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Modeling Research on the Relationship between Physical Training and Vocational Ability Enhancement of College Students in Public Security Colleges and Universities Based on Deep Learning Models

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ABSTRACT

At present, the physical training of public security police has not formed a unified training system in the country, and various places ignore the cultivation of other aspects of the ability to take skill training as the leading role, and solve the problem of how to train through the construction of the system, so as to ensure that the physical training of public security police is carried out effectively. This paper explores the impact of physical training on college students' professionalism in public security colleges, constructs the K nearest neighbor classification algorithm, and introduces the relevant activation function to deal with more complex students' physical training exercise trajectories. ATT-DAN multi-target tracking model is constructed to extract the feature information of college students' physical fitness training, obtain the target movement trajectory, and parameterize the representation of students' physical fitness training programs. The correlation ranges of frequency, average score, highest grade score of physical fitness training and occupational ability were between 0.415~0.632, 0.452~0.769, 0.412~0.715, respectively, and the credibility and stability of the occupational ability characteristics were good. Meanwhile, the linear regression of the two showed that the correlation P-value of age, 30-second deep squat, pull-up, 3200 meters, and 15-second repetitive straddle with occupational ability was less than 0.05, and there was a positive correlation between the two.

Keywords: k-nearest neighbor classification algorithm, activation function, ATT-DAN multi-target tracking model, physical training, occupational ability

1. Introduction

Public security colleges and universities are the main position of public security education and training, and play an important role in cultivating public security reserve talents, improving the comprehensive

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quality of public security police, carrying out research on police theories and technologies, and expanding foreign exchanges and cooperation [1-2]. In accordance with the requirements of the public security police recruitment and training system reform deployment, and constantly improve the level of education and teaching and the quality of personnel training, focus on cultivating high-quality applied, complex public security specialists, and strive to realize the development from the expansion of the connotation to the connotation of the deepening, quality enhancement type development [3-5]. The focus of teaching should be changed from the teaching of theory and basic knowledge to the cultivation of political quality and professionalism, professional ability education and police skills training [6-7].

To fulfill the mission of protecting the people and maintaining social order, it is absolutely not enough for the police to have an idea or desire, but they must also master or have the ability to realize it. Therefore, the police should have a high level of operational practical skills. And the police physical ability is the foundation of mastering various police business practical skills [8]. Physical fitness training for college students in public security colleges and universities can effectively promote the students to be strong and healthy, improve their abilities and skills, and establish self-confidence in the police profession [9-11]. The physical fitness of college students in public security colleges and universities is closely related to the overall physical condition of Chinese public security police officers. As a basic way to cultivate the physical fitness of students in Chinese police colleges and universities, physical fitness training is of great significance to comprehensively improve the physical fitness of students in police colleges and universities and to comprehensively improve the overall strength of the police force [12-16]. In order to better utilize the important role of physical training in the training of students in police colleges and universities, and to cultivate more efficient technical and tactical literacy, the relationship between physical training and vocational ability enhancement of college students in public security colleges and universities is studied with a view to providing useful reference for the work practice after police work [17-19].

In this paper, we sort out the influence of police physical training on the improvement of professionalism, establish KNN classification model, judge whether the prediction point belongs to the category by calculating the category to which the prediction point with the new target belongs, use the related activation function, input the movement trajectory of each target, and realize the data augmentation after summing to deal with the more complex patterns. Construct a multi-target tracking model of ATT-DAN to analyze the training movements of college students in public security colleges and universities, and parameterize the students' physical training programs as a means of assessing college students' physical training performance. A linear regression model was established to study the relationship between college students' physical training and vocational ability enhancement.

2. Influence of physical training on college students' professionalism in public security colleges and universities

2.1. Police physical training improves police ethics

Police officers face different types of suspects most of the time in their work, and only with fairly strong communication skills and the ability to speculate on each other's psychology can they open the hearts of different types of people. A good police team, maximize and play its potential and enthusiasm, there is no case that can not be solved, there is no thing that can not be solved. Police officers face different cases, how to find breakthroughs and entry points, which requires the ability to innovate and pioneering sense. Systematic and scientific police physical training can enhance the police professional quality of the police constitute the police professional ethics, police professional knowledge, police professional ability to enhance the ability of the three aspects.

Scientific and hard physical training can not only refine the police's will quality, but also improve the police's morality. Physical training itself is part of the physical education program [20]. An important function of sports is the function of educating people. People's police through persistent hard physical training, can be in the subtle cultivation of hard-working, perseverance, courageous and tenacious ideological style, high morale, tenacious will and the spirit of unity, which is the new era of police officers must have the most basic ideological and moral and will qualities.

2.2. Promote better knowledge and skills in the police profession

Rapid economic development at home and abroad has led to constant changes in the law enforcement environment. Unforeseen security problems are increasing, public security work is facing unprecedented challenges, and the task of public security training and education has become more arduous and burdensome. To actively adapt to the new requirements of the network era and the information age, to solve the new problems under the new situation, we must effectively update the ideology and concept, further adjust the direction of the work, and vigorously strengthen the construction of public security colleges and training bases, to truly improve and implement the conditions of education and training, and effectively improve the quality of education and training and effectiveness of the public security team to comprehensively enhance the ability of the public security team to fight and the overall quality of the overall comprehensive. Police grappling techniques and tactics, shooting, driving, overrun, police equipment operation and police seizure tactics and other techniques and tactics to improve and effectively use, need to be based on good police physical fitness. Good physical fitness is conducive to the mastery of police techniques and tactics such as the basic movements, techniques and tactics of grappling. Sharp and decisive judgment and sensitive reaction is conducive to the effective use of technical and tactical actions and play. Good sensitivity and coordination is conducive to overcoming various obstacles, abundant energy, tenacity and perseverance is conducive to adhere to a long period of arduous work and so on. In a word, good physical fitness is the foundation and premise for further learning skills and mastering tactics, while physical fitness, technology and tactics are a harmonious whole.

2.3. Basis and guarantees for the improvement of the professional competence of police officers

As we all know, good and fast promotion of the modernization of the public security forces depends on highly qualified and comprehensive talents. Good physical fitness is a prerequisite for the cultivation of political-ideological and operational quality. The more modernized and scientific the construction of the public security forces is, the more attention should be paid to the construction of physical fitness. The development of society needs police officers with excellent physical fitness and flexible skills. The mastery of flexible skills requires good police physical fitness, and physical training is the foundation. Scientific and reasonable training of police physical fitness, can improve the police "form - physical - mental - mental" four integrated response ability, that is, to improve the police police professional ability, that is, learning ability, synthesis ability, communication ability, collaboration ability, innovation ability. In other words, it improves the professional ability of police officers, i.e. learning ability, synthesis ability, communication ability, cooperation ability, innovation ability, pioneering ability, adaptability, decision-making ability, self-defense ability and so on.

2.4. Algorithms and Models for Predicting Physical Fitness Training for Public Safety College Students

2.4.1. K Nearest Neighbor Classification Algorithm. Model KNN classification algorithm is an instance-based learning, or memory-based learning method [21]. It assumes that the output value of a sample is determined by the output value of its nearest k neighbor. In classification problems, the principle of KNN algorithm is simple: if a sample belongs to a certain category in the feature space of

the majority of the k nearest neighbors (most similar) samples, the sample also belongs to this category.

The KNN classification algorithm determines whether the new target prediction point belongs to the category by calculating the categories to which the closest existing sites and the most sites belong.

The features in the sample set are as follows:

$$x = (x^1, x^2, ..., x^m) \tag{1}$$

The Euclidean distances between the samples are as follows:

$$d(x^1, x^2) = \sqrt{\sum_{i=1}^{m} (x_1^i - x_2^i)^2} \tag{2}$$

2.4.2. Deep Neural Networks. Deep neural network is a technique in the field of machine learning that deals with more complex patterns by combining low-level features to form a more abstract high-level representation. The inputs of each motion trajectory are augmented after summation and the correlation function is as follows:

The Sigmoid activation function is of the form:

$$f(z) = \frac{1}{1 + \exp(-z)} \tag{3}$$

The Tanh activation function is of the form:

$$f(z) = \tanh(z) = \frac{e^z - e^{-z}}{e^z + e^{-z}} \tag{4}$$

The Re LU activation function takes the following form:

$$f(z) = \max(0, z) \tag{5}$$

3. Physical fitness training for college students in public security colleges based on deep learning models

3.1. Multi-target tracking model based on ATT-DAN

The overall structure of ATT-DAN network is shown in Fig. 1, DAN network has problems such as frequent switching of tracking target IDs and high number of tracking times for trajectory fragmentation, to address the above problems, this chapter uses the ECA channel attention mechanism and spatial attention mechanism on the basis of DAN network, introduces the anti-bottleneck structure in the feature extraction phase of multi-semantic hierarchy and uses residual connection in the affinity estimation part [22].ATT-DAN for the target tracking task is divided into two steps of processing, the first step is to detect the objects of interest in the video frames and extract the object feature information, the second step is to establish the relationship between the objects in different frames by applying the affinity field network between the objects in the different frames, so as to complete the data association on the target and obtain the target's motion trajectory.

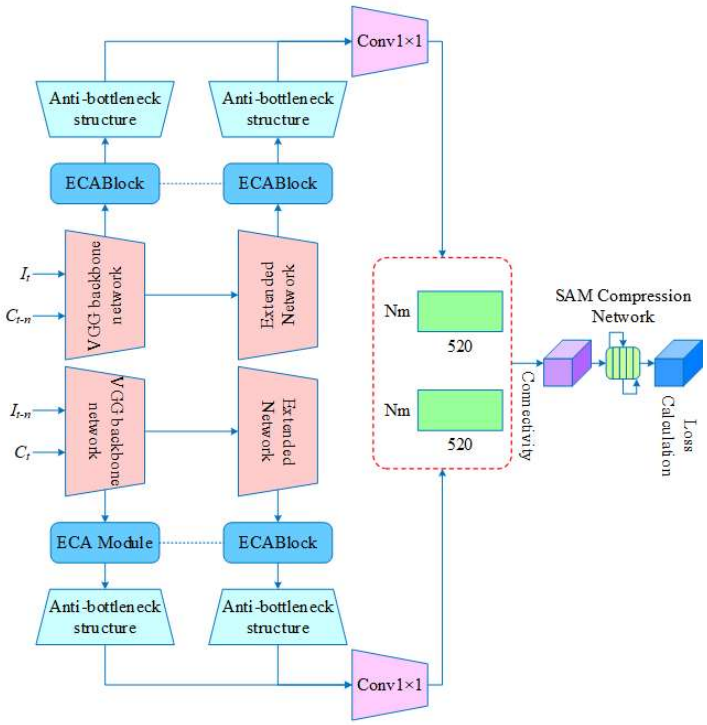


Fig. 1. Overall structure of the ATT-DAN network

3.2. Assessment of General Physical Training Performance of Public Security College Students

The evaluation of training effect of college students in public security colleges mainly includes three parts, firstly, the movements of college students in public security colleges during pull-ups, sit-ups and push-ups training are analyzed. Then we define the parameter representation of the normative behaviors during the general physical fitness training of college students in public security colleges, and construct the normative index parameter library. Finally, the key frames in the training process of the college students in public security colleges were extracted to determine the key behaviors of the college students in public security colleges during the training of pull-ups, push-ups, and sit-ups as well as the location of the running process in the field.

3.2.1. Analysis of training movements. In the pull-up training process public security college students should be the initial state of arm hanging, arms straight to grasp the bar. When the body rises to the highest point, the lower jaw is higher than the horizontal line of the bar. At the same time, in the pull-up process, the use of the body swing to generate the force over the bar movement should be regarded as a violation of the law.

In the push-up training, first of all, the public security college students' shoulder joints and wrist line and the ground angle is about 90 degrees, and the elbow joints are straight. The elbow joints and shoulder joints remain at the same height during the flexion phase, and throughout the process the body only touches the ground through the palms of the hands and toes, and the torso remains straight. It is considered a violation when the trainer's shoulder joint point is higher than the elbow joint point during the arm flexion phase, for example.

During sit-ups the hands should be placed in front of the chest, with the wrist joint points coinciding with the shoulder joint points and the ankle joint points fixed and coinciding. The elbows should be in contact with the knees and the joints should be aligned. It is considered a violation of the rules when the sit-up is performed without the hands in front of the chest or without the elbows touching the knees during flexion.

3.2.2. Parametric representation of student training programs. The qualification index for the pull-up movement is mainly based on whether the lower jaw of the public security college students is higher than the single du, therefore, the camera should be kept in the horizontal front of the photographed person as much as possible during the training image acquisition process of the public security college students. Since most of the datasets were not labeled with the key points of the lower jaw, the Lite-Trans Pose network did not predict the position of the lower jaw, so the judgment was made based on the approximation of the other joint points, and the position of the lower jaw was defined as $H_{chin} = H_{sho} + 0.5\left(H_{nose} - H_{sho}\right)$, where H_{sho} is the height of the shoulder joint point and H_{nose} is the height of the nose joint point. As the trainer kept the legs straight during the pull-up process, the angle formed by the line connecting the knee with the hip and ankle joint points was used to judge the position, and the formula is shown in (6), where the values of x_{knce} and y_{knce} represent the horizontal and vertical coordinates of the knee joint points, the values of x_{ankle} and y_{ankle} represent the horizontal and vertical coordinates of the ankle joint points, and the values of x_{hip} and y_{hip} represent the horizontal and vertical coordinates of the hip joint points:

$$ang_{knce} = \frac{\left[x_{knce} - x_{ankle}\left(x_{hip} - x_{knce}\right) - y_{knce} - y_{ankle}\left(y_{hip} - y_{knce}\right)\right]}{\sqrt{\left(x_{knce} - x_{ankle}\right)^2 + \left(y_{knce} - y_{ankle}\right)^2}\sqrt{\left(x_{hip} - x_{knce}\right)^2 + \left(y_{hip} - y_{knce}\right)^2}} \tag{6}$$

When the trainer's body descending according to the elbow, respectively, and the wrist, the shoulder line into the angle of more than 150 degrees is considered to complete a single pull-up movement, the definition of the angle of the formula as shown in (7), where x_{ellow}, y_{ellow} represents the elbow joints point transverse longitudinal coordinates, x_{sho}, y_{sho} represents the shoulder joints point transverse longitudinal coordinates, x_{wrist}, y_{wrist} represents the wrist joints point transverse longitudinal coordinates:

$$ang_{elbow} = \frac{\left[x_{elbow} - x_{sho}\left(x_{wrist} - x_{elbow}\right) - y_{elbow} - y_{sho}\left(y_{wrist} - y_{elbow}\right)\right]}{\sqrt{\left(x_{elbow} - x_{sho}\right)^2 + \left(y_{elbow} - y_{sho}\right)^2}\sqrt{\left(x_{wrist} - x_{sho}\right)^2 + \left(y_{wrist} - y_{elbow}\right)^2}} \tag{7}$$

At the same time the trainer by swinging the body for the introduction of the body, according to the average height of both knees and knee-ankle height difference for violation of the judgment, the stable state of both knees height is recorded as $\overline{H_{knees}}$, the average height of both knees in real time is $\overline{H_{knees}} = \frac{H_{thnce} + H_{rknee}}{2}$, the record of the stable state of both knees height and the average height of both knees in real time is $D_{sr} = \left|H_{knees} - \overline{H_{knees}}\right|$, the difference between the knee and ankle height is $D_{ka} = H_{knce} - H_{ankle}$, H_{ankle} for the ankle joint height.

The action compliance judgment for the push-up action is mainly based on the angle between the body of the public security college students and the ground, and the camera should be set on the side of the person being photographed at an equal height. For the initial position is set to the body and the ground angle less than 15 degrees, in the push-up movement process, the body and the ground angle reaches 5 degrees, that is, the body has been lowered to the lowest point, rise in the process of the body and the ground angle of more than 13 degrees recorded as a single push-up action, the body and the horizontal angle of the ground by the formula is defined as:

$$ang_{dor} = \cos^{-1}\frac{\left(x_{neck} - x_{hip}\right)}{\sqrt{\left(x_{neck} - x_{hip}\right)^2 + \left(y_{neck} - y_{hip}\right)^2}} \tag{8}$$

In the formula, x_{neck} and y_{neck} represent the horizontal and vertical coordinates of the neck joint points. When the shoulder joint point is higher than the elbow joint point or the degree of arm bending is low during the sinking process of the trainer's body, it is judged as a violation of the movement, i.e. $H_{sho} > H_{elbow}$ or $ang_{elbow} > 110^{\circ}$.

The normality of the sit-up movement is mainly evaluated by the angle between the shoulder joint point and the angle between the shoulder joint point and the ground, and the camera should be placed slightly higher on the side of the person being filmed in order to capture the person's knees and arms. The initial judgment standard of sit-ups for public security college students is set as the angle between the back and the ground is less than 30 degrees, and the angle between the back and the ground is more than 75 degrees and the distance between the head and the knee is less than the threshold value when bending over, which is considered to be qualified, in which the distance adopts the Euclidean distance metric:

$$l_{kn} = \sqrt{\left(x_{head} - x_{knce}\right)^2 + \left(y_{head} - y_{knce}\right)^2} \tag{9}$$

where x_{head} and y_{head} indicate the horizontal and vertical coordinates of the head, the horizontal and vertical coordinates of the nasal joint points were used instead. The angle of the back ground during the downward movement was less than 20 degrees and was considered to have completed a single sit-up movement. When the public security college students' arms were not placed in front of their chests, the angle between the elbow and the shoulder and wrist was used to judge the situation, and when it exceeded a fixed value, it was judged to be a violation of the rules.

In the long-distance running training program for public security college students, the focus was on the real-time position of public security college students on the playground. The initial position of the public security college students is set as the starting point, and the four entry points, two curve apexes, and the midpoints of the bilateral straights in the runway are selected as the recording frames, and the degree of compliance is determined by tracking the running trajectories of the public security college students. The entry points, midpoints, and exit points of the same turn were used to evaluate whether the college students crossed the inside of the runway during the running process, which was calculated as in Eq. (10):

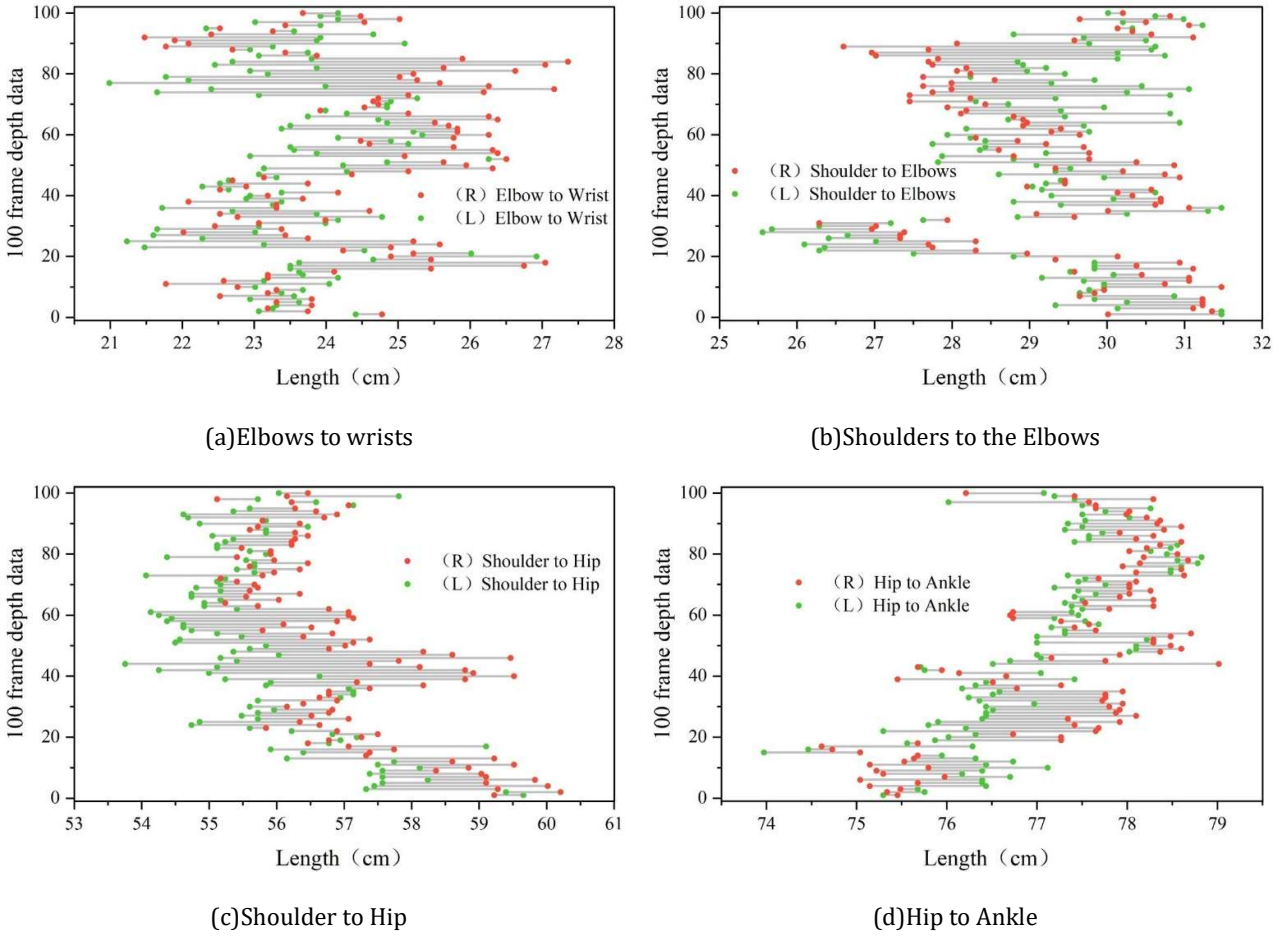
$$ang_{cunve} = \frac{\left[x_{midw} - x_{in}\left(x_{out} - x_{midw}\right) - y_{midw} - y_{in}\left(y_{out} - y_{midw}\right)\right]}{\sqrt{\left(x_{midw} - x_{in}\right)^2 + \left(y_{midw} - y_{in}\right)^2}\sqrt{\left(x_{out} - x_{midw}\right)^2 + \left(y_{out} - y_{midw}\right)^2}} \tag{10}$$

In the formula, x_{mid} and y_{mid} are the coordinates of the midpoint of the bend, x_{in} and y_{in} are the coordinates of the position when entering the bend, and x_{out} and y_{out} are the positions of the runway when exiting the bend. When $ang_{curve} < 100°$, it is judged that the college students of the public security academy have crossed the runway. Using the same side of the exit point, the midpoint of the straightaway and the entry point in a straight line to determine the running status in the straightaway, the formula as (11), where x_{midz}, y_{midz} for the trainer in the midpoint of the straightaway horizontal and vertical coordinates:

$$\left(x_{in} - x_{midz}\right)\left(y_{out} - y_{midz}\right) = \left(x_{out} - x_{midz}\right)\left(y_{in} - y_{midz}\right) \tag{11}$$

3.2.3. Analysis of physical training movements of college students in public security colleges and universities. According to the above calculation method in this paper, 100 consecutive frames of depth data were selected to carry out the distance measurements from the hip to the ankle, shoulder to the hip, shoulder to the elbow, elbow to the wrist, and a total of 8 groups of data on the left and right sides, and the measurement results were plotted as shown in Fig. 2, with Fig. (a) elbow to the wrist, Fig. (b) shoulder to the elbow, Fig. (c) shoulder to the hip, and Fig. (d) hip to the ankle. The mean value of the left side from the elbow to the wrist was 23.568 and the mean value of the right side was 24.373. The

left and right mean values of shoulder to elbow were 29.2702 and 29.245, respectively. The left and right shoulder to hip mean values were 55.859 and 57.011. Whereas the hip to ankle left side mean was 77.002, the right side mean was slightly higher than the left side at 77.331.



(a)Elbows to wrists

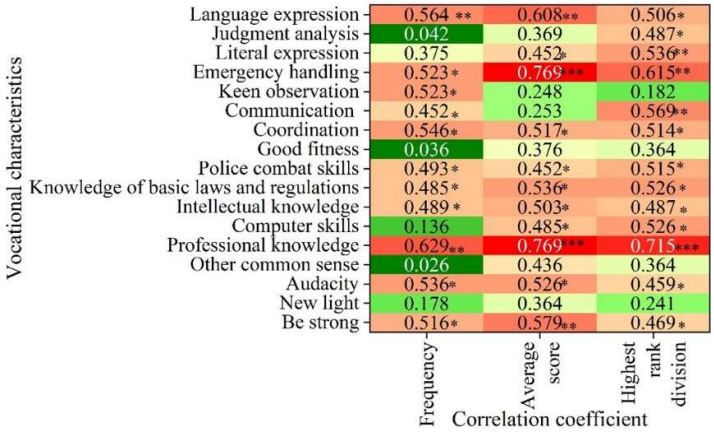
(b)Shoulders to the Elbows

(c)Shoulder to Hip

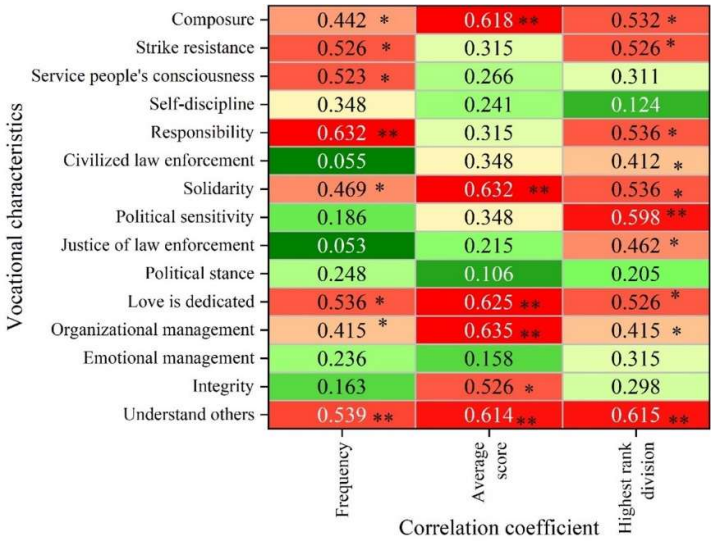
(d)Hip to Ankle

Fig. 2. Limb length measurements

3.2.4. Analysis of the correlation between physical fitness and occupational competence. The average grade score, frequency of occurrence, and highest grade in the characteristics of occupational competence, which are correlated with physical training are shown in Figure 3, with competence in Figure (a) and literacy in Figure (b). In the table, there are 19, 17, and 23 occupational competencies that have a significant relationship with the frequency of physical training, the average grade score, and the highest grade score, respectively. And the correlation ranges from 0.415 to 0.632, 0.452 to 0.769, and 0.412 to 0.715, respectively, which shows that the credibility and stability of the indicator of average grade score are relatively good.



(a)Capable



(b)Literacy

Fig. 3. The professional ability is related to the length coefficient of the training
Note: * indicates statistical significance at the 0.05 level,** indicates statistical significance at the 0.01 level.

After testing the mean rank scores of 32 career competency indicators with SPSS 22.0, the results were obtained and organized into text. Table 1 shows the test of differences between different performance groups on the average grade scores, except that there is no significant difference between different performance groups on relationship building, nurturing others, honesty and integrity, and understanding others, there is a statistically significant difference on the other 27 winning occupational competencies (P<0.05), of which there is a strong significant difference on 14 occupational competencies (P<0.01). At this point, the construction of this occupational competency model has been initially completed.

Table 1. Test table for differences in average grade scores among different

Vocational ability characteristics	Excellent Group(N=60)		General group(N=60)		T	Df	P
	Mean	S.D.	Mean	S.D.			
Language expression	3.615	0.515	1.766	0.948	5.198	118	0.000**
Judgment analysis	3.556	0.286	1.526	0.466	11.031	116	0.000**
Literal expression	3.746	0.254	1.648	0.926	6.836	118	0.000**

Emergency handling	3.169	0.896	1.936	0.915	3.015	112	0.008**
Keen observation	2.796	0.916	1.425	0.369	4.125	114	0.001**
Communication	2.915	0.648	2.136	0.648	2.648	112	0.015*
Coordination	3.041	0.765	1.948	0.825	2.936	118	0.008**
Good fitness	3.136	0.531	1.836	0.798	4.315	116	0.000**
Police combat skills	3.315	0.495	1.936	0.622	5.233	116	0.000**
Knowledge of basic laws and regulations	3.136	0.632	2.066	1.035	2.648	118	0.018*
Intellectual knowledge	3.315	0.586	2.248	1.069	2.798	112	0.015*
Computer skills	3.246	0.926	2.169	1.059	2.356	114	0.023*
Professional knowledge	3.136	0.826	2.169	0.978	2.356	116	0.023*
Other common sense	3.069	0.615	2.236	0.755	2.356	118	0.018*
Audacity	2.974	0.915	1.815	1.165	2.548	112	0.035*
New light	3.036	0.518	2.136	0.974	2.563	114	0.018*
Be strong	3.315	0.433	2.348	1.136	3.315	118	0.023*
Composure	3.218	0.815	1.856	1.031	2.515	116	0.005**
Strike resistance	3.031	0.926	1.915	0.948	3.169	118	0.024*
Service people's consciousness	3.398	0.615	2.136	0.995	3.648	118	0.003**
Self-discipline	3.136	0.813	1.816	0.763	3.745	116	0.003**
Responsibility	3.648	0.415	2.035	1.264	2.314	113	0.002**
Civilized law enforcement	3.615	0.415	2.498	1.026	3.136	118	0.005**
Solidarity	3.498	0.415	2.836	0.648	2.248	116	0.033*
Political sensitivity	3.598	0.493	2.536	0.825	3.154	114	0.004**
Justice of law enforcement	3.154	0.915	2.315	0.796	2.665	116	0.035*
Political stance	3.298	0.755	2.498	0.846	2.265	114	0.004*
Love is dedicated	3.545	0.315	2.512	0.812	3.785	116	0.348
Organizational management	3.165	1.168	2.633	1.066	1.065	118	0.636
Emotional management	2.955	0.921	2.763	0.815	0.515	113	0.246
Integrity	2.635	0.615	2.126	1.098	1.266	118	0.248
Understand others	2.854	1.246	2.159	1.023	1.326	118	0.126

4. Research on the Relationship between Physical Training and Vocational Ability Enhancement for College Students

4.1. Physical fitness test results

After collecting the data of physical fitness and skill indicators from 120 college students of public security colleges, the data were analyzed by IBM SPSS Statistics 22 software applying bivariate pearson correlation coefficient to correlate the two, and the two-tailed test of significance showed that the significant correlation P-value was less than 0.05. Applying linear regression, we set the skill indicators as the dependent variable, and the physical fitness indicators as the independent variables. Applying step-by-step method, a linear regression model was established.

The ATT-DAN mode multi-objective tracking model was utilized to predict the trainees' physical fitness training performance. A total of 120 trainees were tested for 16 physical fitness qualities, and during the test, 119 people completed the test for the 50-meter pole run, 60-second sit-ups, 30-second push-ups, standing forward bending, pull-ups, 15-second push-ups, standing long jump, 30-second deep squats, 5-10-5 test, 15-second repetitive straddle, and 10 quadrant jumps, 101 people completed the test for the 90-meter run, 101 people for each of the 30-second push-ups The 90-meter run and 30-second push-ups each had 101 people completing the test, the 800-meter had 100 people completing the test, the variable pitch toss had 99 people completing the test, and the 3200-meter had

97 people completing the test. Among the 16 physical fitness quality test indexes, there is no full attendance test index due to the physical and teaching management reasons of college students in public security colleges. The specific test results are shown in Table 2. In the strength quality training, the results of 60-second sit-ups, 30-second push-ups, pull-ups, standing long jumps, 30-second push-ups, and 30-second deep squats were 37.54±19.54, 36.45±13.54, 16.15±15.33, 2.08±0.52, 24.32±24.95, and 30.02±8.12, respectively.

Table 2. Physical fitness test results

/	Strength quality					
Physical fitness test index	60 second sit-ups	30 seconds of push-ups	Lead up	Fixed jump	30 seconds of push-ups	Squat 30 seconds
Grade	37.54±19.54	36.45±13.54	16.15±15.33	2.08±0.52	24.32±24.95	30.02±8.12
/	Endurance quality			Speed quality		/
Physical fitness test index	Variable distance run	800 m	3200 m	50 meter sprint	90m race	
Grade	100.48±36.45	224.89±72.36	1214.69±461.21	8.08±1.46	13.84±2.36	
/	Flexibility quality	Sensitive quality				/
Physical fitness test index	Orthostatic forward bend	15 seconds burpees	The 5-10-5 test	15 seconds of repeated cross	Ten quadrant jumps	
Grade	10.59±10.48	9.36±2.18	16.24±5.45	6.12±2.96	16.42±5.12	

4.2. Results of vocational aptitude tests

Table 3 shows the correlation between the total score of vocational ability and physical fitness, and the total score of vocational ability was significantly correlated with age (r=0.391, P<0.01) in the basic information, and was significantly correlated with 15 seconds of stand-up push-ups (r=0.364, P<0.015) and 15 seconds of repeated spans (r=0.327, P<0.013), 30 seconds of squat (r=0.282, P<0.015) reflecting strength quality, and 3200 meters (r=0.234, P=0.024) reflecting endurance quality.

Table 3. The total score of professional ability is related to physical fitness

/		Basic information				/	
		Age	Height	Weight	BMI		
Total score of professional ability	R	0.391	0.134	0.085	0.124		
	P	<0.01	0.245	0.416	0.226		
/		Strength quality					
		60 second sit-ups	30 seconds of push-ups	Lead up	Fixed jump	30 seconds of push-ups	Squat 30 seconds
Total score of professional ability	R	0.102	0.159	0.059	0.064	0.015	0.282
	P	0.364	0.134	0.636	0.531	0.936	<0.015
/		Endurance quality			Speed quality		/
		Variable distance run	800 m	3200 m	50 meter sprint	90m race	
Total score of professional ability	R	0.136	0.164	0.234	0.124	0.123	
	P	0.266	0.123	0.024	0.264	0.248	
/		Flexibility quality	Sensitive quality				/
		Orthostatic forward bend	15 seconds burpees	The 5-10-5 test	15 seconds of repeated cross	Ten quadrant jumps	
Total score of professional ability	R	0.127	0.364	0.116	0.327	0.193	
	P	0.236	<0.015	0.264	<0.013	0.061	

4.3. Linear regression analysis

Table 4 shows the linear regression of occupational ability, and the total score of occupational ability was significantly correlated with age (0.426) and pull-ups (-0.345) (P<0.01), and significantly correlated with 30-second deep squat (0.158) and 3200 meters (-0.236) (P<0.05). The results of linear regression analysis indicated that age, 30-second deep squat, pull-ups, 3200 meters, and 15-second repeated traverse predicted the total vocational ability scores of college students in public security colleges.

Table 4. Linear regression of occupational ability

/	Nonnormalized coefficient		Normalization factor		
	Beta	Standard error	Beta	T	P
Constant	-162.451	48.264	/	-3.215	<0.01
Age	12.453	2.158	0.426	4.736	<0.01
Squat 30 seconds	1.363	0.732	0.158	2.036	**0.046**
Lead up	-1.256	0.353	-0.345	-3.236	<0.01
3200 m	-0.032	0.042	-0.236	-2.436	**0.023**
Over 15 seconds	4.593	2.235	0.193	2.036	0.044

5. Conclusion

In this paper, the influence of physical training on college students' professionalism in public security colleges is described from three aspects: professional ethics, professional knowledge and skills, and improvement of professional ability. On the basis of K nearest neighbor classification algorithm, activation function is introduced to construct ATT-DAN network model to predict physical training related scores based on college students' physical training actions.

1) A visual representation of the parameters of the training program for college students in public security colleges was selected from 100 consecutive frames of depth data, with mean values of 23.568 and 24.373 for the left and right sides of the elbow to the wrist, respectively. Whereas the hip to ankle left side mean was 77.002, the right side mean was slightly higher than the left side at 77.331.

2) Using the ATT-DAN multi-target tracking model to predict trainees' performance in physical fitness training. In the strength training, the scores of 60-second sit-ups, 30-second push-ups, pull-ups, standing long jump, 30-second push-ups, and 30-second deep squats were 37.54, 36.45, 16.15, 2.08, 24.32, and 30.02, respectively.

3) A linear regression model was established to analyze the relationship between occupational ability and physical training. From the model, it can be seen that there is a significant correlation between the total score of occupational ability and age and pull-ups, $P<0.01$, The Beta values of occupational ability and 30-second deep squat, 3200m run, 15-second repeated horizontal jump are 0.158, -0.236, 0.193, $P<0.05$, which indicates that there is a positive correlation between physical training and occupational ability have a positive correlation.

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