

Research Article

Exploration of the Ideological and Political Elements of Artificial Intelligence Courses under the Background of Three Comprehensive Education

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“Three comprehensive education” is an important measure and mechanism to build a big ideological and political pattern, condense various educational resources, and realize the fundamental goal of morality and cultivating people under the new situation. Curriculum ideology and politics are an effective way for universities to “three comprehensive education,” combining professional construction and curriculum characteristics, grasping the law of students’ growth and talent, and clarifying the direction of education. Curriculum ideology and politics are not only the specific practice of “three comprehensive education” but also the specific embodiment of implementing the goal of morality and talent cultivation. The “three comprehensive education” and the curriculum ideology and politics are organically integrated, represent each other, and complement each other. “Three comprehensive education” grasps the direction of education from a macro perspective, and the practice the education policy from a mesoscopic perspective. The research and exploration under the pattern of “three comprehensive education” effectively promote the supply-side structural work in universities. Pertinence and effectiveness, building a macro, meso-, and micro integrated education system, provide new ideas, new ways, and new methods. In this paper, by discussing the relevant theoretical knowledge of three complete education educating people, the intelligent image recognition algorithm is used to intelligently identify the classroom behavior of teachers and students. Combining intelligent image analysis with educational scenarios not only achieves high accuracy of action recognition in classroom scenarios. According to the process of behavior and action classification and recognition, the system is divided into three steps for research: video-based motion target positioning, human behavior and action feature extraction, and human behavior and action recognition and classification.

1. Introduction

All courses have the function of education, and every teacher has the important mission of teaching and educating people [1]. The party and the state have vigorously emphasized the need to strengthen the work of college students, fully tap and use the elements of various disciplines, enhance the role of classroom teaching in the work, and pay attention to the work of college students [2]. “Insist on taking morality and cultivating people as running into the directions [3].” It clearly shows that cultivating people are the central link of college education [4]. The education of college students should be continued from entering the school to graduation and fully tap all available resources to serve the work and

achieve the effect of all-round coverage [5]. “Education” is being a human being [6]. College students’ ideological and moral concepts and comprehensive quality have a country [7].

The proposal of “course ideology and politics” is precisely to further effectively improve the ideological and moral cultivation, promote comprehensive development, and fully embody the general requirements of the “three comprehensive education” concept [8]. It is a social practice activity in which a society or social group exerts a purposeful, planned, and organized influence on its members with certain political views and moral norms, so that they can form ideological and moral qualities that meet the requirements of a certain society. It is the education of Marxism

Leninism theory, the party's line, principles and policies, patriotism, internationalism, and revolutionary tradition carried out by the state in the military and the national education system, so that students can understand and master the basic contents of the theory of socialism with Chinese characteristics, establish a world outlook of dialectical materialism and historical materialism, and transform it into practical actions to support the party and socialism and cultivate civic awareness in modern society. The coping strategy made is an inevitable choice to new challenges of the times [9]. However, from the "course ideology and politics," there are still some shortcomings. It is against this background of "course ideology and politics" that we should fully tap the elements of and effectively integrate the content of education into the course [10]. The unity of leadership will cultivate college students into talents with both ability and political integrity and all-round development. Figure 1 shows the system in universities [11].

Smart education, that is, educational informatization, refers to the process of comprehensively and deeply using modern information technology to promote educational reform and development in the field of education (educational management, educational teaching, and educational research). Its technical characteristics are digitalization, networking, intelligence, and multimedia, and its basic characteristics are openness, sharing, interaction, collaboration, and universality. Promote educational modernization with educational informatization, and change the traditional mode with information technology. In the concept of smart education, the teaching information is obtained through the audio and video materials in the classroom, and the teaching evaluation is completed through the identification and analysis of the behaviors and actions of the teachers and students in the video and the reform and development of the current education [12]. The teaching process is the program structure in which the teaching activities continue in time [13]. People's understanding of the teaching process is also constantly changing. With the increasing emphasis on education in society and the in-depth research on teaching process, people have begun to realize the complexity of classroom teaching behavior. The process of the teacher's explanation is not only the process of students' cognition, but also, the students will have certain psychological changes [14]. In the process of classroom teaching, a series of classroom behaviors will occur. For students, typical actions include raising their hands, putting down, standing up, and sitting down. For teachers, they will appear explaining PPT, writing on the blackboard, asking questions, and wandering [15]. A series of classroom behaviors of students can reflect students' integration and participation in teachers' teaching process. Education recording and broadcasting systems and artificial intelligence technology, an intelligent system, achieved rapid development. By adopting a behavioral action recognition algorithm based on video sequence images, the behaviors and actions of teachers and students in classroom scene videos can be identified and analyzed. Through the learning status of students, students' participation in classroom teaching can be reflected and teachers' teaching can be evaluated [16].

2. State of the Art

2.1. Basic Overview of "Three Complete Education." "Three complete education" refers to the education of all personnel, the whole process, and all-round education. Higher education promotes "three comprehensive education"; integrates moral education into all aspects, fields, and aspects; systematically grasps the core of education; and maximizes existing and potential moral education resources. In the whole process, we will forge newcomers of the era who are worthy of the great task of national rejuvenation [17].

2.1.1. The Scientific Connotation of "Three Comprehensive Education." All-person education is to follow the law of students' growth, mobilize all the forces that can be mobilized, and make them work, forming a big pattern in which all members of the country, society, school, and family participate, with clear responsibilities. The whole process of educating people is to design the key points and measures of education according to the different stages, angles, levels, and characteristics of students and to integrate the content of education into all aspects of personnel training. All-round education is to achieve full coverage in space by expanding the dimension of education, taking the all-round development of students as the foundation, closely following the people realizing the ultimate goal of educating people for the party and cultivating talents for the country [18]. Ultimately, the combined efforts of all personnel will form a scientific and systematic guiding ideology for education. From a macro level, "three comprehensive education" is the strategic policy of the party and the country to promote the work of universities; from a mesoscopic level; "three comprehensive education" refers to the responsibility and financial support of universities, team building, institutional guarantee, evaluation, supervision, etc. to build the work system and mechanism. From a micro level, "three comprehensive education" focuses on guiding college teachers to apply this concept and method while education is a departure from the. In addition to the consciousness of faculty and staff in universities, it is also necessary to explore the education factors in different fields and integrate the education methods in accordance with it. "The three are interconnected and inseparable", and together, they form an educational system centered on morality and cultivating people, which embodies the educational policy of "education-oriented, moral education first," and "the combination of education and production and labor and basic requirements for the integration of social practice" [19].

2.1.2. The Characteristics of the Era of "Three Comprehensive Education." Cultivating people in higher education, it is necessary not only to understand its connotation and essentials but also to firmly grasp the characteristics of the times and return to the education essence of it. The first is full participation. There are some phenomena and problems in universities, such as "emphasizing teaching, neglecting education"; "emphasizing management, neglecting education"; "emphasizing intellectual education, neglecting moral education"; and "emphasizing scientific research and neglecting

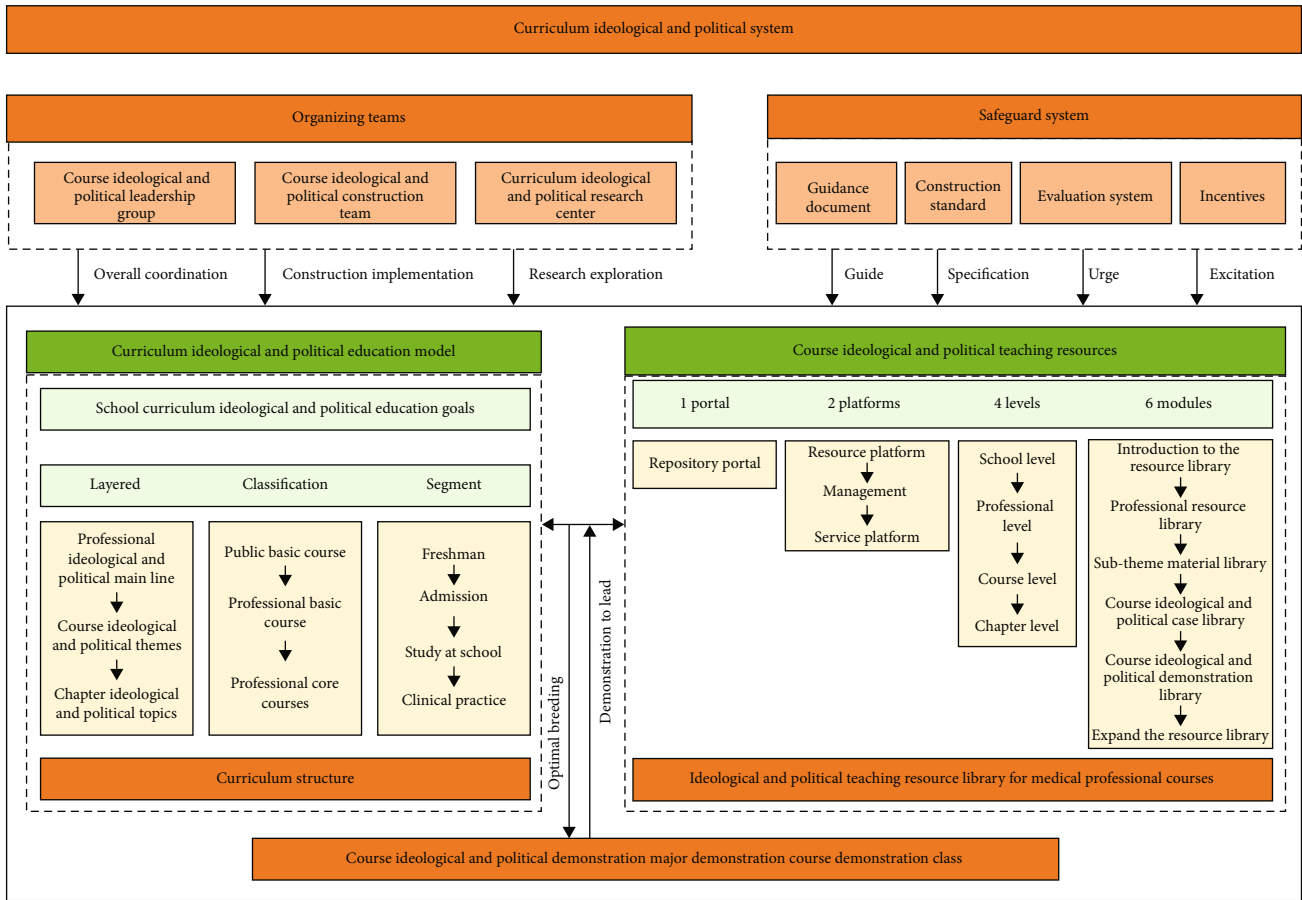


FIGURE 1: The ideological and political curriculum system in universities.

teaching” to varying degrees. The proposal of the concept of “three comprehensive education” is a strong response to how the current universities should effectively solve the practical problems of educating people. Figure 2 shows the characteristic framework system of the three comprehensive education in universities. The core value of the concept of “three comprehensive education” lies in the participation of all employees, and the work awareness of “everyone educates everyone, everyone at all times, and everywhere” is strengthened, and the supply of scientific education is increased to respond to work. New changes are in demand. “Follow the law of students’ growth, mobilize all the forces that can be mobilized and can be exerted, so that they can participate in the education of college students and form a school, family, and society with full participation, clear responsibilities, and division of labor. A leadership management system for educating people with rigorous management and clear goals can effectively make all educators inside and outside the school become leaders of students’ ideological growth.”

2.2. *The Theoretical Basis of Ideological and Political Courses.* The research requires not only multiperspective research but also the guidance of multiple theories. Philosophy is a collection of natural sciences, thinking, social sciences, etc.

Marxist philosophy reveals the essential characteristics between human beings and the objective world and the law of development of universal thinking and cognition. It is the guiding ideology of curriculum ideology and politics. Fundamentally solve the problem of professional courses. People-oriented is a concentrated expression of the essence of socialism. The focus and effectiveness of curriculum ideology and politics lie in people, which are restricted and influenced by the social environment. “The development of people’s social characteristics mainly includes the development of people’s qualities, the development of people’s needs, the development of people’s social relations, and the development of people’s personality.” People are both builders of society and enjoyers of achievements and the ultimate value goal of social development people. The following analysis from the perspective of anthropology shows that Marxist theory is the guiding ideology.

2.3. *The Connotation and Essence of Curriculum Ideology and Politics under the Pattern of “Three Comprehensive Education.”* “Three comprehensive education” is the overall grasp of the goal of the development requirements of education in high schools. Course education forms a long-term mechanism for educating people and promotes classroom teaching reform by mining the education resources of all

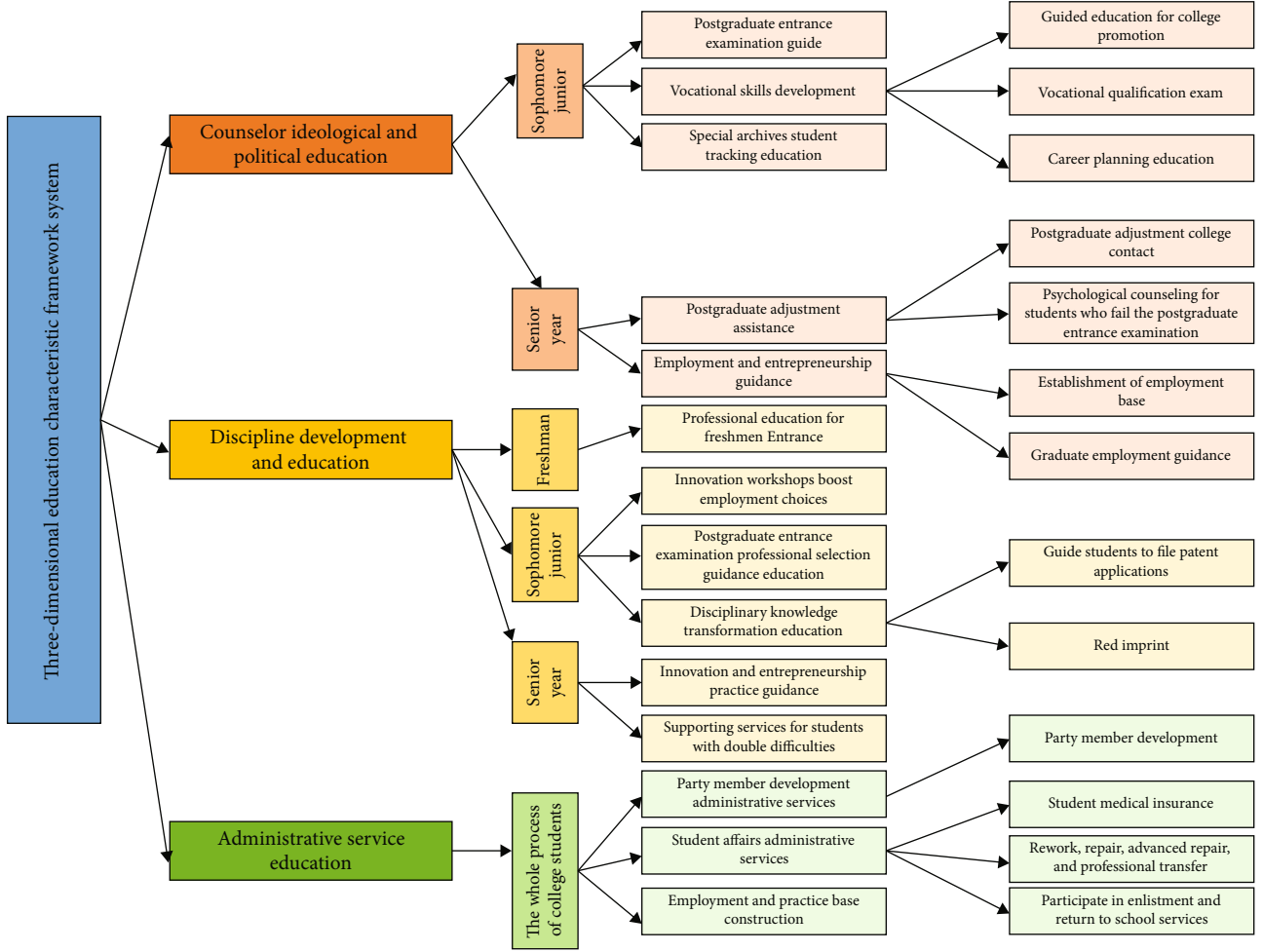


FIGURE 2: The framework system of three comprehensive education in universities.

courses, to build a curriculum ecological community that goes to school's education. Table 1 is a table of educational elements for courses.

The curriculum is based on the specific practice of educating people, and by connecting the subject, it gives full play to the educating function of the whole curriculum of "the theory courses, general courses, and professional courses." Curriculum ideology and politics are a curriculum concept that combines knowledge imparting and value guidance and educating people and talents, to achieve Lide, cultivating people and moisturizing things silently." From the internal logic point of view, "three comprehensive education" is synergistic in terms of concept requirements and implementation content; for function orientation, it focuses on college education "three comprehensive education"; in essence, the two go in the same direction and jointly focus on building an integrated education system and exerting the combined force of education. All of the above fully reflect that the curriculum ideology and politics are consistent with the goals pursued by the "three comprehensive education," their educational methods and teaching effects are complementary, and they promote and complement each other in the goals of cultivating people with morality and cultivating new talents in the era.

3. Methodology

3.1. Commonly Used Moving Target Detection Algorithms. In video image research, we call the pixels that do not move or change as background pixels, and the pixels in the moving area are called foreground pixels. The current mainstream foreground detection methods include the ViBe method.

3.1.1. Background Difference Method. To obtain the moving area in the video image, which has high computational efficiency and is convenient for real-time monitoring, the mathematical expression of the background difference algorithm is as follows:

$$\text{Res}(i, j) = \left| P(i, j) - \text{Ref}(i, j) \right| \begin{cases} < T, \text{ background} \\ \geq T, \text{ foreground} \end{cases}, \quad (1)$$

where $P(i, j)$ is the pixel value of the original video at (i, j) , $\text{Ref}(i, j)$ is the pixel value corresponding to the reference frame, and $\text{Res}(i, j)$ is the result. T is the set differential threshold, which can be specified manually or set by calculating the global or local threshold.

TABLE 1: Reconstruction table of educational elements of ideological and political courses.

Course ideological and political integration points	Specific implementation content and measures	Moral education elements
Course teaching requirements	Class attendance, daily homework	Honesty
Course knowledge point 1	Difficulties faced by manufacturing companies	Patriotism
Course knowledge point 2	Current situation of China's manufacturing industry (ceramic technology)	Cultural confidence
Course knowledge point 3	Current situation of China's manufacturing industry (C919 large aircraft)	National confidence
Course knowledge point 4	Supply chain management	Hard work
Course knowledge point 5	Lean production	Keep improving
Course knowledge point 6	Enterprise resource planning	Unity and cooperation
Course knowledge point 7	ERP in daily life	Mutual cooperation
Course knowledge point 8	Procurement operation management	Moderate consumption
Course knowledge point 9	ERP financial management	Honesty
Course experiment	ERP sand table simulation	Dedicated to work
Second classroom	Corporate internship	Honesty
Second classroom	Expert lectures	Innovative mind
Second classroom	Subject competition	Creativity

3.1.2. *Interframe Difference Method.* The difference is that the current video frame always uses the previous video frame as a reference frame and performs a difference operation on two adjacent frames.

$$\text{Res}_k(i, j) = \begin{cases} < T, \text{background} \\ \geq T, \text{foreground} \end{cases}, \quad (2)$$

where $p_k(i, j)$ and $p_{k-1}(i, j)$ represent the pixel values of the k th frame and the $k-1$ th frame of the video sequence at pixel (i, j) , and Res_k represents the frame of two adjacent frames of image poor results. The image obtained after the frame difference is binarized, and then, the moving target area is determined according to the binarized image.

3.1.3. *Code Table Method.* The stop table method is a method for modeling the background. The basic idea is to build a time series model for each pixel. CodeBook (CB) and CodeWord (CW) are structured as follows:

$$\begin{aligned} \text{CW} &= \{\text{Ihigh}, \text{Ilow}, \text{max}, \text{min}, t_{\text{last}}, \text{staale}\}, \\ \text{CB} &= \{\text{CW1}, \text{CW2}, \dots, \text{CWn}, t\}. \end{aligned} \quad (3)$$

Each CodeWord consists of six elements.

3.1.4. *Mixture Gaussian Model.* The feature of a certain pixel is represented by 3-5 Gaussian models which is shown in Figure 3.

- (1) Initialize the background model T

$$\mu_0 = \frac{1}{N} \sum_{t=0}^{N-1} I_t, \quad (4)$$

$$\sigma_0 = \frac{1}{N} \sum_{t=0}^{N-1} (I_t - \mu_0)^2$$

- (2) Detect whether a pixel $I(x, y)$ background pixel, and judge whether the pixel value is within the range of the mean $\mu(x, y)$ -determined

If

$$|I(x, y) - \mu(x, y)| < \lambda * \sigma(x, y), \quad (5)$$

the pixel is in the background, otherwise it is the foreground target area.

- (3) Parameter update, learn to model, and use the following formula to update:

$$\begin{aligned} \mu(x, y) &= (1 - \alpha) * \mu(x, y) + \alpha * I(x, y), \\ \sigma(x, y) &= \sqrt{(1 - \alpha) * \sigma^2(x, y) + \alpha * (I(x, y) - \mu(x, y))^2} \end{aligned} \quad (6)$$

3.1.5. *ViBe Method.* Compared to Gaussian mixture models, ViBe includes following:

- (1) Initialization of the background model. For the sequence, the background model of the pixel is initialized as

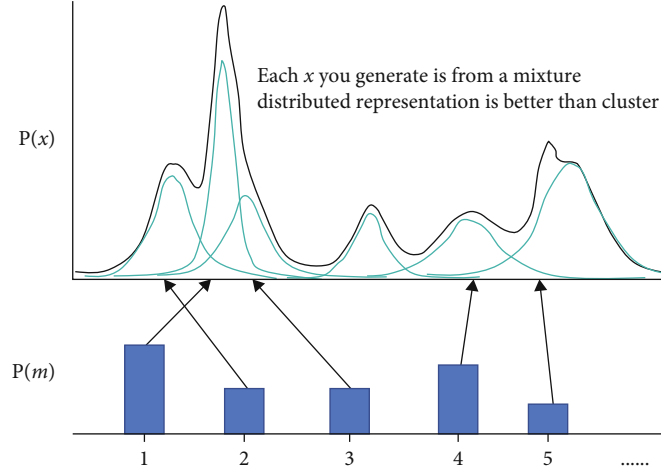


FIGURE 3: Schematic diagram of the mixture Gaussian model.

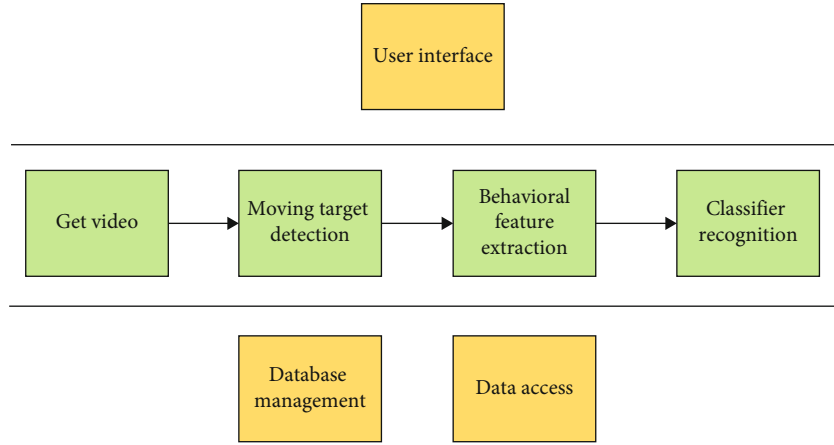


FIGURE 4: The flow chart of the framework of classroom behavior intelligent image recognition and analysis system.

$$BK_M^0 = f^0(x^i, y^l) \mid (x^l, y^l) \in N_G(x, y) \quad (7)$$

- (2) Foreground object segmentation of subsequent video sequence frames

For the k th video sequence frame, the pixel value of the pixel at (x, y) is $fk(x, y)$. The model is $BK_M^{k-1}(x, y)$; if $BK_M^{k-1}(x^l, y^l) \geq T$, then $fk(x, y)$ is determined to be approximate foreground.

- (3) Background model update. In both the time and space domains, the ViBe algorithm has randomness. First, randomly select a background model from the N times of judgment background models in the second step. When a new video image sequence arrives and is judged for N times, if a certain pixel position in the image is judged as the background, the original background model, this pixel bit needs to be updated

3.2. Extraction of Human Behavior Features

3.2.1. HOG Features. Oriented gradient histogram feature was first proposed to solve the pedestrian detection problem and achieved success. Calculate the gradient of the image, and the image obtained by derivation in the two directions can not only capture the contour, texture, and other information of the object in the image but also reduce the influence of illumination.

$$\begin{aligned} G_x &= H(x+1, y) - H(x-1, y), \\ G_y &= H(x, y+1) - H(x, y-1). \end{aligned} \quad (8)$$

The gradient magnitude and direction for each pixel are calculated as follows:

$$\begin{aligned} G(x, y) &= \sqrt{G_x(x, y)^2 + G_y(x, y)^2}, \\ \alpha(x, y) &= \tan^{-1} \left(\frac{G_y(x, y)}{G_x(x, y)} \right). \end{aligned} \quad (9)$$

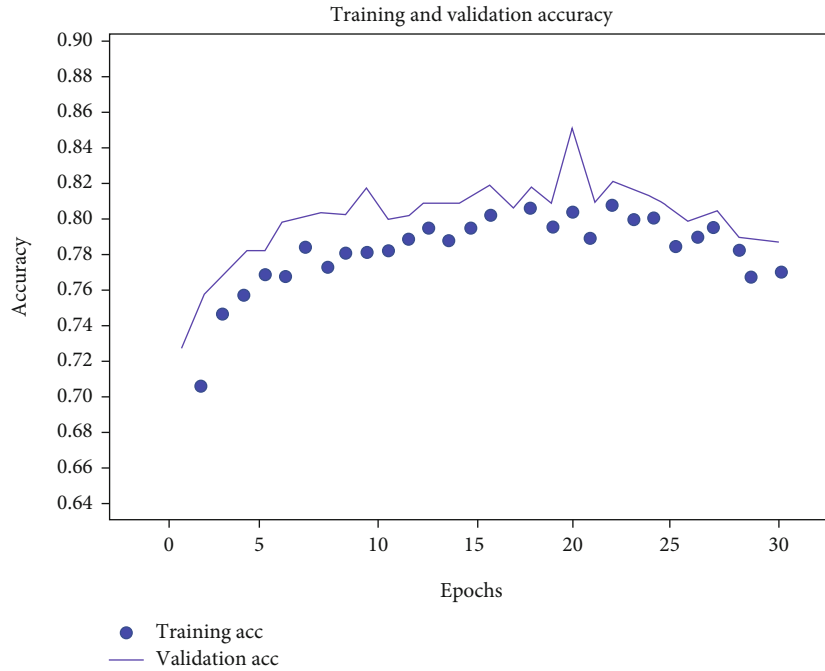


FIGURE 5: Accuracy change curve.

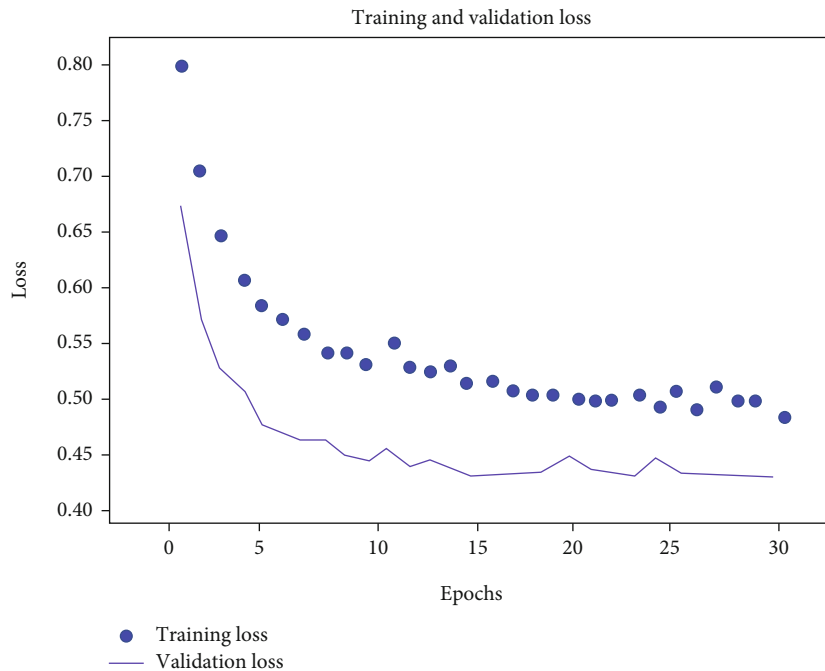


FIGURE 6: Change curve of loss rate.

3.2.2. *MEI and MHI Characteristics.* Davis and Bobick first used the contour information of the human body to describe the human action. In their method, the motion energy map and the motion history map were used to represent the behavior and action information of the target object, and finally, the action was recognized and classified by a behavior classifier. Davis and Bobick were the first to propose a

kinematic energy map, an image that can represent the spatial location where an action has occurred.

For the motion history map, the time sequence of the motion of the moving object is represented in the form of image brightness. The most recent action is the brightest, and the longer the action is from the current time node, the darker the action. The following is a mathematical

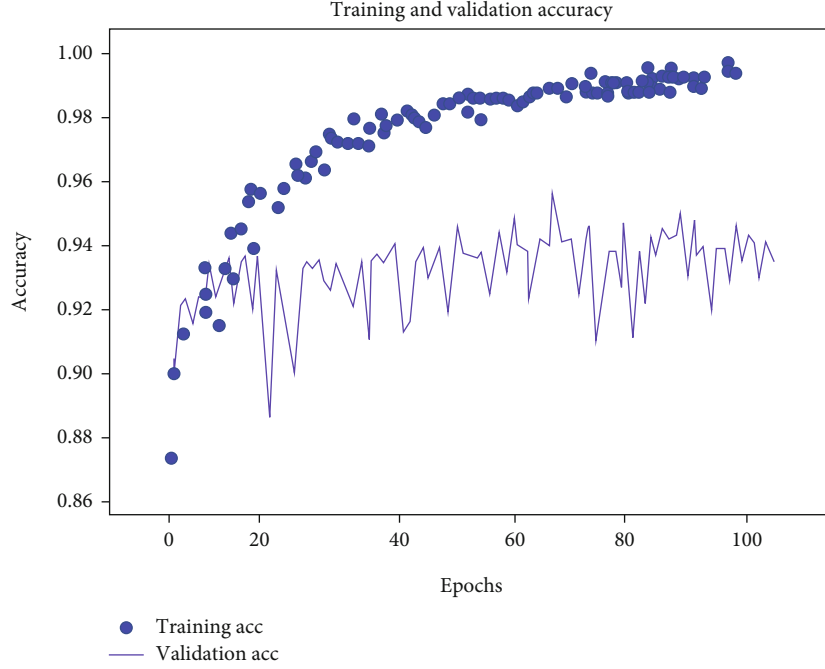


FIGURE 7: Accuracy change curve.

representation of the motion history graph construction process:

$$H_{\tau}(x, y, t) = \begin{cases} \tau & \text{if } (\Psi(x, y, t) = 1, \\ \max(0, H_{\tau}(x, y, t-1) - \delta) & \text{otherwise,} \end{cases}$$

$$\Psi(x, y, t) = \begin{cases} 1 & \text{if (foreground),} \\ 0 & \text{otherwise.} \end{cases} \quad (10)$$

$H(x, y, t)$ represents the luminance value at the (x, y) position at time t . T represents the duration, which represents the time frame of the movement. $\Psi(x, y, t)$ represents an update function.

3.2.3. Optical Flow Field. The core of optical flow research is to determine the motion information of each pixel position according to the correlation between adjacent frames in the video sequence and the information of pixel changes. Through the study of the optical flow field, the motion field of objects not included in the video sequence images can be obtained.

According to the three premise assumptions of the use scene of the optical flow method, the following relational expressions exist:

$$I(x, y, t) = I(x + dx, y + dy, t + dt). \quad (11)$$

3.3. Human Behavior Recognition and Classification. In order to complete classroom behavior action recognition, the main framework and process are shown in Figure 4.

3.3.1. Template Matching Method. Template matching is the most representative algorithm. It compares the feature vector of the image to be recognized with the feature vector stored in the template, selects the feature vector in the template that is closest to the feature vector to be recognized, and then classifies the image to be recognized as this category.

When constructing the template library, the feature vector should also be normalized to construct the normalized standard template library. The normalization method is as follows:

$$\hat{f} = \frac{f - \mu}{\sigma}. \quad (12)$$

3.3.2. Artificial Neural Network. It can have the functions of learning and memory just like the human brain. Since the advent of neural networks, with the continuous improvement of computer computing power, the model has shown good characteristics in the fields of pattern recognition, intelligent robots, and automatic control.

$$f(x) = \frac{1}{1 + e^{-x}}, \quad (13)$$

$$b_j = f(s_j).$$

3.3.3. K Nearest Neighbor Algorithm. It is an instance-based method, which is the simplest classification method in the classification and recognition technology. In the process of it, if in the training stage, the classification categories of all training samples are statistically recorded and when the sample test is performed, if the attributes of the test sample

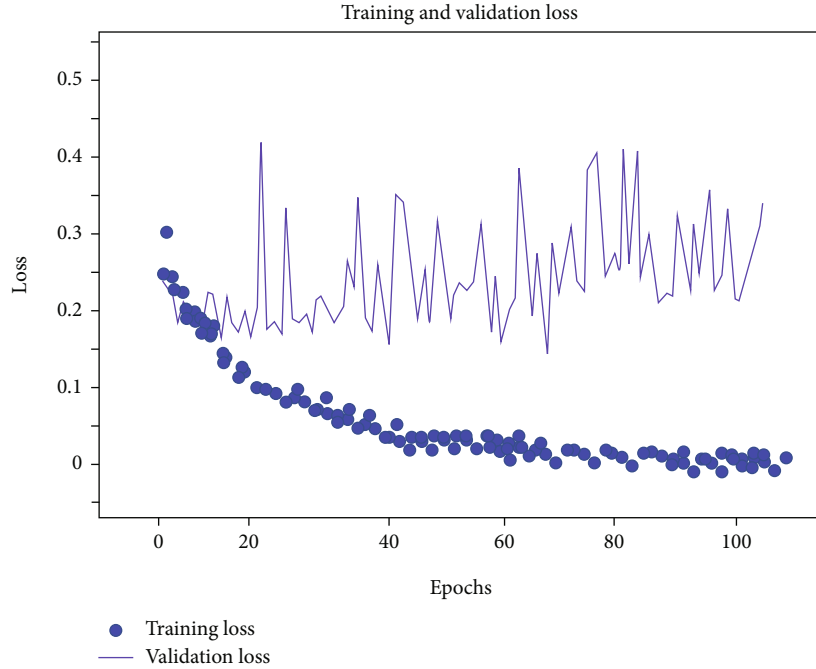


FIGURE 8: Loss rate change curve.

are exactly the same as the attributes of a training sample, the classification of the samples can be completed.

4. Result Analysis and Discussion

4.1. Experimental Data and Environment. We finally choose to conduct experimental verification on the Weizmann Dataset video dataset. Each of these ten types of movements is performed by nine different people. During the experiment, the behaviors of eight people and the behaviors of this were used for testing and verification. In the verification of the classifier performance, this paper uses the MHI-HOG joint feature as the behavior recognition feature and uses the BP, the support vector machine, and the BP support vector machine combined classification. Verify the effectiveness of the proposed joint classifier.

The resolution of videos in the Weizmann Dataset video database is 180×144 . Adjust each frame of image in the video to 128×64 , first obtain the motion history map of each frame image, and then extract the HOG feature of the motion history map. Finally, a total of 3340 training samples were constructed from the video sources of eight people and six actions, and a total of 356 test samples were constructed from the six action video sources of the remaining one person.

4.2. Experimental Results and Analysis. Figures 5 and 6 show the accuracy and loss rate curves of the confusion matrix for classification and recognition using the MHI-HOG joint feature through the BP neural network.

Figures 7 and 8, respectively, show the change curves of the loss rate of the accuracy of the confusion matrix for clas-

sification and recognition by using the MHI-HOG joint feature through the BP.

For the MHI-HOG joint feature, this paper will use the SVM classifier to perform action recognition based on the joint feature and HOG feature, respectively. The MHI-HOG joint feature and HOG feature have the same dimension, which ensures that the subsequent constructed SVM classifier has the same scale. Figures 9 and 10, respectively, show the action recognition results of the SVM classifier classification and recognition using the MHI-HOG feature and the HOG feature.

According to the confusion matrix in Figure 9, the use of SVM classifier for action recognition based on HOG features can effectively identify several actions. Except for the jump action, the recognition accuracy of the other actions is above 80%. This feature is not very representative for jump, and the recognition accuracy is only 69%. In the experiment, the comprehensive recognition rate of action recognition based on traditional single HOG feature is 90%. According to the comparison of confusion matrix in Figure 10, the effect of behavior classification and recognition based on MHI-HOG joint feature has been significantly improved. For example, for the recognition of jump action, the accuracy rate has been increased from 69% to 92%, and the effect is the most obvious. The recognition rate is also slightly improved. The comprehensive recognition rate of action recognition based on MHI-HOG joint features reaches 95%. Therefore, the experiment proves that the MHI-HOG joint features used in this paper can effectively represent the behavior and action information. Compared with the traditional HOG feature, the MHI-HOG feature contains useful information such as the time sequence relationship

Label \ Predict	Bend	Jack	Jump	Walk	Wave1	Wave2
Bend	1.00	0.00	0.00	0.00	0.00	0.00
Jack	0.15	0.80	0.00	0.00	0.00	0.05
Jump	0.03	0.15	0.69	0.13	0.00	0.00
Walk	0.00	0.00	0.05	0.95	0.00	0.00
Wave1	0.00	0.00	0.00	0.00	1.00	0.00
Wave2	0.00	0.00	0.00	0.00	0.16	0.84

FIGURE 9: SVM classifier recognition and classification results based on HOG features.

Label \ Predict	Bend	Jack	Jump	Walk	Wave1	Wave2
Bend	1.00	0.00	0.00	0.00	0.00	0.00
Jack	0.15	0.82	0.00	0.00	0.00	0.04
Jump	0.08	0.00	0.92	0.00	0.00	0.00
Walk	0.00	0.01	0.00	0.96	0.01	0.01
Wave1	0.00	0.00	0.00	0.00	0.97	0.03
Wave2	0.00	0.00	0.00	0.00	0.00	1.00

FIGURE 10: SVM classifier recognition and classification results based on MHI-HOG joint features.

of motion actions, so it can more fully represent each behavior.

5. Conclusion

The competition in today's world is the competition of talents. Universities should update the mode to serve the needs of students' growth and development and the development of the times. "Three-round education" is a mode work in universities. In-depth exploration and enhancement of its practicality are conducted. The arduous and long-term characteristics of the "three comprehensive education" work in universities require all faculty and staff to be well prepared for theoretical knowledge and ability and literacy, so as to form a pattern. Based on the deficiencies in today's "three comprehensive education" work in universities, for all-person education, for the construction of teachers, we should be strengthened to enrich the team's theoretical knowledge of ideology and politics and enhance accomplishment; we should increase the pertinence of the education link according to the law of students' growth for all-round education, and we should carry out curriculum education, practical education, and psychological education. In this context, this topic mainly studies the intelligent image analysis system of classroom behavior. Guided by the early process of action recognition, this paper conducts theoretical research on three parts: video image motion foreground detection, action feature extraction, and action recognition classifier. A complete solution for intelligent image recognition and analysis of classroom behavior is proposed. The scheme is to extract the MHI-HOG joint feature according to the positioned foreground target area based on the fast

target detection of the FFmpeg codec and finally complete the behavior through a BP joint classifier based on a look-up table.

The comprehensive recognition rate of motion recognition based on MHI-HOG joint features is 95%. Therefore, experiments show that the MHI-HOG joint features used in this paper can effectively represent behavior and motion information. Compared with the traditional HOG feature, MHI-HOG feature contains useful information such as the timing relationship of motion actions, so it can represent each behavior more comprehensively.

Data Availability

The figures and tables used to support the findings of this study are included in the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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