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Computer-Aided Design AND APPLICATIONS

Establishment and Application of Intelligent Learning and Skill Analysis of Fitness Actions Driven by Multi-Dimensional Information Situational Awareness

Jingli Zhang[1*], Feifan Yang[2] and Yingying Tang[3]

[1]School of Preschool Education, Zhumadian Preschool Education College, Zhumadian, Henan 463000, China,zhangjingli77@163.com
[2]School of Basic Education, Zhumadian Preschool Education College, Zhumadian, Henan 463000, China,13783676617@163.com
[3]Times Power Company Limited Shunda Branch, Kaifeng, Henan 475000, China
chnty0@163.com

Corresponding Author: Jingli Zhang, zhangjingli77@163.com

Abstract. In recent years, with the rapid development of science and electronic information technology, and the continuous popularization of smart phones, mobile networks and tablet computers, people have entered a "micro-era". The way of establishing manual motion model requires a lot of knowledge and careful observation of modeling experts, which is time-consuming and labor-intensive. In recent years, the modeling assistant method of building action models automatically has become a research hotspot in the field of intelligent planning. With the rise of the national fitness craze, our national love for and the next hot spot in the smart terminal industry has become the research and development of smart wearable devices. The purpose of this study is to explore the impact of the transformation of the service mode on the transformation of fitness education and its role in the synchronous transformation of fitness education by studying the transformation of the service guidance mode, service consumption mode and service platform of the public intelligent fitness club in the Internet era. Finally, the mode of "network course platform+intelligent monitoring equipment+communication and sharing platform" is adopted to solve the problems before, during and after teaching in a one-stop manner, and realize the transformation from simple fitness to scientific fitness.

Key words: Fitness movement; Skill analysis; Intelligent learning; Multidimensional information situation; Perception driven
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1 INTRODUCTION

The sports prescription system of fitness clubs is an inevitable product of people's growing desire for a healthy life. Since China started late in the field of sports and fitness, the current sports prescription

system has not yet solved the problems of standardization, structure, safety, etc. [9]. We can use a variety of learning platforms to obtain information about all aspects of our concern, which also makes the traditional learning, life and other ways of behavior further changed and updated. Now the access to information is no longer constrained by time and space, and the world has become more miniaturized. Mobile learning has become a new development trend, presenting a new situation of anytime, anywhere learning [2]. The reason for this result is that the new smart phones and laptops are mobile terminals that are easy to carry and use, but the new smart phones are more compact and very suitable for learning in fragmented time, so teenagers' preference for them is also increasing [10].

Planning algorithm has always been an important research content of automatic planning. It designs an efficient solution method for a given planning model. However, with the progress of automatic planning technology, it gradually extends to solve complex practical problems, and the construction of planning domain model becomes an important knowledge engineering problem. The mode of domain construction includes manual construction, semi-automatic construction and automatic construction [12]. In the semi-automatic or automatic construction mode, how can a machine obtain the information needed for construction, learn in what way and abstract its action model that changes the world, and finally form a general and domain-independent method, which has become a hot spot in automatic planning research in recent years. The awakening of the awareness of national exercise and fitness, and the rising proportion of consumers and sports people have brought more commercial and industrial values [19]. More and more smart products and smart apps are also beginning to enter the sports field. In the 21st century, in the field of fitness, it has developed very mature abroad. The sales of products around sports, such as clothing, sports food and related equipment, are increasing. In China, sports and related industries are still in the "blue ocean" stage. Actively promote the integration and development of the Internet and fitness and leisure, encourage the fitness industry to optimize the allocation of resources from all sides, and expand the development of enterprises [18].

"Internet +" is an important driving force. The deep integration of "Internet +" with the public intelligent fitness club and the promotion of the upgrading of the service mode of the public intelligent fitness club can not only improve the quality of life of fitness people, but also have important significance for the sustainable development of the fitness industry [15]. The transformation of "Internet+" public intelligent fitness club service mode catalyzes the synchronous transformation of fitness education, and provides theoretical basis and technical support. The transformation of fitness education is mainly to use the Internet to help the educated master fitness knowledge and skills, and become all-round and high-quality fitness talents, aiming at educating people, Therefore, it is necessary to explore the transformation of public intelligent fitness club service mode and fitness education under the Internet background [7]. In order to have a healthy body and a good figure, most people first think of fitness exercise. People begin to develop and implement fitness programs, taking fitness exercise as an essential activity in daily life. The management of fitness exercise and figure can also reflect a person's self-regulation ability. Nowadays, people have a stronger awareness of fitness than before, and most people are aware of the benefits and self-confidence of fitness [8].

With the spread of the idea of big data, more and more enterprises are beginning to realize that there is a wealth of knowledge behind these massive data. By analyzing and processing the massive data, we can dig out the value hidden behind the data [3]. ISome high-quality fitness apps, such as "Splash Exercise" and "Keep", have tens of millions of users. When you walk into any gym, you can see that many users are doing fitness training following the video tutorials of the app.

In this paper, by independently developing fitness APP and big data processing platform, while realizing the basic functions of fitness APP, aiming at the above problems, National Football League (NFL) near field communication technology is used to realize the networking of fitness equipment, so that fitness APP can realize data interaction with fitness equipment. Its innovation lies in:

1. The business requirements of sports prescription system are analyzed. Based on the analysis of project construction requirements, the functional and non-functional requirements of the system are analyzed, the platform and scope of the system are defined, and the corresponding Unified Modeling Language (UML) is given.

2. The evaluation index and method of situation awareness consistency are proposed, and a distributed situation awareness model based on unmanned system cluster is established. And on the basis of the original single source centralized multi-source situation awareness system, the distributed situation awareness system is realized, including target clustering, target intent identification and other module design. Finally, the overall system design, testing, simulation and display are completed under the Django framework of the Web development application platform.

2 RELATED WORK

With the continuous development of science and technology, information based teaching and mobile learning are becoming more and more popular, and people's learning methods and learning methods are becoming more and more flexible. Learning apps are also a new learning and teaching tool born in this context.

Morgan PJ's analysis and comparison show that there are two kinds of knowledge about micro-courses, one is that micro-courses are micro-videos designed for a certain teaching link, and the other is that micro-courses have a relatively complete system, which is a new online course that combines micro-videos, learning interaction, assignment and review of homework, course evaluation, and learning situation detection [14]. Holt NL proposed that the combination of online health and fitness community provides a healthy environment, and consumers can participate freely, which provides a foundation for the development of health products. This research has enhanced the knowledge of social media and online communities about health and fitness products [6]. Lai SK pointed out that the fitness industry caught up with the development of "internet plus" earlier, while the mobile fitness application took the lead, and developed functions such as online sports teaching and the establishment of health records [11]. Cohen KE If they don't finish, they need fines, so as to motivate users to keep fit [4]. Fairclough SJ uses GPS to accurately locate the user's position, track the movement route and record the user's movement track. At the same time, through social functions, it can find goo-goo friends around you running around and exercising together [5]. Barnett LM developed a machine learning oriented, high-performance computing framework that can deal with large-scale datasets and deal with Tencent's rapidly growing data mining needs. It uses the large-scale datasets collected by Tencent for machine learning computing and has been applied to Tencent video, social advertising and other precision recommendation services [1]. Smith JJ has conducted relevant research on the process architecture of high-precision coordination, control and command involved in cluster air operations, and established a cluster coordinated air combat command and control system model through stochastic Petri net technology [17]. Shaf II N proposes a dynamic game theory method based on the particle swarm optimization of predators and prey, which decomposes the dynamic task allocation problem of multiple UAVs in military operations into a one-to-one game model at the decision-making stage [16]. Lu Keqiang proposed the Distributed Situation Awareness (DSA) model theory, comprehensively analyzed the characteristics of dynamic systems in the distributed environment from the system level, and gave a description of the system's distributed behavior process under the situation awareness model [13]. By recording the wearer's movement in the three-dimensional space, Yu Z can not only record the pace, but also calculate the wearer's physical consumption when sitting, walking or running, opening the era of wearable sports fitness equipment [20].

3 METHODOLOGY

3.1 Analysis on the Application Platform of Fitness Action Intelligent Learning Combined with Skill Analysis

With the gradual maturity and rapid development of communication technology, cmnet has entered a period of rapid development. With the optimization of 4G network, the development of wireless network, the popularization of smart phones and the continuous innovation of application software, mobile phones have become one of the main forms for people to access the network. Formal learning requires that learners should be planned, targeted, required and organized in their learning, while informal learning is unique and flexible, and there are not too many requirements and constraints on learning content. Learners can learn at will according to their own needs and preferences. There are various ways of informal learning, and learners can choose their own learning methods according to their different knowledge. Nowadays, smart wearable products come in various forms, but they are basically the combination of one or more smart wearable hardware and corresponding App software. Can read internal or external parameters; Smart wearable products themselves can extend the interaction with other smart devices. "Internet + sports" refers to the deep integration of the Internet and the sports industry under the new forms and formats of Internet development, promoting the transformation and transformation of the traditional sports industry, improving the competitiveness of the traditional sports industry, injecting innovative vitality, and thus promoting the new development of the traditional sports industry. "Internet + fitness" mainly refers to integrating the innovative development achievements of the Internet with the traditional fitness industry on the platform of the Internet, innovating and changing the original development model, and providing new ideas for the development of the traditional fitness industry. Fitness apps can be divided into the types of recording and analyzing fitness process, the type of online and offline combination of o2 o, and the type of online guidance. These apps provide a variety of forms for fitness and meet the different fitness needs of various fitness practitioners, but there are still many shortcomings, such as the accuracy of client data recording; Scientific fitness guidance; Technical loopholes and hidden dangers of information security indicate that fitness needs to return to offline finally. For example, in the recommendation systems of major shopping websites, the scale of data generated by shopping websites every day is far beyond the ability of human beings to handle. It is necessary to use machine learning platforms to analyze and process data, and machine learning methods can be used to discover patterns that are difficult for human beings (because of the high magnitude and complexity of data sets) to discover.

The exercise prescription system of fitness club is mainly to complete the functions of formulating, saving, browsing and modifying the exercise prescription of members of fitness club. Its main participants are fitness instructors and club members. Members choose their own coaches through the exercise prescription system, then complete a series of SL90 psychological evaluation and physiological index tests, wait for the system to generate its own evaluation report, then the system generates the corresponding exercise prescription through the evaluation report of the member, and finally uploads the exercise prescription to the third-party trusted cloud. As shown in Figure 1.

From the above business description, we can know that the system has two roles: fitness coach and fitness club member. Members of the fitness club complete a series of health questionnaires, exercise tests, conduct health assessments and finally download their own exercise prescriptions. The background manager of fitness coaches is responsible for managing member information, maintaining the standard library, generating exercise prescriptions, etc. Analyzing from the aspect of business requirements, sports prescription upload and download module. The following briefly describes the basic functions of each module, and describes how users interact with modules, and describes them with UML use case diagrams.

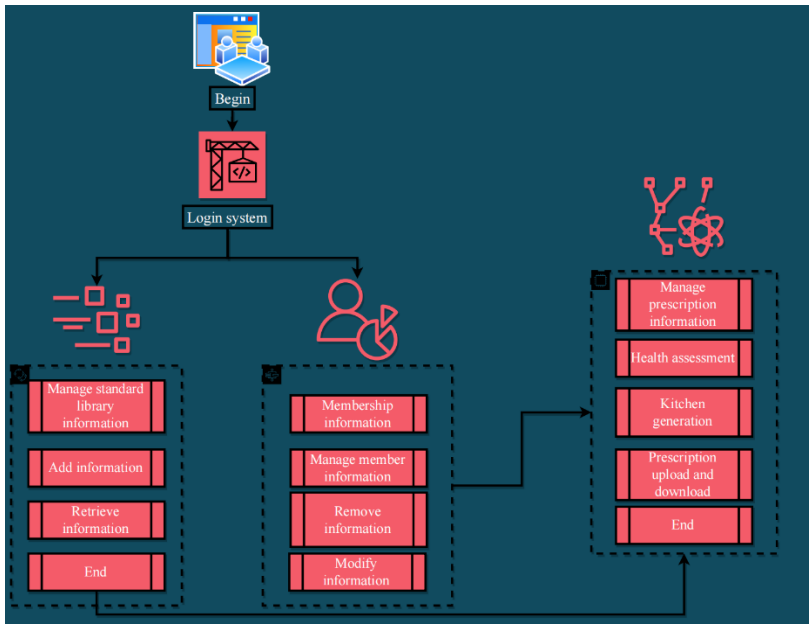

Figure 1: Basic Workflow of Exercise Prescription System.

Set up an information exchange system between other devices and mobile terminals, and the devices transmit the indexes collected at ordinary times to mobile phone applications by referring to the information of remote terminals. According to these data, it can help users to analyze sports items, exercise intensity and exercise reports that are more suitable for them. The value of wearable clothing lies in the data it obtains and the services it provides. The more vertical and deep the product is, the greater the value it creates.

3.2 Optimal Design of Fitness Exercise Based on Multi-Dimensional Information Situation Awareness

Situation awareness is a hierarchical system formed by a series of complex processes. Each level is interdependent and progressive. The main purpose of situation awareness is to process multidimensional data generated by enemy targets in the course of operations, including spatial position, radar mode, speed, elevation angle and other information in many ways. By extracting situation elements, simplifying information dimensions, situation understanding and forecasting the future situation of targets. The ultimate purpose of situation awareness system is to generate the situation analysis diagram of the current battlefield environment, assist commanders to quickly understand the battlefield environment and make correct decisions. As situational awareness can be applied in a wide range, the definition of situational awareness for different scenarios is slightly different. Among them, the most mainstream model is the model established by Joint Directors of Laboratories (JDL) in the United States. As shown in Figure 2.

As can be seen from Figure 2, the JDL model is divided into five processes. The first part of the data pre-processing part is mainly to complete and eliminate the data missing, outliers and other dirty data, as well as normalization; The target extraction in the second part is the preliminary data

fusion operation of multidimensional data, and serves as the input of the situational awareness model in the third part.

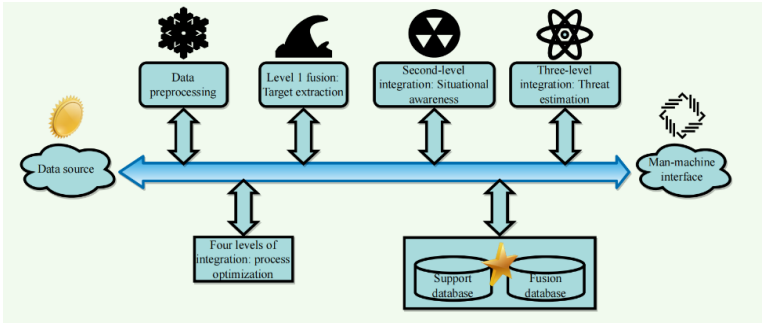

Figure 2: JDL Information Fusion Model.

The fourth part of the threat assessment analysis is based on the upper-level output results to assess the threat level for the current target; The fifth part is mainly about content optimization, including process optimization of data fusion and feature understanding.

Situation awareness systems involving multi-dimensional information often need multiple methods to deal with them jointly, and it is difficult for a single algorithm to summarize data information with different structures and attributes. Situation awareness method based on expert system (ES): The knowledge representation of expert system usually adopts rule-based method. Rule-based recognition and matching needs to build knowledge base and inference engine. It is not easy to maintain, and it is difficult to give the knowledge base and reasoning rules covering the whole problem domain. Nowadays, in the face of highly complex information warfare, the expressive ability of empirical reasoning rules to complex battlefield situation is gradually weakened. The common expert system model consists of seven parts, as shown in Figure 3.

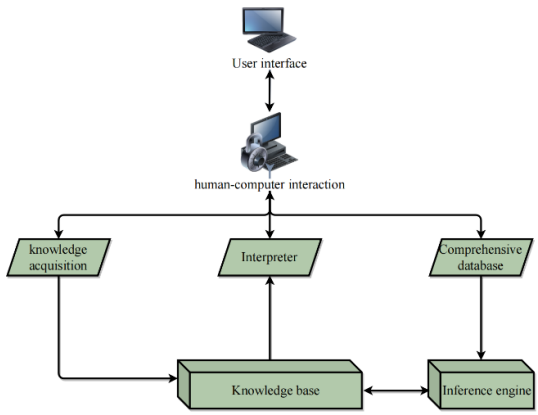

Figure 3: Expert System Model.

Situation awareness method based on template matching (MT): The template matching method is easy to implement, conforms to human cognitive laws, and is easy to understand. It is applicable to the identification field with a clear purpose category. However, this method mechanically separates

the battlefield situation, and does not fully consider the characteristics of fuzzy, deceptive, incomplete battlefield information in reality. Compared with the above-mentioned mathematical model, Bayesian network has a strong reasoning ability in mining the causal relationship between random variables, making it the mainstream research method of situation awareness. On the basis of fitting the model to the actual situation of the battlefield, the battlefield environment is highly surveyed through the node relationship and conditional probability table, and the battlefield change trend contained in the data is mined to solve the uncertainty problem of the situation information. The disadvantage is that the network model is difficult to determine, and the accuracy of the model will have a great impact on subsequent reasoning. Actions between two observations have equal opportunities to make the proposition corresponding to the text true, and calculate the probability of its occurrence in the state between two observations; The case of negative characters is similar to that of positive characters. The difference is that if positive characters appear in previous observations, the actions between the two observations have equal opportunities to make the proposition corresponding to the characters false. Therefore, the probability that the proposition is true in the state is 1 minus the probability that it is not true.

Given the characters l and t -step action-observation sequence $\langle a_i, o_i \rangle (1 \le i \le t)$, and assuming that the state before the action a_i is S_{i-1}. If there are $1 \le k < i \le t$ and $l \in o_i$ for $-l \in o_j$, and $\forall k (j < k < i)$ and $l \notin o_k$ for $-l \notin o_k$, the probability of $l \in s_k$ is

$$\sum_{m=0}^{k-j-1} (1 - \frac{1}{i-j})^m \frac{1}{i-j} \tag{1}$$

In order to describe the learning differences in detail, the statistical rules of learning the STRIPS action model, or the statistical rules of error rate, are given below.

Statistical rule EC-PRE for difference of operation: Assuming that the premise set of the learned STRIPS operation o is $L_{pre}^{I} = \{\langle atom^l \rangle\}$, and the real STRIPS operation premise set is $L_{pre}^{T} = \{\langle atpm^T \rangle\}$, the difference between L_{pre}^{l} and L_{pre}^{r} is defined as:

$$\Delta_o^{pre} = \left| L_{pre}^{l} \cup L_{pre}^{T} - L_{pre}^{l} \cap L_{pre}^{T} \right| \tag{2}$$

Statistical rule EC-EFF for difference of operation effects: Assuming that the learned effect set of STRIPS operation o is $L_{eff}^{l} = \{\langle atom^l \rangle\}$, and the real effect set of STRIPS operation is $L_{eff}^{T} = \{\langle atom^T \rangle\}$, the difference between L_{eff}^{l} and L_{eff}^{r} is defined as:

$$\Delta_o^{eff} = \left| L_{eff}^{l} \cup L_{eff}^{r} - L_{eff}^{l} \cap L_{eff}^{r} \right| \tag{3}$$

Assuming that the learned temporal operation o is in the form of: $\langle E_L, L_{pre}^{l}, L_{eff}^{l} \rangle, o$, the total number of possible preconditions and effects are sum, respectively, and the set of tested actions is, the error rate is defined as:

$$\Delta_o = \frac{1}{2}\left(\frac{\Delta_o^{pre}}{T_{pre}} + \frac{\Delta_o^{eff}}{T_{eff}}\right) \tag{4}$$

Based on the above rules, the error rate of all operations O learned in the test domain is defined as:

$$\Delta_o = \frac{1}{|O|}\sum_{o \in O} \Delta_o \tag{5}$$

Where $|O|$ is the number of elements of the set O.

Based on people's daily online browsing records and purchase information, the intelligent recommendation system analyzes users' preferences and recommends products that they think the user will like. For example, when we log on Taobao or JD Mall, the shopping interface always recommends to us the items we have browsed or similar items we have purchased, even when we browse news or watch blogs daily, The system will also take the initiative to recommend some products that we may be interested in. For users, the recommendation system can help them find the items they want. The recommendation engine can recommend similar items to users or find users with similar interests according to their previous browsing records, and recommend items to users according to the products they choose. At this time, the recommendation engine can often recommend items that users do not know but like in advance.

3.3 Alternating Least Square Method

Alternating Least Squares is an optimization method in solving matrix decomposition problems. It is powerful and relatively easy to parallelize, so it is very suitable for platforms like Spark that need parallel computing. At present, it is the only matrix decomposition optimization computing method realized in Spark's machine learning library. Euclid's distance formula calculates the distance between two vectors, and calculates the similarity by calculating the vectors generated by two users' ratings of articles. The calculation formula is shown in formula (6).

$$d(x, y) = \sqrt{\sum (x_i - y_i)^2} \tag{6}$$

In order to better represent the similarity between users, formula (6) needs to be converted. The result should be controlled between 0-1. The closer to 1, the higher the similarity between two users. The converted formula is shown in formula (7).

$$sim(x, y) = \frac{1}{1 + d(x, y)} \tag{7}$$

The closer the result is to 1, the closer the vectors of two users are, and the closer it is to 0, the less similar it is. The calculation formula is shown in formula (8).

$$sim(x, y) = \frac{x \bullet y}{\|x\|^2 \|y\|^2} = \frac{\sum x_i \bullet y_i}{\sqrt{\sum x_i^2}\sqrt{\sum y_i^2}} \tag{8}$$

Matrix decomposition means that a matrix is decomposed into the multiplication of several matrices. The commonly used matrix decomposition methods are triangle decomposition, singular value decomposition and QR decomposition. If the original score matrix C is $m*k$ dimensions, and the decomposed factor matrices A and B are $m*k$ dimensions and $k*n$ dimensions respectively, the original matrix C can be approximated by the matrix obtained by multiplying A and B, and the formula is shown in (9).

$$C_{i,j} \approx A_i \bullet B_j = \sum_{p-1}^{k} a_{ip} b_{pj} = a_{i1} b_{1j} + a_{i2} b_{2j} + ... + a_{ik} b_{kj} \tag{9}$$

Assuming that the actual score matrix is J, J, and the approximate score matrix is A, it is obtained by multiplying the user factor matrix B and the article factor matrix S. The loss functions of S and J are shown in formula (10).

$$C = \sum_{(i,j) \subset R} (S_{i,j} - J_{i,j})^2 = \sum_{(i,j) \subset R} (S_{i,j} - A_i \bullet B_j)^2 \tag{10}$$

Compared with the overall framework of STRIPS action model learning, the process of temporal action model learning is more complex. The duration expression construction and temporal relationship operator analysis are added to deal with temporal domain problems rather than STRIPS domain problems.

Error Count Rule for Duration (EC-DUR): If the learned temporal operation duration expression is D_L, for action a, assuming that the duration of D_L is a according to $dur^L(a)$, the error rate of D_L on a is

$$\Delta_{D_{L,a}} = \frac{\left| dur^L(a) - dur(a) \right|}{dur(a)} \tag{11}$$

The error rate of D_L on the action set $A_{test} = \{a\}$ is

$$\Delta_{D_{L,A_{test}}} = \frac{1}{|A_{test}|} \sum_{a \in A_{test}} \Delta_{D_L,a} \tag{12}$$

Statistical rule EC-PRE for differences of operations: Assuming that the premise set of the learned temporal operation o is $L_{pre}^{\ l} = \left\{ \left\langle tr^l \quad atom^l \right\rangle \right\}$ and the actual temporal operation premise set is $L_{pre}^{\ T} = \left\{ \left\langle tr^T \quad atom^T \right\rangle \right\}$, the difference between $L_{pre}^{\ l}$ and $L_{pre}^{\ T}$ is defined as

$$\Delta_e^{pre} = \left| L_{pre}^{\ l} \cup L_{pre}^{\ r} - L_{pre}^{\ l} \cup L_{pre}^{\ r} \right| \tag{13}$$

Statistical rule EC-EFF for difference of operation effects: Assuming that the learned effect set of operation o is $L_{eff}^{l}=\left\{\left\langle tr^{l} \quad atom^{l}\right\rangle\right\}$, and the actual effect set of operation o is $L_{eff}^{r}=\left\{\left\langle tr^{r} \quad atom^{r}\right\rangle\right\}$, the difference between L_{eff}^{l} and L_{eff}^{r} is

$$\Delta_{o}^{eff}=\left|L_{eff}^{l} \cup L_{eff}^{r}-L_{eff}^{l} \cap L_{eff}^{r}\right| \tag{14}$$

Statistical rule for error rate of temporal operation ER-TOTAL: suppose that the form of temporal operation o learned is $\left\langle E_{L}, L_{pre}^{l}, L_{eff}^{l}\right\rangle$, the total number of possible preconditions and effects of operation o are T_{pre} and T_{eff} respectively, and the action set tested is A_{test}, then the error rate of o is defined as:

$$\Delta_{o}=w_{1} \times \Delta_{E_{L}, A_{test}}+w_{2} \times \frac{1}{2}\left(\frac{\Delta_{o}^{pre}}{T_{pre}}+\frac{\Delta_{o}^{eff}}{T_{eff}}\right) \tag{15}$$

Among them, the total error rate of Δ_{0} is composed of two parts: the error rate relative to the duration and the error rate relative to the logical relationship between the action premise and the action effect. Based on the above rules, all operations learned in the test domain are tested. The error rate of is defined as.

$$\Delta_{o}=\frac{1}{|O|} \sum_{o \in O} \Delta_{o} \tag{16}$$

Finally, the evaluation method of learning temporal action model is given. It includes duration expression error rate statistics rules, operation premise error rate statistics rules, operation effect error rate statistics rules, and temporal operation overall error rate statistics rules.

4 RESULT ANALYSIS AND DISCUSSION

In order to better compare the stability and performance of the four algorithms, Hamming distance less than 4 is defined as the best, more than 4 and less than 8 are defined as the medium, and more than 8 is defined as the poor. The Hamming distance grading distribution of 1000 independent experiments of the four algorithms is shown in Table 1.

Algorithm	*Best*	*Middle*	*Worst*
MCMC algorithm	*212*	*507*	*281*
Random Node Rank K2 Algorithm	*45*	*308*	*647*
K2 algorithm based on node priority	*356*	*513*	*131*

OMCMC-K2 algorithm	*653*	*335*	*12*

Table 1: Hamming Distance Distribution of Four Algorithms for 1000 Independent Tests.

It can be seen from Table 1 that the improved algorithm of K2 combined with MCMC can basically learn a better network structure, and only rarely can there be answers far from the real network structure, which fully demonstrates that the improved algorithm is robust and not affected by the quality of the data set while ensuring accuracy, and the results are relatively stable. The improved algorithm based on the two-step strategy converges on the fitness score of four groups of data at the time sequence edge and non-time sequence edge, as shown in Figure 4 and Figure 5.

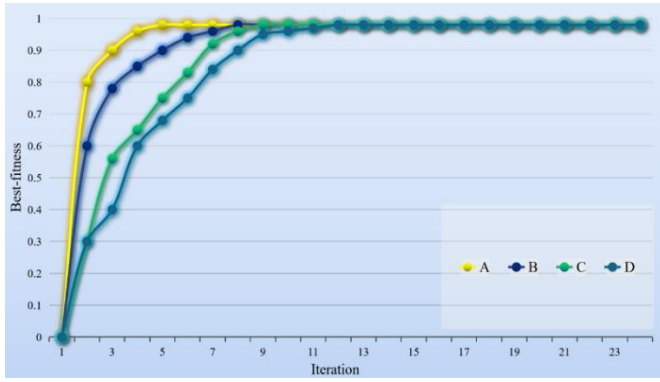

Figure 4: IAGA-DBN Algorithm is Tested Independently for 20 Times in 4 Groups of Data.

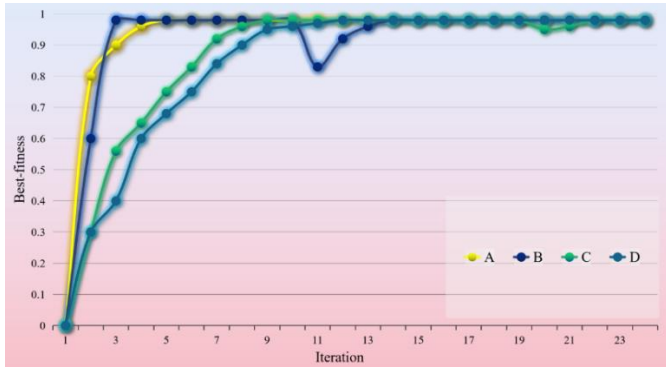

Figure 5: Convergence of Fitness Score of 50 Groups of IAGA-DBN Algorithm with 100T Time Sequence.

In order to further verify the accuracy and convergence efficiency of the algorithm, the IAGA-DBN algorithm in this chapter is compared with IMGA-DBN genetic algorithm, dynamic maximum-minimum hill climbing algorithm (DMMHC), greedy algorithm (GS), maximum spanning tree hill climbing algorithm (MWST-HC) and maximum spanning tree greedy algorithm (MWST-GES). The running results of the algorithm are shown in Figure 6 and Figure 7.

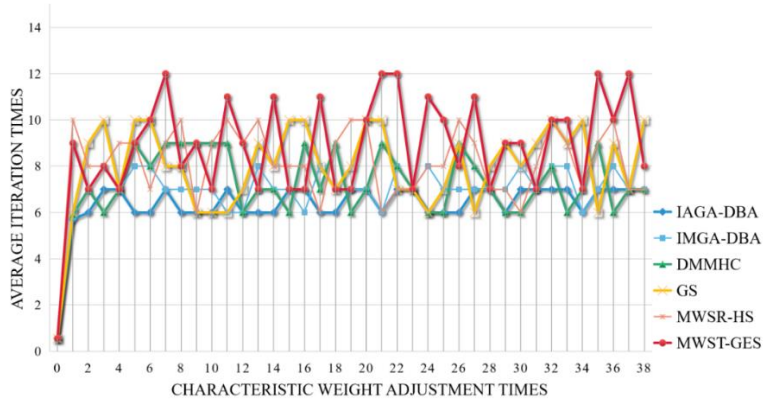

Figure 6: Average Number of Convergence Iterations of the Algorithm.

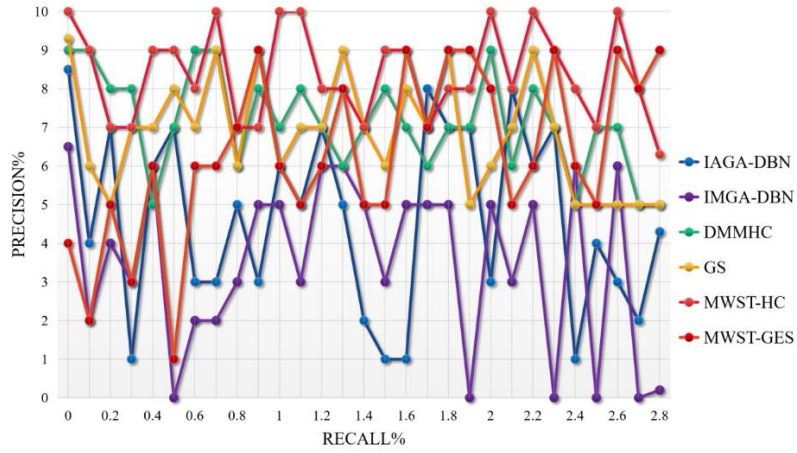

Figure 7: Average Hamming Distance of Algorithm Results.

Table 2 shows the specific numerical results of the average Hamming distance and the average iteration times of the six algorithms when iterating to the optimal solution.

Data set	*Algorithm*	*Average Hamming distance*	*Average Iterations*
Water（5000）	*IAGA-DBN*	*3.95*	*103.6*
	IMGA-DBN	*5.09*	*130.5*
	DMMHC	*7.31*	*298.56*
	GS	*9.75*	*294.45*
	MWST-HC	*7.89*	*166.54*
	MWST-GES	*6.58*	*195.84*

Table 2: Comparison of Water Network Results in Different Algorithms.

In contrast, the experimental results of the complete temporal action model obtained by using the state segmentation method based on probability and statistics in partial observation environments are shown in Figure 8. It can be seen from the observation that the learned temporal action model also has the situation that the proposition text is not learned or is incorrectly learned. The learning situation of these two methods is further analyzed as follows according to the evaluation criteria of learning quality of temporal operation.

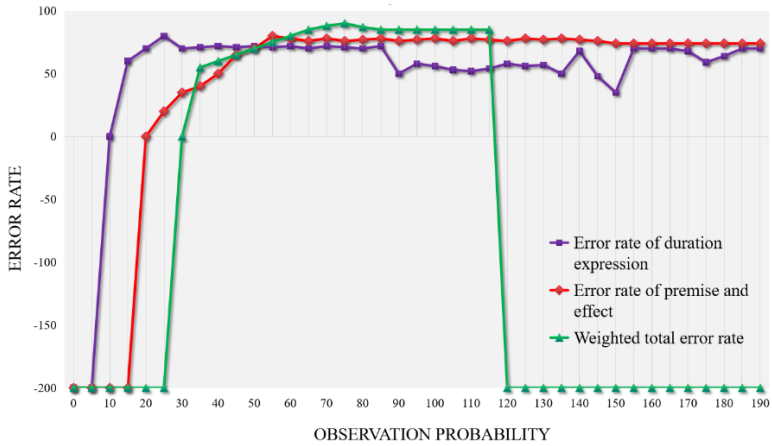

Figure 8: Learning Temporal Operation error rate with probability under observation probability 0.9.

In contrast, the error rate of TAM system in the same observation probability and test domain is shown in the figure above. It reflects that when the observation probability is 0.9, the learning error rate of TAM system is lower than that of probability method. Under each observation probability, the error rate of learning temporal operation duration expression, the error rate of premise and effect, and the weighted total error rate are statistically analyzed. Comparing the error rate of temporal operation learning of the two methods, the error rate of the complete temporal action model learned by TAM system is lower than that of the complete temporal action model learned by the state segmentation method of probability statistics.

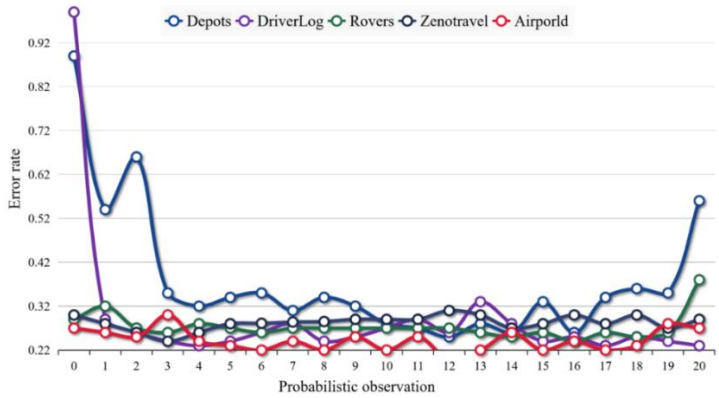

Figure 9: Learning Temporal Operation error rate with probability under different observation probabilities.

Compared with the process based on probability and statistics, the TAM system uses more advanced "word vector" technology. Although the difference between the average time spent on learning is 94 seconds, as shown in Figure 9. However, the average correct rate of the complete temporal action model obtained by TAM system learning is 7.5% higher than that of probability method, and the overall learning quality is better than that of probability method. As shown in Table 3. From the table, in terms of the overall structural framework, users' understanding is generally satisfactory, and users are quite satisfied with the division and arrangement of without the guidance of a novice. On the operation, the user gives a good evaluation of the operation feedback, especially in sports, reminding the wrong posture to help the user complete a more standard exercise. However, it is also found in the questionnaire their own physical fitness and data analysis reports, and are willing to turn the exercise into a part of their lives completely.

Evaluation dimension	*Evaluating indicator*	*Score of specific indicators*	Latitude comprehensive score
Information architecture	*Navigation clarity*	*98.5*	93.5
	Objective clarity	*97.6*	
	Response speed	*85.9*	
Interaction mode	*Path brevity*	*90.2*	89
	Fault tolerance	*92.4*	
	Practicability	*91.5*	
Interface vision	*Page Layout*	*97.6*	93.5
	Recognition	*86.5*	
	Color perception	*92.6*	
Emotional experience	*Degree of control*	*88.5*	90.9
	Immersion	*87.6*	
	Incentive degree	*85.5*	

Table 3: Evaluation Form of User Experience Scale.

5 CONCLUSIONS

The transformation of service mode under the Internet starts with the transformation of service guidance mode. With the help of the Internet and big data, we can understand the most real service needs of the bodybuilders and build a service panorama in the minds of the bodybuilders. Game design has a natural advantage in keeping user's driving force and user's stickiness, so it has been widely used in finance, education and management in recent years. Through the Internet, the public gym provides users with online and offline service guidance. Through accurate analysis, it can not only find the problems existing in the fitness service, but also realize automatic collection of fitness and service data, intelligent solutions and other services through "intelligent software+intelligent hardware+cloud platform". Aiming at each function point of the exercise prescription system, the system has carried out a comprehensive functional and non-functional test. The test results show that each function of the exercise prescription system proposed in this paper runs well, the system runs smoothly, the response time of downloading and uploading meets the needs of users, the consistency of exercise prescription is good, the privacy and security of users are guaranteed, and the initial design goal of the system is completed. In the process of developing mobile apps and servers, I also had a basic understanding of the construction and operation mode of a website, and had a clear concept of the data flow mode in the Internet.

Jingli Zhang, https://orcid.org/0009-0007-8248-6663
Feifan Yang, https://orcid.org/0009-0000-3192-7747
Yingying Tang, https://orcid.org/0009-0000-2221-8551

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