

Retraction

Retracted: College Information Education Management Relying on Interactive Multimedia Teaching Mode

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Manipulated or compromised peer review

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] R. Li, "College Information Education Management Relying on Interactive Multimedia Teaching Mode," *Journal of Electrical and Computer Engineering*, vol. 2022, Article ID 7384200, 11 pages, 2022.

Research Article

College Information Education Management Relying on Interactive Multimedia Teaching Mode

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At present, educational management in colleges and universities has problems such as outdated content and backward methods of management work, fragmentation of structure, poor coordination and communication, surfaceization of work, and lack of joint efforts for all-staff education. In order to improve the effect of information education management in colleges and universities, this paper integrates the interactive multimedia teaching mode English into education management, and improves the multimedia intelligence algorithm to provide reliable technical support for subsequent information education management in colleges and universities. Moreover, with the support of intelligent algorithms, this paper constructs a college teaching information management system based on interactive multimedia teaching mode. The experimental research results show that the college teaching information management system based on the interactive multimedia teaching mode proposed in this paper has good educational data collection effects and educational information management effects.

1. Introduction

With the popularization of higher education rhyme, colleges and universities need to continuously improve the quality of teaching and the level of student management. Student management is the focus and difficulty of school work, which is related to the stability of the school and the overall development of students [1]. At present, China is at a critical stage of development and reform, and profound and complex changes are taking place in all areas of society. These changes have also affected colleges and universities, causing many new problems and new trends in the management and education of college students. With the continuous deepening of my country's higher education reform, the management and operating mechanism of colleges and universities are also undergoing tremendous changes.

Education informatization is another huge change in human society since the creation of writing and the invention of printing. It is the only way for education in all countries to respond to the challenges of the knowledge economy and realize the modernization of education [2]. At present, higher education is experiencing a profound

friendship. On the one hand, the rapidly developing modern information society has put forward higher and newer requirements on the mode of talent training and the requirements of talent quality, and it is necessary for colleges and universities to train more talents who meet the needs of modern society. On the other hand, higher education itself needs to survive through reforms, develop through innovation, break through the shackles of traditional education models, and move toward educational modernization [3]. Both aspects need to be supported by education informatization.

This article combines the interactive multimedia technology to study the information education management of colleges and universities, and builds an intelligent education model of information education in colleges and universities, and improves the effect of college education management.

2. Related Work

The Educational Communication and Technology Agency of the United Kingdom has released the self-evaluation system for school informatization (the self-review framework,

referred to as SRF). The evaluation index system focuses on the actual application of school development and evaluates the ICT level of colleges and universities in order to provide reference and practical guidance for the follow-up development of schools [4]. After multiple rounds of revision and improvement, the evaluation of local college education management has formed an evaluation system with six dimensions including leadership and management, development planning, learning ability, evaluation, professional development, and resources [5]. Statistics Canada and the Canadian Bureau of Education Statistics have implemented a pan-Canadian education evaluation model (O'CEIP). As the main component of the model, the evaluation of education informatization mainly includes the ratio of school students to computers, students' learning activities using the Internet, the proportion of Internet connections, and the obstacles faced by ICT applications [6]. Korean education informatization gradually incorporates the learning ability of students' informatization into the scope of evaluation and assessment, and has formed an evaluation index system based on the dimensions of infrastructure, teaching informatization, and digital database construction [7].

Literature [8] relies on the national informatization index system, refers to the research results of other scholars, and follows the principles of scientificity, completeness, and practicability, and builds infrastructure construction, information resource construction, information application, integrated management, and information technology. Literature [9] determined six core indicators for education and informatization talents and 30 secondary indicators of strategic position, application status, infrastructure, human resources, information resources, organization, and management on the basis of interviews with many experts. Literature [10] based on the principles of systemicity, feasibility, and comparability established by the university informatization index system, based on the basic status of universities, proposes strategic position, infrastructure, information resources, application status, talent team, funding, distance education, organization management, and nine core indicators of safety mechanism. The literature [11] constructs the information technology construction vocational education development index from several aspects such as infrastructure, resources and applications, information management, and safeguard measures, and also analyzes the overall growth trend of the development of vocational education informatization based on the data. Literature [12] uses the Technical Acceptance Model (TAM) as the theoretical framework to analyze the informatization ability of teachers. Six factors including external variables, adjustment variables, perceived usefulness, perceived ease of use, use attitude, and behavior intention of the TAM model are used to evaluate the development of teachers' informatization ability. Literature [13] used factor analysis to establish an evaluation model of regional basic education ICT development after conducting a large number of questionnaires. The model is composed of four factors: ICT application, ICT special expenditure, ICT platform, and ICT terminal. The development direction of informatization

provides theoretical support for the modernization of education.

The comprehensive index method refers to a method that uses a single statistical indicator to quantitatively reflect the comprehensive change level of multiple indicators. Literature [14] conducted related research and used this method to measure the development index of regional education informatization. The advantage of this method is that it is easier to understand, the evaluation process is comprehensive and systematic, and the calculation is simple. The disadvantage is that each index simply synthesizes a comprehensive index and lacks mature theoretical foundation support. This method is suitable for situations where the evaluation criteria are clearly defined, the evaluation objects are not very different, and the fluctuations of various indicators are small. Fuzzy evaluation method refers to the use of fuzzy mathematics to quantify fuzzy concepts using the principle of fuzzy relationship synthesis, so as to comprehensively evaluate the pros and cons of the evaluation object. Literature [15] uses fuzzy evaluation to construct an evaluation model of college teachers' performance, which scientifically reflects the status of college teachers' performance. The advantage of this method is that incomplete information and uncertain information are converted into fuzzy concepts to quantify qualitative problems and improve the accuracy and credibility of evaluation. The disadvantage is that only the main factors are considered and the secondary factors are ignored, which makes the evaluation result inaccurate; it is easy to be affected by subjective factors in the determination of weighting and membership functions. This method is suitable for the evaluation of things that cannot be accurately measured, such as quality assessment and risk for decision making. The gray correlation analysis method refers to seeking the numerical relationship between the various factors in the system through the geometric shape of the change curve of each factor. Literature [16] used the gray correlation analysis method to calculate the comprehensive index value and the five-dimensional index value when studying the evaluation of the basic education development level, and compared with the values calculated by other evaluation methods. The advantage of this method is to quantitatively analyze the changes between factors or systems, and conduct systematic evaluation by dividing the dominant factors and restrictive factors. The disadvantage is that the evaluation results have only discrete evaluation grades, and there is a problem of low-grade resolution. This method is suitable for quantitative analysis of the correlation degree between various factors in the development process of dynamic system. Factor analysis refers to the use of a few factors to describe the relationship between many indicators or factors. Literature [17] uses factor analysis to determine the dimensions of basic education informatization performance evaluation. The advantage of this method is to combine the information of the original variables to obtain the common factors affecting the variables, simplifying the data; through rotation, the naming of the factor variables is clear. The disadvantage is that the result is only the synthesis of the original information, and the calculation is only used as a part of the

comprehensive evaluation, and subsequent calculation support is required. This method is suitable for the strong correlation between evaluation indexes.

3. Intelligent Multimedia Teaching Algorithm

The intelligent multimedia algorithm is studied to provide reliable technical support for the subsequent information technology education management in universities. Ordinary cameras contain optical devices mainly include lenses, apertures, and image sensors. The ordinary image capture process is essentially a recording process of a four-dimensional light field. It records a two-dimensional slice of the four-dimensional light field at the focus position, which is the information of a specific direction in the light field.

The lens of a camera is usually a thin lens that serves to transform the u -plane of the light field in the two-plane parametrization to an imaging plane symmetrical to it according to the imaging formula.

Aperture can be seen as a limiter, and only the light entering the aperture will be imaged. The modulation function of the aperture is defined as

$$a(u, s) = \text{rect}\left(\frac{s}{s_0}\right). \quad (1)$$

It is a gate function, where Q is the size of the aperture. Therefore, the process of the light field entering the aperture can be described as

$$l_a(u, s) = l(u, s)a(u, s). \quad (2)$$

The corresponding Fourier transform is as follows:

$$L_a(f_u, f_s) = L(f_u, f_s) * A(f_u, f_s). \quad (3)$$

$A(f_u, f_s) = s_0 \text{Sa}(f_s s_0 / 2)$ is the Fourier transform of the gate function.

The final image is formed on the image sensor, which is a two-dimensional projection of the four-dimensional light field entering the aperture, or understood as a two-dimensional slice of the light field in the Fourier domain.

A compressed optical field camera is a two-dimensional plane mask added between the lens and sensor of a normal camera to compressively encode (modulate) the light field entering the aperture for acquisition. In order to obtain the most random and noncoherent acquisition of the angular dimension of the light field, the mask is located in the position between the lens and the sensor. A schematic diagram of the structure of the compressed light field camera is shown in Figure 1.

For a more concise exposition, the analysis is performed only for the light field entering the aperture. Assuming that the target light field is of finite bandwidth, the light field is represented as $l(u, s)$ at the lens. In Figure 1, the distance between the lens and the sensor is set to 1, and the mask is located at z in front of the sensor. When the light field propagates from the lens to the mask position, the corresponding light field is represented in the spatial and frequency domains as

$$l_1(u, s) = l(u - (1 - z)s, s), \quad (4a)$$

$$L_1(f_u, f_s) = L(f_u, f_s + (1 - z)f_u). \quad (4b)$$

The spectrum of the optical field is expressed as a shear along the f_s -axis.

After that the light field passes through an optical mask with the mask plane perpendicular to the optical axis. At this point, the mask modulation function $m(u, s)$ is a constant in angular dimension s . According to the conclusion, when the mask is a plane mask and perpendicular to the light, its modulation function corresponds to the Fourier transform of the unit pulse. The passage of the light field through the mask will cause a replication of the spectrum of the light field in the f_s -axis direction, and this replication can be expressed as follows:

$$l_2(u, s) = l_1(u, s)m(u), \quad (5a)$$

$$L_2(f_u, f_s) = L_1(f_u, f_s) * [M(f_u)\delta(f_s)]. \quad (5b)$$

The target light field acquired by the compressed light field camera is the s -plane at the light field lens, which is equivalent to requiring the light field $l_2(u, s)$ to propagate back to the lens. This is a virtual process

$$l_3(u, s) = l_2(u + (1 - z)s, s), \quad (6a)$$

$$L_3(f_u, f_s) = L_2[f_u, f_s - (1 - z)f_u]. \quad (6b)$$

The reverse propagation of the light field produces a reverse shear along the axis. Finally, the sensor in the u -plane integrates all the rays with the same (u, v) different (s, t) to obtain the encoded two-dimensional sensor image $i(u)$:

$$\begin{aligned} i(u) &= \int_{-\infty}^{+\infty} l_3(u, s) ds \\ &= \int_{-\infty}^{+\infty} l(u, s)m(u + (1 - z)s) ds. \end{aligned} \quad (7)$$

The whole acquisition process is essentially a compressed projection of the four-dimensional light field signal into a two-dimensional sensor image signal, which is a compressed sensing process. In this process, the spectral change of the light field is shown in Figure 2. In the focus case, the image captured by the 2D sensor is a slice in the four-dimensional light field $f_s = 0$, as shown in the red rectangular box in Figure 2. As can be seen from the figure, although the final acquisition by the sensor loses the information in the f_s -axis direction, the acquisition along the f_s -axis already contains most, if not all, of the light field information. This is the key factor that enables subsequent successful reconstruction of the target light field from the sensor image.

The position of the mask from the sensor can be calculated based on the magnitude of β in Figure 2

$$\begin{aligned} \arctan\left(\frac{f_{s_0}}{5f_{u_0}}\right) &= \beta \\ &= \arctan\left(\frac{z}{1 - z}\right). \end{aligned} \quad (8)$$

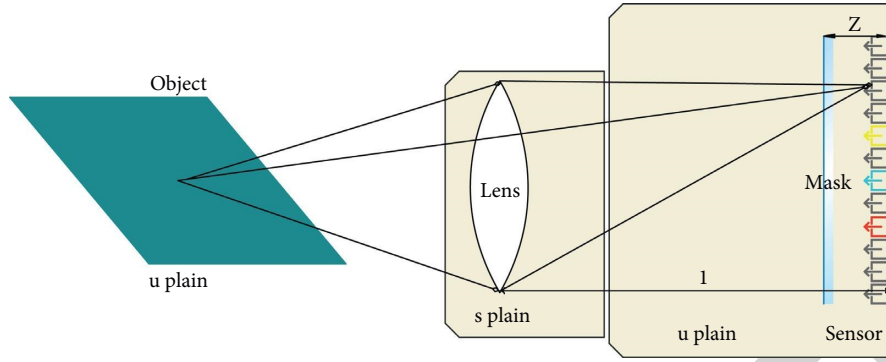


FIGURE 1: Schematic diagram of the structure of the compressed light field camera.

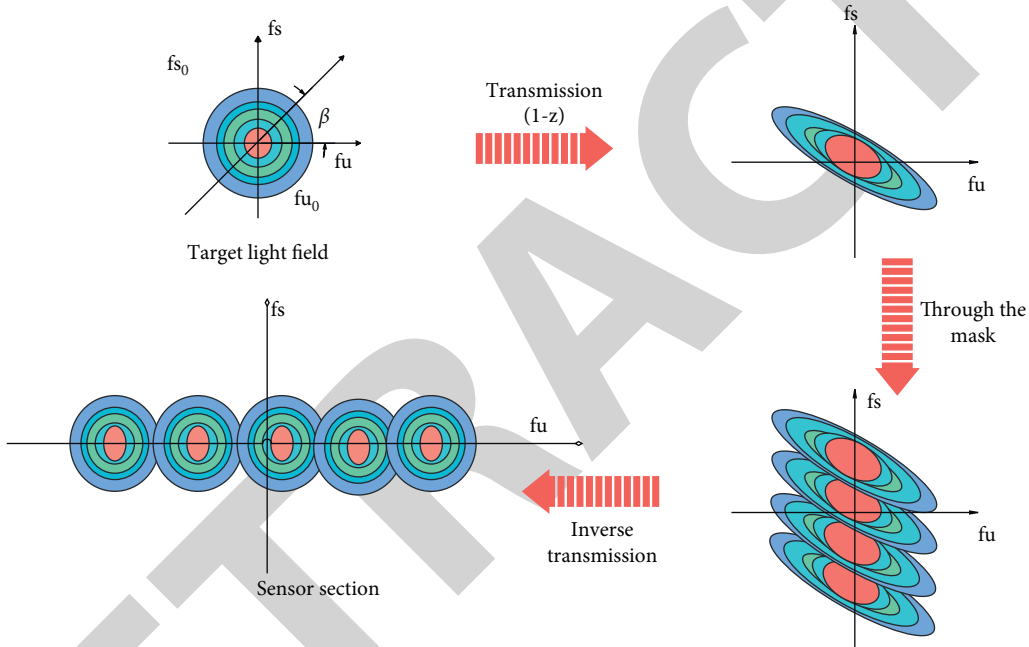


FIGURE 2: Changes in the light field spectrum during the compressed light field camera acquisition.

In practice, the spatial resolution of the optical field is usually much larger than the angular resolution, and the value of β is very small. Therefore, the mask needs to be placed very close to the sensor.

Light field reconstruction is the inverse process of light field acquisition, and it aims to recover the four-dimensional light field from the encoded two-dimensional projection image. By discretizing formula (7), the encoded light field projection can be expressed as a matrix and vector multiplication:

$$I = \Phi L, \tag{9}$$

$$\Phi = [\Phi_1 \Phi_2 \dots \Phi_{x^2}].$$

Among them, $I \in R^m$ and $L \in R^n$ are the vectorized sensor image and light field, respectively. The $x \times x$ angular viewpoints $L_i (i = 1, \dots, x^2)$ of the light field are stacked in L . Each picking matrix $\Phi_i \in R^{m \times m}$ is a sparse matrix, and they contain tangent mask codes on the diagonal, as shown in Figure 3.

Formula (9) can be understood as the encoded sensor image I is the sum of the products of each light field viewpoint and the corresponding sparse measurement matrix, as shown in Figure 4.

For a coded sensor image, the dimension of the sampling matrix is much smaller than the dimension of the sampled light field, that is, $m \ll n$ in formula (9). Sparse coding can be used to solve this underdetermined problem. Assume that the light field $L \in R^n$ is k sparse and can be sufficiently sparsely represented in some overcomplete ($d > n$) light field dictionary $D \in R^{n \times d}$, that is,

$$I = \Phi L = \Phi D \alpha. \tag{10}$$

The α in the formula is called the sparse coefficient vector, which tends to 0 for most of its values. According to the theory of compressed sensing, when the minimum norm of ℓ_0 of the coefficient vector α is calculated with $m_c \geq k \log(n/k)$, the sparsest coefficient is optimized to

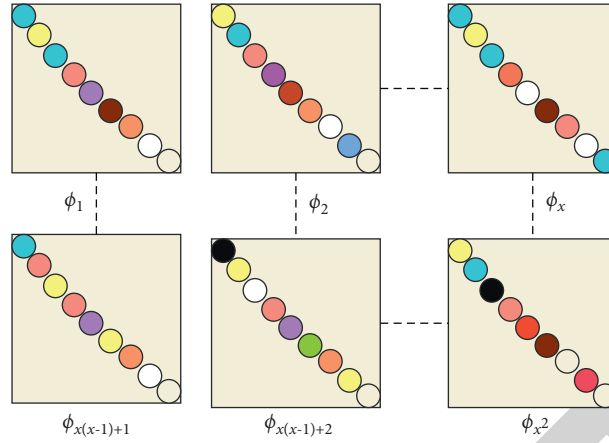


FIGURE 3: Style of sampling matrix.

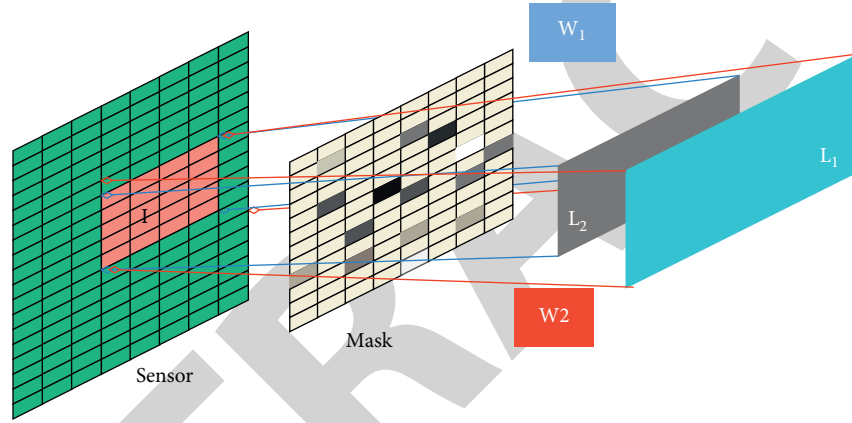


FIGURE 4: Mask-based optical field encoding projection.

obtain the light field that satisfies formula (10). This process is expressed as follows:

$$\begin{cases} \text{minimize}_{\{\alpha\}} & \|\alpha\|_0, \\ \text{subject to} & \|I - \Phi D\alpha\|_2 \leq \varepsilon. \end{cases} \quad (11)$$

After calculating the sparsest coefficient vector α , the light field signal can be reconstructed from $L = D\alpha$.

Next, several key issues involved in the optical field reconstruction process are discussed, which include the training of the overcomplete optical field dictionary and the parameter analysis of the dictionary, the reconstruction algorithm of the optical field, and the design of the random mask.

The training sample set of the light field needs to be learned before the light field reconstruction, and the overcomplete light field dictionary (i.e., the sparse representation domain of the light field) satisfying the sparse representation of the light field is solved. The overcomplete light field dictionary is four-dimensional, and on the basis of the two-dimensional texture, the elements of the overcomplete light field dictionary have the directionality of the light field, which is manifested by the existence of parallax on the content of the light field dictionary elements.

After a sufficient number of light field training samples are obtained, the light field sample images with different angular resolutions are randomly decomposed into light field fragments of spatial resolution size $p \times p$. The learning of the overcomplete light field dictionary is performed according to the following formula:

$$\begin{cases} \text{minimize}_{\{D, A\}} & \|L - DA\|_F, \\ \text{subject to} & \forall j, \|\alpha_j\|_0 \leq k. \end{cases} \quad (12)$$

In the formula, $L \in R^{n \times q}$ is called a training set composed of fragments of q light fields, $A = [a_1, a_2, \dots, a_q] \in R^{d \times q}$ is a vector of k sparse coefficients of q light fields, and F norm is expressed as $\|X\|_F^2 = \sum_{ij} x_{ij}^2$. The ℓ_0 norm calculates the number of nonzero elements in the coefficient vector, and k ($k \ll d$) represents the expected sparsity level. In the implementation process, the Lagrangian formula can be used to directly include the constraints in formula (12) in an objective function

$$\arg \min_{a, \infty R^d, D \in R^{n \times d}} \|L - D\alpha_j\|_F^2 + \lambda \|\alpha_j\|_0. \quad (13)$$

The optimization process of the parametrization of ℓ_0 in formula (13) involves the operation of the product of parameters D and α , and its solution process is a nonconvex function for the joint variable $D\alpha$. However, when one of the variables is fixed, the objective function is convex for the other variable, so it can be optimized using the convex function optimization algorithm. This is done by fixing one of the variables in the optimization process and using alternating iterations to optimize the other variable, and finally calculating the joint optimal solution of the two variables. As mentioned in the analysis above: The ℓ_0 -parametric optimization problem is an NP (nondeterministic polynomial) hard problem IR, and solving the global optimal solution is more difficult. For this problem, the usual practice is to perform the optimization constraint relaxation of the ℓ_0 -parametric in the objective function and use the ℓ_0 -parametric instead, so that formula (13) can be transformed as

$$\arg \min_{\alpha_i \in \mathbb{R}^d, D \in \mathbb{R}^{m \times d}} \left\| L - D\alpha_j \right\|_F^2 + \lambda \left\| \alpha_j \right\|_1. \quad (14)$$

The main learning algorithms for overcomplete light field dictionaries are as follows: K-singular value decomposition algorithm (K-SVD) and online optimization algorithm, and K-means algorithm. One of the main characteristics of the online optimization algorithm is that it can efficiently process the complete light field fragment training set, but the slow convergence speed limits its application. In the dictionary learning with a fixed number of iterations, the atomic quality of the light field obtained by the online optimization algorithm is poor, which is accompanied by large noise. This is mainly attributed to the fact that for a given number of algorithm iterations, the algorithm is aimless in the selection of training fragments after each iteration. Unlike online optimization algorithms, the K-SVD algorithm only selects part of the training set of light field fragments in the process of training the complete light field dictionary. However, it is a simple and effective learning algorithm for overcomplete dictionaries. At the same time, compared with the general K-means algorithm, the biggest difference of the K-SVD algorithm is that only one column in the dictionary is updated each time during the dictionary update process, and the corresponding coefficient value is updated, thus reducing the mean error and speeding up the convergence speed of the whole algorithm.

The K-SVD algorithm applies two main steps to solve the problem described in formula (14):

Step 1: (sparse coding phase): the algorithm is given an initial estimated dictionary D and A and fixes the dictionary D . The coefficient vector A_j , $j = 1 \dots q$ is updated iteratively by the tracking algorithm.

Step 2: The algorithm selects the singular vector of residual matrices $E = L - DA$ that satisfy the error, and the coefficients corresponding to both A and D are updated during the singular decomposition of the minimized residual matrix.

The K-SVD algorithm performs iterative calculations in the above two steps, and finally, the original light field is recovered from the compressed encoded sensor image after satisfying the objective of light field reconstruction. Subsequently, formula (11) is transformed into a Lagrangian formula

$$\min_{\{\alpha\}} \|I - \Phi D\alpha\|_2 + \lambda \|\alpha\|_0. \quad (15)$$

The Lagrangian function can balance the minimization of errors and sparse coefficients. The light field optimization problems described in formulas (11) and (15) are all NP-hard problems, and it is very difficult to solve them. From the subsections of this chapter, we can use the greedy method and convex relaxation method to optimize the solution. The greedy method has low computational complexity and fast execution speed in sparse signal reconstruction, but its accuracy is low. The light field reconstruction in this chapter uses the convex relaxation method. In the convex relaxation method, the ℓ_0 norm in formula (15) is relaxed, replaced by ℓ_1 norm, and transformed into

$$\min_{\{\alpha\}} \|I - \Phi D\alpha\|_2 + \lambda \|\alpha\|_1. \quad (16)$$

The commonly used methods in convex relaxation are base-tracking denoising (BPDN) and lasso method (Lasso).

The Homotopy-BPDN algorithm in optical field reconstruction is discussed next. The objective of the Homotopy-BPDN algorithm in optical field reconstruction is to solve for the optimal value of α such that it satisfies

$$\begin{aligned} a &= \arg \min_{\alpha} F(\alpha) \\ &= \arg \min_{\alpha} \|I - \Phi^* \alpha\| + \lambda \|\alpha\|_1. \end{aligned} \quad (17)$$

In the formula, $\Phi^* = \Phi D$, which is called the equivalence dictionary. To find the partial derivatives of the objective function, there are

$$\partial_{\alpha} F(\alpha) = -\Phi^{*T} (I - \Phi^* \alpha) + \lambda \partial_{\alpha} \|\alpha\|_1. \quad (18)$$

In the formula, $\partial_{\alpha} \|\alpha\|_1$ is the subdifferential of $\|\alpha\|_1$, which can be expressed as

$$\partial_{\alpha} \|\alpha\|_1 = \left\{ \begin{array}{l} u \in \mathbb{R}^n \quad u_i = \text{sgn}(\alpha_i), \alpha_i \neq 0 \\ u_i = [-1, 1], \alpha_i = 0 \end{array} \right\}. \quad (19)$$

We assume that $S = \{i: \alpha(i) \neq 0\}$ is the support set of α , and $c = \Phi^{*T} (I - \Phi^* \alpha)$ is called the residual correlation vector. We set up the objective function $\partial F(\alpha) = 0$, and we can get two constraints that the optimal solution α must meet

$$c(S) = \lambda \text{sgn}(\alpha(S)), \quad (20)$$

$$\left| c(S^{off}) \right| \leq \lambda. \quad (21)$$

Formulas (19) and (20) can be interpreted as follows: the magnitude of the residual correlation in the support set S is equal to λ . The positive and negative signs of the residual correlation depend on the elements in the corresponding α .

The magnitude of the residual correlation not in the support set S is less than or equal to λ . The Homotopy-BPDN algorithm follows the above two constraints during the optical field reconstruction. It performs iterative optimization for all λ greater than zero to find the optimal α that satisfies the condition.

The algorithm starts iterating at $\alpha_0 = 0$. Throughout the iteration, the algorithm needs to ensure that the valid support set established by formulas (19) and (20).

$$S = \{j: |c_\ell(j)| = \|c_\ell\|_\infty = \lambda\}. \quad (22)$$

In formula, ℓ is the number of iterations. The direction of the next iteration needs to be determined after each iteration, and the iteration direction d_ℓ can be calculated by formula (22)

$$\Phi_S^{*T} \Phi_S^* d_\ell(S) = \text{sgn}(c_\ell(S)). \quad (23)$$

When the effective support set is not satisfied, the iteration direction d_ℓ is set to zero. The update of each iteration direction can ensure that the residual correlation value decreases uniformly under the effective support set. It is possible to encounter breakpoints when updating along the iteration direction. Therefore, in order to avoid breakpoints, iteration step lengths need to be calculated. The principle of calculating the iteration step is to avoid breakpoints in two cases. First, a c_ℓ element that is not under a valid support set will make the size of the residual correlation exceed the value of λ , thus violating the constraint of formula (20). This situation occurs in

$$\gamma_\ell^+ = \min_{i \in S^{\text{off}}} \left\{ \frac{\lambda - c_\ell(i)}{1 - \phi_i^T v_\ell}, \frac{\lambda + c_\ell(i)}{1 + \phi_i^T v_\ell} \right\}. \quad (24)$$

In the formula, $v_\ell = \Phi_S^* d_\ell(S)$, the minimized index in this situation is recorded as production.

The second situation is when the c element is in the effective support set, but its size tends to zero, and it will violate the symbol constraint in formulas (3)–(24). This situation occurs in

$$\gamma_\ell^- = \min_{i \in S} \left\{ \frac{\alpha_\ell(i)}{d_\ell(i)} \right\}. \quad (25)$$

The corresponding minimized index is denoted as i^- . Therefore, the iteration step size is as follows:

$$\gamma_\ell = \min\{\gamma_\ell^+, \gamma_\ell^-\}. \quad (26)$$

With the implementation of Homotopy-BPDN algorithm, the limited support set will be updated. The specific method is to add i to S when the first situation is met, and remove i^- from S when the second situation is met. At the same time, the sparse representation α will also be updated [18]

$$\alpha_\ell = \alpha_{\ell-1} + \gamma_\ell d_\ell. \quad (27)$$

When the condition $\|c_\ell\|_\infty$ is equal to the threshold, the algorithm iteration is terminated, and the optimal sparse representation coefficient vector α is obtained.

In traditional compressed sensing systems, random matrices are often used to project high-dimensional sparse signals into lower-dimensional subspaces. This is because the random matrix satisfies the RIP (constrained isometricity) property, which is intuitively expressed as maintaining energy conservation for a sparse vector when it is projected to a lower dimensional subspace. For light field acquisition, the 4-dimensional light field signal can be projected into the space of dimension using a random sampling matrix with a good sparse representation. In the compressed light field camera simulation experiments in this chapter, the structure of the measurement matrix is very sparse. Each sensor pixel pools only a very small amount of incident light, so that only those elements on the corresponding matrix rows that transmit light have nonzero values. Mathematically, this measurement matrix can be expressed in the form of

$$\Phi_i = \text{diag}(f_{i1}, f_{i2}, \dots, f_{im}), \quad (28)$$

$$i = 1 \dots x^2, 0 \leq f_{ij} \leq 1, j = 1 \dots m.$$

In the formula, f_{ij} is the element on the diagonal of Φ_i , corresponding to the pattern of the mask. This means that each measurement submatrix has diagonal elements with values between [0,1]. Corresponding to the pattern physically printed on the mask, it can be a series of random points whose normalization value is between [0,1], as shown in Figure 5 [19].

4. College Teaching Information Management Based on Interactive Multimedia Teaching Mode

In this study, the evaluation system was designed. The evaluation system mainly includes four parts: data layer, acquisition and processing layer, evaluation layer, and display layer. Figure 6 shows the architecture diagram of the college teaching information management system based on the interactive multimedia teaching mode.

Sqoop data collection: The source of this part of the data is a MySQL relational database, which is stored in the data source server. Through the Sqoop open source tool, the data on the data source server are collected into the system. Since the system does not require high real-time data, a timer can be used to collect once a week, which can achieve the purpose of relational data collection. The design idea of Sqoop collecting data is shown in Figure 7 [20].

Flume software is installed on the data source server. When a new file in the log folder is generated, the data will be collected and then sent to the interface server. The interface server receives the sent data and sends the received data to the system, thus completing the cross-server collection function of log files. The design idea of Flume data collection log file is shown in Figure 8 [21].

This article designs an experiment to evaluate the college teaching information management system based on interactive multimedia teaching mode and mainly verifies the

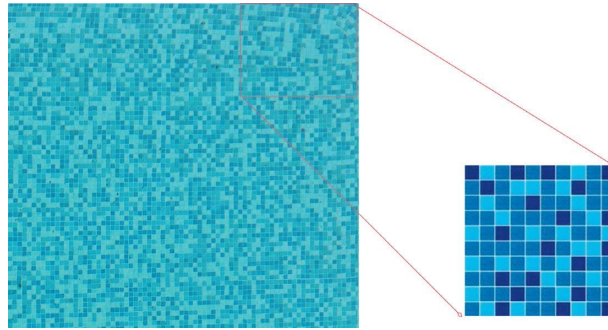


FIGURE 5: Random attenuation mask pattern.

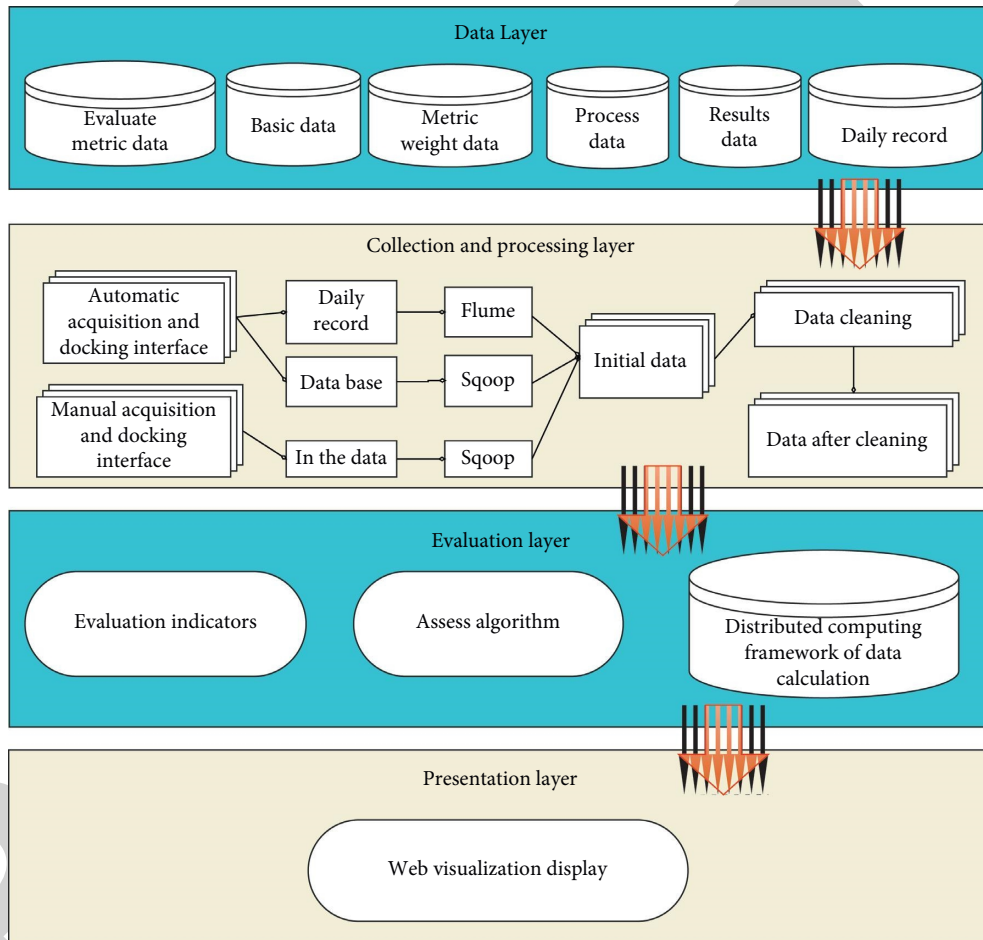


FIGURE 6: System architecture diagram.

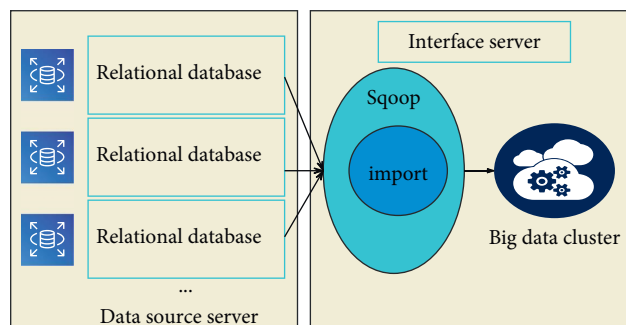


FIGURE 7: The design idea of Sqoop data collection.

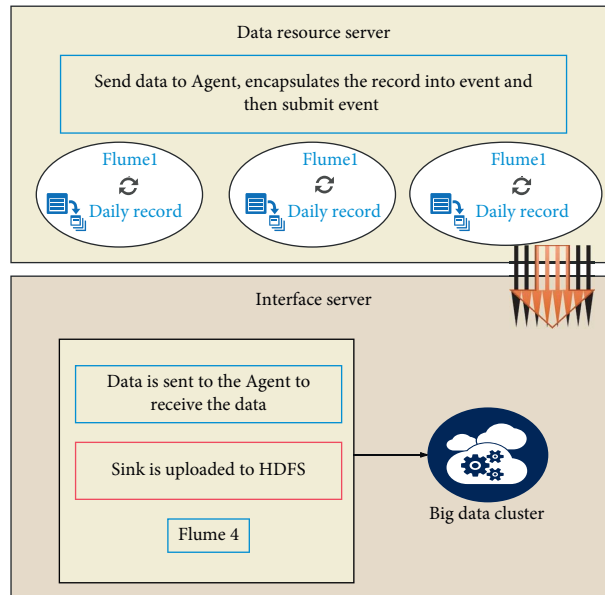


FIGURE 8: The design idea of Flume data collection.

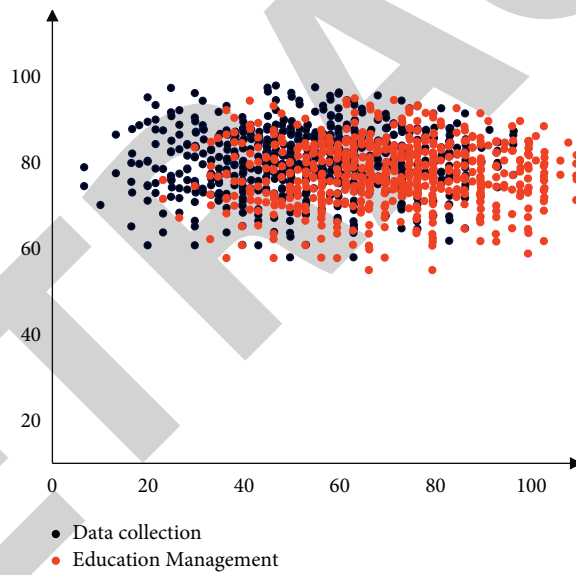


FIGURE 9: Educational data collection effect and education information management effect.

TABLE 1: System feasibility evaluation and satisfaction evaluation.

No	Feasibility	Satisfaction
1	92.40	90.96
2	90.14	92.99
3	93.40	91.76
4	92.91	90.88
5	90.67	95.55
6	85.06	94.59
7	92.85	94.07
8	93.61	92.27
9	83.09	92.72
10	84.32	92.91

TABLE 1: Continued.

No	Feasibility	Satisfaction
11	90.17	91.33
12	93.60	96.96
13	89.29	93.13
14	89.80	91.02
15	86.78	90.56
16	88.01	92.56
17	90.88	95.91
18	82.16	90.34
19	91.21	94.26
20	89.07	96.43
21	89.57	96.20
22	89.08	93.16
23	86.27	90.94
24	86.68	92.39
25	89.31	93.75
26	87.74	95.13
27	85.51	90.92
28	83.86	92.57
29	89.25	92.97
30	91.53	93.85
31	87.28	92.88
32	88.22	93.75
33	93.17	94.11
34	84.38	92.71
35	91.26	95.63
36	92.78	96.08
37	84.06	96.78
38	82.35	95.03

education data collection effect and education information management effect of this system. The results of the statistical experiment are shown in Figure 9.

From the art research, it can be known that the college teaching information management system based on the interactive multimedia teaching mode proposed in this paper has good educational data collection effects and educational information management effects. On this basis, this paper conducts system feasibility evaluation and satisfaction evaluation of the system in this paper and obtains the results shown in Table 1.

From the above research, we can see that the college teaching information management system based on interactive multimedia teaching mode proposed in this paper has certain feasibility and user satisfaction.

5. Conclusion

Educational informatization is the only way for the further development of our country's institutions of higher learning. The overall educational reform and development promoted by education informatization is an important direction of my country's current educational development, and college informatization is an important part of education informatization. Therefore, it is of great significance to carry out the evaluation work of higher education informatization. The research on the index system of higher education informatization is the requirement of the operation law of education informatization system. Higher

education informatization is a subsystem of social informatization, and it is an organic whole with a specific structure and function. The indicator system should be a scale that reflects the external characteristics and internal changes of the organic whole. Since different indicators reflect different conditions and performance, it is necessary to comprehensively examine the overall operating conditions and development changes of each component and each element of the higher education information system, and it is necessary to establish a corresponding indicator system. This article combines the interactive multimedia technology to study college information education management, constructs an intelligent college information teaching model, and improves the effect of college education management on this basis. The experimental research results show that the college teaching information management system based on the interactive multimedia teaching mode proposed in this paper has good educational data collection effects and educational information management effects.

Data Availability

The labeled dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares no competing interest.

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