Efficient Sports Websites Evaluation System
Based on ASP Technology

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Abstract—To perform a research on the application of ASP technology in sports websites, and to establish a set of objective and scientific evaluation system for sports websites based on ASP technology. Method: ASP technology is applied to design functional modules of websites like database, sports forum, resource sharing, etc. On this basis, document literature, expert interview, neural network evaluation, as well as other methods are employed to construct the evaluation system for the website. Result: The ASP-based sports website is successfully constructed. In the meanwhile, we also constructed a set of neural-network-based evaluation system for sports websites made with ASP technology. We can draw the conclusion that to apply ASP technology in sports websites is beneficial for the healthy and rapid development of these websites. On the other hand, to construct an objective and valid evaluation system is also quite important for the development of websites.

Index Terms—ASP Technology, Website, Neural Network, Evaluation

I. RESEARCH BACKGROUND

Nowadays, along with the popularization of network application, the Internet is impacting an increasingly greater influence on people’s work, study, and daily life. As a new media platform, network has incomparable advantages compared with traditional media, such as the integrity and richness of information, strong interactivity and openness, the speediness, hyper-space and hyper-time nature in information transmission, as well as numerous and resourceful information content [1, 2]. Information transmitted on the Internet has six major features: abundant content, diversified form, strong timeliness, worldwide range, free from restrictions with interactive function[3]. It is large in volume, lower in production cost, and can be used to convey various media forms including voices, images, etc. Especially, it breaks through the restrictions of space and time on news communications. These are all superiorities that traditional media do not have [4, 5]. The Internet is consequently changing the mode of business activities, transforming people’s pattern of consumption, upgrading enterprises’ productivity, as well as promoting the reformation and innovation of the entire finance industry.

In recent years, the fast popularization of Internet in China is obvious to all. According to the 24th China Internet Development Statistical Report released by CNNIC (China Internet Network Information Center), the population of Internet users in China had reached 384 million [6] by January 30, 2010. What’s more, the government is still increasing its investment on infrastructure construction. In order to revive the economy, the nation had invested 4 thousand billion capitals, which were mainly concentrated on infrastructure construction. As a result, the communication and network construction of China was also progressing steadily. Shown by information offered by Ministry of Industry and Information Technology, investment on telecommunications had completed 277.34 billion Yuan by the November of 2009, increasing by 28.5% compared with the same period of the previous year. By the end of 2009, the 3rd phase project of TD-SCDMA network had been successfully completed. More than 70% regions and cities in China had been covered by TD-SCDMA network. Among all these regions and cities, eastern provinces had realized 100% coverage, with more than 100 thousand base stations. The core indexes had approached the 2G level. Upgrade of infrastructure has provided precondition for Internet applications in different regions.

Although being increased all the time, compared with developed countries, the Internet popularization rate of China is still on a lower level. By the December of 2008, the popularization rate of Internet in the US, Japan and Korea are separately 74.1%, 75.5% and 77.3%. Compared with these countries, China still has a long way to go. In the meanwhile, the growth speed of quantity of Chinese Internet users is decreasing gradually [7], from 41.9% in 2008 down to 28.9% in 2009. The major reason for the fact is that, information and technology normally has an “attenuation effect” along with time lapses. In other words, when being spread and transmitted among groups, network technology, information and concept will gradually become lower in energy and transmission speed. When spreading among regions and people groups, Internet application also has such “attenuation effect”. Those network accessible people have basically got used to the network lifestyle in the process of network popularization. However, people who have not yet used the Internet are normally population with higher threshold for network. As for this, the Internet would consequently need stronger incentive and motivation to penetrate into these people.

Here is the reason for choosing sports websites as the research object: as an important constituent part of recreation and entertainment websites, sports websites are
now developing rapidly. Among all top 10 cultural recreation and entertainment websites in Best China Website Selection, two sports websites were included: Shark Wave Sports Community and China Football News [8]. Meanwhile, live broadcast service provided by “Sina.com” during the Olympic Games also still remains fresh in people memory. Web-based media has a series of features like strong interactivity, multimedia transmission, personalized transmission, etc. These features have turned it into a new platform for sports information propaganda, and provide accessible sources and channels for sports fans and workers to acquire sports information. On the other hand, with the development of scientific technology and people’s cognition on sports, people’s demands on sports information via the Internet are increased and broadened as well. Correspondingly, websites related with sports also get a prosperous development in recent years. However, owning to lower quality, present sports websites are far from enough to satisfy people’s needs in acquiring the information and knowledge they want. As professional websites, sports websites will be faced with challenges from other professional websites and comprehensive websites. Moreover, sports columns in traditional media form are also threaten to the existence and development of sports websites. As for this, it would be a subject cared by all network enterprises to figure out their own marketing orientation, so as to remain invincible in the fierce competition. The research is hereby conducted under this development background.

In the research, a sports website based on ASP and ACCESS database technology was constructed. On this website, users may get latest sports news, sports products, as well as some sports-related technical information. Besides satisfying users’ needs, the website also enables users to exchanges ideas with other Internet users concerning topics on sports. Through sports product design, users may as well get to know the entire designing process of sports products.

In order to successfully make a sports website popular, an objective and valid evaluation system is quite essential. Website evaluation system based on ASP technology is a complicated nonlinear system, in which, there are plenty of uncertain factors between input and output. Owning to high nonlinear function mapping performance, strong adaptability and self-learning ability, BP neural network model can effective overcome the defects in traditional evaluation methods, and weaken artificial influential factors decided by index weight in traditional evaluation method. It is both workable and of high precision [9, 10]. In this research, neural network evaluation method is applied to explore and discuss the website evaluation index system applied in ASP sports websites in China, with the objective to make use of this index system to scientifically and reasonably evaluate sports websites in China, so as to promote the healthy and fast development of professional websites in China.

II. ANALYSES ON KEY TECHNOLOGIES APPLIED IN SPORTS WEBSITES

A. ASP Technology Introduction

ASP is an acronym of Active Server Page, and is an application developed by Microsoft for replacing CGI scripts. It can interact with database and other programs, and is a simple and convenient programming tool [11]. The format of webpage file compile with ASP is “.asp”. ASP is now frequently applied in various dynamic websites. ASP is actually a server-side script compilation environment, which can be used to create and run dynamic web pages or applications. ASP web pages can contain HTML tag, ordinary text, script command, COM module, etc. With ASP, we are able to add interactive contents (such as online form) into web pages, as well as to create web application with HTML web pages as the user interface. Compared with HTML pages, ASP pages have the following features:

- **Function**: with ASP, we can break through functional limitations of static web page, and realize dynamic web page technology; The constructivism learning theory;
- **ASP files**: ASP files are included in files comprised by HTML codes, and are easy to be modified and tested;
- **Interpretative program**: ASP interpretive program on servers would generate ASP programs at the server-side, and then transmit the result in HTML form to web browser at the client-side. Thus, all web browsers will be able to interpret ASP web pages;
- **Technology**: ASP technology provides some built-in objects, with which, the script function at the server-side will be largely strengthened. For example, with web browsers, it is workable to acquire information submitted by users via HTML forms, to process the information in scripts, as well as to send information to web browsers;
- **Use**: ASP makes it possible to make use of Active X modules at the server-side to execute all kinds of tasks, such as accessing the database, sending or picking up emails, accessing the file system, etc.
- **Servers**: As servers would send execution results of ASP programs back to users in HTML form, users will not be able to see the source program code compiled in ASP, which would be helpful in preventing ASP program codes from being stolen [12].

ASP programs can only be executed on web servers. When a browser sends request to a web server for running a certain ASP [13], the server will firstly read and execute the program, convert the execution result into HTML form, and then send the file back to the browser. After the HTML file has been received by the web browser, it will then be displayed. Diagram 1 shows the realization principle of ASP.

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The principle of ASP’s accessing web database is demonstrated in Diagram 2. When a user requests an asp document, web server will respond to the HTTP request, and invoke the ASP engine to interpret the requested file. When finding any script (VBScript and JavaScript) compatible with ActiveX Scripting, ASP engine will invoke corresponding script in processing. If there is request for accessing database contained in the script, ODBC or OLEDB will then be employed in connecting with the database, and the database accessing module ADO will be applied to access the database.

B. Database Design

For the website in the research, operations related with ACCESS database would be quite simple. Firstly, we are to create a database, and then make some forms for the website, as is shown in Diagram 3. Among all the forms, discuss is used to store hot spot contents posted by users in forum; goods is designed to preserve machine tool information; message is employed to keep forum message delivered among users; news is used to store numerical control news; user is adopted to preserved users’ registration information.

- **Overall Design of Website:** Overall design of website is shown in figure 3. Users are connected to the Internet via web browsers, so as to perform corresponding operations on the website platform and interface, such as registration, log-in, inquiry, etc. Websites are connected with database through ASP, so as to access related data.
third-level directory will be directly linked to the corresponding web page.

- **Sports Forum Module**: The forum is comprised by several sections, such as sports information, sports technology, user information, forum information, etc. Users may post their topic in different sections, so as to exchange and communicate with other users.

### III. Establishment of Evaluation System of ASP-based Sports Websites

#### A. Theoretical Foundation of Website Evaluation Model based on BP Neural Network Technology

Network. BP (Back Propagation) Neural Network is also called Multilayered Feed-forward Neural Network, in which, neurons in each layers are only connected with neurons in their adjacent layer. There is no connection among neurons in the same layer. Neurons in different layers have no feedback connection either. Moreover, the relation between input and output is of high nonlinear mapping. If the amount of inputting nodes is n, while the amount of outputting nodes is m, BP can therefore be regarded as a mapping from n-dimension Euclidean space to m-dimension Euclidean space [14-16]. Thus, all index properties used for website technology and quality evaluation will be firstly normalized, and then be employed as the input vector of BP network model. The evaluation results will be taken as the output of BP network model. This network will be trained with plenty of samples, so as to make it acquire evaluation experts' experience, knowledge, subjective judgment, as well as the tendency of indexes' significance. In this way, the weighted coefficients obtained by the BP network model will be an internal representation of correct knowledge acquired by the network through self-adaptive learning. The well-trained BP network will then be able to figure out the evaluation result in allusion to the technology and quality of the website, by drawing support from the properties of technical and quality index of the website to be evaluated. After that, with the help of experts' experience, knowledge, subjective judgment, as well as the tendency of indexes' significance, we may reach to an effective combination between quantitative method and qualitative method, so as to ensure that the evaluation results are objective and consistent.

#### B. Research Method

- **Document Literature**: During the research, I have retrieved plenty of literatures and documents on Internet technology, website design, website development, information technology, as well as other subjects related with the research topic through China Academic Journal, CDMD and CPCD. Besides, I have as well collected and read related research materials on CNNIC, Internet Society of China, CNTI, CERNET, CCF, as well as other official websites.

- **Expert Interview**: During the research, with regard to related questions, 12 experts in fields of Computer, Physical Education, Network Development, Informatics and Automation, Statistics and E-business were interviewed face-to-face or via the telephone.

#### C. Establishment of Sports Website Evaluation System based on BP Neural Network

Sports website quality evaluation is to reach to a correct grade by analyzing factors that affecting the quality of sports websites, as well as the influence degree of these factors. Thus, the following index system (Table 1) is hereby constructed, including 4 first-level indexes and 21 second-level indexes.

### IV. BP Neural Network-based System for Managing Sports Website Quality

In the sports website quality evaluation model establishment, the choice of network model structure is a very important job. A good network model structure can reduce the network training times and improve the accuracy of online learning.

- a. Determine the number of neurons of the input layer. According to the index system, there are 21 indices that influence the sports website quality of. Therefore, the number of neurons on the input layer is 21, namely n=21.

- b. Determine the number of neurons of the output layer. The evaluation result is used as the output of the network, and therefore the number of neurons of the output layer is 1, namely m=1.

- c. Determine the number of hidden layers. The more hidden layers there are, the slower the learning speed of the neural network is. According to Kolmogorov's theorem, under a reasonable structure and proper weight
conditions, a three-layer BF network's approximation of any continuous functions can be realized. Therefore, we choose a three-layer BF network that has a relatively simple structure.

d. Determine the number of neurons of the hidden layer. Generally speaking, the number of neurons of the hidden layer is determined in accordance with the network’s convergence performance. After summarizing a large number of network structures, we obtain an empirical formula: \( s = 0.43nm + 0.12m^2 + 2.54n + 0.77m + 0.35 + 0.510 \). According to the above formula, the number of neurons on the hidden layer is 8, namely \( s = 8 \).

e. Determine the transfer function of neurons. The transfer function of network neurons goes like

\[
f(x) = \frac{1}{1 + e^{-x}}
\]

(1)

e. Determine the model structure. BP neural network model structure, as is shown in Figure 5, is determined according to the above results.

A. BP neural network learning algorithm

a. Initialize network and learning parameters, add a random number in \([0, 2/n, 2/n]\) to connection weights \( w_{ij} \) and threshold \( \theta_j \), \( i = 1, 2, \ldots; n \); \( j = 1, 2, \ldots, s \).

b. Choose the training data of a sample pair \( \{x_1, x_2, \ldots, x_s\} \) as input vectors, \( y_p \) as desired output.
c. Calculate the output of neurons of each hidden layer with the input vector \( x \), the connection weight \( w_{ij} \) and the threshold \( \theta_j \) of neurons on the hidden layer.

d. Calculate the output of neurons of the output layer with the hidden layer output \( y_i \), the connection weight \( w_{ij} \) and the threshold \( \theta_j \) of the output layer.

e. Calculate the alignment error of the output layer with the desired output \( y_p \) and the actual output of the network \( y \).

\[
\sigma = (y_p - y)(1 - y)
\]

(4)

f. Calculate the alignment error of the hidden layer with \( w_{ij} \), \( y_j \), \( y_i \)

\[
\sigma_j = y_j(1 - y_j)\sigma w_{ij}
\]

(5)
g. With \( w_{ij} \), \( y_j \), \( y_i \) and \( \theta_j \), calculate the new connection weight between the next hidden layer and output layer and the threshold of output neurons.

\[
\theta(t + 1) = \theta(t) + \eta(t)\sigma + \alpha(\theta(t) - \theta(t - 1))
\]

(6)

\[
\theta(t + 1) = \theta(t) + \eta(t)\sigma + \alpha(\theta(t) - \theta(t - 1))
\]

(7)

\[
\eta(t) = \eta | 1 - \frac{t}{T + M} |
\]

(8)

In the above formulas, \( \eta(t) \) represents the step size, \( \alpha \) the momentum coefficient which values from 0 to 1 and normally 0.9; \( \eta \) represents the initial step size; \( t \) represents learning times; \( T \) represents iteration times; \( M \) is any positive number.

h. With \( \eta(t) \), \( x_i \), \( w_{ij} \) and \( \theta_j \), calculate the new connection weight between the next output layer and hidden layer, that between hidden layers, and the neuron threshold of the hidden layer.

i. Obtain allowable errors after iterative calculations. Choose another sample pair for training and repeat the above algorithm until all the samples have received training and the neural network evaluation model has been established.

B. The realization of a neural network-based model for evaluating sports website

By use MATLAB, a high-performance visual software environment for numerical computation, to build a three-layer BP neural network. Within this network, there are 21 neurons of the input layer, 1 neuron of the output layer, 8 neurons of the hidden layer, 1000 learning times and 600 iteration times. Also, the initial step size is 0.9, \( M \) value is 400, the momentum coefficient is 0.9, and the allowable error is 0.001. We choose 10 pairs of sample data and 10 pairs of test data, and adopt the MATLAB neural network for learning training. Finally, we establish a neural network-based evaluation model. After verifying the test data, we obtain some satisfactory results.

Write the following codes in Matlab:

\[
P = \text{load}('datrain.Txt');\quad \text{Input the training data documents}
\]
\[
T = \text{load}('dagoal.txt');\quad \text{Input the training target data}
\]
\[
\text{net} = \text{newff}([\text{minmax}(P)], [8, 1], \{'tansig', 'logsig', \text{trainlm}'\});\quad \text{create a BP network, and use the tangent S-type and logarithmic S-type transfer function}
\]
\[
\text{net.trainParam.epochs}=2000;\quad \text{set the number of maximum training times as 2000}
\]
\[
\text{net.trainParam.goal}=0.001;\quad \text{Set the error accuracy}
\]
\[
\text{net.trainParam.lr}=0.1\quad \text{net=\text{train}(net, P, T)}\quad \text{Call the corresponding algorithm to train BP network}
\]
\[
A = \text{sim}([\text{net}, P])\quad \text{Call the corresponding code to predict}
\]
\[
e = T - A\quad \text{End}
\]
As shown in the following chart, after being trained 9 times, the network error will meet the requirements. The network error curve is shown in the following chart.

![Figure 6. The Network Error Curve](image)

The error at this moment Res = 0.0267
The obtained simulation result of neural network is A = 0.8061, 0.5854, 0.9937, 0.8020, 0.7982, 0.8182, 0.2002, 0.5994, 0.8082, 0.3958
Error curve is shown as below:

![Figure 7. The Network Error Curve](image)

From the above-mentioned error curve, the network through training meets the error requirement very soon. The comparison between the test result and expert assessment result is shown as below (see Table II).

<table>
<thead>
<tr>
<th>Serial No</th>
<th>The test value of neural network</th>
<th>The expert assessment value</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.806</td>
<td>0.8</td>
<td>Good</td>
</tr>
<tr>
<td>2</td>
<td>0.585</td>
<td>0.6</td>
<td>Medium</td>
</tr>
<tr>
<td>3</td>
<td>0.994</td>
<td>1.0</td>
<td>Excellent</td>
</tr>
<tr>
<td>4</td>
<td>0.802</td>
<td>0.8</td>
<td>Good</td>
</tr>
<tr>
<td>5</td>
<td>0.798</td>
<td>0.8</td>
<td>Good</td>
</tr>
<tr>
<td>6</td>
<td>0.818</td>
<td>0.8</td>
<td>Good</td>
</tr>
<tr>
<td>7</td>
<td>0.200</td>
<td>0.2</td>
<td>Poor</td>
</tr>
<tr>
<td>8</td>
<td>0.599</td>
<td>0.6</td>
<td>Medium</td>
</tr>
<tr>
<td>9</td>
<td>0.808</td>
<td>0.8</td>
<td>Good</td>
</tr>
<tr>
<td>10</td>
<td>0.396</td>
<td>0.4</td>
<td>Fair</td>
</tr>
</tbody>
</table>

Next, input two-group test date to make a test; and the obtained result is:
B = (0.3958, 0.9759)

Compare test result and expert assessment result:
(see Table III)

<table>
<thead>
<tr>
<th>Serial No</th>
<th>The test value of neural network</th>
<th>The expert assessment value</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.396</td>
<td>0.4</td>
<td>Fair</td>
</tr>
<tr>
<td>2</td>
<td>0.976</td>
<td>1.0</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

The error res = 0.0243, and the error rate is low, it is clear that the neural network has good assessment ability.

V. DISCUSSION

Through empirical research and analysis, the paper has reached to the following conclusions in allusion to how to construct sports website course quality management system:

The empirical research of constructing sports website with ASP technology and ACCESS database indicates that: ASP technology has huge potential in promoting sports website development. Firstly, enterprises will be able to save large amount of capitals, which should have been spent on IT construction, and may largely reduce the cost in an enterprise’s management informatization [17, 18]. Secondly, ASP users may make use of different channels to acquire applications and services. Software and service products can compose a completed, efficient and advanced enterprise management system within very short period, so as to rapidly obtain an operation and management solution for enterprise integration. Internet economy is now developing at high speed, and e-business is also advancing at a tremendous pace. From portal to content, from attention focus to scope, networks and websites are also gradually turning to ASP [19]. When looking up materials, the author found that, the earliest ASP enthusiast was an Internet user nick-named “Fei Niao”. In the June of 1998, he voluntarily organized “Fei Niao’s Home” for researching, exchanging and exploring ASP technology. The website soon developed to be ChinaASP.com, which was the earliest website that supplies ASP application technology and service. By integrating the actual situation of domestic China, Shanghai Whoee Network Co., Ltd. constructed the ASP platform – Whoee Net, with the aim to provide service to domestic enterprises, and offering enterprises with e-business-centered remote structure and hosting service, as well as enterprise internal and external network facilities and application. The company created the virtual enterprise portal (EP) and directly applied ASP into commercial appreciation links [20]. Furthermore, ISP also fully turned their concentration into ASP, and became the development outcome of ASP. Software manufacturer also shows special preference to ASP. According to latest information in the field, the third largest telecom operator – “China Netcom” had...
formulated its ASP development strategy. The largest management consulting company in China – "Han Consulting" orientated its eight subsidiaries on ASP in the field of Enterprise Resource Planning (ERP). Beijing “MyCRM” also aimed at ASP technology in the field of Customer Relationship Management (CRM). Beijing “DigiArk” orientated itself in web-office-based ASP. HP is now negotiating with China Construction Bank on developing ASP in finance. Thus, it can be seen that ASP is making a figure in the huge tide of IT economy. Its development prospect is inestimable.

B. Development Stage and Issues of ASP Application in Sports Websites

Different IT participators with network service providers, software manufactures and ISP as the major part are now bringing into play their advantages to try to achieve development in ASP. Currently, ASP-related service is of numerous kinds, with no normative or quantitative concept. Hardware manufacturers are drawing close to the “root” and foundation of ASP, while software companies and ISP directly pushes themselves to the front line of ASP service. Estimated by the author, after a period of exploration and development, ASP will gradually develop to the direction of service integration, and corresponding product and service standard will be established soon. After that, it will develop into a stage with divided market, normative standard, and mature ASP products. With ASP’s growing steadily, it will finally develop to be the business kernel of IT industry. At present, the major problem faced by ASP development is concept transformation: replacing purchasing with leasing, substituting service integration for product dealer, taking service economy over product economy, etc. In concrete, safety and service quality is the most important matter that concerned by both ASP and customers.

C. BP neural network can effectively overcome defects of traditional website evaluation methods

BP neural network is also called “error back-propagation neural network”. It is an innovative technology for website quality evaluation, which can effectively overcome defects of traditional website evaluation methods. In essence, BP neural network is a dynamic information processing system comprised by large amounts of a same kind of information processing units through wide connections. This system has unique function when dealing with contradictory, fuzzy, random, large amounts, dynamic and low precision information. It has functions like learning, memorization, association, summarization, conclusion, generalization, extraction, fault tolerance, self-learning and self-adaptation, which can be used to handle nonlinear problems [21]. The basic feature of neural network is nonlinear mapping, learning classification, and real-time optimization. Thus, it has opened a new way for mode identification, nonlinear classification, and other researches.

VI. CONCLUSION

Through discussing and analyzing this topic, we can draw following conclusions as to how to establish a system for construct and managing sports website quality.

A. ASP technology has huge potential in promoting sports website development

By applying ASP technology in sports websites, users are able to share news, latest products and technologies in sports. Through forums, more users will be able to participate in the communication and exchange on sports technology, so as to make progress together. Via product design, users are enabled to design sports products. Thus, to some extent, sports website development is of help to users’ improvement in sports technology learning.

B. BP neural network can effectively overcome defects of traditional website evaluation methods

The amount and scale of websites in different fields are increasing sharply. As for this, there would be wide prospect by applying neural network in sports website quality evaluation, for it removes subjective factors in experts’ evaluation. The variable step algorithm can largely improve the convergence rate of network, increasing its service efficiency and can help to offer satisfactory evaluation result.

C. Development of ASP-based sports websites shall have a certain development mode

The quality of website is determined by the ability of controlling the entire process of website development. The process approach can be employed, following project management procedures, to ensure that the responsibility of all functional sections is fulfilled all through procedures, including initiation management, plan management, stage management, and the final handing-over. Besides, major procedures like realization of duties, resources and courses, analysis and improvement, as well as minor procedures contained in major procedures shall also be kept under control.

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