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Exploring the Use of Online Immersive Game for Monitoring the Psychological Anxiety State of English Learners

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Abstract. In order to improve the real-time monitoring effect of English learners' psychological anxiety, this paper combines modern intelligent technology to conduct intelligent detection of English learners' psychological anxiety. Moreover, this paper constructs an English learner's psychological anxiety state monitoring system through intelligent means to improve the English learner's mental health, and improve the English learning efficiency of the learner through healthy body and mind. In addition, according to the real-time needs of monitoring psychological anxiety in English classrooms, this paper analyzes the selection range and bifurcation of neuron filtering parameters, and obtains the parameters selection principle of neuron filtering model. After constructing the model, this paper verifies the effect of the English learners' psychological anxiety state monitoring system based on modern technology proposed in this paper. Finally, this paper uses simulation experiments to verify the reliability of the intelligent system proposed in this paper, and combines the questionnaire survey to verify that the system has high user satisfaction.

Keywords: English; learning; psychological anxiety; state monitoring
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1 INTRODUCTION

The Internet shows a whole new world to college students with its vast space and rich information resources. Fully stimulate the curiosity and thirst for knowledge of college students On the Internet, college students can quickly find the information resources they need. It can also help them appreciate the knowledge content, news events, masterpieces, film and television information that are not easily accessible in the real environment [12]. These have greatly satisfied the curiosity of college students about the outside world. It stimulates their desire to learn and master network knowledge and application skills, and at the same time, it also stimulates the imagination and creativity of college students [11]. Such as the dissemination of online literary works by college students and the self-employment of college students through network resources are all good examples. However, the cognitive ability of college students is still in a stage of rapid development. The screening and selection process of knowledge is not perfect. Its moral judgment is still at an imperfect level, therefore. For college students who often contact the Internet [5]. Due to the frequent browsing of a large amount of ever-changing information. It is difficult to form proper cognition. Cognitive bias is prone to occur. For example, we often find that some students arbitrarily make evaluation judgments on some events in some forums or post bars. These judgments are often deeply influenced by other speeches on the Internet [2].

In the real environment, college students may face various pressures from society, family, school, teachers and classmates. And this kind of pressure often cannot be released in the real environment, but on the Internet, they can relax and get rid of by chatting with people, posting Weibo, playing online games, watching entertainment movies and so on [7]. When many college students encounter various confusions and psychological problems, they are often reluctant to talk and vent to outsiders. More unwilling or not have the courage to seek the help of a psychiatrist. This attitude is not conducive to the individual's mental health. It is also not conducive to the timely solution of individual psychological problems and in the network environment. The virtuality of the network provides a safer channel for college students to vent their bad emotions [6]. Let them release their negative emotions in time. Obtaining the corresponding psychological support College students can talk about their troubles, confusions and wishes in real time by interacting with netizens, and at the same time, they can also get the maximum understanding, support and help from others, which can relieve their tension and depression to a great extent. Psychology, so that the state of mind can be balanced [3]. Emotions are stabilized. However. The emotional development process of an individual is an important process of individual socialization. It follows certain rules. In the real environment, people will follow corresponding norms for emotion recognition, emotion expression, and emotion control. Once the specification is not followed [8]. Will be subject to pressure from all aspects, such as college students in the real interpersonal communication can not be free to lose their temper. Feel free to generate impulsive emotions. Otherwise, it may be forced to control and converge due to the vision or evaluation of the surrounding people, but in the network environment, the binding force of this environment will be greatly reduced. People's ability to control their emotions will also decline. It is easy to have impulsive emotions, make impulsive remarks, etc. [4]. And for some college students who are addicted to the Internet. It is often more dependent on interpersonal relationships on the Internet. More inclined to seek psychological comfort and emotional satisfaction in the network. They often pin their emotional experience on the network interpersonal interaction. In reality, there is often a lack of corresponding interpersonal interaction and emotional and emotional communication. Then there are distortions of emotional development in real life, such as apathy, lack of empathy, etc. [9].This section describes the methodology for monitoring the psychological anxiety state of English learners using online gaming and immersive multimedia. It discusses the selection and design of gaming elements, the integration of immersive multimedia technologies, and the data collection and analysis methods employed.

The biggest difference between mental health education courses and other basic and professional courses is that mental health education courses focus on students' experience teaching, focusing on students' practice, experience, perception and discovery [1]. There is no fixed teaching content, and it is flexible. Class hours can be added or reduced at any time according to the situation generated in the classroom; there are no rigid regulations and restrictions, so that students can internalize them. Through the subtle influence of the teacher's personality charm, it is necessary to moisten things silently and the collision of the soul, so that students have a sense of identity first, so that students can constantly understand themselves correctly, enhance their ability to regulate themselves, withstand setbacks, and adapt to the environment, and cultivate students' healthy Personality and good personality psychological quality2[10].

2 OBJECTIVES

Teaching environment is the key factor that affects college students' English classroom learning anxiety. In teaching, too loose and too strict teaching environment will affect students' learning anxiety. In English learning in many universities, there is also a situation of learning anxiety in the teaching environment between different majors. English teaching is very relaxed in terms of teaching atmosphere and teaching environment. At this time, many students will feel anxious because they think they cannot learn English knowledge. However, among English majors, the sudden shift from high school English study to in-depth study in university causes students to have a very strong sense of urgency, which also causes study anxiety. This paper uses intelligent means to construct the psychological anxiety state monitoring system of English learners, to improve the psychological health of English learners.

3 METHODOLOGY

This paper combines modern intelligent technology to carry out intelligent detection of English learners' psychological anxiety, and this part mainly carries out the identification algorithm of psychological anxiety parameters.

3.1 Parameter Analysis of Neuron Filter Model

The stability of the system is the premise that the system can work normally. For multivariable systems, especially time-varying systems and nonlinear systems, state space expressions are used to describe them. An important method for analyzing stability is the stability theory proposed by Lyapunov. The selection of system parameters is an essential part of system analysis. The dissipative structure of the system not only leads to the diversification of the system morphology, but also increases the system complexity. When the control parameters of the system change, new steady state solutions, periodic solutions, quasi-periodic solutions or chaotic solutions will branch out.

$$x_1 = x, x_2 = y, \quad X = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}, \dot{X} = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}, A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, B = \begin{bmatrix} w \\ t \end{bmatrix},$$

Among them, B can be regarded as a constant as the external noise of the system and the self-response noise at each time point. Then,

$$\dot{X} = AX + B \tag{1}$$

When the Lyapunov function $V(X) = X^T PX$ is chosen,

$$\dot{V}(X) = -X^T QX \tag{2}$$

In the above formula:

$$Q = -\left(A^T P + PA\right)$$

According to the necessary and sufficient conditions of Lyapunov's determination theorem, we get:

$$\begin{bmatrix} a & c \\ b & d \end{bmatrix} \cdot \begin{bmatrix} p_1 & p_2 \\ p_2 & p_3 \end{bmatrix} + \begin{bmatrix} p_1 & p_2 \\ p_2 & p_3 \end{bmatrix} \cdot \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \tag{3}$$

The above formula is:

$$\begin{bmatrix} 2(ap_1 + cp_2) & ap_2 + bp_1 + cp_3 + dp_2 \\ ap_2 + bp_1 + cp_3 + dp_2 & 2(bp_2 + dp_3) \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \tag{4}$$

By solving the above formula, we get:

$$\begin{aligned} p_1 &= bc - ad - c^2 - d^2 \\ p_2 &= ac + bd \\ p_3 &= bc - ad - a^2 - b^2 \end{aligned} \tag{5}$$

$$P = \begin{bmatrix} bc - ad - c^2 - d^2 & ac + bd \\ ac + bd & bc - ad - a^2 - b^2 \end{bmatrix} \tag{6}$$

According to Lyapunov's second method, if the system is to be stable, P must be positive definite, and the necessary and sufficient conditions for the system to be stable are:

$$\begin{cases} p_1 = bc - ad - c^2 - d^2 > 0 \\ p_1 p_3 - p_2^2 > 0 \\ p_1 = bc - ad - c^2 - d^2 \\ p_2 = ac + bd \\ p_3 = bc - ad - a^2 - b^2 \end{cases} \tag{7}$$

Therefore, according to the Lyapunov stability determination theorem, the value space of a, b, c, and d satisfying formula (7) is the stable working space of the neuron filter model.

3.2 Dynamical System Morphology Analysis and Parameter Selection of Neuron Filter Model

For weak nonlinear vibration systems,

$$\begin{cases} x' = ax + by + w = f_1(x, y) \\ y' = cx + dy + t = f_2(x, y) \end{cases} \tag{8}$$

Since f_1、f_2 is a function without explicit time t, formula (8) is called an autonomous system.

When the velocity $x^{'}=0, y^{'}=0$ in the autonomous dynamic system is zero, the particle is at rest in physics (the coordinates of the particle are x_0 and y_0 at this time). Therefore, the system of equations (8) becomes:

$$\begin{cases} ax+by+w=0 \\ cx+dy+t=0 \end{cases} \tag{9}$$

By solving the above formula, we get:

$$\begin{cases} x_0=\dfrac{bw-td}{bc-ad} \\ y_0=\dfrac{aw-tc}{bc-ad} \end{cases} \tag{10}$$

(x_0, y_0) is the equilibrium point (equilibrium state) or singularity of the neuron filtering model.

Since the equilibrium state in the filter model is equivalent to the singularity (equilibrium point) in the phase plane, the singularity can be regarded as the state that is not disturbed. If a small disturbance $\delta x, \delta y$ is given to the system to make it leave the equilibrium state x_0, y_0, the solution of equation (8) is:

$x=x_0+\delta x, y=y_0+\delta y$

Then, we can get:

$$\begin{bmatrix} \delta x^{'} \\ \delta y^{'} \end{bmatrix}=\begin{bmatrix} \dfrac{\partial f_1}{\partial x} & \dfrac{\partial f_1}{\partial y} \\ \dfrac{\partial f_2}{\partial x} & \dfrac{\partial f_2}{\partial y} \end{bmatrix}_{(x_0,y_0)} \begin{bmatrix} \delta x \\ \delta y \end{bmatrix}$$

The right-hand side of the above formula is the Jacobian matrix of formula (9):

$$J=\begin{bmatrix} \dfrac{\partial f_1}{\partial x} & \dfrac{\partial f_1}{\partial y} \\ \dfrac{\partial f_2}{\partial x} & \dfrac{\partial f_2}{\partial y} \end{bmatrix}=\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

$$|\lambda E-J|=\begin{vmatrix} \dfrac{\partial f_1}{\partial x}-\lambda & \dfrac{\partial f_1}{\partial y} \\ \dfrac{\partial f_2}{\partial x} & \dfrac{\partial f_2}{\partial y}-\lambda \end{vmatrix}=0 \tag{11}$$

According to the determinant operation, the above formula becomes:

$$\lambda^2 - (a+d)\lambda + ad - bc = 0 \tag{12}$$

If we set:

$$T = a + d, D = ad - bc$$

Then, formula (12) becomes:

$$\lambda^2 - T\lambda + D = 0 \tag{13}$$

By solving the above equation, we get:

$$\lambda_{1,2} = \frac{a+d \pm \sqrt{(a+d)^2 - 4(ad-bc)}}{2}$$

The above formula is:

$$\lambda_{1.2} = \frac{T \pm \sqrt{T^2 - 4D}}{2} \tag{14}$$

According to the properties of the characteristic equation root of the neuron filter model obtained in the previous section, the equilibrium state of the neuron filter model as shown in the following table is obtained through discussion:

The distribution of two-dimensional equilibrium points on the reference plane (T, D) is shown in Figure 1.

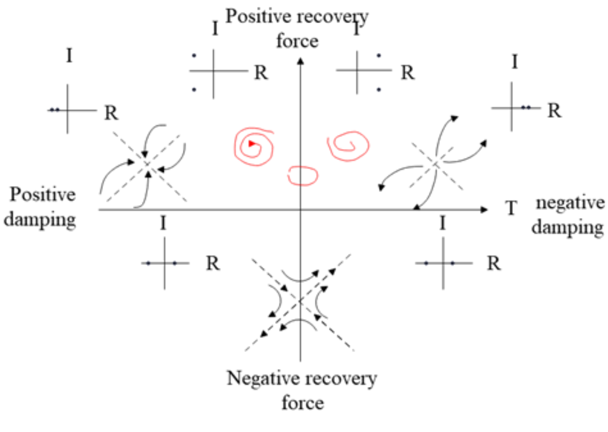


Figure 1: Distribution diagram of balance points of neuron filtering model.

The phase relationship of the equilibrium state of the neuron filter model can be processed and analyzed from the vibration theory, which is also the characteristic equation corresponding to the second-order equation.

$$x'' - Tx' + Dx = 0 \tag{15}$$

From the theory of vibration theory, since the term containing x' in the equation of motion 16 is the damping term and the Dx term is the restoring force term, the above equilibrium states have corresponding physical meanings.

3.3 Selection and Analysis of Parameters of Ecg Signal Filtering Model

The response of neurons to external stimuli mainly includes two aspects: frequency response (the frequency generated by the internal noise of the neuron) and the magnitude of the action potential amplitude generated on this basis. In the neuron filtering model established in the previous chapter, the parameter b is the main control quantity that controls the response range of the model to external frequency stimuli. On the basis of a large number of experiments, this paper preliminarily determines that the value range of b suitable for ECG signal filtering is:

$$b \in (-2.8, -0.15) \cup (0.1, 3.2)$$

Secondly, the ECG signal (body surface measurement value) itself is a very weak signal whose amplitude generally does not exceed 5mV. Moreover, the magnitude of the action potential of the neuron is not only related to the amplitude of the external noise, but also related to the $\text{Na}+$ and $\text{K}+$ confluent potential of the neuron itself and its control parameter d. Among them, the confluent potential of $\text{Na}+$ and $\text{K}+$ is considered as an unchangeable quantity, and the amplitude of the action potential can only be controlled by adjusting the parameter d. Through experiments, this paper determines the value range of the d parameter suitable for ECG signal filtering:

$$d \in (-2.25, -0.23) \cup (0.15, 1.85)$$

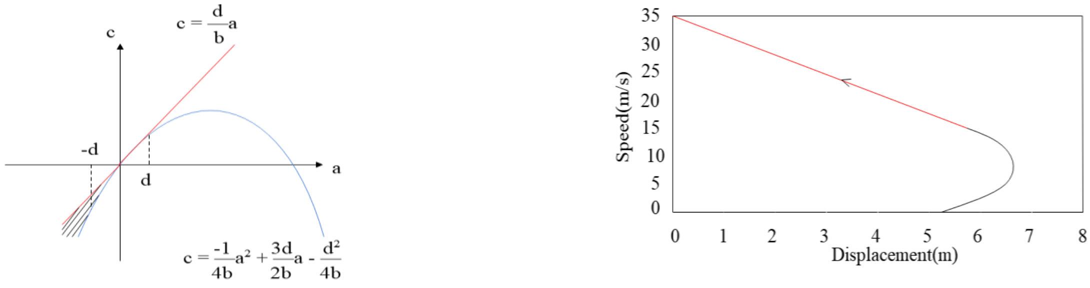
Based on the above analysis, the value space of neuron filtering parameters b and d is:

$$\begin{cases} b \in (-2.8, -0.15) \cup (0.1, 3.2) \\ d \in (-2.25, -0.23) \cup (0.15, 1.85) \end{cases} \tag{16}$$

1) The node stability region and its bifurcation of the neuron filter model

From the discussion in the previous section, it can be seen that a fork-type bifurcation occurs at T=0 when $D > 0, T^2 - 4D > 0$. Within the range of values satisfying formula (17),

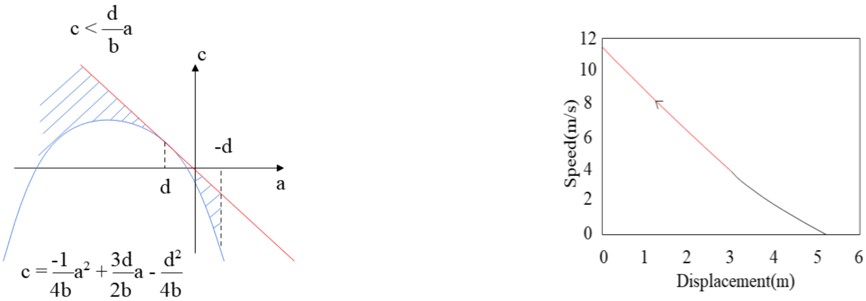
1.When taking b as positive and d as positive: From D>0, we get $c < \frac{d}{b} a$, from $T^2 - 4D > 0$, we get $c > \frac{-1}{4b} a^2 + \frac{3d}{2b} a - \frac{d^2}{4b}$, and from T=0, we get a=-d. Its stability region is shown in Fig. 2a. We take a=1, b=1, c=-3.5, d=-2 in its stability region, and its phase diagram is shown in Figure 2b.



(a) (b)

Figure 2: The stability region of the node and its phase 1: (a)Stability region, (b)Phase.

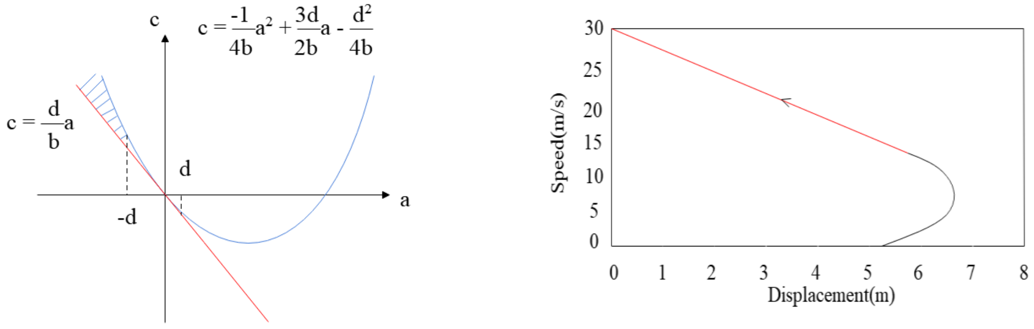
2.When taking b as positive and d as negative: From D>0, we get $c < \frac{d}{b}a$, from $T^2 - 4D > 0$, we get $c > \frac{-1}{4b}a^2 + \frac{3d}{2b}a - \frac{d^2}{4b}$, and from T=0, we get a=-d. Its stability region is shown in Figure 3a. We take a=-1, b=1, c=1, d=-2 in its stable domain, and its phase diagram is shown in Figure 3b.



(a) Stability region (b) Phase

Figure 3: The stability region of the node and its phase 2.

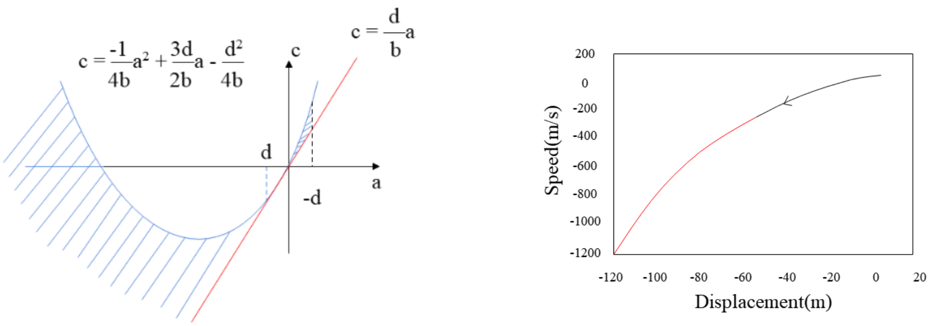
3.When taking b as negative and d as positive: From D>0, we get $c > \frac{d}{b}a$, from $T^2 - 4D > 0$, we get $c < \frac{-1}{4b}a^2 + \frac{3d}{2b}a - \frac{d^2}{4b}$, and from T=0, we get a=-d. Its stable domain is shown in Figure 4a. We take a=1, b=-1, c=3.5, d=-2 in its stable domain, and its phase diagram is shown in Figure 4b.



(a) Stability region (b) Phase

Figure 4: The stability region of the node and its phase 3.

4.When taking b as negative and d as negative: From D>0, we get $c > \frac{d}{b}a$, from $T^2 - 4D > 0$, we get $c < \frac{-1}{4b}a^2 + \frac{3d}{2b}a - \frac{d^2}{4b}$, and from T=0, we get a=-d. Its stable domain is shown in Figure 5a. We take a=1, b=-1, c=1, d=1 in its stable domain, and its phase diagram is shown in Figure 5b.

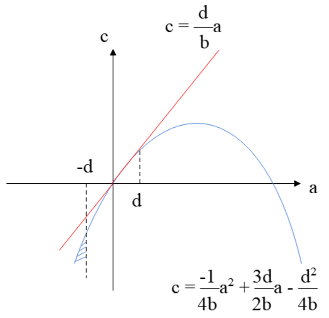


(a) Stability region (b) Phase

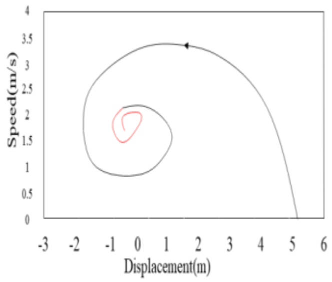
Figure 5: The stability region of the node and its phase 4.

2) Focal Stable Domain and Hough Bifurcation of Neuron Filter Model

It can be seen from the previous discussion that the Hough bifurcation occurs at T = 0 when $D > 0, T^2 - 4D < 0$. Within the range of values satisfying formula (17), 1.When taking b as positive and d as positive: From D>0, we get $c > \frac{d}{b}a$, from $T^2 - 4D > 0$, we get $c < \frac{-1}{4b}a^2 + \frac{3d}{2b}a - \frac{d^2}{4b}$, and from T=0, we get a=-d. Its stability region is shown in Figure 6a.



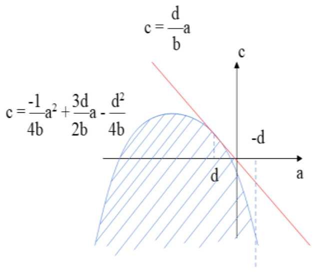
(a) Stability region



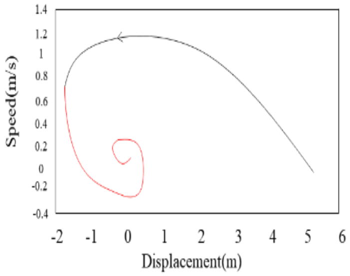
(b) Phase

Figure 6: The stability region of the focal point and its phase 1.

2. When taking b as positive and d as negative: From D>0, we get $c > \frac{d}{b}a$, from $T^2 - 4D > 0$, we get $c < \frac{-1}{4b}a^2 + \frac{3d}{2b}a - \frac{d^2}{4b}$, and from T=0, we get a=-d. Its stable domain is shown in Figure 7a. We take a=-1, b=1, c=-5, d=-1 in its stable domain, and its phase diagram is shown in Figure 7b.



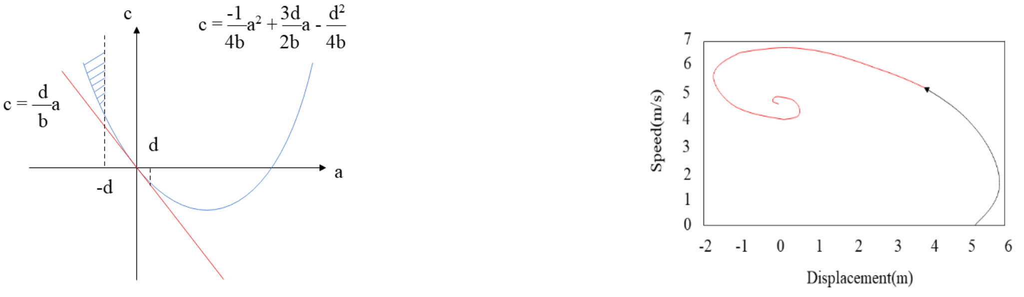
(a) Stability region



(b) Phase

Figure 7: The stability region of focus and its phase 2.

3.When taking b as negative and d as positive: From D>0, we get $c > \frac{d}{b}a$, from $T^2 - 4D > 0$, we get $c < \frac{-1}{4b}a^2 + \frac{3d}{2b}a - \frac{d^2}{4b}$, and from T=0, we get a=-d. Its stability domain is shown in Fig. 8a. We take a=1, b=-1, c=-5, d=-1 in its stable domain, and its phase diagram is shown in Figure 8b.



(a) Stability region (b) Phase

Figure 8: The stability region of focus and its phase 3.

4. When taking b as negative and d as negative: From D>0, we get $c > \frac{d}{b}a$, from $T^2 - 4D > 0$, we get $c < \frac{-1}{4b}a^2 + \frac{3d}{2b}a - \frac{d^2}{4b}$, and from T=0, we get a=-d. Its stability domain is shown in Figure 9a. We take a=-1, b=-1, c=1, d=2 in its stable domain, and its phase diagram is shown in Figure 9b.

(a) Stability region (b) Phase

Figure 9: The stability region of a node and its phase 4.

3)Periodic oscillation and unstable region

Periodic oscillations occur at both the bifurcation points (lines) and the Hough bifurcation points (lines) described above.

The parameter selection range of the neuron filter model is as follows:

When b is positive and d is negative:

$$\begin{cases} b \in (-2.8, 0.15) \cup (0.1, 3.2) \\ d \in (-2.25, -0.23) \cup (0.15, 1.85) \\ c < \dfrac{d}{b} a \\ a < -d \end{cases} \tag{17}$$

When b is negative and d is negative:

$$\begin{cases} b \in (-2.8, -0.15) \cup (0.1, 3.2) \\ d \in (-2.25, -0.23) \cup (0.15, 1.85) \\ c > \dfrac{d}{b} a \\ a < -d \end{cases} \tag{18}$$

3.4 Preliminary Verification of Filtering Effect of Neuron Filtering Model

On the basis that the parameters of the filtering model satisfy the analysis in the previous section, we select two different sets of signals. In the case of artificially adding noise, three different filtering methods are used to filter it, and the denoising performance evaluation indicators of the filtering results of each method are statistically calculated.

Signal-to-noise ratio, root mean square error and signal-to-noise ratio gain are three commonly used denoising performance evaluation indicators, which are defined as follows:

$$SNR = 20\log\left(\frac{\sum_n f^2(\mathrm{n})}{\sum_n [f(\mathrm{n}) - \hat{f}(\mathrm{n})]^2}\right) \tag{19}$$

$$\mathrm{RMSE} = \sqrt{\frac{1}{n}\sum_n [f(\mathrm{n}) - \hat{f}(\mathrm{n})]^2} \tag{20}$$

$$G = \frac{SNR_{dn}}{SNR_n} \tag{21}$$

In the formula, f(n)——the standard noise-free signal;

$\hat{f}(n)$ ——the estimated signal after denoising;

SNR_{dn} ——the signal-to-noise ratio after denoising;

SNR_{n} ——the original SNR before denoising.

In order to facilitate adjustment and expansion, the system divides the database into measurement information library, measurement process library, and measurement result library. The structure is as shown in Figure 10:

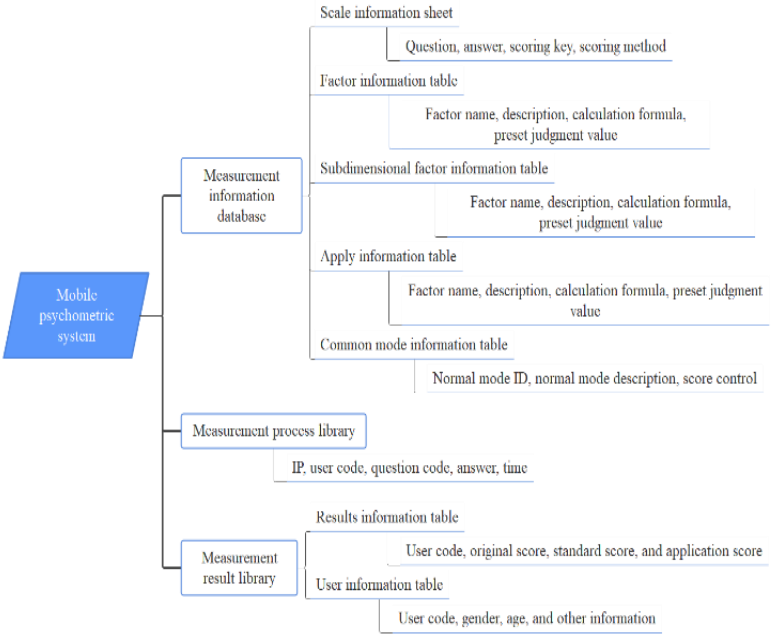


Figure 10: Monitoring system for English learners' psychological anxiety state based on intelligent technology.

4 RESULTS

After constructing the above model, this paper verifies the effect of the monitoring system for English learners' psychological anxiety state based on modern technology. Moreover, this paper builds an intelligent system through the simulation platform, and gathers some English learners from colleges and universities for experimental analysis. In addition, this paper uses the model proposed in this paper for real-time monitoring of mental health anxiety, and compares the experimental results with the actual results. A total of 10 hours of testing are carried out, and the test results shown in Figure 11 below are obtained.

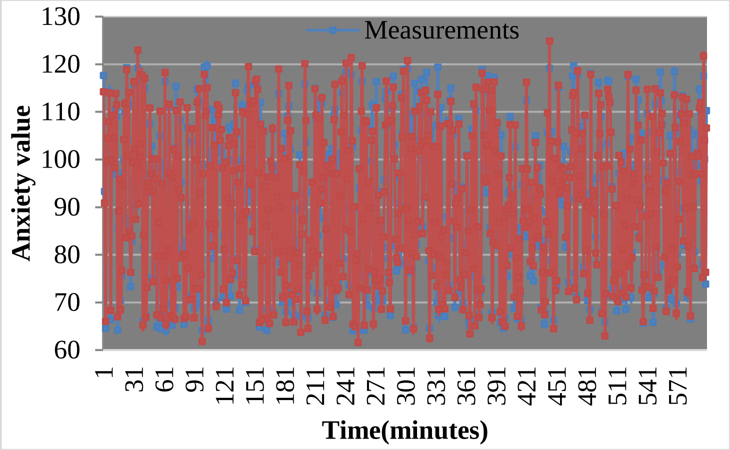


Figure 11: Validation of the effect of the monitoring system for English learners' psychological anxiety state based on modern technology.

On the basis of the above research, the model proposed in this paper is investigated and analyzed for user satisfaction, 30 groups of users are counted, and the satisfaction is evaluated statistically, and the statistical results shown in Table 1 are obtained.

Num	*Satisfaction*	*Num*	*Satisfaction*	*Num*	*Satisfaction*
1	*85.032*	*11*	*88.758*	*21*	*87.756*
2	*80.567*	*12*	*89.313*	*22*	*79.224*
3	*86.614*	*13*	*89.510*	*23*	*82.320*
4	*92.601*	*14*	*82.422*	*24*	*92.689*
5	*92.352*	*15*	*89.804*	*25*	*79.725*
6	*85.024*	*16*	*85.984*	*26*	*81.045*
7	*80.769*	*17*	*81.803*	*27*	*80.991*
8	*90.703*	*18*	*79.902*	*28*	*86.458*
9	*83.340*	*19*	*87.986*	*29*	*83.756*
10	*89.296*	*20*	*91.938*	*30*	*81.101*

Table 1: Statistical results of user satisfaction survey.

5 DISCUSSION

It is very necessary to keep students moderately anxious in the classroom, which can make students concentrate and mobilize their enthusiasm for learning, but we must grasp the degree well, and it is too much. Moreover, once teachers' questioning, error correction and evaluation are used improperly, it will inevitably cause high anxiety of students, and ultimately affect the effect of classroom teaching. In foreign language classrooms, teachers should have the ability to properly and correctly cause and control anxiety, create a harmonious teaching atmosphere, enhance students' enthusiasm and confidence in learning, so as to improve the effect of classroom teaching.

As can be seen from Figure 11 of this paper, the results of real-time monitoring of English learners' psychological anxiety state through the intelligent system in this paper are close to the actual results, and the downward fluctuation does not exceed 5%. This verifies that the intelligent system proposed in this paper has a good performance in real-time monitoring of English learners' psychological anxiety state.

The reliability of the intelligent system in this paper is verified by simulation experiments, and the user satisfaction survey is carried out in combination with the questionnaire survey, and the results are shown in Table 1. From Table 1, it can be seen that the intelligent model proposed in this paper can effectively improve user satisfaction, that is, the real-time monitoring effect of students' psychological state is better, and it can effectively improve the effect of English learning.

6 CONCLUSION

For English majors, the sudden shift from high school English study to in-depth study in university causes them to have a very strong sense of urgency, which also causes study anxiety. In this paper, the monitoring system of English learners' psychological anxiety state is constructed by intelligent means, so as to improve the psychological health of English learners, and improve the English learning efficiency of learners through healthy mind and body. Moreover, this paper combines modern intelligent technology to carry out intelligent detection of English learners' psychological anxiety, and to improve the identification algorithm of psychological anxiety parameters. After constructing the model, this paper verifies the effect of the proposed monitoring system for English learners' psychological anxiety state based on modern technology. Finally, this paper uses simulation experiments to verify the reliability of the intelligent system in this paper, and uses questionnaires to verify that the system has high user satisfaction.

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RECOMMENDATIONS

Students' English classroom anxiety is caused not only by students' own factors, but also by teachers, teaching and other factors. In the teaching process, teachers should take various measures to help students adjust their anxiety in English classroom. Only in this way can a good classroom teaching effect be achieved, and students' physical and mental health can be guaranteed. In the follow-up teaching, the real-time monitoring of intelligent psychological anxiety can be combined, which is convenient for teachers to improve teaching strategies in a timely manner and improve students' English classroom learning effect in a targeted manner.

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