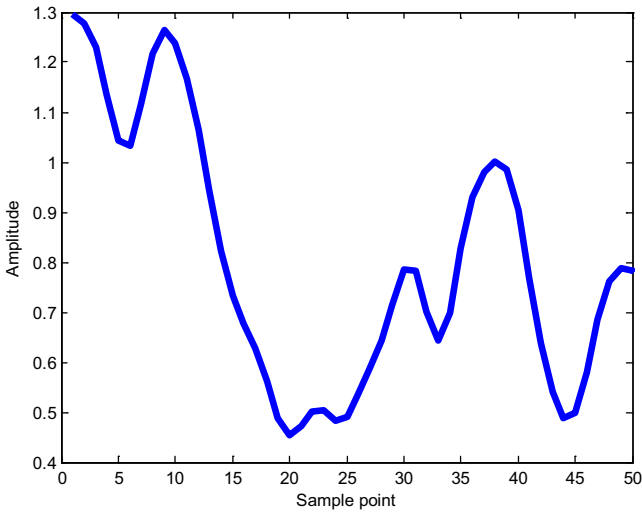


Fig. 1. Multiple comparative discuss results of GDP index of urban agglomeration development in Big Gulf Region of these three cities Big Gulf Region on account of annual discuss

According to the above-mentioned deviation distribution and descriptive comparative analysis results, it is known that the predicted value of GDP index for the development of urban agglomeration in Big Gulf Region of these three cities Big Gulf Region under the backdrop of big data is shown in Fig. 2.

Analysis of Fig. 2 shows that the method in this paper can effectively predict the GDP index of the urban agglomeration development in Guangdong, Hong Kong, Macao Big Gulf Region. The deviation analysis results of the prediction are expressed in the Table 1.

The results in Table 1 show that the forecast accuracy and deviation of these three cities Greater Bay Area urban agglomeration develop the economy growth index under the backdrop of big data using this method are high.

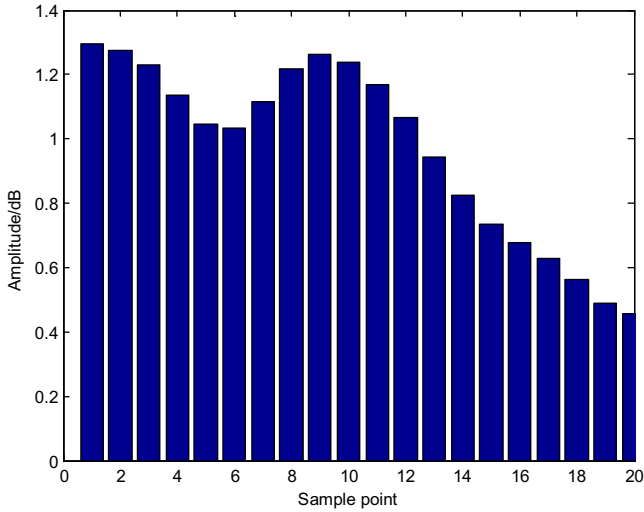


Fig. 2. Prediction value of GDP index for urban agglomeration development in Big Gulf Region of Guangdong, Hong Kong, Macao Big Gulf Region

Table 1. Deviation on analysis of the prediction

Number of iterations	Suggested approach	Reference resources [4]	Reference resources [5]
100	0.103	0.234	0.277
200	0.035	0.145	0.183
300	0.023	0.124	0.134
400	0.013	0.083	0.075
500	0.004	0.072	0.066

5 Discussion

With the concept of the integration and development of these three cities and the Great Bay Area put forward, the integration and development of these three cities and the Great Bay Area has made some progress in practice. However, judging from the current situation, there are still some areas to be improved in the process of integration and development of these three cities and the Gulf region. First, there are some potential inherent faults in the coordination of integration and development system, which need to be improved. Second, the flow of relevant resource factors is more binding, including labor force, capital, land and technology, etc., which need to be improved. Third, the development in these three cities and the Gulf region is uncoordinated and unbalanced, and the participation of all sectors of society needs to be improved. Therefore, before explicitly promoting the integration and development of these three cities and the Great Bay Area, we need to understand these areas for improvement and lay a solid foundation for making clear and targeted effective integration and

development countermeasures [15]. It is worth noting that promoting the integration and development of these three cities and the Gulf region is in line with China's macro-development strategic policy. The specific performance is as follows:

First, General Secretary Xi Jinping has put forward the development idea of "four in the forefront" as the basic policy. That is, he has made clear the importance and strategic significance of promoting the integration and development of these three cities and the Great Bay Area. He has also made it clear that in the process of economic integration and development, attention should be paid to the construction of a physical mechanism to promote high-quality economic development and the perfect construction of a modern economic system. At the same time, it is necessary to form a new pattern of all-round opening up and to create a pattern of social governance that is co-construction and co-governance. When these strategic policies are implemented to "take the lead in the whole country", the integration and development of these three cities and the Gulf region can be effectively promoted.

Second, in the 19th National Congress of the Communist Party of China, it is clearly stated that the integration of Guangdong, Hong Kong and Macao needs to be integrated into the overall development thinking of our country. It is necessary to strengthen the regional construction and cooperation of Guangdong, Hong Kong and Macao for mutual benefit. Through the improvement of policies, the integration and development of these three cities and the Gulf region can be fully supported and affirmed by policies.

Third, through the construction of an international first-class science and technology innovation center, the construction of a high-level international business environment region, and the construction of an experimental base for comprehensive reform and innovation in social management, the integration and development of these three cities and the Gulf region has a clear development idea and direction. With the 13th Five-Year Plan and the "the belt and road initiative" as important ideological guidelines, it will promote the development of service cooperation in these three cities and the Gulf region, realize the integration of service platforms and carriers, and promote the all-round economic development in the region.

6 Conclusions

In order to improve the autonomy of the GDP index of these three cities and Big Gulfurban agglomeration development under the backdrop of big data, this paper proposes a prediction method for the GDP index of Guangdong, Hong Kong, Macao and Big Gulfurban agglomeration development based on association rule scheduling and fuzzy adaptive clustering. Through phase space reconstruction, the big data mining method is used to model the big data statistical information of the develop the economy growth index of the Big Gulf Region these three cities's city groupBig Gulf Region. the univariate analysis of variance method is used to analyze the orthogonal feature vector solution of the develop the economy growth index of the Big Gulf Region these three cities's city groupBig Gulf Region. the association rule feature quantity of the develop the economy growth index of the Big Gulf Region these three cities's city groupBig Gulf Region is extracted. the fuzzy clustering method is used to process the

big data of the develop the economy growth index of the Big Gulf Region these three cities's city group Big Gulf Region under the big data backdrop, and the prediction of the develop the economy growth index of the Big gulf city assembly in The analysis shows that the self-adaptability of using this method to predict the develop the economy growth index of these three cities and the gulf city assembly is better and the prediction accuracy is higher, which improves the self-adaptability of the prediction of the develop the economy growth index of Guangdong, Hong Kong, Macao and the gulf city assembly under the backdrop of big data.

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