

Research on the Construction of Japanese Interactive Learning Platform based on Internet of Things Technology

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Abstract:

In order to improve the effect of Japanese teaching, this paper analyzes the interactive process of Japanese teaching by combining the Internet of Things technology and the identification of student characteristics in online classrooms. Starting from the kinematics model of the human body standing up in the interactive teaching process, this paper derives the inverse kinematics parameters of the aided standing mechanism of the student body model, and analyzes the motion speed function of each mechanism. Moreover, this paper adopts the Lagrangian method to study the dynamics of standing up with the assistance of the assisting mechanism, and calculates the provided assisting force and torque under the assumed initial conditions. In addition, this paper builds a Japanese interactive learning platform based on Internet of Things technology. It can be seen from the experimental results that the interactive learning platform for moral education based on the Internet of Things technology proposed in this paper has a good effect on language teaching.

Keywords: Internet of things; Japanese; interactive; learning platform

1 INTRODUCTION

The functional communication method stands out from many language teaching theories because of its emphasis on functional teaching and the selection of various teaching methods. It has become an effective means of contemporary language teaching. The functional communication method draws on the strengths of others, integrates the advantages of linguistics and psychology, and forms a brand-new language teaching model. It not only enables students to experience the charm of language in the process of language learning, but also enhances their enthusiasm for learning, and also makes language teaching more lively and interesting, and the teaching effect is more significant [1].

The ultimate goal of learning a language is to be able to use it in real life. However, according to the current situation of Japanese teaching in colleges and universities in China, most colleges and universities still use the traditional language teaching mode. As the center of teaching, teachers blindly impart knowledge to students, making students in a passive position in Japanese teaching. In addition, teachers attach too much importance to basic knowledge such as words and grammar in Japanese teaching. However, the neglect of students' Japanese application and communication ability has led to the loss of the original Japanese content of the Japanese knowledge students have learned. On the surface, students have a solid grasp of Japanese teaching content, but they will still be hard pressed in practical application [2].

No reform can be divorced from reality, and so can the functional communicative reform of Japanese teaching in colleges and universities. Although the functional communicative approach is scientific and advanced, it can indeed promote the development of Japanese teaching in colleges and universities in China. However, when applying the functional communicative approach, we should still consider the current situation of Japanese teaching in colleges and universities in China: on the one hand, we should consider the current situation of Japanese teaching and the extent to which the functional communicative approach should be applied, Whether the original teaching mode should be changed comprehensively or gradually is related to the effect of the practical application of the functional communicative approach; On the other hand, we should also consider what kind of functional communicative teaching methods can be supported by the current Japanese teaching facilities [3].

The key to the functional communicative approach is to give full play to the students' dominant position in Japanese teaching, so that students can really be interested in Japanese and take the initiative to learn Japanese. This is the biggest advantage of the functional communicative approach compared with the traditional Japanese teaching model. In addition, the functional communicative approach also requires Japanese teachers to consider the needs of students, rather than what students should learn. Only by understanding the needs of students can they formulate a teaching plan that is truly suitable for and beneficial to students. Moreover, in the process of students' learning Japanese, teachers should not participate and interfere too much, and should try to maximize the students' initiative and enthusiasm in learning Japanese [4].

The lack of practicality is the biggest problem facing Japanese teaching in colleges and universities in China, and the functional communicative approach can just solve this problem. Functionality is the core of the functional communicative approach. In Japanese teaching in colleges and universities, we should replace the original rigid and dead knowledge with living knowledge with strong functionality, and add fresh and flexible knowledge in Japanese teaching to replace the original teaching method that is completely dominated by textbooks. Only in this way can we overcome the disadvantages of backwardness of textbook knowledge and let students really learn the knowledge that conforms to the trend of the times and is real and useful. It is no longer a "scholar" who can only talk on paper. Japanese teaching reform should focus on functionalization, change the current situation of Japanese teaching in Chinese universities, and truly achieve efficient and practical teaching [5].

Behavior will be greatly affected by ideas. The effect of Japanese teaching mode in Chinese universities is not good. In the final analysis, teachers' teaching concepts are backward. To change the traditional Japanese teaching mode, the most critical point is to change the traditional teaching concept and learn the new teaching idea of functional communication method. On the one hand, it is also the most important point to change the traditional Japanese teaching concept. Only through innovation can we make innovations. This requires Japanese educators in colleges and universities to recognize the drawbacks of the traditional Japanese teaching model and actively change the Japanese teaching method [6]; On the other hand, to apply new Japanese teaching concepts, such as the functional communicative approach, requires the state to vigorously promote the functional communicative approach. Only when Japanese educators in local colleges and universities realize the advantages of the functional communicative approach, can the practical application of the functional communicative approach in Japanese teaching in Chinese colleges and universities be truly implemented [7].

In the traditional Japanese teaching in colleges and universities, teachers explain knowledge and students absorb it passively is the most important teaching method. The functional communication principle requires that in the Japanese teaching in colleges and universities, a variety of teaching methods should be adopted so that students can learn knowledge in a variety of classroom forms. For example, in the teaching method of scenario simulation, teachers can ask students to play their subjective initiative and arrange their own situations to enable students to learn new knowledge in a happy atmosphere [8]. Students will have a more solid grasp of knowledge and be more comfortable in using it in real life. In addition, there are a variety of teaching methods for teachers to choose, such as group cooperation and student lectures. In a word, college teachers should take the initiative to make innovations in Japanese teaching methods based on the principle that students dominate the classroom and teaching is beneficial to students [9].

The pace of the times has been moving forward, and Japanese teaching in colleges and universities should also make corresponding changes with the development and changes of the times. As time goes on, the original Japanese teaching content is no longer suitable for the current social needs, which requires Japanese educators in the state and grass-roots colleges and universities to reform the Japanese teaching content in a timely manner. Based on this, the state should invest more funds in Japanese teaching in colleges and universities, formulate new teaching objectives, teaching contents and textbooks on time, and fully support the development and progress of Japanese in colleges and universities [10]; Japanese educators in grass-roots colleges and universities should pay attention to the trends of Japanese teaching at home and abroad, and timely add and modify learning content according to the new situation to ensure that students can access the latest knowledge. Only when students learn the latest knowledge can they occupy a favorable position in the rapidly changing world trend and not fall behind the times [11].

Thanks to the development of network information technology and big data, the additive effect of science and technology on education has been gradually explored, and the cloud classroom teaching model has emerged as the times require. "Cloud Classroom" is a teaching platform based on cloud computing technology. Users can easily realize real-time interaction between instructors and learners and share various learning data resources synchronously through the client interface of the platform [12]. Cloud teaching can transform the teaching mode with the lecturer as the core into the teaching mode with the learner as the core, which can mobilize the initiative of learners to a greater extent, and can fully reflect the autonomy, enthusiasm and creativity of learners as the main body of the learning process, so as to improve the learning effect. As the organizer of the learning process, the lecturer can also fully grasp the learning progress and needs of learners by using modern cloud teaching tools to optimize the teaching plan and maximize the teaching effect [13].

Situational teaching of Japanese can also be expressed by means of drama and stories, so that students can learn more about the rich culture and connotation behind the language of Japanese, and cultivate their ability to think in Japanese [14]. Teachers can carefully design and arrange the words and sentences learned in the textbook into a textbook play based on classic or familiar

drama performances and story fragments, and guide students to freely choose drama roles according to their own personality and characteristics. Let students ponder the context of the lines in continuous rehearsal and performance, play their imagination and creativity to make reasonable adaptation, learn Japanese efficiently and use Japanese in the textbook scenario [15].

In the teaching of cultivating Japanese communicative competence, situational teaching method plays an important role. Situational teaching can create a happy and relaxed language environment. Based on this language atmosphere and language environment, students can maximize their enthusiasm, so that they can participate in teaching activities with quick thinking, high interest and happy mood, thus improving the teaching quality [16]. As the leader and organizer of teaching activities, teachers create life related scenes based on teaching resources to enable students to enhance their Japanese learning ability in a strong Japanese learning atmosphere [17].

This paper analyzes the interactive process of Japanese teaching by combining the Internet of Things technology and online classroom student feature recognition to improve the practical effect of the Japanese teaching platform.

2 ANALYSIS OF HUMAN-MACHINE MODEL OF INTELLIGENT CLASSROOM INTERACTION WITH STANDING UP

2.1 Analysis of the human kinematics model in the process of standing up

In order to facilitate the analysis and interpretation of the motion of the joints of the lower limbs of the human body, it is necessary to briefly introduce the benchmark terms prescribed by anthropometrics. As shown in Figure 1, the three reference axes of anthropometry include sagittal, frontal, and vertical axes, and reference planes positioned through the three reference axes—sagittal, coronal, and horizontal.

Sagittal axis: it is located in the anterior-posterior direction of the human body, perpendicular to the frontal and vertical axes;

Frontal axis: it is located in the left-right direction of the human body, perpendicular to the sagittal and vertical axes;

Vertical axis: it is located in the up-down direction of the human body, perpendicular to the sagittal and frontal axes;

Sagittal plane: it passes through the sagittal axis and vertical axis of the human body, and is perpendicular to the frontal axis, and cuts the human body into a longitudinal section of left and right parts, also called the median plane;

Frontal plane: it passes through the vertical axis of the human body and the frontal axis, and is perpendicular to the sagittal axis, and cuts the human body into a longitudinal section of the front and rear parts, also known as the coronal plane;

Horizontal plane: It passes through the sagittal axis and frontal axis of the human body, and is perpendicular to the vertical axis, cutting the human body into a transverse plane of the upper and lower parts.

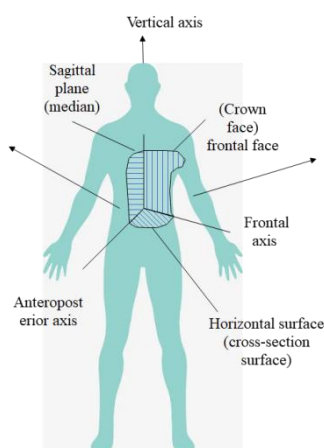


Figure 1 Basic plane and basic axis of the human body

Since the human body has many degrees of freedom, it is difficult to establish a model that includes all the degrees of freedom of the human body's standing up process. Considering the left-right symmetry of the human body about the sagittal plane, it is assumed that the human body is only composed of the upper body (including the head, torso, and upper limbs), thighs, and calves, and each part can be regarded as a rigid body, and the mass is located at the center of mass. Then, a simplified three-degree-of-freedom model can be established in the sagittal plane during the standing process of the human body, as

shown in Figure 2. Since the position of the foot does not change during the standing up process, it can be set as the origin of the coordinates, and the sagittal axis and vertical axis are set as the x and z axis directions respectively.

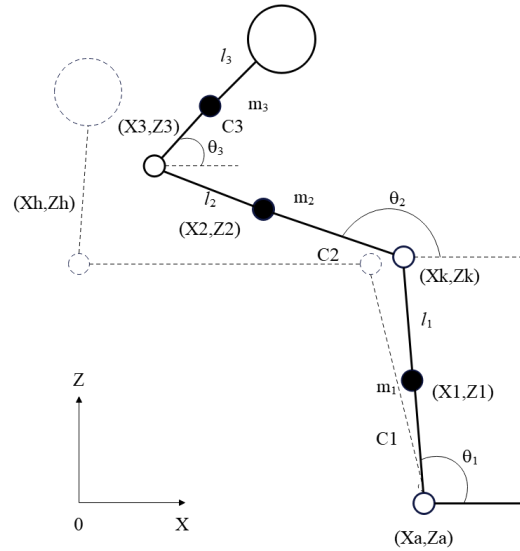


Figure 2 Mathematical model of the human body standing up

The position coordinates of the ankle joint, knee joint and hip joint are (x_a, z_a) , (x_k, z_k) , (x_h, z_h) , the angles between the three joints and the x-axis are respectively θ_1 , θ_2 , θ_3 , and the length and mass of the calf, thigh and upper body are l_1 , l_2 , l_3 , m_1, m_2, m_3 . The coordinates of the center of mass of the calf, thigh, and torso are (x_1, z_1) , (x_2, z_2) , and (x_3, z_3) , respectively, and the distances from the center of mass of these three parts to the next joint are c_1 , c_2 , and c_3 . From the geometric relationship, we can get:

$$\begin{cases} x_h = x_a + l_1 \cos \theta_1 + l_2 \cos \theta_2 \\ z_h = z_a + l_1 \sin \theta_1 + l_2 \sin \theta_2 \end{cases} \quad (1)$$

By dividing both sides of the above equation by l_2 , and setting $a = \frac{l_1}{l_2}$, $b = \frac{(z_h - z_a)}{l_2}$, $c = \frac{(x_h - x_a)}{l_2}$, we can get:

$$\begin{cases} \cos \theta_2 = c - a \cos \theta_1 \\ \sin \theta_2 = b - a \sin \theta_1 \end{cases} \quad (2)$$

After squaring the two equations in equation (2), we can get:

$$\theta_1 = \arcsin\left(\frac{a^2 + b^2 + c^2 - 1}{2a\sqrt{c^2 + b^2}}\right) - \arctan \frac{c}{b} \quad (3)$$

We set $d = \frac{l_1}{l_2}$, $e = \frac{(z_h - z_a)}{l_1}$, $f = \frac{(x_h - x_a)}{l_1}$, and in the same way, we can get:

$$\theta_2 = \arcsin\left(\frac{d^2 + e^2 + f^2 - 1}{2d\sqrt{e^2 + f^2}}\right) - \arctan \frac{f}{e} \quad (4)$$

For the solution of θ_3 , according to the literature, we can get:

$$\theta_3 = \cos^{-1} \left\{ \frac{1}{m_3 c_3} [(m_1 + m_2 + m_3)x_{ref} - (m_1 c_1 + m_2 l_1 + m_3 l_1) \cos \theta_1] \right\} \quad (5)$$

Among them, x_{ref} represents the abscissa of the action point of the zero moment (resultant force) on the sole of the foot, and the value range is 30-50mm.

Since the action point of the auxiliary standing mechanism is about the center of mass of the human thigh, it can be obtained from the above analysis:

$$\begin{cases} x_2 = l_1 \cos \theta_1 + c_2 \cos \theta_2 \\ z_2 = l_1 \sin \theta_1 + c_2 \sin \theta_2 \end{cases} \quad (6)$$

To ensure that the auxiliary standing mechanism can help the human body stand up naturally, it is first necessary to rotate the

joint through an angle θ equal to the knee joint rotation angle θ_2 of the human body, and the rotating mechanism and the lifting mechanism are connected in series, so there are:

$$z_2 = 2l_1 P \theta_2 \quad (7)$$

Among them, P is the lead of the screw drive, and l_1 is the reduction ratio of the rotating mechanism.

When it is substituted into the above formula, the change θ_1' of the ankle joint angle due to the action of the rotating mechanism and the lifting mechanism can be obtained.

$$\theta_1 = \arcsin\left(\frac{2l_1 P \theta_2 - c_2 \sin \theta_2}{l_1}\right) \quad (8)$$

The classroom interaction driving radius is r , so that the required interaction horizontal movement distance s and the classroom interaction turning angle φ_1 can be obtained.

$$s = x - x' = l_1 \cos \theta_1 - l_1 \cos\left(\arcsin\left(\frac{2P l_1 \theta_2 - c_2 \sin \theta_2}{l_1}\right)\right) \quad (9)$$

$$\varphi_1 = \frac{s}{r} \quad (10)$$

The motion angle function of the three joints of the lower limb is calculated. Here, the rotation angle of the ankle joint and the knee joint is set as:

$$\theta_1 = a_1 + b_1(1 - \cos(c_1 t)) \quad (11)$$

$$\theta_2 = a_2 + b_2(1 - \cos(c_2 t)) \quad (12)$$

By taking formulas (11) and (12) into formulas (9) and (10) and derivation, the rotational angular velocity ω_1 of the classroom interaction motor and the rotational angular velocity ω_2 of the stand-up motor can be obtained.

$$\omega_1 = \varphi_1 = \frac{b_1 l_1}{r} \sin(ct) \sin[b_1(1 - \cos(ct)) + a_1] + \frac{2P l_1 b_2 \sin(ct) - c b_2 \cos(ct) \sin[b_2(1 - \cos(ct)) + a_2]}{\sqrt{l_1^2 - [2P l_1 b_2 \sin(ct) - c b_2 \cos(ct) \sin[b_2(1 - \cos(ct)) + a_2]]^2}} \quad (13)$$

$$\omega_2 = l_1 l_2 \theta_2 = l_1 l_2 b_2 \sin(c_2 t) \quad (13)$$

The joint angle function obtained from the above formula can draw the variation curve of the motor angular velocity with time in Matlab, as shown in Figure 3:

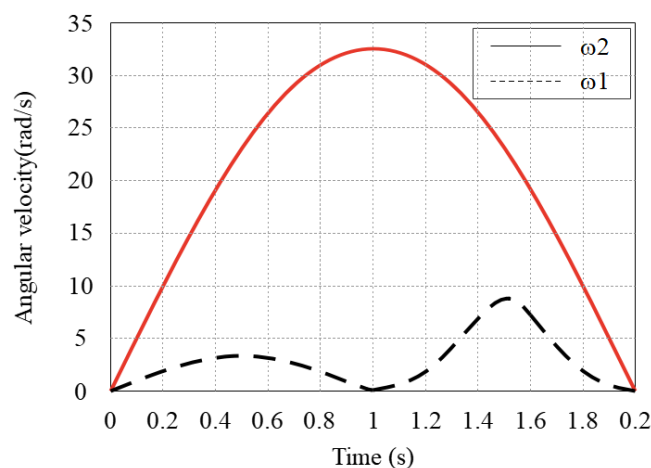


Figure 3 Motor speed curve

Among them, ω_1 is the angular speed of the classroom interaction motor, and ω_2 is the angular speed of the standing motor. It can be seen that the speed of the classroom interaction motor has two peaks in the horizontal direction, the maximum angular velocity is about 8rad/s, and the horizontal speed of the electric classroom interaction decreases to 0 at 1s. The motor of the standing mechanism first accelerates and then decelerates, and the maximum angular velocity is about 32rad/s until it reaches

the standing balance position.

2.2 Dynamic analysis of standing up process

The methods of dynamic modeling and analysis mainly include dynamic static analysis method and Lagrangian method. The dynamic static analysis method is based on the motion analysis, considering the inertia force or inertia moment generated by the acceleration, so as to solve the balance force or balance moment that needs to be added to the mechanism. This method requires that the number of equations is not less than the number of unknowns. Lagrange's law is to analyze the organization as a whole, and does not need to consider the forces within the organization. Since there are many interaction forces and moments between the joints in the process of standing up, and most of them are unknown quantities, in order to simplify the analysis process, the Lagrangian method is chosen to analyze the dynamics problem. Mathematical model of the human body standing up is shown in figure 4.

The coordinates of the center of mass of the calf, thigh and torso are (x_1, z_1) , (x_2, z_2) , (x_3, z_3) , respectively, and the distances of the center of mass of these three parts from the next joint are c_1 , c_2 , c_3 , and the coordinate equation of the center of mass can be obtained:

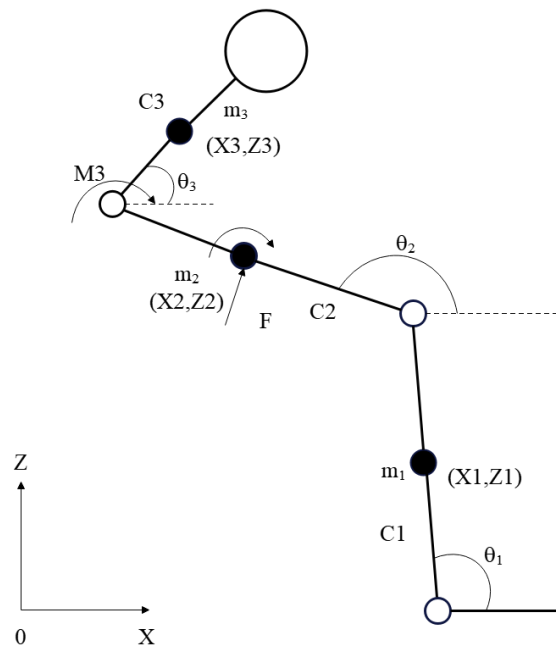


Figure 4 Mathematical model of the human body standing up

$$\begin{cases} x_1 = c_1 \cos \theta_1 \\ z_1 = c_1 \sin \theta_1 \\ x_2 = c_2 \cos \theta_2 + l_1 \cos \theta_1 \\ z_2 = c_2 \sin \theta_2 + l_1 \sin \theta_1 \\ x_3 = c_3 \cos \theta_3 + l_2 \cos \theta_2 + l_1 \cos \theta_1 \\ z_3 = c_3 \sin \theta_3 + l_2 \sin \theta_2 + l_1 \sin \theta_1 \end{cases} \quad (15)$$

Taking the derivation of the above formula, we can get the component velocity of each centroid in the x and z axes.

$$\begin{cases} v_{x_1} = \dot{x}_1 = -c_1 \dot{\theta}_1 \sin \theta_1 \\ v_{z_1} = \dot{z}_1 = c_1 \dot{\theta}_1 \cos \theta_1 \\ v_{x_2} = \dot{x}_2 = -c_2 \dot{\theta}_2 \sin \theta_2 - l_1 \dot{\theta}_1 \sin \theta_1 \\ v_{z_2} = \dot{z}_2 = c_2 \dot{\theta}_2 \cos \theta_2 + l_1 \dot{\theta}_1 \cos \theta_1 \\ v_{x_3} = \dot{x}_3 = -c_3 \dot{\theta}_3 \sin \theta_3 - l_2 \dot{\theta}_2 \sin \theta_2 - l_1 \dot{\theta}_1 \sin \theta_1 \\ v_{z_3} = \dot{z}_3 = c_3 \dot{\theta}_3 \cos \theta_3 + l_2 \dot{\theta}_2 \cos \theta_2 + l_1 \dot{\theta}_1 \cos \theta_1 \end{cases} \quad (16)$$

The velocity of each centroid is:

$$\begin{cases} v_1^2 = v_{x_1}^2 + v_{z_1}^2 \\ v_2^2 = v_{x_2}^2 + v_{z_2}^2 \\ v_3^2 = v_{x_3}^2 + v_{z_3}^2 \end{cases} \quad (17)$$

The total kinetic energy of the system consists of the moving kinetic energy and the rotational kinetic energy of the three parts of the human body.

$$T = \left(\frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2 + \frac{1}{2} m_3 v_3^2 \right) + \left(\frac{1}{2} I_{x_1} \theta_1^2 + \frac{1}{2} I_{x_2} \theta_2^2 + \frac{1}{2} I_{x_3} \theta_3^2 \right) \quad (18)$$

The total potential energy of the system is composed of the gravitational potential energy of the three parts of the human body:

$$U = U_1 + U_2 + U_3 = m_1 g c_1 \sin \theta_1 + m_2 g (c_2 \sin \theta_2 + l_1 \sin \theta_1) + m_3 g (c_3 \sin \theta_3 + l_2 \sin \theta_2 + l_1 \sin \theta_1) \quad (19)$$

The Lagrange equation can be expressed as follows:

$$\frac{d}{dt} \left(\frac{\delta L}{\delta \dot{x}} \right) - \frac{\delta L}{\delta x} = Q \quad (20)$$

Among them, $L = T - U$.

For paraplegic patients, the torque generated at the ankle and knee joints is negligible. The moment generated at the hip joint is M_3 , and the support force and moment provided by the assistant to stand up classroom interaction are F and M , respectively, which can be obtained by bringing them into the Lagrangian equation respectively.

$$M_3 = m_3 c_3 g \cos \theta_3 - m_3 c_3 l_1 \theta_1^2 [\sin(\theta_3) - \sin(\theta_1)] - m_3 c_3 l_1 \theta_2^2 [\sin(\theta_3) - \sin(\theta_1)] + m_3 c_3 l_1 \theta_1 [\cos(\theta_3) - \cos(\theta_1)] + m_3 c_3 l_1 \theta_2 [\cos(\theta_3) - \cos(\theta_1)] + (m_3 c_3^2 + I_{x_3}) \theta_3 \quad (21)$$

$$M = m_1 c_1 g \cos \theta_1 + (m_2 c_2 + m_1 l_1) g \cos \theta_2 + m_2 c_2 l_1 \theta_1^2 [\sin(\theta_2) - \sin(\theta_1)] - m_3 c_3 l_1 \theta_2^2 [\sin(\theta_3) - \sin(\theta_1)] + m_2 c_2 c_1 \dot{\theta}_1 [\cos(\theta_2) - \cos(\theta_1)] + m_3 c_3 c_1 \dot{\theta}_2 [\cos(\theta_3) - \cos(\theta_2)] + (m_1 c_1 + m_2 c_2^2 + I_{x_1} + I_{x_2}) \quad (22)$$

$$F = (m_1 + m_2 + m_3) g \sin \theta_2 + m_1 c_1 \ddot{\theta}_1 \cos \theta_1 + (m_1 l_1 \ddot{\theta}_1 + m_2 c_2 \ddot{\theta}_2) \sin \theta_2 + (m_1 l_1 \ddot{\theta}_1 + m_2 l_2 \ddot{\theta}_2 + m_3 c_3 \ddot{\theta}_3) \cos \theta_3 \quad (23)$$

In order to analyze and calculate the above model, it is necessary to know various parameters of the human body (the mass, center of mass and moment of inertia of the three parts of the torso, thigh and calf). In this paper, the CT method is used to calculate and determine the above human parameters. The CT method takes the height and weight of the human body as independent variables, uses the CT machine to measure the mass of each body segment, the position of the center of mass and the moment of inertia and other data as the dependent variables, and uses quadratic regression to obtain various parameters of the human body.

The mass centroid regression equation is:

$$Y = B_0 + B_1 x_1 + B_2 x_2 \quad (24)$$

Among them, x_i is the mass or weight and the unit is kg, and B_i is the centroid position and the unit is mm.

The moment of inertia regression equation is:

$$J_i = B_0 + B_1 x_1 + B_2 x_2 \quad (25)$$

Among them, J_x , J_y , J_z represent the moment of inertia around the coronal axis, sagittal axis, and vertical axis, respectively, and the unit is kg*mm².

According to the above data, the images of equations (22) and (23) are made in Matlab as follows (figure 5 and figure 6):

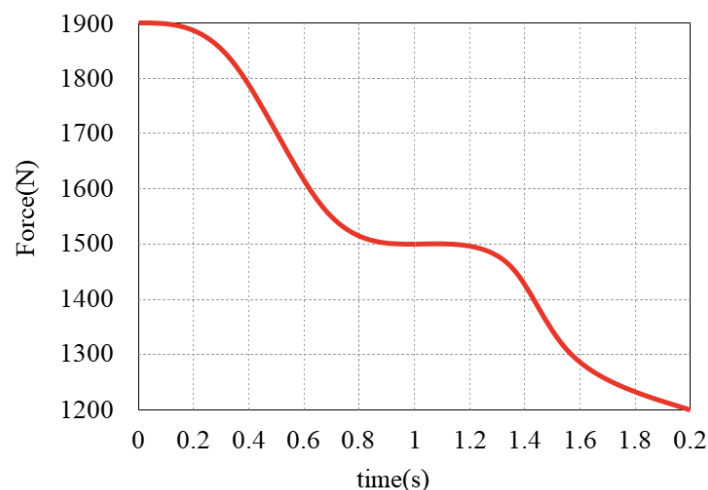


Figure 5 Change curve of auxiliary force F

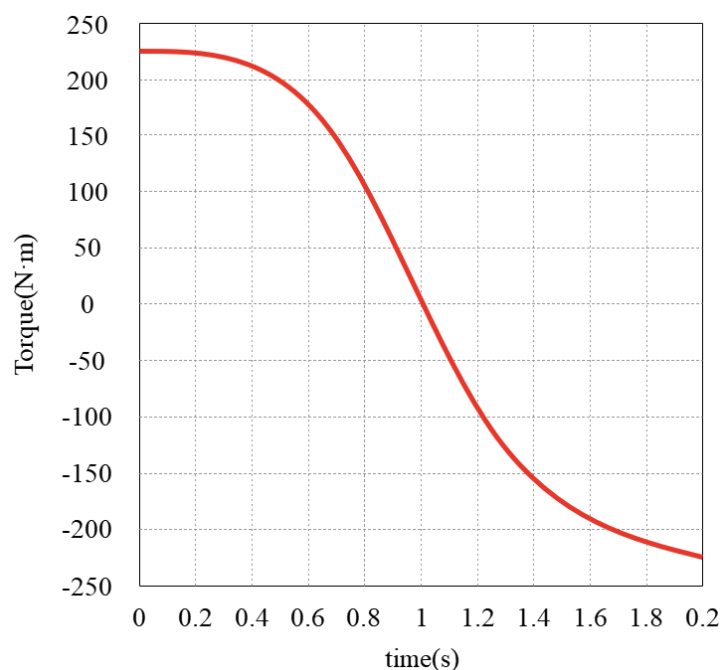


Figure 6 Change curve of assist torque M

3 RESEARCH ON THE CONSTRUCTION OF JAPANESE INTERACTIVE LEARNING PLATFORM BASED ON INTERNET OF THINGS TECHNOLOGY

This paper investigates and analyzes the curriculum settings of the Japanese major training program, draws on the reform experience of various schools, combined with the school's guiding ideology of talent training of "thick foundation, wide caliber, emphasis on practice, and innovation", and constructs a "dynamic multi-curriculum system" that reflects school-based characteristics (Figure 7).

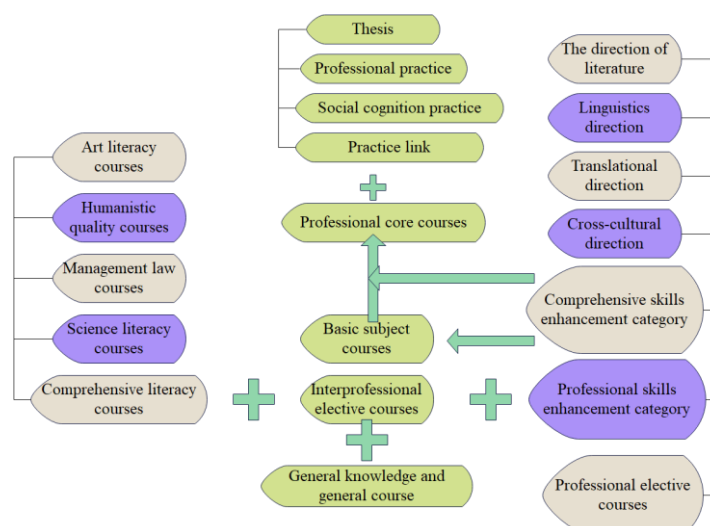


Figure 7 Dynamic multi-curriculum system for Japanese majors

Teaching activities are an important part of smart classrooms. Therefore, the principles of designing Japanese classroom teaching activities should be further clarified. It is necessary to adhere to the principle of subjectivity. The most important thing is to focus on improving a more targeted, characteristic and effective learning environment for students, firmly establish the concept of "people-oriented", and adhere to "learner-centered". Moreover, efforts need to be made to achieve new and greater breakthroughs in developing students' self-confidence and motivation. The main reason for insisting on high efficiency is to vigorously promote the openness and generative nature of Japanese classroom teaching activities from the goals, requirements and tasks of Japanese classroom teaching activities. In addition to using smart classrooms to carry out specific teaching activities, it is also necessary to build a more scientific feedback mechanism to obtain feedback from students in a timely manner. At the same time, it is necessary to understand and master the problems existing in the learning process and the results achieved by students. For example, big data technology can be used for analysis, so that teaching activities can be more targeted.

In order to use the smart classroom to more effectively promote the development of Japanese classroom teaching activities, it is crucial to make arrangements for the elements of Japanese classroom teaching activities, and strive to develop Japanese classroom teaching activities in depth. In addition to strengthening the "three elements" of students, teachers and learning, it is also necessary to incorporate teaching feedback, teaching environment, teaching methods, teaching content, teaching objectives, and teaching effectiveness into the elements of Japanese classroom teaching activities. In order to arrange the elements of Japanese classroom teaching activities, we must pay more attention to improving the comprehensive quality of teachers. In particular, it is necessary to effectively increase the systematic training of Japanese teachers, further improve the comprehensive quality of Japanese teachers, and enable them to achieve breakthroughs in the use of network, information and even intelligent means to carry out Japanese classroom teaching activities. In addition, we should focus on cultivating Japanese teachers' information literacy, network thinking, and data awareness, and actively explore effective forms of online ideological and political education and training. For example, Japanese teachers should be guided to effectively combine network technology, information technology, and big data technology with teaching. In particular, efforts should be made to promote the application of information-based education, "flipped courses" and "micro-courses".

For the use of smarter classrooms to promote the reform and innovation of Japanese classroom teaching activities, it is crucial to work hard to improve effectiveness. In order to improve the effectiveness, we must build a more scientific, systematic and characteristic Japanese classroom teaching process system. In the specific implementation process, the construction of the "three processes" system before class, during class and after class should be the top priority, so that the pre-class preview, in-class teaching and after-class remediation are closely integrated and systematic. On this basis, we should actively explore a more characteristic Japanese classroom teaching process system. For example, smart classrooms can be used to carry out "situational teaching", "collaborative generative teaching", "problem feedback teaching" and "cooperative inquiry teaching", and the corresponding processes can be refined. In particular, it is necessary to effectively combine the pre-class process, the in-class process, the post-class process, the teacher's T-work process, the student's learning process, etc., so as to promote the Japanese classroom teaching activity process system to play a more effective function and role. In the process of constructing the process system of Japanese classroom teaching activities, it is also necessary to continuously optimize the process,

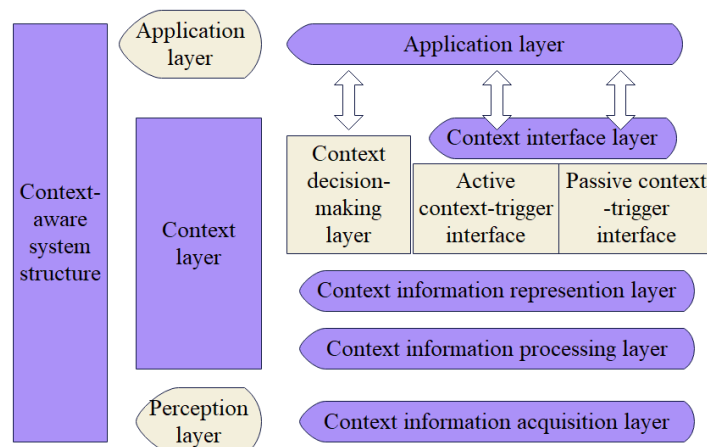
especially to continuously improve the problems that arise during the implementation of Japanese classroom teaching activities.

In the process of designing and implementing Japanese classroom teaching activities using smart classrooms, the construction of teaching evaluation mechanism is very important. It is a process of quantitatively analyzing the learning data and information generated in the teaching process, and making value judgments on the learners' learning behavior and teaching effect. Since the smart classroom involves all aspects, in the process of carrying out the evaluation of Japanese classroom teaching activities, in-depth research and exploration must be carried out to make it more suitable for the needs of the smart classroom. It is necessary to vigorously promote the construction of a diversified mechanism for evaluation subjects. In addition to teacher evaluation and student self-evaluation, evaluations must be carried out through many subjects such as expert evaluation and student mutual evaluation. In order to promote the diversified construction of evaluation content in the Commonwealth of Independent States, in addition to taking students' learning effect as an important evaluation content, it is also necessary to incorporate students' online time, the number of interactive exchanges, the number of accessed resources, learning attitudes, answering questions, unit tests, etc. into the evaluation system from the actual situation of the smart classroom. At the same time, scientific summary and analysis should be carried out, and targeted solutions should be formulated for the problems existing in the students.

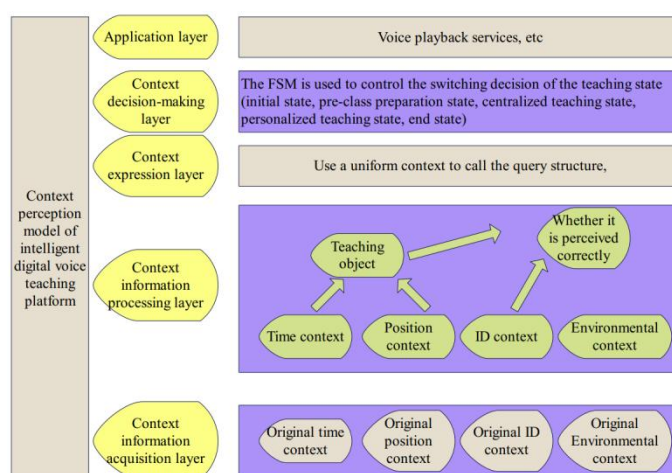
To sum up, with the rapid development of information technology, the construction of smart classrooms in colleges and universities has continuously achieved new results. How to use smarter classrooms more effectively to carry out Japanese classroom teaching activities is a major issue that colleges and teachers must attach great importance to. This requires that in the specific implementation process, we must attach great importance to the innovation of application concepts and application models. In particular, it is necessary to focus on providing teachers with an effective teaching environment, and enable students to learn Japanese knowledge in an easy-to-use, beautiful, convenient and intelligent classroom environment, and vigorously promote the design and implementation model innovation of Japanese classroom teaching activities in the smart classroom environment. In the specific implementation process, we should adhere to "people-oriented", focus on more effectively improving the effectiveness of Japanese classroom teaching, and use the powerful functions of smarter classrooms. The focus is on making breakthroughs in clarifying the design principles of Japanese classroom teaching activities, making arrangements for the elements of Japanese classroom teaching activities, constructing a process system for Japanese classroom teaching activities, and improving the evaluation mechanism for Japanese classroom teaching activities. Moreover, it is necessary to promote the design and implementation of Japanese classroom teaching activities to achieve greater results.

The context information collection layer is responsible for collecting raw context data from sensors. This original contextual information provides the underlying preliminary information, originating from any time and location, and acquired through multiple different sensors. The limited accuracy of sensors often creates potential conflicts and uncertainties in data, all of which pose problems for context perception and processing. Therefore, it is necessary to refine the context of these original information, reduce data redundancy for high-level applications, and separate context awareness from actual use.

The contextual data processing layer is responsible for filtering, interpreting, fusing and reasoning on the collected raw information. Filtering is to screen out the information that the system does not need to eliminate data redundancy; interpretation is to translate the original information into the format we want. However, some context information is collected by multiple devices, and there is inconsistency in the data. Fusion is to obtain the required context information to the greatest extent, and reasoning is to infer the high-level context required in high-level applications based on the original information. Figure 8(a) is the conceptual model of the context-aware system, and Figure 8(b) is the context-aware model of the intelligent digital speech teaching platform.



(a) Conceptual model of context-aware systems



(b) Context-aware model of intelligent digital speech teaching platform

Figure 8 Intelligent Japanese interactive learning platform

The effectiveness of the Japanese interactive learning platform based on the Internet of Things technology proposed in this paper is verified, and the effectiveness of the model in this paper is calculated. Moreover, combined with the simulation experiment teaching, this paper obtains the experimental results shown in Figure 9.

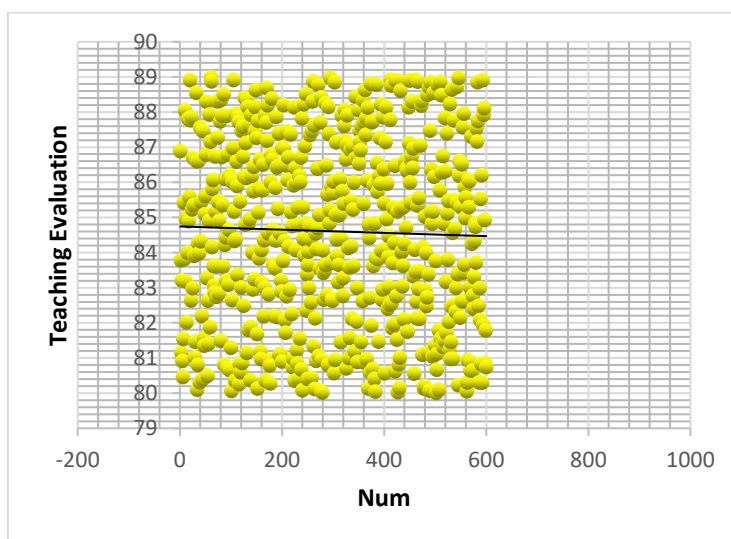


Figure 9 Verification of the effect of the Japanese interactive learning platform based on the Internet of Things technology

From the experimental results in Figure 9, it can be seen that the Japanese interactive learning platform based on the Internet of Things technology proposed in this paper is based on a good language teaching effect.

4 CONCLUSION

With the continuous strengthening of the trend of economic globalization, foreign communication is playing an increasingly important role in various fields of the country. As one of the major languages in the world, Japanese has become a popular major in language teaching in colleges and universities in my country. Therefore, the quality of Japanese teaching in colleges and universities needs to be improved urgently. The functional communication method has attracted much attention because of its uniqueness. Japanese educators in colleges and universities should actively seek effective methods of using the functional communication method. The functional communication method takes linguistics as the core, and draws nourishment from psychology. It believes that human psychological factors will have a significant impact on the effect of language learning, and the subjective purpose of language learning will directly affect the degree of mastery of knowledge. This paper combines the Internet of Things technology and online classroom student feature recognition to perform an analysis of the interaction process of Japanese teaching. From the experimental results, it can be seen that the Japanese interactive learning platform based on the Internet of Things technology proposed in this paper is based on good language teaching effect.

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