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The Fate of The Poultry Industry Forecasting in Kurdistan Region by Using Neural Networks

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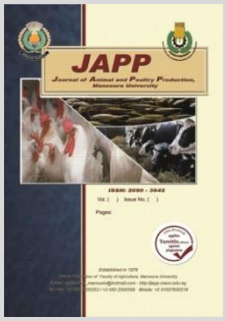

ABSTRACT

The most recent studies demonstrate the predictive power of neural-networks. Used neural-networks were success to predict of economic results trends, and the neural-networks have an advantage, whereas its can the nonlinear functions approximate. In doing so, it can provide the alternative analysis regression of the biology of modeling growth. Some Few searches were conducted by neural-networks on the animal growth model artificially. The present study was conducted to compare, the parameters of various associated input performance. For example, the chickens price/kg in poultry farm, the price/tons of poultry feed, the quantity import of white meat, and the numbers of chickens slaughtered, which is expected to be of help in future for our study. We applied series of data/monthly for rates exchange in between 2009 to 2014. Aims of recent study in the first place; to develop ANN- based models to study the Fate of the Poultry Industry Forecasting in Kurdistan Region. Secondly, through previous data we can recommend that, neural-networks method, more suitable in chicken industries, than the simple analysis regression, if accurate data are collected and processed in such forms.

Keywords: Neural Networks, Poultry Industry, Forecasting.

INTRODUCTION

Exchange rates forecasting is very hard problem theoretically and practically, attributed to political and economic factors effect on the rates of exchange. Some searches on econometric and statistical models through this time, were developed on exchange rates forecasting, this problems considered as the major one confrontation in this area (12).

Currently, the agriculture development and industries of petroleum were very effected on stability of economic development in this region. Between of agriculture sectors, sub-sector of meat farming very beneficial for promoting this industry, it is characterized by secondary products like, eggs and manures. Moreover, rate of poultry meat consumption higher when compared with others like, the beef, lamb and birds, etc… (13).

Neural-Networks (ANNs) were applied artificially in many fields, Includes, agriculture sciences, engineering sciences, life sciences, and technology sciences in addition to medicine sciences.

Poultry manure from chicken farms can be a major source of groundwater pollution, and this may have widespread implications especially when farms use nearby groundwater (5).

Neural-Networks (ANNs) processing methods is a parallel, and easily models learn as in an example (2).

The current work aim to Neural-Networks (ANNs) develops According to study models of Poultry Industry Fate and forecasting in Kurdistan Region, and through the results, we can recommend that neural-networks more suitable method in chicken industry than the simple analysis regression if the accurate data are collected and processed in such forms.

MATERIALS AND METHODS

In this study we analyze the performances of different correlated information's parameter, e.g. price (kg) in chicken's poultry farm, the price (tons) of poultry feed, the quantity import of white meat, and the numbers of chickens slaughtered in Kurdistan Region between 19.01.2009 to 07.08.2014. The data series are obtained from the Directorate of Veterinary Medicine and its affiliated departments of Kurdistan Region.

Data selection:

Time lag: researchers introduced a time lag in the study because the data were too untidy and difficult to get them. As such, researchers set 5 months of data in the study. Therefore, the months data mentioned later in this study refer to the months data for rearrangement.

Model Development:

Neural-Networks (ANNs) Model. This model considered a system of processing to implement activities like those of human brains by some replicating operations and biological neurons connectivity (16).

Human beings also have entry units connected to the outside world, the five senses. As well as networks artificial neuralgia has a pathway in the processing units in which calculations are carried out the weights are determined by the reaction of each of the references to the network. Units the input layer is called the incoming input

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layer, and the share units are a thaw layer, which you take out (10).

The network is called the output layer. Each of these layers (Figure 1) has a layer of interconnect which binds each layer to the next layer in which the weights of each interconnect are adjusted. It contains the grid is on only one layer of input units, but they may contain more than one layer of layers Treatment (11).

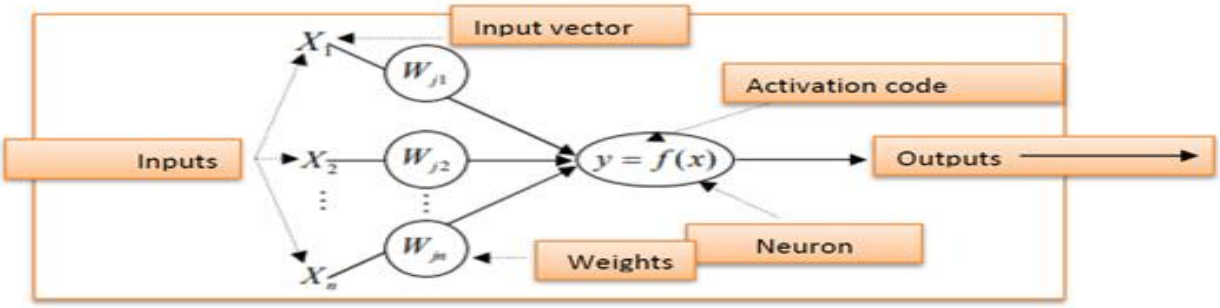

Figure 1. Components of artificial neural networks

Note that the neuron consists of:

Y= f (Xi, Wi)……(1)

Whereas:

Xi= Input, Wi= Weight, F= Activation code, Y= Output

F(Y) = if Y ≥ threshold 1

if Y < threshold 0

Often the function activation is specific to the extent [-1,1],[0,1] This function can be linear or nonlinear and may be on several models

1- Hyperbolic tangent : $f(x)= \tanh(x) =1- \frac{2}{1+\exp(2x)}$ .....(2)

2- Logistic $f(x)= 1-\frac{2}{1+\exp(-x)}$ ..... (3)

3- Threshold f(x) =0 if x <0 , 1 otherwise ..... (4)

4- Gaussian $f(x) = \exp(\frac{x2}{2})$ .....(5)

The software data has been used for validation into the model and calculates the predictive values for months of each parameter, which transferred into Minitab to obtain the regression equation.

RESULTS AND DISCUSSION

Table 1,2, and 3 summarizes the statistical results for the data included the price (kg) of chickens in the field for 5 years in Iraqi dinar, Price (tons) Poultry feed for 5 years, And the number of the slaughtered chickens for (5) years

It was clear that annual average rate of price of chickens in the field was not linear caused by the different social and economic problems, experienced different sectors stakeholders.

Table 1. the price (kg) of chickens in the field for 5 years in Iraqi dinar

Month	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014
January	2850	2900	3000	3500	3000	3000
February	2800	2900	2900	3650	2500	3500
March	3200	3450	3000	3600	3000	3750
April	2350	2500	2850	3000	2700	2350
May	2650	2900	3650	3100	3100	2250
June	2900	3100	3500	3100	2750	2700
July	3400	3600	4000	4550	3800	2750
August	2600	3100	3800	3900	4000	2500
September	3400	3500	3500	3500	4000	3400
October	2750	2600	2950	2850	3300	3500
November	2850	2850	3000	3100	2500	2250
December	2600	3100	3150	3000	2600	2150

Table 2. The Price (tons) Poultry feed for 5 years.

Month	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014
January	500000	500000	535000	615000	722000	685000
February	500000	530000	600000	600000	722000	685000
March	500000	550000	600000	610000	685000	670000
April	475000	500000	610000	625000	670000	670000
May	480000	560000	590000	625000	655000	670000
June	480000	560000	590000	625000	660000	670000
July	500000	570000	590000	640000	660000	690000
August	500000	575000	590000	732000	685000	635000
September	500000	550000	590000	722000	685000	635000
October	500000	580000	600000	722000	685000	635000
November	500000	568000	600000	722000	685000	630000
December	530000	590000	615000	722000	685000	630000

Throughout Data tabulated in the search, cleared that, the average of current chicken meat price and feed fluctuation. The chicken meat price, feed input cost and other factors were effective (Fig. 2).

From the previous data, these actors represented just similar the fluctuations of periodical and seasonal prices, in markets, enterprises number, volume of production, population of animals, productivities volume, diseases of animals, safety of economic environment, prices of feed raw materials, variations of the substitute product e.g. beef and fish and the prices affect chicken meat supply.

Table 3. The number of the slaughtered chickens for (5) years

Month	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014
January	265489	350225	156620	1032225	1000265	955685
February	245752	421598	154200	1220956	1254862	952200
March	452300	510220	201195	1353680	1222950	458990
April	356210	493562	156210	1354529	1522295	785955
May	523186	395628	132558	1222014	1495620	1000956
June	398421	399542	120080	1444590	1356628	658955
July	375462	245890	128562	1423225	1112350	859005
August	456789	265984	125985	1422110	1296520	800567
September	412532	256950	135538	1223628	1395000	754966
October	256480	289562	140775	1355900	1400952	1000560
November	368950	300215	129665	912200	956885	855992
December	400255	198755	135995	599850	1102250	655585

Results of the neural network models for poultry data are given in Figures 1, 2.

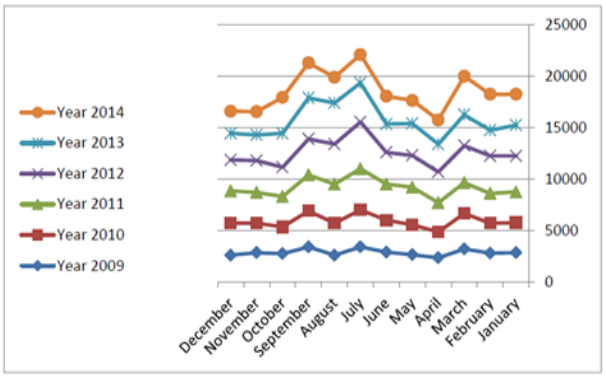

Figure 1. the price (kg) of chickens in the field for 5 years in Iraqi dinar

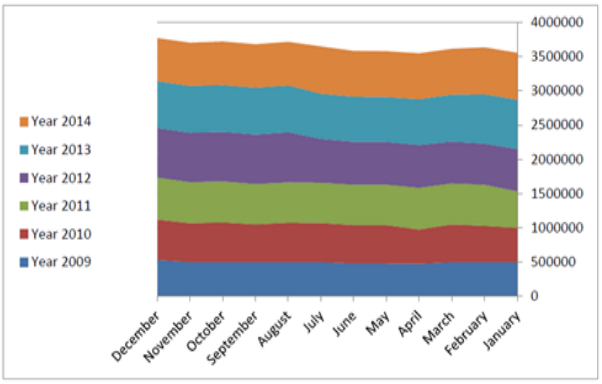

Figure 2. The Price (tons) Poultry feed for 5 years

Figure: 1 describes the price (kg) of chickens in the field for 5 years in Iraqi dinar. It's clear that the price (kg) of chickens in the field were reached in its maximum level in July more than the others months in all years, may that its belong to influence of atmosphere temperature on tradition within this month. However, the price (kg) of chickens in the field was reached in its minimum level in April due to the same reason.

The advantage of neural-networks is that there is no requirement to pre-select a model or base the model entirely on the suitability of the data. The disadvantage of neural-networks artificial is that they follow a "Black Box" approach, which doesn't give insight into the inner workings of a neural-network; in addition; networks doesn't provide estimate of data parameters that may be helpful for comparison and development purpose. (10).

Yee *et al.* (1993) reported that, the data previous were attempt to explain the significance of biology and parameters evaluate of an equation. It may be practical to ignore the importance of parameters estimate and focus on predictability of response.

Data in Fig. (2), cleared that, the seasonal factors were effective in chickens prices in the field. The prices of chicken field increased during winter season and a drop occurred in March month and shows peak tendency in July then started to drop again from October.

All of data obtained were used potentially and making the ANN model was more accurate method (9).

Ahmadi, and Golian, (2011) reported that, ANN model was more reliability in prediction, than others of models in chicks broiler.

The artificial neural-networks are the appropriate function used to solve the complex challenges of growth estimation, and they can simulate this model with data learning, and they have advantages that there is no requirements to choose function before calculating of equation, (14, 7).

Predictability model using Method of linear trend:

After examining the time series for the years 2009 to 2014, regression parameters were found Import Quantity of white meat for 5 years using statistical methods and a program Minitab was obtained the following data summarized in table 4:

Table 4. Import Quantity of white meat for 5 years

Month	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014
January	1100900	1063254	1093265	1062358	1009965	1023335
February	1104625	1068954	1095127	1022521	1002658	1254897
March	1098562	1025689	1059480	1092325	985695	844527
April	963254	1053568	1081594	1001289	1012358	877495
May	1002154	1002548	1053254	1040023	1025300	1012225
June	1062355	963258	1012354	923588	623589	1045520
July	845720	956285	1000568	956890	799650	759220
August	899526	895625	754625	1002658	821695	644124
September	1012358	1025665	998562	1025480	1050023	654890
October	1033595	1026598	1009856	1023695	1023325	1000085
November	1039325	1059859	1075468	1083200	999580	994510
December	1055480	1092165	1085235	1000625	1062255	875150

Although, software has contained on a validations procedure. We applied a separately dataset for our validations of trained neural-network. When final neural-work model was created and predicted numerically data were generated, these data were compared with true dataset, which the prediction was intended. Results were complemented with data 2009. Predicted data were realistic and actually and satisfactory when compared with dataset 2010,

This study was an exploratory study, and we believe that, there are major possibilities for such approaches to exactly prediction future of chicken's poultry industries. On the other hand, researches are required more of methodology and market validation.

Demirci, (2008), concluded that, there were variations in products of chicken's poultry sales, according to variation seasons, especially sales of chickens meat and price of general levels were increased during summer season. In the current search, data obtained cleared that, most suitable periods to supply chickens meat during the seasonal fluctuations and level of demand level, were determined in months; June, July, August and September.

Finally; the obtained results concluded that, the size of trading of these parameters depend on statistical method "usually". Further, the suitable mathematics or statistical methods are necessary to get on accurate conclusion for fate of chicken's poultry industries and forecasting in Kurdistan Region, and the relationship could be described by ANN model.

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تنبؤات صناعة الدواجن في منطقة كردستان من خلال استخدام الشبكات العصبية

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أظهرت الدراسات الحديثة قوة التنبؤ بالشبكات العصبية. حيث تم استخدام الشبكات العصبية بنجاح للتنبؤ بسلسلة البيانات المالية. إذ تتمتع الشبكات العصبية بميزة يمكنها تقريب الوظائف غير الخطية. في هذه الدراسة قمنا بمقارنة أداء معلمات المدخلات المختلفة المرتبطة بها مثل: سعر (كجم) الدجاج في مزرعة الدواجن، وسعر (طن) علف الدواجن، واستيراد اللحوم البيضاء، وعدد الدجاج المذبوح، والذي من المتوقع أن يكون عونا في المستقبل لدراستنا. استخدمنا سلسلة البيانات مع أسعار الصرف الشهرية بدأً من عام 2009 حتى عام 2014. أهداف الدراسة الحديثة في المقام الأول؛ تطوير التنبؤ بالشبكات العصبية لدراسة مصير توقعات صناعة الدواجن في إقليم كردستان. ثانيًا، تشير النتائج إلى أن الشبكات العصبية قد تكون طريقة أكثر موثوقية في صناعات الدجاج من تحليل الانحدار البسيط إذا تم جمع بيانات موثوقة ومعالجتها لمثل هذه النماذج.