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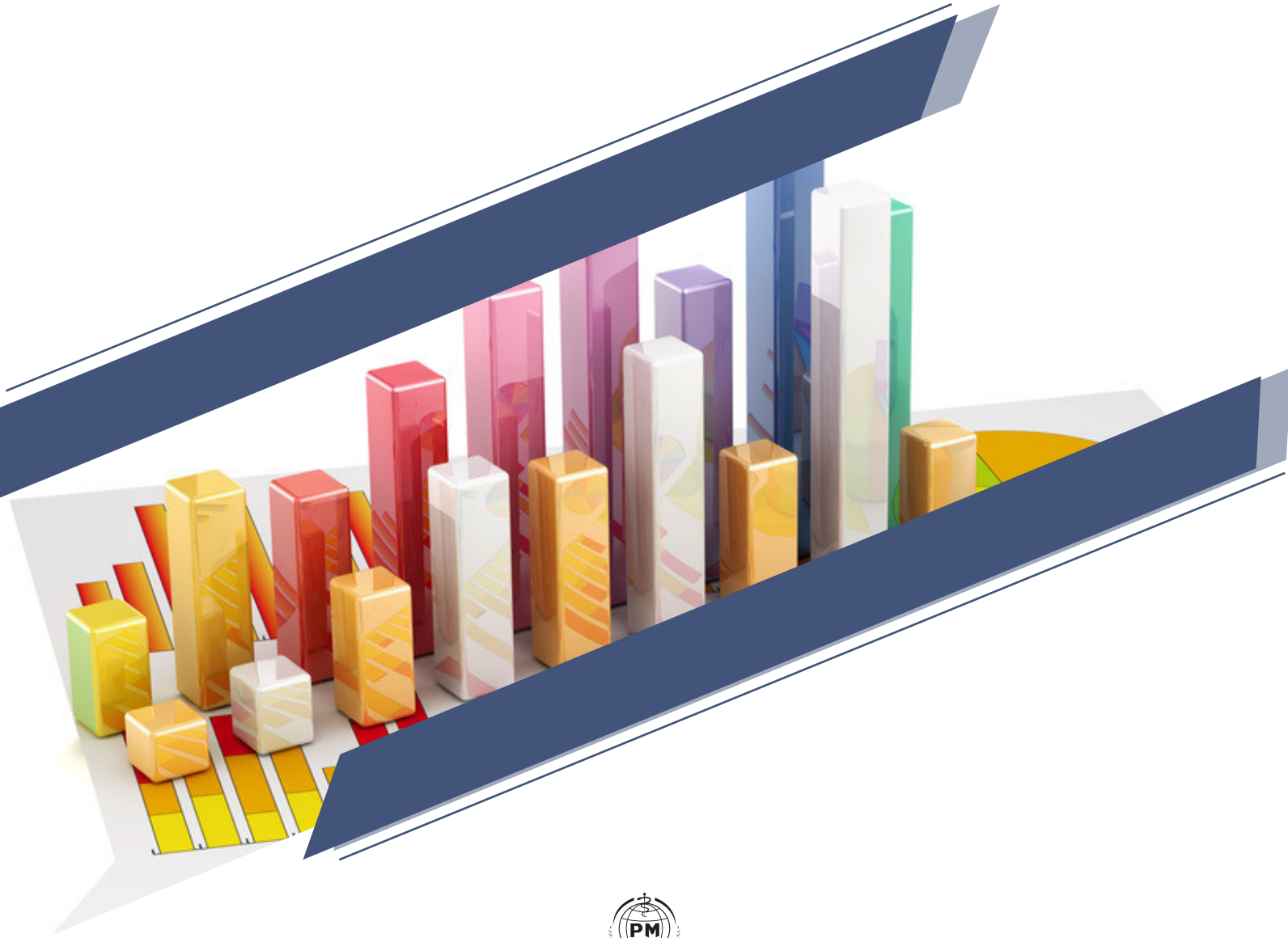
Insight – Statistics



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Original Research Articles

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Original Research Article

Analysis and Prediction of Soccer Games: An Application to the Kaggle European Soccer Database

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Abstract: The study of soccer game data has many applications for both fans and teams. The effective analytical work can not only help the teams to improve their offensive and defensive skills and strategies, but also could assist the fans to make a bet. In this work, the authors study the European League Dataset with statistical methods to analyze the game data. Moreover, machine learning techniques are designed to predict the game results based on in-game performance and pre-game odds provided by bookmakers. With rational feature engineering and model selection, our model results in an overall 95% accuracy.

Keywords: Soccer; Python; Data Science; Artificial Neural Network; Statistics; Poisson Distribution

1. Introduction

Soccer is one of most popular sports in the world, especially in Europe and South America. Numerous people are enthusiastic about this sport. More than a billion people watched the final match of World Cup in 2018. Another fact of soccer is that it is quite excellent for betting at different levels. The outcome of a soccer game depends on many factors, like the home-away ground effect, the physical and psychological conditions of key players. On the other hand, for each team, a good understanding and analysis of their past games is effective to help improving their skills, strategies and training methodologies.

In literature, Balogun O. and Ogunseye AA[1] used Artificial Neural Network (ANN) to predict the scoreline of Manchester United matches against opposing teams for matches played in the English Premier League in 2019. Their data spans a period if nine years from 2009 to 2018. 331 of the data set were used as the training data set, while 12 was used for validation. Their artificial neural network model has 6 input layers 5 hidden layers, and 2 output layers. And their model gave an accuracy of 73.27% for goals scored by Manchester United. And Yoel F. Alfredo and Sani M. Isa[2] also published a similar research paper in 2019. Their data comes from football data.co.uk which is a common data set to be used in conducting research in football match predictions. There are 71 attributes in the data, and they can be divided into two categories: football match statistics and bookmaker odds prediction. Only 14 attributes are selected by them, which they think can have good impacts on prediction and result accuracy. They use 3 models to predict the result: C5.0 Model, Random Forest Model, and Extreme Gradient Boosting Model. And each model has a high accuracy of prediction.

2. Dataset description

The open dataset for study in this work is acquired from www.kaggle.com, built by Hugo Mathien, includes soccer match data of 11 European countries with their

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lead championship from seasons 2008 to 2016. The database covers 24,637 matches and over 10,000 players. Betting odds from up to 10 bookmakers are included. Detailed match events like goal types, possession, corner, cross, fouls, cards are also recorded in the database. Moreover, this dataset integrated players and teams attribute ratings sourced from EA Sports' FIFA video game series.

The dataset is a SQL database file contains 7 tables of "Country", "League", "Match", "Player", "Player_Attribute", "Team", "Team_Attributes". For the match table, 134 attributes are recorded, some of which are significant for predicting game results, while appropriate feature engineering based on relative soccer knowledge may also be conducted in the later prediction process.

3. Statistical analysis

3.1 Best offensive and defensive teams

Match data provide supporting evidence to reveal the offensive and defensive performance for each team. Hence, the first investigation conducted on this dataset is to study the game performance for each team from 2008 to 2016 based on goal events. The attributes applied include "home_team_goal", "away_team_goal" and another two designed features, "shot_efficiency" and "goal_efficiency". The feature "shot_efficiency" is the radio of the number of shot-ons and the number of total shots, and "goal_efficiency" is the radio of the number of goals and the number of shot-ons. With simple feature engineering, the two introduced new attributes demonstrate the efficiency of team performance of shooting and scoring, which are significant to evaluate team offensive capabilities.

By calculating the averaged attributes from 2008 to 2016 for all teams, the top away and home teams are demonstrated in **Figure 1** and **Figure 2.**

Away team goal performance top list

Rank	away_team	away_team_goal
1	FC Barcelona	2.33
2	Real Madrid CF	2.22
3	FC Zurich	2.13
4	Ajax	2.11
5	PSV	2.07
6	Celtic	2.01
7	FC Bayern Munich	1.99
8	SL Benfica	1.99
9	FC Porto	1.98
10	Rangers	1.93

Away team defensive performance top list

Rank	away_team	home_team_goal
1	Grasshopper Club Zurich	0.63
2	Rangers	0.75
3	FC Porto	0.77
4	SL Benfica	0.84
5	Juventus	0.84
6	FC Bayern Munich	0.85
7	FC Barcelona	0.86
8	Celtic	0.88
9	Sporting CP	0.9
10	Legia Warszawa	0.97

Away team shot efficiency top list

Rank	away_team	away_team_shot_efficiency
1	Valenciennes FC	80%
2	Karlstruher SC	75%
3	FC Utrecht	69%
4	Novara	68%
5	SC Freiburg	68%
6	Vitesse	67%
7	FC Barcelona	66%
8	Legia Warszawa	65%
9	Paris Saint-Germain	65%
10	SC Heerenveen	64%

Away team goal efficiency top list

Rank	away_team	away_team_goal_efficiency
1	DSC Arminia Bielefeld	32%
2	Valenciennes FC	25%
3	CD Numancia	22%
4	SV Darmstadt 98	22%
5	ADO Den Haag	22%
6	Rangers	21%
7	Xerez Club Deportivo	20%
8	Zaglebie Lubin	20%
9	Paris Saint-Germain	20%
10	AS Monaco	19%

Figure 1. Away team attributes ranking.

Home team goal performance top list		
Rank	home_team	home_team_goal
1	BSC Young Boys	3.38
2	Real Madrid CF	3.32
3	FC Barcelona	3.26
4	FC Bayern Munich	2.81
5	PSV	2.72
6	Ajax	2.65
7	SL Benfica	2.59
8	Celtic	2.56
9	Manchester City	2.4
10	FC Porto	2.38

Home team defensive performance top list		
Rank	home_team	away_team_goal
1	FC Zurich	0.13
2	FC Porto	0.52
3	Ajax	0.57
4	Celtic	0.58
5	SL Benfica	0.66
6	FC Barcelona	0.66
7	FC Bayern Munich	0.71
8	FC Vaduz	0.71
9	Legia Warszawa	0.73
10	Rangers	0.74

Home team shot efficiency top list		
Rank	home_team	home_team_shot_efficiency
1	Paris Saint-Germain	67%
2	FC Barcelona	66%
3	Monchengladbach	66%
4	FC Twente	65%
5	N.E.C.	65%
6	Bournemouth	65%
7	Real Madrid CF	65%
8	Ajax	65%
9	Hercules Club	64%
10	Wolfsburg	64%

Home team goal efficiency top list		
Rank	home_team	home_team_goal_efficiency
1	Korona Kielce	25%
2	Paris Saint-Germain	23%
3	FC Barcelona	23%
4	Livomo	22%
5	Ajax	22%
6	Celtic	22%
7	Real Madrid CF	21%
8	Hecules Club	21%
9	Wolfsburg	20%
10	Reading	20%

Figure 2. Home team attributes ranking.

The above two figures demonstrate that FC Barcelona appears 7 times, and real Madrid CF appears 5 times, which match with the practical game performance of these two teams during that time period.

3.2 Goal distribution

Numbers of goals for both away team and home team in each of the matches are collected in order to study the distribution of goals. Two Poisson distribution model are built to fit the goal distribution. Demonstrated in Figure X to Figure X, the Poisson distribution is appropriate to accurately model the true distributions of home team goals and away team goals. Therefore, as the two variables home goal and away goal follow the Poisson distribution, the difference between them, which is the net goal, should fit the Skellam distribution. Figure X shows the Skellam distribution of net goals accurately fit the true distribution of the net goals calculated by taking the difference of home and away goals for each match.

The total goal and net goal distribution are shown in the **Figure 3** and **Figure 4.**

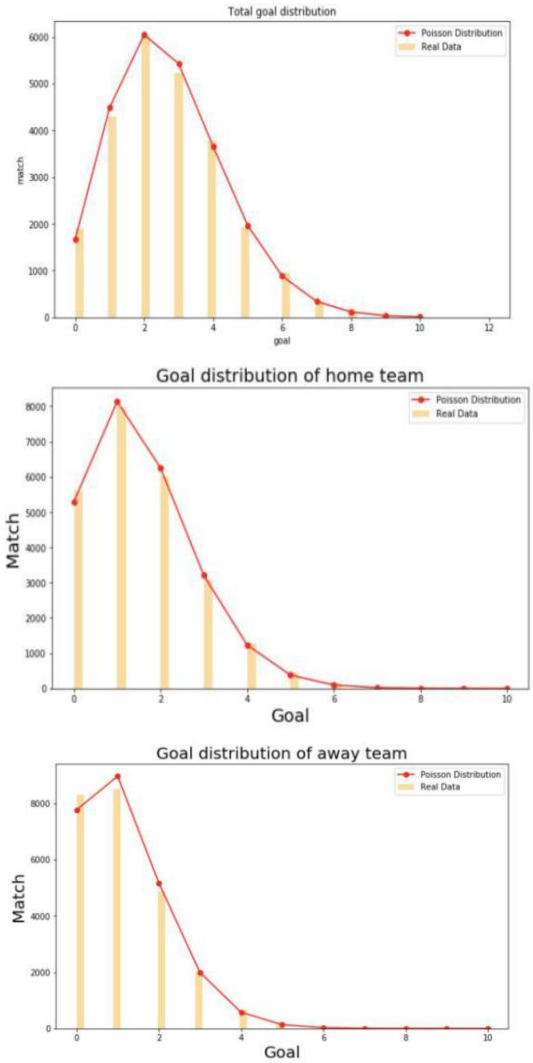

Figure 3. Goal distribution of away team and home team.

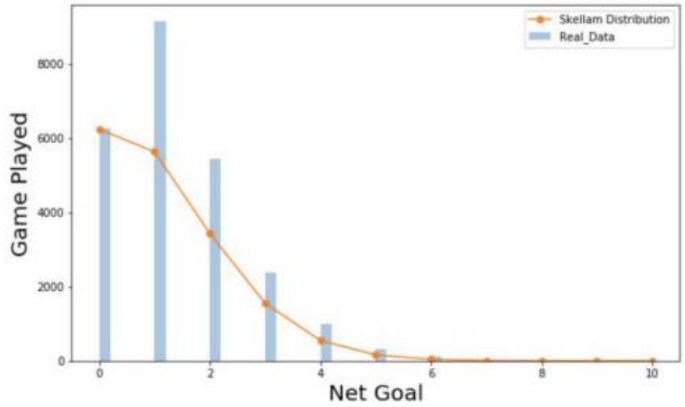

Figure 4. Net goal distribution.

4. Game result predictions

4.1 Description

This prediction of this dataset is slightly different from normal predictions of match results. Normally, the prediction is focused on the result of matches which have not happened yet, based on some pre-game features, such as squad, and historical match results. The prediction in this work is to foretell the match results based on pre-game bet radios and in-game performance. The objective of this prediction is to analyze the key features that mostly affect the final match results, which could be useful to help improving team training and strategy making.

4.2 Feature engineering

There are total 144 attributes in the match table of the database file, 28 of which are selected, including bet radios provided by different bookmakers and in-game features like possession (the time of controlling the ball in percentage), shot-efficiency (on target shot/total shot), goal-efficiency (goal/on target shot), etc.

Featuring engineering is a significant and necessary process to appropriately help improving the prediction accuracy. Sufficient background knowledge of the practical application is essential to help understand the prediction problem. For soccer games, the offensive efficiency plays an important role in evaluating the game performance, and strongly related to the final results. Therefore, additional features including shot efficiency and score efficiency are designed to characterize the offensive efficiency.

4.3 Models

Four models are built in the work, including Logistic Regression, Decision Tree, Random Forest and Deep Neural Network. The Logistic Regression model is appropriate for this problem since the dependent variable win-draw-lose is categorical. It is easy to implement, and computational efficient. For the Decision Tree model, each branch of it represents a possible decision, outcome, or reaction, and the last branch of the tree represents the final result. In our Decision Tree model, the criterion is information entropy: a mathematical measure of the degree of randomness in a set of data, with greater randomness implying higher entropy and greater predictability implying lower entropy. The advantage of Decision Tree is that data processing is simple or unnecessary. However, when the types of data increase, the accuracy will decrease, since the over-fitting problem occurs. For the Random Forest model, literally, it gives a higher accuracy than the Decision Tree model since the problem of over-fitting is ameliorated, with the cost of increasing computational complexities. The last model we generate is the Deep Neural Network model, which is suitable to describe the non-linear relationship between the match features and results. In this work, a neural network with 5 fully-collectly dense layers, 5 activation layers, 2 dropout layers and 1 batch normalization layer were designed. Softmax transformed function is applied in the model, and the loss of the model is based on sparse categorical crossentropy. The batch size of the model is 32, and the epochs of the model is set to as 500.

4.4 Results

The four models are all implemented to predict the match results based same training and testing data. Comparison of the prediction results for the four models are provided in **Figure 5.**

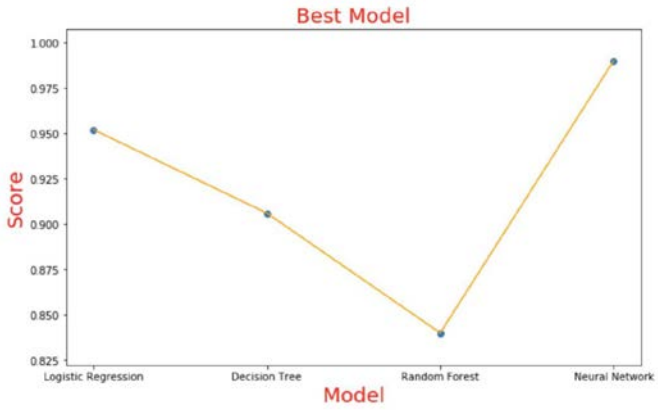

Figure 5. Four models' prediction result.

Among which, the Deep Neural Network model gives the highest accuracy of 0.99. The Logistic Regression, Decision Tree and Random Forest models results in 0.95, 0.91 and 0.84. Moreover, we implement the best model on the 5 top leagues of Europe exclusively, which are English Premier League (England), Laliga (Spain), Bundesliga (Germany), Serie A (Italy) and Ligue1 (France), and the results are shown in **Figure 6.**

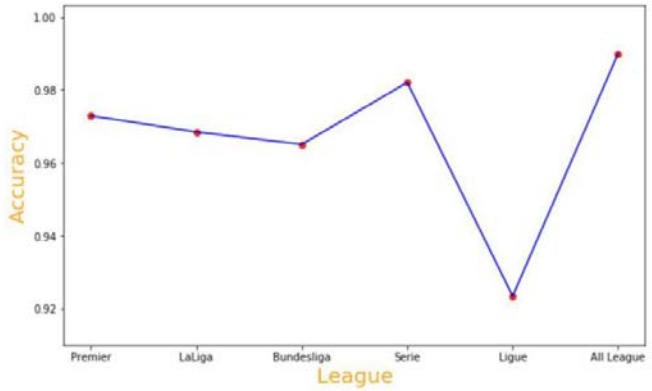

Figure 6. Top 5 leagues' prediction result.

For analyze the most import features for soccer match prediction. 4 most important features including possession, total shot, shot efficiency and goal efficiency are compared. Each of the 4 features is solely applied for the prediction for the 5 leagues. The results in **Figure 7** to **Figure 10** indicate that the possession, total shot and shot efficiency are most important for Laliga, and goal efficiency is most significant for Ligue.

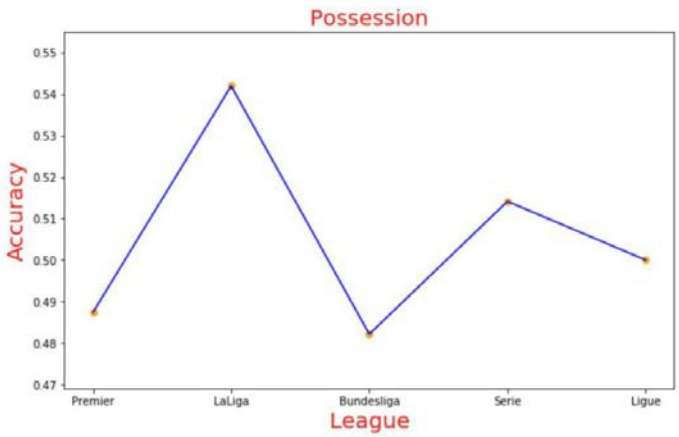

Figure 7

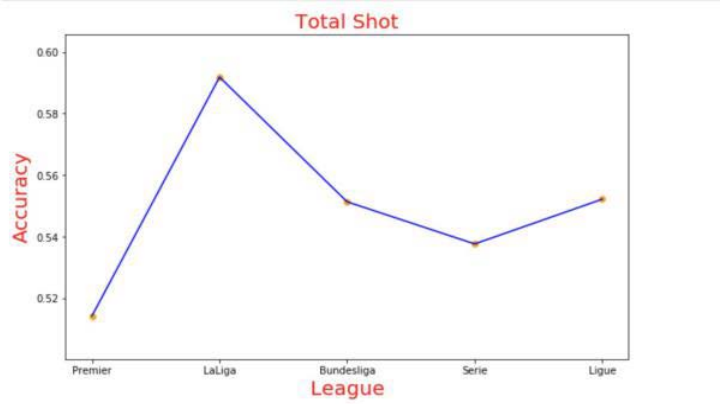

Figure 8

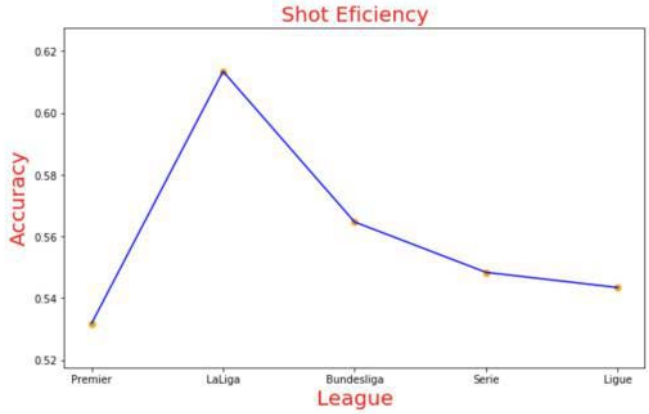

Figure 9

Figure 10

5. Conclusion

In this work, a novel analysis and prediction on an open soccer game database are proved. By using simple statistical methods, the best offensive and defensive teams are successfully evaluated, and the Poisson and Skellam Distribution is verified for fitting the goals. Moreover, feature engineering and four prediction models are conducted to foresee the match outcomes. The results indicate that our feature engineering and the designed Neural Network is effective for the match result prediction.

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Original Research Article

The Forecast of Housing Price in Xi'an Based on Big Data Analysis

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Abstract: Based on the statistical data, the forecast for housing price of Xi'an city is made by identifying 13 different kinds of indicators. The multi-variable regression model and SPSS are used to analyze the data in linear and non-linear way respectively. R2 for both methods are over than 0.9. So we can get the similar conclusion that housing price in Xi'an will not increase dramatically recently and keep stable.

Keywords: Housing Price; Forecast; Big Data

1. Introduction

Based on the crossover development of data collection, storage and analysis, big data technology is recognized by the academic community as an important factor of production that penetrates into various fields. With the rapid rise in the bandwidth of the mobile network, the availability of cloud computing and the Internet, more sensor equipment and mobile terminals are connected to the interconnection network, and the interconnection and intercommunication between the devices have been realized previously. The data generated from this cannot be estimated. In the field of real estate, the process of commercial housing sales also produces abundant data. How to effectively dig the hidden value behind the data and analyze and use these data to predict the trend of future housing price is a hot topic in the research of today's real estate industry.

On January 6, 2014, the state officially approved the establishment of Xi Xian new district in Shaanxi province. At this time, Xi Xian new district becomes a national new district and the seventh largest new district in China. In February 2018, Xi'an was identified as the national central city, and Xi'an was also the starting point of the silk road. Under the joint promotion of several national strategies, the rapid development of Xi'an also laid a solid foundation for its real estate market. Of course, when it develops rapidly, all kinds of problems can't be avoided. How to make the real estate market in Xi'an, which is the central city and the ancient capital of 13 dynasties, develop better and faster becomes an important problem to be solved. It plays an important role for Xi'an's economic development. Therefore, it is necessary to use big data to predict future housing prices in Xi'an[1].

2. Literature review

Joe Peek and James A. Wilcox[2] studied the influence of the first baby boomers on housing price in America. Through the simulation analysis, they thought the housing price would fall when the first American baby boomers became adults. Although the population was large, the actual income of these young people was relatively low. However, when the first baby boomers were getting old, due to the increment of their income

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and the improvement of their purchasing power, the housing price would be enhanced and it would make the housing price higher than the original level.

Cost is the important factor of impacting the housing price, and the increment of cost must boost the housing price increasing. Shi Qun and Fu Jiangbo[3] worked out the trend of housing price in Nantong through the analysis of Nantong housing cost of each factor price trend. Wang Limei[4] analyzed the reason of increasing housing price in China from the angle of housing price composition. He thought the land price, artificial cost, the increment of price of building materials and China's imperfection of industrial tax system resulted in continuously high housing price in China. Sheng Guangheng and Li Xinyong[5] thought the land price and expenses of taxation accounting for 50% of housing price in China led to the high level of housing price.

3. Establishment of database

In order to establish our database to predict the housing price in Xi'an, we carefully looked up the Yearbook of Xi'an from 2000 to 2017[6]. There were many plenty of information and data in the Yearbook in the almost past 20 years, and we chose 14 indicators among them according to the theories and professors' suggestions. The indicators are selling price indices of residential buildings (1999 is 100), GDP (100 million), per capita GDP (Yuan), the value added in construction industry (100 million), total population (10000), population of urban area (10000), vacancy of residence (10000 m^2), floor space of buildings under construction (10000 m^2), floor space of buildings completed (10000 m^2), per capita annual disposable income of urban-absolute number (Yuan), average household size, average number of employed persons.

4. Model establishment

When designing a model to analyze and predict the price of residential buildings, variables should be selected carefully. First of all, dependent variables and independent variables must have the inner linkage, which means the dependent variables must be used to explain the performance of independent variables. Secondly, the number of dependent variables must be suitable for the problem conditions. The more variables we involved in the model, the more general solution we will get to describe the independent variables, but if too much variables are included to calculate the predicting equation, the variance of course will become larger and larger. The best way to deal with this issue is modifying the prediction model to ensure the important variables which with higher significance should be included and used to predict the result.

As we identified previously, 14 indicators may affect the residential pricing of Xi'an city (Shown in the **Appendix 1**). But not all these indicators are independent from each other. So the multi-variable regression model is considered to be used based on the previous government statistical big data.

4.1 Linear regression modeling

The step 1 is to definite the corresponding relationship among the variables. Here the simple linear relation is assumed between residential pricing and each indicator.

The step 2 is to analyze the data using "stepwise" method in SPSS. The linear relationship among these dependent variables may exist due to the economic relation and the limitation of source data. The data collected for this research is not quite adequate because of the limited data uploaded on the website, there is no doubt that some of the variables are not independent. So during model establishment, linear relationship among variables must be taken into consideration. The "stepwise" method here is used to avoid this kind of problem.

The variable which is the most significant is figured out, then other variables will be involved one by one, meanwhile, the test of significance needs to be done after involving one variable. When the significance is no longer increase any more as involving more variables, the "stepwise" stops automatically. The result of stepwise regression analysis is shown as below in **Table 1** (The process of stepwise method is shown in the **Appendix 2**).

Table 1. Model summary

Model	R	R^2	Adjusted R^2	Standard error of estimate	D.W.
1	0.978[a]	0.956	0.953	5.97198	
2	0.989[b]	0.977	0.974	4.44037	2.490
a. Predictor	(constant)	l			
b. Predictor	(constant)	l,m			

The table shows that 2 steps of regression have been made. In the first step, indicator l, which means per capita annual disposable income of urban, has been involved. The R is 0.978, R square is 0.956, and adjusted R square is 0.953. Secondly, indicator m—average household size, has been involved. The R value, R2 and adjusted R2 have increased. No more indicators are involved, that is to say these two indicators contribute most to the residential pricing.

Table 2 shows the ANOVA result, the significance of F value is 0, much less than 0.05.

Table 2. ANOVA

ANOVA

Model		Sum of square	df	Mean square	F	Sig.
1	Regression	12390.175	1	12390.175	347.409	.000[b]
	Residual	570.633	16	35.665		
	Total	12960.808	17			
2	Regression	12665.055	2	6332.527	321.173	.000[c]
	Residual	295.753	15	19.717		
	Total	12960.808	17			

a. Dependent: a

b. Predicator: (constant), l

c. Predictor: (constant), l, m

Then we can analysis the coefficients of the variables and test the significance. From the **Table 3** we can know that the constant in this model is 220.406, coefficient of per capita annual disposable income of urban is 0.002, coefficient of average household size is -43.907, both of the significance of these two indicators are less than 0.05. So the statistical prediction equation is:

$$Y = 220.406 + 0.002 * l - 43.907 * m;$$

Table 3. Regression analyzing result and coefficients

Coefficients						
Model		Unstandardized		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	91.001	2.838		32.060	.000
	l	.002	.000	.978	18.639	.000
2	(Constant)	220.406	34.722		6.348	.000
	l	.002	.000	.996	25.337	.000
	m	-43.907	11.759	-.147	-3.734	.002

a. Dependent variables: a (Residential pricing)

4.2 Model testing of linear regression model

As the P-P diagram shows in **Figure 1**, all points locate in both sides of the line, the distribution curve is a standard normal deviation in the regression standardized residual diagram.

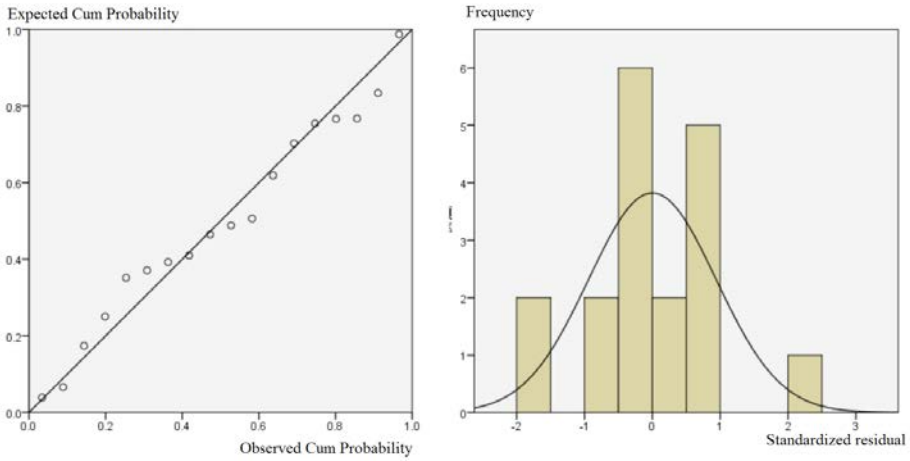

Figure 1. P-P Diagram and regression standardized residual.

4.3 Non-linear regression modeling

Similar as the previous analyzing procedures, a non-linear regression is made to modify the proper model. Assuming that the residential pricing and the indicators have an exponential relationship, so the equation can be written as:

$$Y = a_0 \cdot x_a^{a1} \cdot x_b^{a2} \cdot x_c^{a3} \cdots x_n^{an};$$

Where Y is the residential pricing for each year, a_0, a_1, a_2, …, a_n are the coefficients of each indicator, x_a, x_b, x_c, …, x_n are the independent variables which may affect the dependent variable Y. The exponential relationship of them can be written as:

$$\ln Y = \ln a_0 + a_1 \ln x_a + a_2 \ln x_b + a_3 \ln x_c + \cdots + a_n \ln x_n;$$

Taking logarithm for each variables and analysis through SPSS[7] as the procedures we did when analyzing the linear regression relationship. The result of stepwise regression analysis is shown as below in **Table 4**.

Table 4. Model summary for non-linear regression

Model	R	R^2	Adjusted R^2	Standard error of estimate	D.W.
1	0.991[a]	0.983	0.982	0.028	1.542

a. Predictor (constant) l

The R square is a little bit higher than the R square we got through linear regression method, **Table 5** shows the ANOVA result, the significance of F value is 0, much less than 0.05.

Table 5. ANOVA

ANOVA

Model		Sum of square	df	Mean square	F	Sig.
1	Regression	0.701	1	0.701	917.100	.000[b]
	Residual	0.012	16	0.001		
	Total	0.713	17			

a. Dependent: ln(a)

b. Predicator: (constant), ln(xd)

Then we can analyze the coefficients of the variables and test the significance. From the **Table 6** we can know that the constant for non-linear regression is 3.750, coefficient of "the value added in construction industry" is 0.208, the statistical non-linear regression prediction equation is:

$Y = 42.521 \times x_d^{0.208}$;

Where Y is the residential pricing, x_d is the added value in construction industry of each year.

Table 6. Non-linear regression analyzing result and coefficients

Coefficients

Model		Unstandardized		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.750	0.039		97.331	.000
	Ln(x_d)	0.208	0.007	0.991	30.284	.000

a. Dependent variables: ln(a) (Residential pricing)

As the P-P diagram shows in **Figure 2**, all points locate in both sides of the line, the distribution curve is a standard normal deviation in the regression standardized residual diagram.

4.4 Model testing of non-linear regression model

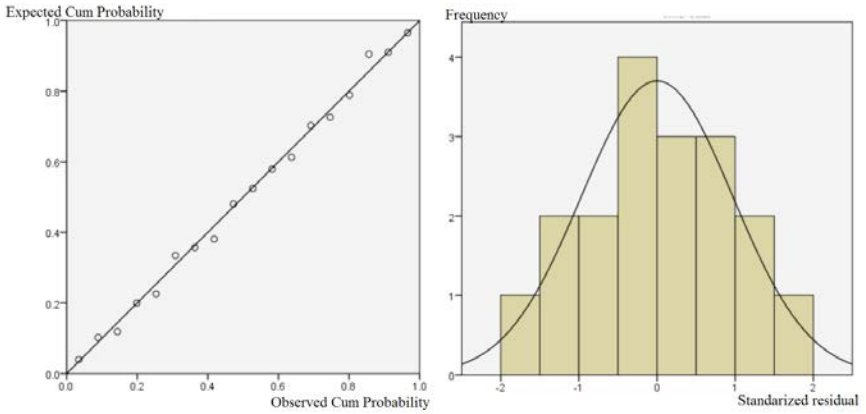

Figure 2. P-P Diagram and regression standardized residual of non-linear regression model.

The exponential relationship between residential pricing and value added in construction industry expresses a mathematical relation between these two variables. The pricing will increase as the value added exponentially. This equation shows the relation between government adjustment methods and pricing.

5. Conclusion analysis

5.1 The aspect of demand

For the linear regression model, we mainly focus on two factors which might influence the housing price in Xi'an. They are "per capita annual disposable income of urban-absolute number (Yuan)" and "average household size". Although the Xi'an government encourages talents to settle down and has introduced a series of policies on talent introduction recently, the talents introduced are almost young single people or young couple. It will lead to the little decrement of average population of each household. In other word, the demand of commercial house market in Xi'an will go down relatively. In the meantime, the development of economy in Xi'an has slowed down, so the per capita annual disposable income of urban will not increase significantly in the short term. The conclusion of it is that the housing price in Xi'an for the coming years will not increase dramatically.

5.2 The aspect of supply

For the non-linear regression model, the most important factor is "the value added in construction industry". The value added in construction industry is related to the government regulation, and its effect on housing price is exponential. In recent years, real estate industry has developed rapidly in Xi'an, and the developers are scrambling to build commercial house in Xi'an, so that it leads to the shortage of land resources. And with the reasonable government regulation, the development of commercial housing market in Xi'an could be slow down and the housing price will remain stable and not increase significantly.

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Appendix 1

Indicators	Descriptions
	(all data are cited in the web[6] from 2000 to 2017)
a	Selling price indices of residential buildings (1999 is 100)
b	GDP (100 million)
c	per capita GDP (Yuan)
d	The value added in construction industry (100 million)
e	total population (10000)
f	population of urban area (10000)
g	vacancy of residence (10000 m^2)
h	floor space of buildings under construction (10000 m^2)
i	residential buildings (10000 m^2)
j	floor space of buildings completed (10000 m^2)
k	residential buildings (10000 m^2)
l	per capita annual disposable income of urban-absolute number (Yuan)
m	average household size
n	average number of employed persons

Appendix 2

Correlation

		a	b	c	d	e	f	g	h	i	j	k	l	m	n
Pearson correlation	a	1.000	.965	.966	.962	.968	.941	.593	.955	.974	.848	.854	.978	-.024	.903
	b	.965	1.000	.998	.998	.945	.951	.757	.996	.989	.927	.919	.987	.156	.817
	c	.966	.998	1.000	.999	.945	.943	.752	.998	.994	.922	.917	.991	.161	.824
	d	.962	.998	.999	1.000	.937	.937	.754	.998	.993	.924	.918	.989	.171	.812
	e	.968	.945	.945	.937	1.000	.977	.649	.932	.943	.830	.830	.948	-.054	.939
	f	.941	.951	.943	.937	.977	1.000	.724	.936	.927	.873	.864	.933	-.021	.873
	g	.593	.757	.752	.754	.649	.724	1.000	.773	.710	.827	.801	.681	.411	.438
	h	.955	.996	.998	.998	.932	.936	.773	1.000	.993	.931	.924	.987	.180	.802
	i	.974	.989	.994	.993	.943	.927	.710	.993	1.000	.906	.906	.995	.138	.840
	j	.848	.927	.922	.924	.830	.873	.827	.931	.906	1.000	.997	.883	.328	.679
	k	.854	.919	.917	.918	.830	.864	.801	.924	.906	.997	1.000	.881	.317	.693
	l	.978	.987	.991	.989	.948	.933	.681	.987	.995	.883	.881	1.000	.124	.852
	m	-.024	.156	.161	.171	-.054	-.021	.411	.180	.138	.328	.317	.124	1.000	-.207
	n	.903	.817	.824	.812	.939	.873	.438	.802	.840	.679	.693	.852	-.207	1.000
Significance (single tail)	a	.	.000	.000	.000	.000	.000	.005	.000	.000	.000	.000	.000	.463	.000
	b	.000	.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.269	.000
	c	.000	.000	.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.262	.000
	d	.000	.000	.000	.	.000	.000	.000	.000	.000	.000	.000	.000	.249	.000

	e	.000	.000	.000	.000	.	.000	.002	.000	.000	.000	.000	.000	.416	.000
	f	.000	.000	.000	.000	.000	.	.000	.000	.000	.000	.000	.000	.468	.000
	g	.005	.000	.000	.000	.002	.000	.	.000	.000	.000	.000	.001	.045	.034
	h	.000	.000	.000	.000	.000	.000	.000	.	.000	.000	.000	.000	.238	.000
	i	.000	.000	.000	.000	.000	.000	.000	.000	.	.000	.000	.000	.293	.000
	j	.000	.000	.000	.000	.000	.000	.000	.000	.000	.	.000	.000	.092	.001
	k	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.	.000	.100	.001
	l	.000	.000	.000	.000	.000	.000	.001	.000	.000	.000	.000	.	.312	.000
	m	.463	.269	.262	.249	.416	.468	.045	.238	.293	.092	.100	.312	.	.204
	n	.000	.000	.000	.000	.000	.000	.034	.000	.000	.001	.001	.000	.204	.
Number of cases	a	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	b	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	c	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	d	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	e	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	f	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	g	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	h	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	i	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	j	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	k	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	l	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	m	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	n	18	18	18	18	18	18	18	18	18	18	18	18	18	18

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Original Research Article

Shortcomings and Improvement Suggestions of China's Statistical Management System under the New Situation

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Abstract: According to some researches, in the daily management work, statistical management work, as one of the important basic tasks, is conducive to helping relevant departments to effectively understand and grasp the real level of people's daily life, and has important guiding significance for the development and implementation of related work. In recent years, driven by economic development, great changes have taken place in informatization level and interest pattern. Based on this, the investigation objects and data information involved in statistical work are becoming increasingly complex, which leads to a substantial increase in the difficulty of statistical work in China, and then puts forward higher demands for the professional ability of statistical departments. In this article, the statistical management system in China under the new situation is taken as the breakthrough point, and the shortcomings in the statistical management system are deeply explored and analyzed. At the same time, the corresponding improvement suggestions are put forward, aiming at further improving and perfecting the statistical management system, to lay a solid foundation and guarantee for the further development and prosperity of China's economic and cultural work.

Keywords: Statistical Management System; Work Status; Main Points of Work; Deficiencies and Suggestions

As one of the important people's livelihood work in China, the development and implementation of statistical management is conducive to helping relevant departments to effectively understand the current social life and people's living needs in China, and has a good guiding role for the formulation and implementation of relevant policies. In recent years, with the continuous improvement and optimization of the economic development system, the market structure in China has gradually shown a diversified trend. Based on this, the amount of data and information generated in social market life has greatly increased, thus greatly improving the difficulty of statistical management. In response to this problem, the relevant statistical departments should actively adjust and improve the statistical management system to further enhance the government's mastery of the needs of the people[1], thus ensuring that the relevant statistical work can better meet the current needs of China's social development for statistical work.

1. The current shortcomings in China's statistical management system

1.1 Traditional data statistics method unable to meet the needs of data statistics

In the statistical management work, with the continuous improvement and optimization of economic development level, the amount of data involved in China's social statistical work is gradually increasing. Based on

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this, the traditional data statistical management mode can no longer meet the current social statistical needs reasonably. At the same time, a large number of data show that with the increasing amount of daily social information data, the traditional statistical model is often difficult to reasonably meet the statistical management needs of relevant departments for dynamic data, leading to the delay in the results of statistical work, which is not conducive to the scientific formulation of statistical plans by relevant departments according to statistical results. In addition, from the perspective of statistical technology, the technology used at present in China's statistical management work is relatively backward, mainly based on human statistics. Based on this, a large amount of data and information are often difficult to be processed in time, making it difficult to guarantee the scientificity of relevant calculation results.

1.2 Low ability of basic statistical work not conducive to the reasonable collection of original statistical data

Researchers pointed out that the current development level of China's base statistical institutions is relatively low. Meanwhile, due to the influence of economic development, there is no basic statistical institution established and improved in some remote and underdeveloped areas in China, leading to the relatively weak statistical ability of data information in relevant areas, which is not conducive to the effective guarantee of the rationality of statistical work[2]. because of this problem, it is often difficult for grass-roots data statistics departments to effectively collate and calculate the original data reasonably, which is not conducive to the effective guarantee of scientific and accurate follow-up statistical work, and has a very adverse impact on the comprehensive quality of statistical work.

1.3 Imperfect statistical management system increasing the interference in statistical work

From the point of view of statistical management system, there are many leadership problems at present in China's statistical management work. Based on this, in the process of data statistical information inquiry, because the statistical department is led and influenced by many departments, there is a problem of "counting by many departments" in related data statistical work. In view of this problem, as there are certain differences in the understanding and starting point of statistical work among various departments, certain differences exist in the results of statistical data, which is not conducive to realizing the unified control of relevant information by statistical managers, and has a negative impact on the accuracy of statistical results of data information[3]. Moreover, in the process of statistical management, some departments often have the problem of false reporting of statistical data for the sake of their own interests, negatively effecting the authenticity of statistical work results, which is not conducive to the competent departments to effectively realize a reasonable understanding of the real development of various undertakings in China, and has a very negative impact on the subsequent development of statistical management and the formulation of coping strategies.

1.4 The lack of capacity of statistical staff hindering the improvement of the comprehensive quality of statistical work

As the main implementers of statistical management, the ability of statistical management staff often has an important impact on the quality of statistical management. On this issue, the researchers said that at present, the comprehensive ability of data management statistics staff in China is relatively weak, which is mainly manifested in the lack of reasonable understanding of statistical expertise by some staff and their lack of sufficient sense of responsibility and self-motivation in their daily work, thus causing extremely adverse effects on statistical results. At the same time, a large number of studies have pointed out that due to the lack of professional ability of staff, it is often difficult for them to effectively discover and deal with related problems in time in the process of data statistical management, leading to the application of erroneous data in statistics, and further causing extremely adverse effects on the follow-up statistical work. From the perspective of development, this problem directly leads to a significant reduction in the value of the follow-up statistical work.

2. Strategies to improve the level of enterprise statistical management

2.1 Actively introduce advanced technologies and optimize the statistical processing effi-

ciency of data information

On the whole, in the statistical management work, in order to further realize the reasonable control of statistical work, relevant departments should actively explore and innovate the statistical management technology, so as to effectively and reasonably introduce and apply advanced technology in daily work, and then realize the effective improvement of statistical work efficiency[4]. On this issue, the researchers pointed out that the development of information technology provides a strong driving force for improving the technical level of statistical work. Based on this, relevant departments should actively introduce information technology reasonably to effectively promote the establishment and formation of the "Internet plus statistics" model, for laying a good foundation and guarantee for improving the comprehensive efficiency of statistical work. Practice shows that through the effective application of information technology, relevant departments can reasonably realize the establishment and optimization of statistical management system, thus utilizing information technology to realize the timely management and dynamic monitoring of massive statistical data, which has a good promotion significance for improving the scientificity of statistical results.

2.2 Improve the design of basic statistical work to ensure the collection quality of data information

In the process of statistical management, the development and implementation of the related work of grass-roots statistical departments, as one of the important components, have an important impact on the results of statistical work. Regarding this, in order to further improve and optimize the quality of statistical work, relevant departments should actively do a good job in the construction of grassroots statistical departments, and at the same time formulate corresponding work plans in combination with objective conditions, so as to guide grassroots statistical departments to realize the orderly development and rational implementation of statistical work, and then lay the foundation and guarantee for improving and perfecting the comprehensive quality of statistical work[5]. In this regard, a large number of practices have shown that through the formulation of daily work plans, grass-roots statistical departments can set reasonable and clear objectives of their daily work, which will play a good role in promoting the orderly development of statistical work. At the same time, through the improvement of the relevant work management system, the grass-roots statistical departments can better find and correct the problems in their own statistical work in time, which is of positive significance to the improvement of the scientificity of statistical work and the accuracy of data.

2.3 Rationally perfect the statistical management system to provide power for the development of statistical work

From an institutional point of view, in order to further improve and optimize the level of statistical work, relevant departments should actively formulate and improve the statistical management system, so as to reasonably connect all links of statistical work and lay a solid foundation and guarantee for the orderly development of statistical work. In this process, the statistical departments should effectively clarify the relevant working principles and leading departments, so as to avoid the interference of multiple departments in statistical work, and avoid the distortion of data information. At the same time, through the establishment and improvement of relevant systems, the statistical authorities can further clarify the work authority of relevant grassroots statistical staff, thus effectively ensuring that they can get assistance from relevant departments in their daily work, and laying the foundation and guarantee for the orderly development of statistical work and the improvement of efficiency and quality of related work.

2.4 Do a good job in building the team of statisticians to rationally improve the professional ability of the statistical team

On the issue of statisticians, in order to reasonably meet the needs of statistical work, relevant departments should actively conduct regular assessments of statisticians, so as to effectively understand the working quality of statisticians, and further enhance and improve their professional ability[6]. Regarding this, relevant departments can help statisticians to further understand the importance and related value of statistical work through the professional ability training, and at the same time guide them to understand and apply statistical professional knowledge, which is of great significance to the promotion and optimization of statisticians' professional

quality. In addition, through the cultivation of professional ability, statistical staff can make better use of relevant professional knowledge to effectively analyze and calculate objective data in their daily work, and at the same time reasonably and timely deal with unexpected situations, which can guarantee the authenticity of statistical results.

3. Conclusion

In recent years, with the continuous prosperity and development of the market economy, the amount of statistical information data involved in social life has gradually increased. Based on this, the traditional statistical management model has been unable to meet the market management needs reasonably[7]. Therefore, relevant departments should pay attention to statistical knowledge, and actively adjust and improve the contents of statistical work in combination with objective conditions, so as to lay a solid foundation for improving the comprehensive level of statistical work. This article analyzes and discusses the shortcomings in China's statistical management system at present. During the research process, by discussing the causes of related problems, the researchers said that in order to further improve and optimize China's statistical management system, relevant departments should effectively adjust and improve the statistical management system from multiple aspects, so as to lay a solid foundation and guarantee for the improvement of China's statistical level and provide good assistance for the formulation and improvement of the follow-up international livelihood strategy.

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Original Research Article

Analysis on the Current Situation and Optimization Strategy of Statistics Teaching in China

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Abstract: As one of the important teaching subjects, the development and implementation of statistics teaching is conducive to the further realization of the training and construction of China's statistical talents, and has an important role in promoting China's social development and economic prosperity. Based on this, people from all walks of life have recently paid more and more attention to the training of statistics talents, thus effectively promoting the development and implementation of statistics teaching reform in China. In this article, the development of statistics teaching in colleges and universities in China is deeply explored and analyzed. During this process, the main shortcomings in statistics teaching in China are explored in detail, and corresponding optimization strategies are formulated, aiming at further improving and optimizing the quality of statistics teaching.

Keywords: Statistics; Teaching Work; Development Status; Optimization Strategy

Driven by economic development in recent years, the amount of data and information involved in social engineering in China is relatively large. Based on this, in order to better realize the reasonable control of related social work, all sectors of society pay more attention to statistics, thus effectively optimizing statistics teaching in China. A lot of analysis has indicated that due to the influence of diversified factors, the current quality of statistics teaching in China is relatively weak, which is not conducive to the effective training of talents in statistical schools[1]. Therefore, in order to effectively deal with these problems, relevant educators should actively do a reasonable analysis and exploration of statistics teaching, so as to adjust the teaching methods according to the actual situation of students, and lay a solid foundation and guarantee for the improvement of students' learning quality.

1. The value of statistics teaching

From the perspective of development, with the continuous improvement and optimization of social and economic level, the amount of data and information involved in social engineering and daily work in China has gradually expanded. In view of this problem, through the rational introduction and application of statistical knowledge, relevant staff can further realize the reasonable statistics and effective control of engineering data information, thus laying a solid foundation and guarantee for the effective formulation and implementation of subsequent decision-making, which can promote China's social and economic development[2]. At the same time, a large number of data show that through the effective introduction of statistical knowledge, managers can further actively control the data, thus laying a solid foundation and guarantee for China's economic development.

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2. The main problems in statistics teaching

2.1 The traditional educational concept of teachers, and lack of attention to the teaching value of students

As the organizer of education, teachers' educational ideas often have an important impact on the direction of teaching work. At present, in statistics teaching in China, some teachers are greatly influenced by traditional educational ideas. Therefore, in the teaching work, they often lack reasonable attention to the teaching value of students, which leads to the teachers' failure to effectively carry out the interaction between teachers and students in the process of teaching link design. Due to this problem, students' classroom participation in the process of learning statistical knowledge is relatively low, which is not conducive to the rational mobilization and cultivation of students' thinking consciousness, and has a very negative impact on the improvement of students' mastery of statistical knowledge.

2.2 A single classroom teaching model which is not conducive to creating a good teaching atmosphere

From the perspective of classroom teaching mode, the current mode in the statistics teaching used by a large number of teachers is relatively simple, mainly traditional cramming teaching. Under this teaching mode, the interest of classroom teaching is often relatively weak, which is not conducive to the reasonable cultivation and mobilization of students' learning interests, and has a very negative impact on the cultivation of students' subjective initiative in knowledge learning. At the same time, students are passively accepting knowledge most of the time, making it difficult for them to utilize their own thinking to deeply analyze and explore relevant statistical knowledge, and hindering the improvement of students' mastery of statistical knowledge.

2.3 The low level of teaching technology limiting students' understanding of knowledge

From the perspective of teaching technology, in the process of statistics teaching in China, the teaching mode and technical level currently used by some teachers are relatively low. In the specific teaching practice, the teaching mode used by teachers is mainly traditional blackboard teaching. Under this teaching mode, it is often difficult for students to effectively realize the intuitive and clear understanding of relevant knowledge, which is not conducive to the reasonable construction and improvement of students' statistical knowledge structure, thus causing extremely adverse effects on the optimization of students mastery of these knowledge[3]. At the same time, under the traditional teaching mode, the efficiency of teaching work is relatively low, making it difficult to effectively improve the quality of classroom teaching, and negatively effecting the development and optimization of students' understanding level of statistical knowledge.

2.4 Lack of teaching evaluation, hindering the reasonable improvement of teaching methods

At present, in the process of statistics teaching in China, some teachers lack enough attention to teaching evaluation, causing the failure to effectively carry out the teaching evaluation in their daily teaching process. From the development point of view, the existence of this problem has a very negative impact on the reasonable adjustment and improvement of statistics teaching methods in China, which limits the effective improvement of students' knowledge understanding and mastery, and has a negative impact on the construction and improvement of statistics talents in China. On the other hand, due to the lack of teaching evaluation, it is difficult for most students to fully find out their own misunderstanding of knowledge, which is not conducive to the adjustment and reform of students' knowledge learning methods, and has a negative impact on the cultivation and mobilization of students' thinking ability.

3. Main strategies to optimize the quality of statistics teaching

3.1 Properly changing educational concepts and giving full play to the teaching value of student groups

From the perspective of teachers, in order to further improve the comprehensive quality of statistics teaching, teachers should actively introduce advanced teaching concepts in the teaching process, so as to correctly understand the value of students in the teaching process, effectively realize the rational play of students' teaching

role and lay a solid foundation and guarantee for students understanding of statistics knowledge and further improvement and optimization of living standards[4]. At the same time, teachers can better guide students to conduct in-depth analysis and thinking on relevant statistical knowledge in the teaching process, which can promote the improvement of students' knowledge understanding level. For example, in the daily teaching process, through the design of questioning session, teachers can help students make in-depth analysis and exploration through some breakthrough points by using statistical knowledge. It can lay a solid foundation and guarantee for the improvement of students' application ability of statistical knowledge.

3.2 Promoting the exploration of teaching mode and promoting the diversified development of teaching work

In the process of classroom teaching, in order to further cultivate and mobilize students' interest in learning knowledge, teachers should actively study and analyze the relevant education and teaching modes, effectively apply them to the classroom teaching of statistics, thus further innovating and improving the classroom teaching mode, and laying a solid foundation for the improvement of students' knowledge mastery level[5]. The diversified development of teaching mode is conducive to meeting students' knowledge learning psychology, and has a good role in promoting the effective stimulation of students' knowledge learning interest. On this issue, a large number of practices show that teachers can better impart relevant knowledge through reasonable exploration of teaching mode, and guide students to realize effective understanding of relevant knowledge in the process of practical activities, which is of positive significance for promoting students' knowledge mastery level. For example, through the introduction of the group competition mode, teachers can help students to further realize the cultivation of knowledge learning and exploring subjective initiative, which is of good value for optimizing students' awareness of knowledge exploration.

3.3 Introducing advanced teaching techniques to guide students to fully understand the relevant knowledge

From the technical point of view, in order to better help students realize intuitive and clear understanding of statistical knowledge, teachers should actively introduce and apply relevant teaching technologies in the teaching process, so as to better realize the presentation of abstract statistical knowledge and provide assistance for students to improve their knowledge understanding level. For example, in the process of teaching statistical knowledge, through the introduction of practical cases, teachers can create a good atmosphere for students to apply statistical knowledge, so as to guide students to realize a clear understanding of the application needs of statistical knowledge more intuitively[6]. In this process, through the application of multimedia teaching equipment, teachers can help students build statistical knowledge models of related cases. Based on this, the relevant models can be used to help students more intuitively realize the understanding and cognition of the corresponding statistical knowledge, which has a positive role in promoting students' ability to apply statistical knowledge.

3.4 Actively carrying out teaching evaluation to achieve targeted adjustment of teaching methods

In order to further promote the teaching level of statistics, teachers should actively pay attention to the teaching evaluation and make a clear assessment and rational understanding of the students' mastery level of statistical knowledge according to their relevant performances. It will help to guide students to further understand and effectively master statistical knowledge. Regarding this, the researchers pointed out that through the development and implementation of teaching evaluation, teachers can further realize the construction of teaching work system, which can accelerate the improvement of students' knowledge acquisition level[7]. On the other hand, from the students' point of view, through the implementation of relevant teaching evaluation links, students can effectively find out and correct their misunderstanding of knowledge, thus promoting students' knowledge mastery level.

4. Conclusion

From the perspective of development, with the continuous improvement and optimization of economic development level in recent years, the amount of data and information involved by all sectors of society has in-

creased geometrically. In the face of this development trend, in order to better realize the development and implementation of relevant management work, the value of statistical work has been strengthened as never before. In order to further realize the reasonable training of statistics talents in China, educators should actively analyze and explore the current situation of teaching work[8]. In terms of specific practices, teachers should start from the perspectives of educational philosophy, teaching mode, teaching technology and teaching evaluation, and conduct in-depth exploration and analysis in combination with the problems existing in the current teaching work, so as to improve and perfect teaching strategies, thus laying a foundation for the promotion of students' mastery of statistical knowledge.

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Original Research Article

On the Problems and Countermeasures in the Development of Corporate Statistical Management

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Abstract: Under the guidance of market economy, Chinese enterprises have developed vigorously in recent years. Based on this, the amount of data in daily operation and management of enterprises has been continuously increased. Corporate managers have paid more attention to enterprise statistics to fully understand the development of enterprises, thus effectively promoting the effective exploration and optimization of corporate statistics. However, a large number of practices have indicated that there are some deficiencies in the statistical management of enterprises in China, which in turn limits the optimization of the statistical work of enterprises. Hence, in order to further meet the needs of corporate statistical work, relevant staff should actively reflect on statistical work and formulate corresponding optimization strategies. This article analyzes the current situation of statistical management in Chinese enterprises, and puts forward corresponding optimization countermeasures, aiming at further promoting the quality of statistical work.

Keywords: Enterprise Management; Statistical Work; Status Quo; Main Problems; Countermeasures

Driven by economic development, the scale and number of enterprises in China have been expanding in recent years. Based on this, a large number of data have been produced in the daily production and operation process of enterprises. In order to realize the reasonable control of relevant data, enterprises should actively carry out the statistical work effectively, so as to help corporate leaders better grasp the relevant corporate data and information, and then realize the formulation and improvement of corporate decision-making, as well as laying a solid foundation for the healthy development of enterprises. However, there are still some shortcomings in some Chinese enterprises in the process of statistical work, which greatly limits the improvement of the comprehensive level of corporate statistical work[1]. Therefore, enterprises should actively and reasonably examine the current situation of statistical work to better meet the needs of corporate statistical work in the new period, and through formulating and improving countermeasures, to lay a foundation for the sound development of enterprises.

1. The main problems in the statistical management of enterprises

1.1 Lack of reasonable attention to statistical work in the traditional business philosophy

As the main maker of corporate strategic plan, the management idea of managers often plays a guiding role in corporate management. From the perspective of management philosophy, due to the influence of traditional business philosophy, some corporate managers in China pay relatively low attention to corporate statistical work. In the daily management process, they devote their main energy to production and market development, resulting in relatively weak comprehensive quality of cor-

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porate statistical work, which is not conducive to its orderly development and implementation. At the same time, due to the lack of attention of corporate managers, relevant departments and employees of enterprises often lack reasonable attention to statistical work, greatly limiting the orderly development of corporate statistical work.

1.2 Lack of statistical personnel, limiting the improvement of the quality of statistical work

The professional ability of corporate statistical staff in China is relatively weak, and it is difficult for them to effectively carry out relevant statistical work in their daily work. At the same time, in some enterprises, the entry barriers for statisticians are relatively low, resulting in the uneven comprehensive quality of statisticians[2]. Among them, some statistical staff have not received systematic training of statistical professional knowledge, making it difficult for them to sort out data information according to relevant professional knowledge in statistical work, which is not conducive to the reasonable guarantee of the authenticity of statistical work, and has an adverse impact on the promotion of the comprehensive level of corporate statistical work. In addition, due to the lack of professional quality, some statistical staff often lack a reasonable understanding of statistical work, affecting the reasonable guarantee of the quality of statistical work.

1.3 Lack of statistical management system is not conducive to the orderly conduct of statistical work

In terms of corporate management system, most enterprises in China have not achieved the formulation and improvement of relevant management systems in statistical work. As a result, in specific work, statisticians often only rely on their work experience to carry out statistical work in an orderly manner, which leads to the randomness of related work and is not conducive to guaranteeing the rigor of statistical work. Moreover, due to the lack of statistical work system, it is often difficult for personnel to make a reasonable evaluation of their work in the process of statistical work, and to effectively find out and timely correct problems, further hindering the improvement of the comprehensive quality of statistical work[3]. On the other hand, in the practice of statistical work, due to the lack of relevant systems, it is often difficult for statisticians to cooperate with involved departments, which is not conducive to the collection and analysis of statistical data and information, and the improvement of the quality of corporate statistical work.

1.4 Weak statistical supervision hindering the adjustment of statistical work

In the statistical management, some Chinese enterprises have not reasonably realized the effective formulation and improvement of the supervision team of corporate statistical work for controlling the cost, leading to the vacancy of related positions. Due to the lack of supervision team, it is often difficult for enterprises to effectively control the authenticity of relevant statistical data and results in statistical work, which leads to hidden dangers in the authenticity of corporate statistical information data. Because of these problems, it is often difficult for corporate managers to make relevant decisions and development directions, laying a serious potential safety hazard in the subsequent development of enterprise.

2. Strategies to improve the level of corporate statistical management

2.1 To change the business philosophy and strengthen the emphasis on statistical work

In order to realize the orderly development and rational implementation of corporate statistical work, corporate leaders should take the lead in making rational changes in their own management concepts, and correctly recognize the significance of statistical work for corporate development, so as to effectively promote the rational implementation of statistical work and provide a new impetus for the improvement of corporate statistical work quality[4]. In addition, corporate leaders should actively pay more attention to the statistical work of enterprises, and effectively realize the regular supervision of statistical data, so as to further strengthen the enthusiasm and sense of professional mission of corporate statistical staff, and lay a solid foundation and guarantee for improving the comprehensive quality of corporate statistical work. For example, through the study of advanced management concepts, business leaders can fully understand the guiding significance of statistical work for corporate decision-making, and actively establish and improve the statistical department.

2.2 To strengthen the training of statisticians and build a high-quality statistical team

From the staff's point of view, in order to effectively meet the needs of corporate statistical management, enterprises should actively strengthen the rational construction of statistical staff team, so as to enhance the professional quality of statistical staff, and lay a foundation for the orderly development of statistical work and the scientific guarantee of relevant statistical results. On this issue, enterprises should start from two aspects. On the one hand, they should actively build a reasonable team of internal statistical staff. In terms of specific practices, enterprises can regularly organize relevant statistical staff to conduct in-depth study and inquiry on statistical work knowledge, guiding them to better understand statistical knowledge, and to apply relevant knowledge to solve problems in corporate statistical work[5]. On the other hand, enterprises should actively seek the rational introduction of high-level statistical professionals, so as to realize the effective role of models and provide power for the promotion of the comprehensive quality of corporate statistical work teams. On this issue, corporate human resources management departments should pay more attention to statistical management talents, and at the same time appropriately raise the salary level of related talents, to strengthen the attraction of enterprises to statistical management talents and provide guarantee for the cultivation of corporate statistical personnel.

2.3 To improve the statistical work system for ensuring the smooth development of statistical work

On the system issue, enterprises should effectively establish and perfect the statistical management system, so as to effectively build the statistical management system according to the objective conditions of enterprises, and thus reasonably ensure the orderly development and reasonable implementation of the statistical management of enterprises. In the process of formulating relevant systems, enterprises should actively clarify the rights and responsibilities of statistical management staff, ensuring that they can reasonably get active cooperation from relevant departments of enterprises in their daily work, so as to reduce the difficulty of data acquisition and provide assistance for improving the comprehensive quality of statistical work. At the same time, through the formulation and improvement of relevant systems, enterprises can further help statistical management staff, clarify their responsibilities and missions, and guide them to actively carry out related work in an orderly manner in daily statistical work[6]. In addition, through the effective establishment of relevant systems, it will help staff to better understand the statistical work, providing guarantee for the integration of corporate statistical work in daily work.

2.4 To establish a statistical supervision team for achieving scientific improvement in statistical work

Enterprises should actively strengthen the effective supervision of statistical work in their daily work to effectively carry out and implement the orderly management. In terms of specific practices, they should organize relevant staff to set up a supervision and management team, so as to orderly supervise the relevant work in all aspects of corporate statistical work, and achieve effective improvement of related issues and provide guarantee for the improvement of the comprehensive quality of corporate statistical work[7]. On this issue, through the orderly development of supervision work, corporate managers can further realize the effective control of corporate work, and at the same time, find out the shortcomings in corporate statistical management work in time and correct them reasonably, thus providing assistance for the improvement of the level of corporate data statistics work.

3. Conclusion

Driven by the market economy, the scale of Chinese enterprises is now gradually expanding. Based on this, the statistical work has become an important issue of most Chinese enterprises in the development process. The current comprehensive quality of China's corporate management level is relatively weak. Based on this, it is often difficult for enterprises to effectively realize a clear understanding of their own business conditions, and is not conducive to the formulation and perfection of development strategies, as well as the sound development of enterprises[8]. In order to solve this problem, this article makes an in-depth analysis based on a large number of enterprises' statistical work. It has been concluded that in order to better improve the comprehensive level of

corporate statistical work, enterprises should actively adjust and improve the statistical work from multiple aspects.

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