Research on Design and Implementation of Digital Art Examination System

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ABSTRACT: With the rapid development of digital technology, multimedia technology and artificial intelligence, art learning and assessment methods have had a revolutionary change. Network-based examination uses computer and network technology to develop the examination system, which conforms to the actual requirements of the campus information construction and distance education, and becomes a new mainstream examination evaluation method. Based on the modernized development demand of art education and the theory of genetic algorithm, the research has conducted targeted design and realized the basic functions of the online examination system of art by using the test paper of genetic algorithm, ASP, SQL and Dreamweaver, and other techniques, with a relatively strong usability.

Keywords: digital art; online examination system; algorithm; design

1 RESEARCH BACKGROUND

The rapid development and extensive application for digital technology, multimedia technology, computer network technology and artificial intelligence have had a profound impact on the modern education and teaching management. On the one hand, the advent of computer and digital technology has changed the manifestation pattern of art. Art can not only manifested as a static plane image, but also manifested as a dynamic three-dimensional image, as well as various painting forms, such as murals, sculptures, watercolors, oil paintings, commercial illustrations, traditional Chinese paintings and graffiti[1]. Digital art is changing and enriching the traditional ideas and rules of art creation and becoming a new art form in the field of art creation[2]. On the other hand, the application for computer and network technology in the field of education has changed the traditional teaching methods. Distance teaching has broken the limitation of time and space and can make full use of high-quality educational resources, which is an important means of education[3]. However, in the link of education evaluation – examination, the traditional paper test highlights many drawbacks[4].

Digital art technology is supported by computer technology and has a strong practical operability and wide application, and also has a broad development prospect from graphic design to three-dimensional art design, from advertising, display boards, modeling design to animation, video, landscape design, games and human-computer interaction design and so on. Various painting forms of digital art have a profound theoretical foundation of art and operation skills of art, which can not only meet the learning needs, but also actively mobilize the enthusiasm of teachers and students, cultivate students’ creative thinking of digital art, inspire creative inspiration and increase art and computer knowledge in practice[5]. Based on the modernized development demand of art education and computer technology, this paper develops a professional knowledge examination evaluation system of digital art in the field of digital art, in order to improve the fairness and efficiency of examination.

2 RESEARCH STATUS

Foreign researches on the examination system can be traced back to the 1970s. American Examination Commission researched tasks of computer simulation tests, and successfully developed an effective simulation examination system called computer aided exami-
ination system in 1983 [6]. Currently, foreign computer examination system is widely used in Microsoft certification examination, computer-based examination of GRE, Adobe certification examination and other international certification examinations [7].

Many domestic scholars have researched the design and implementation of online examination system. Ma Ling, Wu Ying analyzed the design and implementation of online examination system based on the test paper of genetic algorithm [8, 9]. Zhong Ning, Liu Lianhao conducted detailed discussion of the basic operation process of genetic algorithm and auto-composing test paper, and verified in the development of online system [10]. Based on the analysis of the structure of test paper, Lin Guancheng, Wu Daiwen applied for the globally optimized adaptive genetic algorithm to the computer-based online examination system, and implemented a large number of test paper composition tests. The test results show that the test paper of adaptive genetic algorithm can guarantee security and reliability of the examination system, and improve the efficiency of system test paper composition [11]. Zhang Weiyi systematically researched the design of examination system and put forward an online examination system of art based on ASP.NET technology, which divides system roles into teachers, students and administrators, and divides function into test question bank generation, auto-composing test paper, examination organization, test paper review and score management [12].

3 STRATEGY OF TEST PAPER COMPOSITION OF GENETIC ALGORITHM AND TECHNOLOGICAL BASIS

3.1 Theoretical parameters of generating test paper

3.1.1 General parameters

General parameters refer to the overall attributes of the test paper, specifically including: test paper title, examination time, full score, average degree of difficulty, average distinction degree, exposure time and knowledge points tested.

3.1.2 Proportion of question types

Proportion of question types refers to the structure of question types of the test paper, that is: questions of each question type, score of each question, and knowledge points tested.

3.1.3 Proportion of difficulty in knowledge points

We not only need to determine the proportion of difficulty in the entire test paper and the proportion of knowledge points tested, but also need to know the proportion of specific difficulty in knowledge points. Thus, we can get a two-dimensional parameter table, as shown in Table 1.

### Table 1. Proportion of difficulty in knowledge points.

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>More difficult</th>
<th>Moderate</th>
<th>Easier</th>
<th>Easy</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>10%</td>
<td>17%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>(2)</td>
<td>5%</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n)</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

3.1.4 Parameter constraints

For strategy of test paper composition, above parameters input are not arbitrary, and the parameters must meet the following constraints.

\[
\sum_{i} X = 100 \quad (1)
\]

\[
\sum_{i} T = 100 \quad (2)
\]

\[
\sum_{i=1}^{n} \left( \sum_{j=1}^{5} Z_{ij} \cdot N_{ij} \right) \cdot 100\% = 100\% \quad (3)
\]

Note: \(X_i\): score of question \(X\); \(T_i\): examination time of question \(X\); \(Z_{ij}\): knowledge point; \(N_{ij}\): proportion of difficulty.

3.1.5 Test paper composition parameters in finally extracting questions

The computer could not directly use the above parameters to compose questions during test paper composition. We need to transform it into the final parameters of test paper composition. The transform method between them is the strategy of test paper composition. The final parameters of test paper composition are shown in Table 2.

### Table 2. Final parameters of test paper composition.

<table>
<thead>
<tr>
<th>NO.</th>
<th>Question type</th>
<th>Difficulty</th>
<th>Distinction degree</th>
<th>Cognitive classification</th>
<th>Knowledge points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>Difficult</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>Easy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

In the actual test paper composition, conditions selected by each question are as follows:

(1) Parameters of exposure time: exposure time < defined exposure time.

(2) Parameters of number of test questions: number of test questions < > extracted number of test questions.

(3) Final conditions of extracting questions: In each column of final test paper composition parameter table (each item in the table is AND relationship, excluding the number of test questions) AND exposure time < defined exposure time AND number of test questions < > number of test questions extracted.

If there are more than one test questions extracted in a certain condition, the one is randomly extracted from test questions; if any test question is not extracted, control conditions cancelled in turn are: exposure time, cognitive classification, distinction degree; if any test question is not extracted, the difficulty has changed at
a minimum level (level 1); if any test question is still not extracted, knowledge points are randomly extracted from the knowledge points tested \[^{[13]}\].

3.2 Principle of genetic algorithm

Genetic algorithm is a kind of search algorithm, which conducts group operation based on all individuals in the group as an object, with optimization function. Three genetic operators of choice, crossover and variation make the genetic algorithm have the characteristics that are not available for other traditional methods. Its basic principle is shown in Figure 1.

![Figure 1. Basic flow chart of genetic algorithm.](image)

3.3 Auto-composing test paper algorithm

3.3.1 Overview of auto-composing test paper algorithm

The corresponding state space D of the control index is established for the auto-composing test paper process before composing test paper, as shown in formula 3-4. Each row of D is comprised by the control indexes (question number, question type, difficulty and so on) of test questions and encoded in a binary form. Each column is the total value of an index in the test question bank.

\[
D = \begin{bmatrix}
  d_{11} & d_{12} & \cdots & d_{1+m+n} \\
  d_{21} & d_{22} & \cdots & d_{2+m+n} \\
  \vdots & \vdots & \ddots & \vdots \\
  d_{n1} & d_{n2} & \cdots & d_{n+m+n}
\end{bmatrix}
\]

Next, the genetic algorithm is analyzed by the test paper composition system in a detailed way. In genetic algorithm, an individual X is a character string with the length of 0 and L, L is called the chain length of individual, and all of L individuals are recorded as \( S = \{0,1\}^L \), S is called the individual space.

In the test paper composition system, the individual is each test question, and the number of control index of each test question is its chain length.

\( N \) population is a set of N individuals (individuals are allowed to repeat), and N is the size of population.

\[
N = \{X = (X_1, X_2, \ldots, X_N) \mid X_i \in S \ (i < N)\}
\]

(5)

Formula (5) is N population space, the chain length is L, and the population with the size of N can be expressed as \( N \times L \)-order matrix:

\[
\bar{X} = \begin{bmatrix}
  x_{11} & x_{12} & \cdots & x_{1L} \\
  x_{21} & x_{22} & \cdots & x_{2L} \\
  \vdots & \vdots & \ddots & \vdots \\
  x_{n1} & x_{n2} & \cdots & x_{nL}
\end{bmatrix}
\]

(6)

Where: \( X_i = (x_{i1}, x_{i2}, \ldots, x_{iL}) \) is an individual; \( X_0 \), numerical value of the j-th group of the i-th individual, which is specifically applied to the test paper composition system, N test questions form a test question bank, namely, a population.

Parent population is a pair of individuals \( (X_1, X_2) \). Where: \( X_i \in S \ (i=1, 2) \), all of parent population is called parent population space, namely:

\[
S^2 = \{(X_1, X_2) \mid X_1, X_2 \in S\}
\]

(7)

Before the use of genetic algorithm, binary coding should be implemented for control indexes. Next, taking the chapters, questions and difficulty values as an example to elaborate the coding process, here, composition of control indexes are stipulated as follows: encoded 0-2 bits represent sections where the test questions belong to; 3-5 bits represent chapters where the test questions belong to; 6-8 bits represent test question types; 9-12 bits represent attribute values of difficulty. Assuming that there are only four attribute values of test questions, and given an attribute value, their corresponding encoding is as follows:

The corresponding encoding of test questions in Chapter III is as follows:

\[
\begin{array}{cccccccccc}
  \ast & \ast & \ast & \ast & \ast & 0 & 1 & 1 & \ast & \ast
\end{array}
\]

The corresponding encoding of multiple choices is as follows:

\[
\begin{array}{cccccccccc}
  \ast & \ast & \ast & 0 & 1 & 0 & \ast & \ast & \ast & \ast
\end{array}
\]

Where: * represent any one of 0 and 1. When the test paper composition does not have a specific provision on a control index, the system automatically assigns.

3.3.2 Determination of fitness function

Fitness function is a measure form to describe the individual fitness. The purpose of introducing this function is to evaluate and compare individuals ac-
according to their fitness, and to determine the strength and weakness degree, and convert the objective function into fitness function.

The benefit produced by each individual is called fitness function. The fitness function is a mapping from the individual space $S$ to positive real number space, that is, fitness function $f$ is:

$$f : S \rightarrow R^+$$

For convenience, we specify the range of fitness function as $[0, 1]$.

3.3.3 Determination of genetic operators

There are three important genetic operators, namely, selection operator, exchange operator and mutation operator.

(1) Selection operator is also called reproduction operator, and its role is to determine whether it is eliminated or reproduced in the next generation according to the individual’s strength and weakness degree. Selection operator is to select an individual in a population, which is a random mapping: $T_s : S^n \rightarrow S$, according to the rules of probability:

$$P\{T_s(\bar{X}) = X_i\} = \frac{f^s(X_i)}{\sum_{k=1}^n f^s(X_k)}$$

(9)

The method of selecting individuals is called selection operator of fitness value, where $f(X)$ represents the fitness of individuals in a population and has $0 < a < 1$. For the selection operator $T^s_s$ and population $\bar{X} = (X_1, X_2, ..., X_N)$, there is the following property:

$$P\{T^s_s(\bar{X}) \subseteq \bar{X}\} = 1, T^s_s(\bar{X}) \subseteq \bar{X}$$

(10)

$$P\{T^s_s(\bar{X}) \subseteq X\} = \frac{\phi(X)f^s(X)}{\sum_{k=1}^n f^s(X_k)}$$

(11)

(2) Exchange operator

Exchange operator is called crossover operator, which is a mapping from parent population space to individual space, namely, $T_c : S^2 \rightarrow S$. Single-point exchange is the simplest form of numerous exchange operators. That is, to randomly select two character strings from the group, supposing that the length of string is $L$, and crossover point is randomly determined, it takes an integer value between 1 and $L-1$.

Supposing that $T_c$ is a single-point random crossover operator, for $(X_1, X_2) \in S^2, Y \in S$, then:

$$P\{T_c(X_1, X_2) = Y\} = \frac{k}{l}$$

(12)

Where: $k = k(X_1, X_2, Y)$, a single-point crossover $(X_1, X_2)$ can be used to generate the number of gene position of $Y$.

Supposing that $T_c$ is a single-point random crossover operator, for any given population $\bar{X} = (X_1, X_2, X_3, ..., X_N)$ and $i \leq N$, then:

$$P\{T_c(T^s_s(\bar{X})) = X_i\} > 0$$

(13)

Supposing that $T_c$ is a crossover operator; $T^s_s$ is a selection operator; $\bar{X} = (X_1, X_2, X_3, ..., X_N)$ is a homogeneous population, then:

$$P\{T_c(T^s_s(\bar{X})) = X_i\} = 1$$

(14)

(3) Mutation operator

Mutation operator becomes a variation operator, which can change the character at a certain position on the character string, which is a random mapping from individual space to individual space, namely, $T_m : S \rightarrow S$, and its mode of action is to independently change the value of individual component by probability $P_m$. $P_m$ is called mutation probability.

For $f(x)$ function, when $x \rightarrow \infty$, formula (15) is established, then the function $f(x)$ has convergence.

$$\lim_{x \rightarrow \infty} P(f(x) = C) = 1$$

(15)

In case of termination of test paper composition, convergence is realized. Convergence type can be discriminated by Markov chain. For the homogeneous Markov chain and arbitrary $n, m \geq 0, i, j \in S$, then:

$$P_{ij}^{(m+n)} = \sum_{k \in S} P_{ik}^{(m)} P_{kj}^{(n)}$$

(16)

Supposing that $\{X(n); n \geq 0\}$ is a population sequence of the standard genetic algorithm by using a single-point crossover operator, given $\bar{X}(n) = \bar{X}$, then the $j$-th component of the next generation of individual $X(n+1)$ obeys 0-1 distribution of the parameter $p_j(\bar{X}, 1)$, where:

$$P_j(\bar{X}, 1) = P\{x_{ij}(n+1) = 1|\bar{X}(n) = \bar{X}\}$$

(17)

3.4 Test question composing process of genetic algorithm

(1) According to the test question composing requirements of the examiner, to plan the data in the state space database $D$, retain $d_{\text{request}}$ part, remove $d_{\text{void}}$ part and encode the remaining parts $D[1], D[2], ..., D[l]$.

(2) To initialize the test question bank $\{\text{STK}\}$, randomly extract a set of test questions from the test question bank and number $\text{STK}[1], \text{STK}[2], ..., \text{STK}[j]$, determine the appropriate exchange probability $P_e$ and mutation probability $P_m$, and define its fitness value flexibility $[k](k=1, 2, ..., j)$.

$$\text{flexibility} [k] \leftarrow 0 (k = 1, 2, ..., j)$$

(18)

(3) To select $\text{STK}[m] (0 \leq m \leq j)$ from the test ques-
tion bank [STK] and an index D[n] (0 ≤ n ≤ i) from the state space database[D] for matching. If STK[m] and D[n] are complete matching, then Formula (19) is established; if not, Formula (20) is established.

\[
\text{flexibility}[k] \leftarrow \text{flexibility}[k] + 1 \\
\text{flexibility}[k] \leftarrow \text{flexibility}[k] + 0
\]

(19)  

(20)  

(4) To eliminate selection, and retain high-fitness test questions. That is, to remove STK[m] with the flexibility [k] of 0, thus generating a new test question bank model STK[h].

(5) To repeat process (2) to generate a new test question bank model STK[p]; to randomly select the model STK[h] and STK[p] are from [STK] according to a certain exchange probability \( P_c \), exchange the corresponding values in the bit string, to generate a new test question bank model STK[h], STK[p], such as: before exchange STK[h] = 1111110, STK[p] = 0011110; after exchange STK[h] = 1111011; STK[p] = 111110

(6) To randomly select a test question model STK[h] from the test question bank [STK] according to a certain mutation probability to generate a new test question model.

(7) To generate a test question model after completion of the above steps of selection, crossover and mutation, discriminate its convergence according to the error accuracy determined in advance. When the current fitness is high, the test paper composition is successfully turned to step (8); if the fitness is low, turned to step (3).

(8) To output the corresponding test questions, test paper composition ends.

To extract test questions by the genetic algorithm, it is really very important to determine the exchange probability \( P_c \) and the mutation probability \( P_m \). If \( P_c \) is too small, the progress to select test questions will be slow; if \( P_c \) is too large, it will destroy the high-fitness test question model, which is usually defined as 0.4. Similarly, if \( P_m \) is too small, a new test model will not be generated; if \( P_m \) is too large, too many test question models will be generated, which is usually defined as 0.1. In the automatic selection of test questions, parents selection and survival selection can be used. Parents selection adopts non-return random selection, which makes each test question have the possibility of being selected; survival selection allows parents and offspring to compete, and let the best among them select the best of half in the next round of competition. Two selection modes have a combined action on the selection of test questions, in order to ensure the successful completion of selection of test questions. In the process of selection of test questions, which test question is selected is a non-uniform random event, and its probability depends on the process of the previous selection of test questions.

## 4 Examination System Design and Implementation

### 4.1 Overall design of system

The test paper composition system is only a part of an examination system. A complete test system also includes the test question bank management, examination management, examinee information management, grading and so on. Based on the establishment of mathematic model and algorithm research of the test paper composition issues, this paper will apply for ASP and database technology to develop an examination system based on the genetic algorithm. The basic framework structure of the examination system is shown in Figure 2.

![Figure 2. Basic framework structure chart of examination system.](image-url)
The system mainly realizes an online examination management system of test paper composition based on genetic algorithm, so a general description is given to the system database design. Based on the system design, the main function module of the examination system can be divided into staff management module and examinee examination module. The functions of main modules of examination system are as follows:

Administrator module: free to set the subject of examination; free to set the test question bank; automatic generation of a test paper based on genetic algorithm; multi-function query function; release announcement.

Examinees examination module: systematical control of examination time; anti-refresh function; automatic generation of examination score; multi-function query function.

The system function module structure is shown in Figure 3.

4.2 System database design

4.2.1 Conceptual structure design

The conceptual model is mainly modeling of the information world. It has many representing methods. Figure 4 shows E-R diagram of the online examination system [14].

4.2.2 Physical structure design

A process of selecting a physical structure that is the most suitable for the application requirements for a particular logical data model is called the physical design of database. According to system requirements,
the following tables are mainly designed in the database.

(1) Table name
- User information table cadre_info: record user information.
- Professional information table department: record professional information of students
- Examinees information table exam_testuser: record examinees information
- Test question bank information table exam_database: test question bank
- Examination information table exam_test: record examinees examination score information of the corresponding subjects
- Subject information table exam_subject: record examinees examined subjects
- Score information table exam_score: record examinees examination score

(2) Structural design of table

<p>| Table 3. User information table. |</p>
<table>
<thead>
<tr>
<th>Field name</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Userid</td>
<td>Text</td>
<td>User Id</td>
</tr>
<tr>
<td>Username</td>
<td>Text</td>
<td>User real name</td>
</tr>
<tr>
<td>Pwd</td>
<td>Text</td>
<td>User password</td>
</tr>
<tr>
<td>Department</td>
<td>Text</td>
<td>Department</td>
</tr>
<tr>
<td>Duties</td>
<td>Text</td>
<td>Student duties</td>
</tr>
<tr>
<td>ifadmin</td>
<td>Text</td>
<td>Administrator or not</td>
</tr>
</tbody>
</table>

<p>| Table 4. Professional information table. |</p>
<table>
<thead>
<tr>
<th>Field name</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department</td>
<td>Text</td>
<td>Department name</td>
</tr>
</tbody>
</table>

<p>| Table 5. Examinee information table. |</p>
<table>
<thead>
<tr>
<th>Field name</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Auto number</td>
<td>Major key</td>
</tr>
<tr>
<td>Testid</td>
<td>Digit</td>
<td>Examination number</td>
</tr>
<tr>
<td>Userid</td>
<td>Digit</td>
<td>Examinee number</td>
</tr>
<tr>
<td>Havetest</td>
<td>Digit</td>
<td>Take an examination or not</td>
</tr>
</tbody>
</table>

<p>| Table 6. Test question bank information table. |</p>
<table>
<thead>
<tr>
<th>Field name</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Id</td>
<td>Auto number</td>
<td>Test question number, major key</td>
</tr>
<tr>
<td>Subject</td>
<td>Text</td>
<td>Subject</td>
</tr>
<tr>
<td>Type</td>
<td>Text</td>
<td>Reminder</td>
</tr>
<tr>
<td>Question</td>
<td>Note</td>
<td>Question</td>
</tr>
<tr>
<td>Text1</td>
<td>Note</td>
<td>Option 1</td>
</tr>
<tr>
<td>Text2</td>
<td>Note</td>
<td>Option 2</td>
</tr>
<tr>
<td>Text3</td>
<td>Note</td>
<td>Option 3</td>
</tr>
<tr>
<td>Text4</td>
<td>Note</td>
<td>Option 4</td>
</tr>
<tr>
<td>Text5</td>
<td>Note</td>
<td>Option 5</td>
</tr>
<tr>
<td>Text6</td>
<td>Note</td>
<td>Option 6</td>
</tr>
<tr>
<td>Answer</td>
<td>Text</td>
<td>Right answer</td>
</tr>
<tr>
<td>Mark</td>
<td>Digit</td>
<td>A mark to indicate whether the test question is selected</td>
</tr>
<tr>
<td>Nandu</td>
<td>Integral</td>
<td>Difficulty value of test questions</td>
</tr>
<tr>
<td>Chapt</td>
<td>Integral</td>
<td>Chapter where the test questions belong to</td>
</tr>
<tr>
<td>Shijian</td>
<td>Integral</td>
<td>Time to answer each question</td>
</tr>
<tr>
<td>Fenzhif</td>
<td>Integral</td>
<td>Test question score</td>
</tr>
<tr>
<td>Qufendu</td>
<td>Integral</td>
<td>Distinction degree of test questions</td>
</tr>
</tbody>
</table>

Other tables are not listed here.

4.3 System module design and implementation

4.3.1 Administrator function module
Administrator function module includes the subject management, test question bank management, students management, test paper generation, score management, release announcement and so on [15].

(1) Subject management includes: browse, add, modify or delete examination subjects in this module.

(2) Test question bank management include: browse, add, modify or delete test questions in this module.

(3) Examinees management includes: browse all examinees information, add or delete examinees examination qualification.

(4) Test paper generation includes: select examination subjects, automatically generate test questions of the corresponding subjects.

(5) Score management includes: inquire all examination scores of examinees in this module.

(6) Release announcement includes: release news and notifications related to the examination to be conducted.

4.3.2 Examinee function module
Examinee function module includes online examination, score inquiry and view announcement.

(1) Online examination includes: system login, subject selection, enter examination room, online answer questions, submit test paper.

(2) Score inquiry includes all examination scores of examinees.

(3) View announcement module: publish information related to examination.

4.4 System testing
The foreground design of system uses Dreamweaver and other development tools, while background design uses ASP technology and SQL Server database. The system adopts a programming method combined with structuralization and modularization from the overall to the part, and in the process of comprehensive planning to concrete realization, so as to be easier to connect with the integration of the system function modules, and avoid the increase of time and memory space; the structure is designed from top to bottom, from outside to inside, in order to be easy to maintain the integrity of the system.

After testing, the system is running normally, and can provide some error tips, with a certain exception handling capability. The success rate of test paper composition is 100%. Compared to random choice method for the test paper composition, the success rate of test paper composition in this paper has been greatly improved. Overall, the system stability and security can be guaranteed. Therefore, the system designed in this paper realizes the basic functions of the online examination system and achieves the expected purpose.
5 CONCLUSION

This paper focuses on the analysis of principle of auto-composing test paper in online examination system, defines the test paper composition parameters and parameter constraints, and presents a method of test paper composition by genetic algorithm based on matrix coding, combines with the test paper composition strategy and genetic algorithm, and establishes a mathematical model of auto-composing test paper by genetic algorithm, and then uses ASP, SQL Server, Dreamweaver and other technologies for targeted design by virtue of the features of global optimization and intelligent search of genetic algorithm, realizes the basic functions of the online examination system. When various attributes of test questions can meet the control indexes of the mathematical model, the system can quickly extract a set of test questions in art that are in line with the requirements from the test question bank, with a strong practicality.

REFERENCES