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INTERPRÉTATION DES CORRELATIONS ENTRE LES TESTS DE CONTROLE UTILISES POUR EVALUER AU NIVEAU MOTEUR LE DÉVELOPPEMENT DES COMPETENCES COMBINES (8e ANNEE)

Résumé: *L'enseignement des aptitudes motrices conformément au dosage différencié de l'effort physique implique une connaissance approfondie des facteurs qui conditionnent la réussite de cette démarche. Dans ce sens, la sélection et la programmation des modèles opérationnels doit se réaliser en concordance avec leurs influences principales et secondaires ; il faut insister sur les moyens accessibles et attrayantes qui, en fonction du dosage choisi, facilitent l'enregistrement d'effets complexes ou clairement délimités en fonction de la thématique et des objectifs.*

Mots-clés: *transfère et interférence des aptitudes motrices, conditionnement réciproque, tests pertinents, capacité motrice, préparation physique, qualités motrices conditionnelles et coordinatrices, paramètres de l'effort.*

FORECASTING THE RANKING OF IRAN'S NATIONAL FOOTBALL TEAM BY FIFA. TWO PREDICTING MODELS: ARTIFICIAL NEURAL NETWORKS AND AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE

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Abstract:
Prediction of the ranking of the athletes in sports is a complicated task just like other subjects in politics and economics. But nowadays there are some models utilization which, we can predict, to some extent, future results and rankings. The aim of the present study is to provide a predicting model based on ARTIFICIAL NEURAL NETWORKS and Autoregressive-Integrated Moving Average, so that one can anticipate the ranking of Iran's National Football Team [NFT] by FIFA.
Keywords: *Modeling, predicting, artıfıcıal neutral networks, FIFA ranking, autoregressıve-ıntegrated movıng average*

INTRODUCTION

It is manifest that all branches of science such as physical education need the prediction of results and analysis of their performances in their way to progress, in order to achieve further success, and for such anticipations, the utilization of other mathematical sciences has drastically increased. After almost more than half of a century of football activities in our country, nowadays this sport has attracted many followers from the various parts of Iran and Iran's National Football Team has attempted to become the winner of the Asian Olympic Games, the Asian Nations' Cup and the Asian Champions League many times, and has qualified two times in the Olympic Games and three times in the World Cup Series. The previous decade was the period of introducing Iran's Football to the world, to the extent that just in that decade Iran's national football team scored a hundred standing in FIFA ranking and introduced outstanding players to the greatest teams of the European leagues.

At the end of each month the International Football Federation ranks the teams which are members of this federation, based on their performances [1]. The ranking position of many teams changes frequently, which is the result of their performance during that month. According to the available statistics of the last 120 months of the rankings of the Federation, South American and European teams have always taken the first ranks, and

Iran has progressed to the higher ranks in a way that in the second half of 2005 Iran's National Football Team was ranked among the 15 best teams of the world. However, exactly this time ten years ago it had been ranked 118th. It has to be mentioned that, this promising prediction has been done just based on the increasing rank of Iran's National Football Team's position in FIFA ranking during the last 120 months and can be affected by various agents such as the present management and the future of Iran's Sport, the amount of investment in this sport and some other interfering agents.

In recent years, focusing on the analysis the athletes' former performances, and partaking of mathematics and its related branches, managers, coaches and commentators have succeeded in arranging more precise programs for the future. With the help of such modern scientific methods, one can predict the result of the matches and rankings of the sport teams by recognizing the influential agents on the results achieved [2].

Such predictions are affected by different agents as the present managerial methods and the future of Iran's sports, the amount of investment in this sport, better sport equipment, better nourishment and exercise, and especially the effect of the invigorating substances [doping] on the future of sports, each athlete's periodic readiness, teams' conveniences, luck and other agents. In the recent years, researchers of sports, based on the existing information and computer software developments, have attempted to analyze and predict the future events and in some cases they have come to significant conclusions [3].

The prediction of football, like other predictions, such as in politics and economics, is such a difficult and complicated task. However, nowadays, based on existing models and sources and, of course, taking into consideration the teams' abilities and their managements, researchers have been able to make some almost accurate predictions of future results and rankings. In these models two different processes are analyzed: 1] the distribution of the information and the teams' conditions in the past and present, 2] the analysis of the progress made by managerial and programming agents according to which we can create some models for future predictions.

ARTIFICIAL NEUTRAL NETWORKS PREDICTION MODEL

During the last decade we have observed the successful presence of the Artificial Neural Networks. The idea of education for resolving the issue of complicated patterns recognition by the use of Intelligent Data Agents' perspective has been challenging for the university researchers. ARTIFICIAL NEURAL NETWORKS is a simple calculative pattern for analyzing the data and creating some models based on the data structure. The data used for creating models is known as educational data. The neural network, using educational data for recognizing its patterns, can use the data to get access to the output and different conclusions.

Based on the objectives of the research, different kinds of ARTIFICIAL NEURAL NETWORK models could be used. One of the most renowned models is Multilayered Feed-forward Neural Network [MFNN]. MFNN is an example of trained neural network by the use of the spectator. According to recent studies [5], more than 50 percent of the reported trade functional studies of neural networks have used Multilayered Feed-forward Neural Networks with post diffusion learning Algorithm rules. Such neural network is fairly popular because of its widespread utilization in the different kinds of the issues related to management, like material prediction, modeling and classification. MFNN is appropriate for solving the issues including learning the relations between a particular set of inputs and outputs that indeed is an educational technique with a spectator for learning the relations between the data by the use of the education data collection [6,7,8].

Generally, ARTIFICIAL NEURAL NETWORKS do not have a great ability in developing a model, in a rational time, for the purpose we mean to use it for. On the other hand, in order to learn from the experiences [the collected data], Fuzzy modeling requires an attitude for using the integration of decisions. ARTIFICIAL NEURAL NETWORKS and Fuzzy models have been utilized in many functional fields and each has shown some advantages and disadvantages. Therefore, a successful combination of these two attitudes, Fuzzy Modeling and ARTIFICIAL NEURAL NETWORKS, has become the subject of further studies.

Among modern methods of modeling, Fuzzy systems have got a special reputation, and this can be considered as the result of human beings' ability in applying human knowledge, by using the concepts of language tags and Fuzzy rules, non-linearity and adjustment of these systems. In short, the ARTIFICIAL NEURAL NETWORK model is a system based on the rational rules of if-therefore. The starting point of making an ARTIFICIAL NEURAL NETWORK model is to provide a fuzzy if-therefore set of rules of an expert's knowledge or of the special field of science. Providing such rules is the most important and difficult part of the task since it needs the expert's high level of knowledge and its correct application. Having a method at hand for utilization, to create some rules out of the available numerical information beside human knowledge could be of great use in this part.

Therefore, we have managed to apply a Fuzzy system in a way that it has the ability to learn retrospectively. So, we can calculate the error of the amounts of output by using the method of the least

summation of the squares of the error. By combining this method and the post diffusion method we came to a mixed training method that works this way; in each education cycle: when moving forward, outputs of the loops are calculated normally up to the last layer, then the parameters of the result will be calculated by the method of the least summation of the squares of the error. After calculating the amount of the error, in a backward retrospective movement, the proportion of the error on the distributed condition parameters is corrected partaking of descending error grade method.

In the previous years, sports researchers have predicted future events based on available information and computer software developments and they have come to significant conclusions in some cases. Dereveco et al. in 2002 anticipated the performance of elite athletes of the 5 branches of track and field in the next 10 years and they have predicted the improvement of the records between 0.2 to 10.3 percent. They also mentioned that results of this prediction could be affected by some agents like better sport equipment, better nourishment and exercise, and particularly the effect of invigorating substances on the sport's future [9]. Lucus and Luvalgia [2005] also asserted that managerial methods, coaches, teams' facilities and luck have some influence on the prediction of the teams' ranking [10].

Bryan et al. [2005] predicted almost reliably [0.65] the results of the National Basketball league which were based on the results published by New York Times [11]. Boulier and Stekler [2003] analyzed the predictive performance of the statistical models and the judgments in the professional American football games' predictions from 1994 to 2000 by doing a research under the title of *The Prediction of the Results of American National Football League's Games*. Their findings showed that the statistical model [based on the published marks in New York Times magazine] was more successful [65%] than the sport newspapers' editorials [60%]. In general, they predicted 75% of the results of the National Football League [12].

Brawn [2005], too, predicted the teams' rankings for the next 7 weeks by using ARTIFICIAL NEURAL NETWORKS and considering the teams' programs and their previous matches in NCAA of America. After 7 weeks, when the matches were played, it turned out that the results of the predictions were 90% accurate by the use of ARTIFICIAL NEURAL NETWORKS [13]. It is interesting that those who were sufficiently acquainted with a sport field were more successful in their predictions. In their analyzing the prediction of the results of World Cup 2002 by experts and ordinary people, Patrick Anderson and his colleagues [2005] found out that those who had familiarity with football predicted the results more accurately and confidently [14].

What the predictions mostly face as a problematic agent, and which is an unavoidable agent in sports, is the existence of luck. In analyzing the agent of luck on sport records, Gambrayce et al., realized that out of the 22 predictions made according to the systematic progress method, only 4 were reliable and correct and the rest were distant from real performances [14]. However, the recent use of modeling rules for sport exercises has provided this possibility to predict the future [15]. In 2001 Cundell et al. started predicting bacterial infections according to sociological information and found 84% of relevance between these two agents [16]. Chi Ung Song et al. [2007] have done a research under the title of "Comparison of the Accuracy of Predictions Made by the Model and Referee in the National Football League of America [NFL]". They predicted the result of the NFL matches, by using 31 statistical models and 70 experts who had anticipated the winners of 496 NFL games from 2000 to 2001. Results indicated that the difference between accuracy of the predictions of statistical systems and those of experts, regarding the winners, was not significant. Changes in the success of the predictions by experts were higher than the that of the statistical models. However, having detailed and high level of information did not improve the accuracy of the prediction. Neither the experts nor statistical systems could make the predictions correctly [17]. Some other research is being done on predictions in order to increase the reliability of the prediction model [18, 19, 20, 21]. In Iran, a fairly limited measure has been taken to use mathematics for sport predictions, some instances are predictive modeling of Iran's football ranking position in FIFA ranking by Gorzi et al. and prediction of gymnasts' performances in national and international competitions considering the Artificial Neural Network by Mohammadi et al. [17, 22]. The aim of this research is to present a model for predicting the rank of Iran's National Football Team in the future based on the teams' ranking in the last 120 months and its results by using Fuzzy Neural Networks.

METHODOLOGY

The method used in this research is descriptive-analytical. In the descriptive part, the last 120 months records of Iran's National Football Team in FIFA ranking [1996-2006] were obtained from the official FIFA website which includes the ranking position of Iran's team and its points at the end of each month, the number of goals [both received and scored], results of the matches, places in which the matches were held, types of matches, the ranking position of Iran's opponent teams in the last month of FIFA ranking and the regional strength of those teams. In the analytical part, the data was analyzed by the ARTIFICIAL NEURAL NETWORK system and a predicting model has been presented for it.

EXPERIMENTAL ANALYSIS OF THE PREDICTION OF THE STATUS OF IRAN'S NATIONAL FOOTBALL TEAM IN FIFA RANKING

To provide predictive modeling of the ranking of Iran's National Football Team in FIFA ranking in this research the two methods of ARTIFICIAL NEURAL NETWORKS and AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE have been used. Monthly data of Iran's ranking in FIFA in the ten-year time span from January 1996 to December 2006 have been chosen as a time set. In designing ARTIFICIAL NEURAL NETWORKS, because of the huge amount of data, half of them have been selected as educational data, 25 percent as experimental data and the rest as value estimating data. Independent variables of this research are:

a] Match points

1-friendly matches: 1 point; 2-continental cup qualifications: 1.5 points; 3- world cup qualifications: 1.5 points; 4-continental cup finals: 1.75 points; 5-federation's cup: 1.75 points; 6-World Cup finals: 2 points [23].

b] Match results

1-win: 2 to 3 points; 2-draw: 1 point; 3-lose: 0; 4-losing the game in penalty kicks: 1 point [23].

c] Regional Competency

1-Europe: 1.00 point; 2-South America: 0.99; 3-Africa: 0.96; 4-North and Central America: 0.94; 5-Asia: 0.93; 6-Oceania: 0.93 [23].

d] Goals scored

1-the number of goals scored during the game or in extra time [excluding the end-game penalties]

2-the value of the goals based on the competency of the teams [the relative power of the opponents].

e] Host or Guest

1-the host gets no points; 2-the guest gets 3.30 points; 3-in world cup matches, the guest does not get any points.

f] The latest ranking of the opponent in FIFA's table.

g] Passage of Time

1-the teams' results in the previous years are also taken into consideration for the ranking;

2-current year's results: 8.8 points;

3-the previous year's results: 7.8 points;

4-the results of two years before: 6.8 points;

5-tThe results of three years befpre: 5.8 points;

6-the results of four years before: 4.8 points;

7-the results of five years before: 3.8 points; the results of six years before: 2.8 points; and finally the results of seven years before: 1.8 points.

NORMALIZING THE DATA

In order to make the data more potential of accurate prediction, they should be normalized before they are used in ARTIFICIAL NEURAL NETWORKS. So before entering the network, the data is changed in a way so that they will be in the range of [L, H]; this is done, using the following formula:

$$X_{scaled} = mX_i + b$$

That in this equation:

$$m = \frac{H - L}{X_{\max} - X_{\min}} \quad , \quad b = \frac{X_{\max} \cdot L - X_{\min} \cdot H}{X_{\max} - X_{\min}}$$

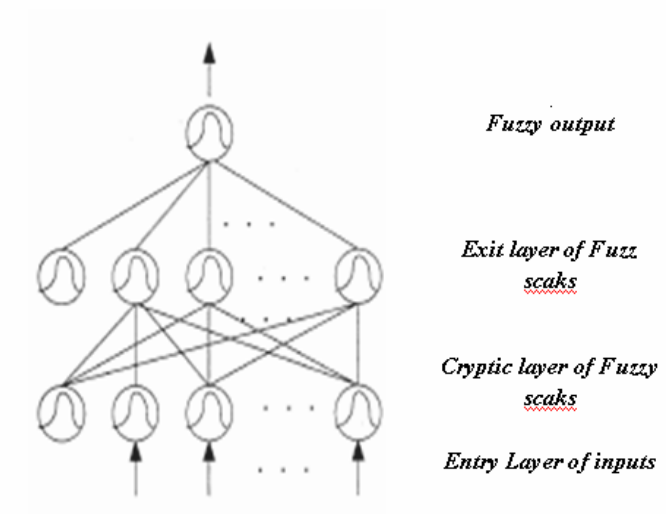
In this equation, H and L are the maximum and minimum of normalization, which, mostly range between 1 and -1. $X_{\max}, X_{\min}$ are the maximum and minimum quantities of X_i. So the above mentioned formula can be simplified as the following, which is much more common:

$$X_n = \frac{2(X - X_{\min})}{X_{\max} - X_{\min}} - 1$$

The ranges of L and H differ based on the kind of issue of the intended transformation function. The largest ranges being used are [1, 0] and [1, -1], for Hyperbolic and logistic functions. In this research, the data has been normalized in the range of [1, -1].

DESIGNING THE ARTIFICIAL NEUTRAL NETWORKS MODEL

There are various structures of fuzzy systems settlement which have been proposed by the ARTIFICIAL NEURAL NETWORKS, the most important of which is the neurotic system based on Adaptive-Network-based Fuzzy Inference Systems, innovated by Jang [24,25]. The structure of a neuro-fuzzy system is illustrated in Picture 1. In designing the Neuro-fuzzy system, the Multilayered Feedforward Neural Network with the post diffusion training algorithm of error and Sugeno Deductive Fuzzy System with the input sequence of "difference between two Sigmoid sequences" and linear output sequence have been used and for making Non-Fuzzy moving average sequence, has been utilized.



Picture 1: The way ANN is design

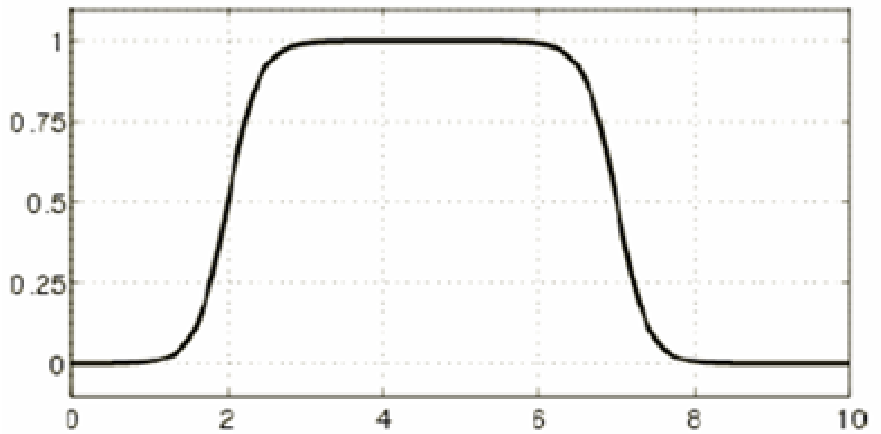
In order to design an optimized ARTIFICIAL NEURAL NETWORK model, the topology of the system is evaluated with an eye on the transformation of different layers and the number of the neurons in the hidden neurological network, so that based on this evaluation, and also based on different changes that occurred in various member functions, and their numbers, a new fuzzy inference system for the database was devised and created. The number of the member functions used in this research is 100. Any member function is harmonized fuzzy collection from group A which ranges between [1, 0] so that: $A: X \to [0,1]$

In general terms, any function which follows the mentioned structure can be used as a member function in a fuzzy collection. As mentioned before, the entering function in this research is the differential function of two [Sigmoid] functions. This function is illustrated in Picture 2. Any sigmoid function is defined as

$$f(x;a,c) = \frac{1}{1+e^{-a(x-c)}}$$

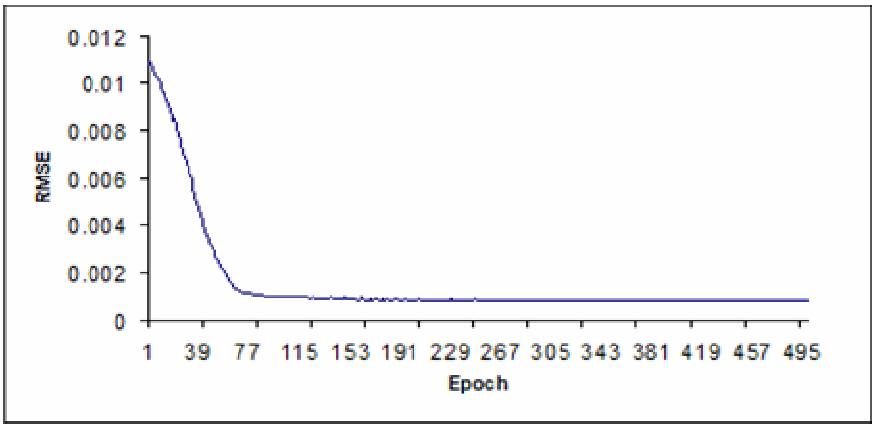
The differential function of two sigmoid functions is based on four different factors which are the following:a_1 ،c_1 ،a_2 و c_2

And: $f_1(x;a_1,c_1) - f_2(x;a_2,c_2)$



Picture 2: The membership sequence of the difference between two sigmoid sequences [a_1=5, c_1=2, a_2=5, c_2=7]

The education [training] algorithm is repeated 500 times. The diagram of RMSE improvement in different repetitions of neuro-fuzzy network training, made to predict Iran's National Team ranking in FIFA, is illustrated in Picture 3. As seen in this figure, the more the repetitions, the lower comes the quantity of RMSE so that in the last repetitions, no improvement is visible. It is emphasized once more that the deviations based on the normalized data are between [1, -1]; the authentic deviation should be calculated after the raw data has been transformed into Genuine Data. The quantity of 6 original standards in the evaluation of ARTIFICIAL NEURAL NETWORK model turnover is shown in Table 1.



Picture 3: The amount of RMSE in ARTIFICIAL NEUTRAL NETWORK training repetitions of the National Football team's Status in FIFA ranking

In the above modeling, independent variables, special for a Month, should be given to the model, so that, based on the turnover evaluation, the model can almost accurately predict Iran's ranking in the International Federation [FIFA] ranking table. Lacking independent variables for each month, like the one in regression models, is a great barrier which makes the prediction of the next few months impossible. On the other hand, this model has great potentiality in prediction. In another model, the only independent variable is time, so that the prediction of the next few months becomes possible, but, because of ignoring the other independent variables, the prediction potentially decreases. Based on this model, Iran's ranking for the next two months, i.e. December 2006 and January 2007 are 19 and 20 respectively.

DESIGNING THE AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE MODEL

One of the most authentic techniques of prediction is the AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE model. This method is the fitting of a moving average model combined with a self-regression one, into a group of data and bringing a mathematical condition formula up. An AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE model has three parts: 1] the self-regression element 2] the accrete average and 3] the changing [moving] average.

The basic structure of AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE model is based on four levels: a] justifying and clarifying the model, b] estimating the parameters, c] recognizing and receiving the model, and d] confirmation, prediction and logicality.

The AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE $_{[p.\ d.q.]}$ model is general and public. In this formula, p is the self-regression base, q is the base of the changing average and d is the reduction base of the model to make it stable. What makes this model the best among the others is the suitable change to make it stable. Which is:

$$\psi_p = (B)Z_t = \delta + \theta_q(B)a_t$$

$$Z_t = (1-\beta)^d y_t \qquad \text{Or/and}$$

$$Z_t = \nabla^d y_t$$

In which Y_t is the temporal series of data. In different combinations of AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE model, the quantities of p,d and q are seldom more than 2 and exactly because of this short range, most of the practical predictions are covered. In the designed AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE model for this research, p [self-regression element] equals 1, the base of the changing average, i.e. "q" equals 1, and "d" equals one as well: AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE$_{[1,1,1]}$. And the quantities of the six original standards of turnover evaluation for the prediction of Iran's ranking in FIFA .

EVALUATING THE OUTCOMES OF THE PREDICTION

For prediction matters, some of the standards of the turnover are used to illustrate how to learn the

relationship between the data in ARTIFICIAL NEURAL NETWORKS. 6 standards are used in this research, the first three of which are from the standard-deviation-average calculations group: a] the squared average of standard deviation [MSE], b] the square root of deviation average [RMSE], c] the squared normalized standard deviation [NMSE]. The remaining two are R^2 and NMSE, in which R^2 is the nomination coefficient and is related to NMSE: i.e., NMSE= 1-R^2. The range of R^2 is [1, 0] in which 1 shows the absolute accordance of the data, while zero suggests a kind of turnover which, by using the average of the real outcome of "d" , can be considered as a base for the predictions. The next two standards [yardsticks] are for the absolute deviations: the average of deviation of absolute value [MAE] and the average of the absolute value's deviation percentages [MAPE].

Considering the fact that each standard in the turnover evaluation does a special task, in ARTIFICIAL NEURAL NETWORKS and AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE models, all of the six yardsticks are used. The results obtained by using both models are presented in Table 1.

Table 1. Performance assessment scales for different methods

Method	RMSE	MSE	NMSE	MAPE	MAE	R^2
ARTIFICIAL NEURAL NETWORK prediction model	**0.1234**	**0.0152**	**0.000032**	**0.000002**	**0.0507**	**0.999972**
AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE prediction model	**3.0340**	**9.2052**	**0.02**	**2.0035**	**0.0078**	**0.98**

As seen in Table 1, the prediction of Iran's rank in FIFA by using the ARTIFICIAL NEURAL NETWORKS method is much superior to the one predicted by the AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE method as it meets all the standards of the turnover evaluation. The improvement rate of prediction deviation in different standards has been quite different. For instance, the RMSE has improved much more than MAE, when used in the ARTIFICIAL NEURAL NETWORKS method rather than the AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE one and this is because different standards have different calculation procedures.

DISCUSSION AND CONCLUSION

In today's world, prediction is considered an important issue in different fields and it is improving and expanding every day. Managers, especially sport managers, since there are lots of variables, would like to have a special mechanism that can help them in decision making. Because of this fact, they tend to be looking for some special methods and formulas that could help their estimations get closer to the real results and their deviations be reduced to a minimum.

Paying attention to such modern methods as Neuro-Fuzzy networks and Fuzzy algorithms have caused other issues to surface in prediction studies. They have yielded different results in different uses. In some of the studies which have been conducted by using mono or multi-variable temporal Data-series, the ARTIFICIAL NEURAL NETWORK method has proved more accurate and has fit the data in more precisely, while in some other studies, traditional methods such as apparent smoothing have done better.

Analyzing the temporal data series for the prediction of an active research field has been special to the previous decades. The accuracy of this series method has been really vital in some special fields, so that the effort to make the influential effects of different models has never come to a halt. The efforts of Box and Jenkins have made AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE one of the most favored methods of prediction. During the last decade, the ARTIFICIAL NEUTRAL NETWORKS method has been constructed to solve the problems of complicated patterns identification, which had always challenged the researchers and had always been used in different fields, partaking of the viewpoint of intelligent data agents.

By using the Neuro-Fuzzy networks, and by looking at the previous games of the teams in the NCAA American league, Brown [2005] could predict their rankings in the next 7 weeks with the accuracy rate of 90%. Brian et al. obtained the accuracy rate of 65%, Boulier and Steckler also obtained the accuracy rate of 70%. ARTIFICIAL NEURAL NETWORKS and AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE methods have been used in this research to predict Iran's ranking in FIFA; moreover, such different yardsticks as [MSE ،RMSE ،NMSE ،MAE ، MAPEand R^2] have been analyzed and compared. The results suggest that the ARTIFICIAL NEURAL NETWORKS method is superior to AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE in every aspect. For instance, concerning RMSE the deviation was considerably lower when it was used in ARTIFICIAL NEUTRAL NETWORKS than AUTOREGRESSIVE-INTEGRATED MOVING AVERAGE and this is because the data used to predict Iran's ranking in FIFA is non-linear. If linear data were to be used, the results would be quite different or even contrary.

As Glickman and Sterm [2005] asserted that past and present conditions, plus management status are really

important, so in this research two different possibilities have been pictured to predict Iran's ranking in FIFA: the first situation is applicable to predict the ranking before FIFA Artificial Neural the results, when such independent variables as Iran's ranking in FIFA at the end of each month, Iran's total points at the end of the month, Match results including Win, Lose and draw, The location of the game, the type of the match [Friendly, Continental cups qualification, World Cup qualifications, Confederations Cup, Asian Cup finals, world cup final round] The opponents ranking and points in FIFA in the previous month are obvious and obtainable.

In the 2nd situation none of the above-mentioned variables are clear so that there will be only one variable such as Time which is considered as a sole criteria based on which, for example, Iran's ranking in the next four months is predicted.

Because of the good outcomes that were achieved by using the ARTIFICIAL NEURAL NETWORK method, Iran's Football Federation can use this method for its future programming. As we know that Iran's or any other country's ranking are in close relation to the management of that country's Football Federation and even the Organization of Physical Training, the results of this study can be a wonderful yardstick against which the turnover of the past and present federation officials can be evaluated. Also, the officials of Iran's football federation can use this method as a kind of self-evaluation procedure. However, it should be mentioned that the results of this research may be influenced by such elements as chance, Iran's opponents' ranking positions in the coming months, major players' injuries and the turnover of Iran's Organization of Physical Training as well as the Football Federation's itself.

The results also suggest that the number of the matches that Iran's National team will play in each month versus those teams with a good ranking in the FIFA's table can considerably influence and improve Irans ranking in FIFA's monthly Artificial Neural; To make this possible, powerful sponsorship is a must.

On the other hand, the experimental results of the present and some other research studies have shown that the combination of Artificial Networks plus Fuzzy logics with the ARTIFICIAL NEURAL NETWORK method yields more accurate results and decreases the deviation considerably. Moreover, asthe ARTIFICIAL NEURAL NETWORK method does not require precise and absolute data, neither a big range of data, it can be very accurate and useful in predicting Iran's ranking by FIFA and is assuredly a better method in comparison to the previous traditional ones. And finally it is suggested that researchers take counsel with some football and other specialists in doing the prediction and compare their viewpoints to the results of this study.

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LA NATIONALE DE FOOTBALL D'IRAN - FIFA PRÉVISION: UN MODÈLE A RÉSEAUX ARTİFİCİELS NEURALES ET UN MODÈLE À AUTORÉGRESSIF

Résumé:
Prévision du classement des athlètes dans les sports est une tâche complexe, tout comme d'autres sujets dans la vie politique et l'économie. Mais aujourd'hui, il ya une certaine utilisation de modèles qui, nous pouvons prédire, dans une certaine mesure, les résultats futurs et les classements. Le but de la présente étude est de fournir un modèle de prédiction basée sur ARTIFICIELLE Networks et autorégressive-moyenne intégrée NEUTRE Moving, de sorte que l'on peut anticiper le rang de l'équipe nationale de football de l'Iran [NFT] dans FIFA.
***Mots-clés**: modélisation, prévision, réseaux artificiels neutres, le classement de la FIFA, autorégressif-moyenne mobile intégrée*

INVESTIGATION AND SELECTION OF THE APPROPRIATE PROMOTION MIX FOR IRAN'S FOOTBALL PRO-LEAGUE. THE AHP METHOD

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Abstract:
For the purpose of the investigation and selection of the appropriate promotion mix for the Football pro-League of Iran, 13 experts in sport marketing responded to the researcher-designed questionnaire. The face and content validity has been proved by experts and its reliability as due to the inconsistency ratio of the questionnaires which is less than (0.1) can be proved as well. For data analysis the AHP method and the Expert Choice (11) software were used. The results showed that in the second level of the hierarchy, the advertising (0/625) ratio was dominant to public relations (0/375). In the third level, among the advertisement and public relation tools, TV advertising (0/522) and the media as one of the public relation tools had respectively the first and the second priority. We can say that, for improving football pro-League marketing, advertising is the most important criteria and TV advertising is the most important choice of promotion mix for Football pro-League.
***Keywords**: Promotion mix, Analytical Hierarchy Process, sport marketing, football pro league*

INTRODUCTION

Modern Marketing is something beyond just manufacturing good products, appropriate pricing, and easy access to the goods. The organizations need to have relation with their customers. Various factors justify the organization's need to communicate with their customers, among which we can mention the increasing distance between the manufacturer and the consumers which causes numerous problems in creating a direct communication with the customers and heavy competition among manufacturers and organizations engaged in an industry (Venos et al., 2008).

The marketing communication program of each organization is called the promotion mix and consists of a combination of advertising, public relations, sales promotion and personal sales, and the organizations use it in order to follow up their marketing goals (Haqparast, 2000). Communication has turned in its various forms into a specialized subject, among which advertising, public relations and interpersonal communication techniques are of great importance (Rezaie, 2006). Marketing as an inter-disciplinary knowledge makes use of communication techniques as one of its components. This part is called promotion mix (Namini, 2006). Establishing an effective communication today, in order to fulfill marketing goals, is one of the main preoccupations of managers in any sport organization. In fact among the most important and the most effective elements which make a link between sport events and the profitability of sport industry are advertisement and promotion (Hasan zadeh, 2004). In some countries the biggest share of marketing expenditure is allocated to the promotion program.

Even in many corporations the total promotion expense exceeds the total production expense (Venos, 2008). Therefore, we can assume that one of the most important responsibilities of the sport marketing management is to assign the most efficient combination of promotion mix. By considering the fact that one of the long term goals in any sport is to develop it quantitatively and qualitatively, sport organizations need to be capable of competing with each other in order to reach this goal (Hasan zadeh, 2004). This goal can be met with the aid of sport marketing results and especially by the use of an appropriate promotion mix.

Since the football industry is regarded as one of the financially profitable industries, with a high added value, it is obvious that proper planning for promoting this sport can