Computer-Aided Analysis of Big Data for Assessing College Students' Physical Health

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Abstract. In order to improve the assessment effect of college students' physical health status, this paper combines big data technology to evaluate college students' physical health status with the support of intelligent physical health monitoring system. This paper starts with the introduction of the current mainstream physical health data frequency synthesis technology, analyzes the principle and structure of DDS and PLL, and expounds their respective advantages, disadvantages and application scenarios. Moreover, this paper analyzes some technical indicators when DDS and PLL devices are used in the fabrication of frequency synthesizers for physical health data, including phase noise, spurious suppression, and frequency switching speed. Through the experimental analysis, it can be seen that the assessment system of college students' physical health status based on big data analysis constructed in this paper can play an important role in the assessment of college students' physical health status.

Keywords: big data; college students; physical health; state assessment.
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1 INTRODUCTION

The physical health of college students is related to their study and life in school. The so-called physique of college students mainly refers to the body quality of college students. On the one hand, the physical condition of students may be determined by congenital factors. On the other hand, it is to continuously improve the physical health of the students through various means, so that the students' innate physical condition will undergo certain changes. Therefore, the physical health of college students can change the congenital factors through various acquired measures [1]. There is a certain relationship between the physique and health of college students. Only with good physique can students have health and be able to live and study in school better. Therefore, a good physique of college students is a prerequisite for maintaining good health. If students do not have a good physique, it is impossible to have a healthy body, so the physique of college students is the premise of health [2]. In today's stressful life and study, in order to ensure a healthy body, college students need to constantly carry out physical exercise. However, since a person's physical fitness can be maintained for a long time, it is not easy to change it. There is a close relationship between the physical fitness and health of college students, and physical fitness can directly affect students' study and life [3].

Colleges and universities are sending a number of high-quality and highly skilled talents to the country, and the physical health of college students can be comprehensively reflected through physical testing. However, according to the current self-evaluation and physical fitness test results of college students, the overall physical condition of college students is not ideal, which mainly shows that the physical condition of junior students is generally higher than that of senior students, this shows that the physical health of college students is gradually declining [4].

College students lack the awareness of self-exercise as a whole, and lack the awareness of strengthening self-exercise. Because they do not recognize the importance of physical exercise, their physical health is affected to some extent. As we all know, physical education has credits in the process of teaching in colleges and universities. Many students participate in physical education courses with a purpose. They mainly study reluctantly in order to pass the physical education examination. Especially in outdoor physical education courses in summer and winter, many students are more reluctant to participate. Their enthusiasm is not high, and they cannot exercise freely according to their own interests, over time, college students' awareness of self-exercise gradually declined, and they could not participate in daily physical exercise and physical education courses well; At the same time, some students were not firm in the process of physical exercise, and often could not continue to persist after a period of exercise, which led to a certain degree of impact on the physical health of students [5].

The process of managing college students is not as strict as that of senior high school students and junior high school students. It mainly adopts an open management mode. However, due to the immaturity of students' minds, they often lack a strong sense of self-discipline. Long term bad lifestyle has caused a huge impact on students' physical health, such as long-term smoking, drinking, games, etc., due to the lack of strong self-control ability, Often, the above behaviors cannot be carried out in a timely and appropriate manner, and the long-term behavior will lead to addiction and deep involvement [6]; At the same time, the development of short videos is very fast. Some students waste a lot of time on short videos, and even stay up late to brush videos, leading to the gradual decline of college students' vision and personal thinking ability. Because students stay up late at night, they often can't get up on time and eat breakfast in the morning, which leads to irregular meals, and students' physical health is affected if they go on for a long time [7].Additionally, computer-aided interventions can assist in curbing addictive behaviors like smoking, drinking, or excessive gaming. For example, there are apps available that provide support and resources for individuals looking to quit smoking or reduce their alcohol consumption. These applications can provide personalized plans, progress tracking, and motivational content to help students overcome their addictions.

As we all know, colleges and universities pay more attention to the teaching of students' knowledge and skills, and the arrangement of physical education courses is often unreasonable. The situation of attaching importance to education and ignoring sports has led to the gradual impact on the physical health of students [8]. On the one hand, when colleges and universities arrange physical education courses, they tend to arrange fewer physical education courses. Most colleges and universities offer one physical education class a week for freshmen, while some colleges and universities do not arrange physical education courses in their sophomores and juniors; On the other hand, some colleges and universities have shown a trend of marginalization in the process of arranging physical education courses. Physical education courses contain fewer sports items, and they cannot set relevant physical education courses according to the needs of students, which leads to a gradual decline in the enthusiasm of students to participate in physical education courses, and gradually affects the physical health of college students over time [9].

College students need certain venues and facilities if they want to do physical exercises. High quality venues and facilities can make students more motivated to participate in physical exercises and can freely choose relevant sports. However, due to the limited funds in the development process of most colleges and universities, the number of sports venues often cannot meet the needs of students for physical exercises, In particular, in recent years, students' requirements for physical exercise facilities have gradually improved, but schools cannot build more physical exercise venues due to venue reasons, which affects students' physical exercise to a certain extent [10]; On the other hand, the sports facilities in some colleges and universities have gradually become obsolete, and there are certain potential safety hazards when doing physical exercises, which makes students unable to do physical exercises well, leading to a gradual weakening of the enthusiasm for exercise over time, resulting in a great impact on the physical health of college students [11].

As one of the main bodies of physical education teaching, physical education teachers can give good guidance to the system health of students. When students are doing physical exercises, professional guidance from teachers can greatly reduce the harm caused by wrong exercise methods. The comprehensive quality of physical education teachers can greatly affect the physical health of students [12]. At present, the overall quality of physical education teachers in colleges and universities needs to be improved. First of all, the size of the teaching staff in colleges and universities needs to be improved. Some physical education teachers often choose fewer physical education teachers in colleges and universities because of their salary or the difficulty of teaching. At present, the number of students in colleges and universities is increasing gradually, and a huge gap is formed between the number of students and the number of physical education teachers, leading to a decline in the teaching quality of physical education teachers, Secondly, the academic qualifications of physical education teachers in colleges and universities need to be improved. With the promotion of high-level education, the number of graduate students is increasing, but the number of graduate students who devote themselves to physical education in colleges and universities is relatively small, leading to the unreasonable educational structure of physical education teachers. At the same time, it is difficult for existing teachers to continue their education. Affected by various factors, physical education teachers have limited time for training and learning, The overall quality of teachers affects the physical health of students to a certain extent [13].

Part of the physical education teachers in colleges and universities come from sports colleges and universities. In the process of teaching, they generally prefer physical education as the main method, but the level of relevant physical education knowledge is less involved. Physical education teachers lack the corresponding educational concept and knowledge of sports health, which leads to the inability to teach students the relevant knowledge of sports education at a deeper level. It is difficult to effectively combine sports health education with sports teaching in the teaching process, as a result, it is not possible to impart relevant sports knowledge to students [14]. At present, the continuing education and training of physical education teachers in colleges and universities are not enough, which leads to the stagnation of physical education teachers' teaching ability, the inability to bring the latest teaching content into the classroom, and the inability of relevant knowledge to keep pace with the times, which has a certain impact on teaching activities. At the same time, in recent years, students in colleges and universities have gradually increased their demand for sports, and put forward higher requirements for physical education teachers. However, from the current situation, physical education teachers have not targeted teaching in the teaching process, resulting in a certain impact on students' physical health [15].

Ideology is the precursor of action. Only when students are fully aware of the importance of physical exercise and physical health, can they really carry out the action of physical exercise. This requires constantly mobilizing the enthusiasm of college students to participate in exercise. Schools can constantly instill the importance of physical health in students by strengthening publicity, so as to attract students' attention and thus cause students' active participation [16]. Colleges and universities can mobilize the enthusiasm and initiative of students to participate in physical exercise in a variety of ways, which requires careful investigation of the reasons why students are unwilling to participate in sports, to find out what causes students' enthusiasm to be greatly weakened, and to implement targeted measures [17].

This paper combines data technology to assess the physical health status of college students with the support of an intelligent physical health monitoring system to improve the physical performance of contemporary college students.

2 MAIN TECHNIQUES FOR FREQUENCY SYNTHESIS OF PHYSICAL HEALTH DATA

2.1 Direct Digital Physical Health Data Frequency Synthesis (DDS)

The schematic block diagram of DDS with the corresponding output waveforms of each part is shown in Figure 1. The main structure includes phase accumulator, ROM sine meter, D/A and LPF. The phase data is output at a clock signal, and this phase data is used as its sampling address to find the amplitude voltage corresponding to its phase in the ROM sine table, so that different codes corresponding to different voltage amplitudes are obtained. After passing through the D/A converter again, the step waveform can be obtained as shown in Figure 1, and then the desired sine waveform can be obtained by passing through the LPF.

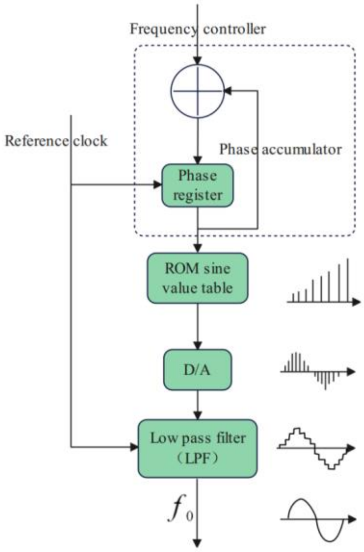


Figure 1: Block Diagram of DDS.

In Figure 1, f_o is the output health data frequency of the DDS, f_r is the reference clock health data frequency generated by the corresponding crystal, N is the length of the accumulator, and K is the health data frequency control word, so that the minimum phase increment of the corresponding accumulator is obtained:

$$\Delta\theta_{min} = \frac{2\pi}{2^N} = 2\pi\frac{f_o}{f_r} \tag{1}$$

Then the minimum output physical health data frequency is:

$$f_{o\,min} = \frac{f_r}{2^N} \tag{2}$$

The final output physical health data frequency is:

$$f_o = \frac{K}{2^N} f_r \tag{3}$$

Thus the maximum output health data frequency is still limited by Nyquist's theorem. Theoretically, the frequency control of the body health data is $K \le 2^{N-1}$, so that $f_o = \frac{1}{2} f_r$, which is generally required for $f_o \le 0.4 f_r$.

This section mainly discusses the ideal DDS spectrum. First, the ideal DDS spectrum must meet the following conditions:

- What is initially stored in the ROM sine value table is the quantized amplitude value represented by an infinite binary number;
- The accumulators of N-bit word length are all used to address the ROM sine value table;
- D/A is a digital-to-analog conversion in an ideal state, in which there is no corresponding conversion error.

If all the above conditions are met, then the ideal sampling sequence of the DDS is:

$$S(n) = cos\left(\frac{2\pi}{2^N}Kn\right) n = 1,2,3\cdots \tag{4}$$

The ideal sequence is passed through the D/A-converter to obtain an analog signal S(t), which is a continuous signal with a period of $MT_r\left(T_r = 1/f_r\right)$. We assume that the signal is in one cycle:

$$S(t)=\sum_{n=-\infty}^{\infty}cos\left(2\pi f_o t\right)h\left(t-nT_r\right) \tag{5}$$

When $0\le t\le T_r, f_o=\frac{K}{2^N}f_r$, h (t)=1, otherwise h (t)=0. In this way, $h\left(t-nT_r\right)$ can be expressed as:

$$h\left(t-nT_r\right)=U(t)-U\left(t-T_r\right) \tag{6}$$

Among them, U(t) is the step function, and the Fourier transform of h(t) is:

$$H(f)=T_r\frac{sin\left(\pi fT_r\right)}{\pi fT_r}exp\left(j\pi fT_r\right) \tag{7}$$

Among them, the Fourier transform of $v(t)=cos\left(2\pi f_0 t\right)$ is:

$$V(f)=\pi\left[\delta\left(2\pi f+2\pi f_o\right)+\delta\left(2\pi f-2\pi f_o\right)\right] \tag{8}$$

The Fourier transform of S(t) is:

$$\begin{aligned}&S(f)=H(f)\times V(f)\\&=\pi\sum_n Sa\left[\frac{\left(nf_r+f_o\right)\pi}{f_r}\right]exp\left[\frac{j\pi\left(nf_r+f_o\right)}{f_r}\right]\delta\left(2\pi f-2\pi f_r-2\pi f_o\right)\\&+\pi\sum_n Sa\left[\frac{\left(nf_r-f_o\right)\pi}{f_r}\right]exp\left[\frac{j\pi\left(nf_r-f_o\right)}{f_r}\right]\delta\left(2\pi f-2\pi f_r+2\pi f_o\right)\\&n=0,\pm1,\pm2\cdots\end{aligned} \tag{9}$$

Among them, $Sa(\bullet)$ is the $sinc$ function, namely, $Sa(x)=sin x/x$. The output spectrum of DDS is shown in Figure 2.

The phase noise performance of DDS is generally better. Its phase noise mainly comes from the system phase noise of the reference clock and the phase noise of the D/A, so that the phase noise of the DDS can be considered here as a divider to analyze.

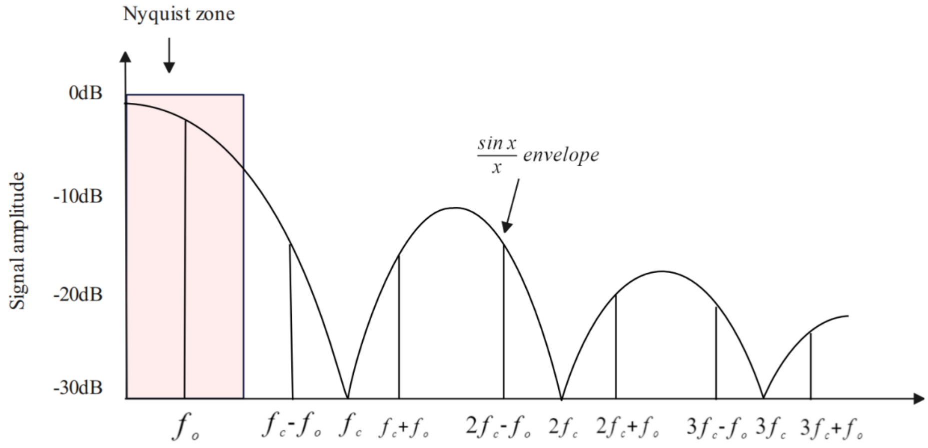


Figure 2: Output Spectrum of an Ideal DDS.

Based on the above analysis, a DDS phase noise calculation formula can be roughly obtained.

$$S_{\theta,DDS} = S_{\theta,clock}\left(\frac{f_o}{f_r}\right)^2 + S_{\theta,D/A} \tag{10}$$

Therefore, when considering the improvement of DDS phase noise, we can start from these two places, one is the choice of reference clock body health data frequency source phase noise to be small; the other is the choice of DDS chip phase noise is better.

1) Phase rounding error

In practical engineering, in order to improve the frequency resolution of the physical health data of DDS devices, it often leads to a relatively large number of bits N of the phase accumulator. Due to the limitation of device volume, the capacity of ROM will be much smaller than 2^N. Therefore, when addressing ROM, the low B bit of the accumulator will be cut off and only the high bit will be used to address ROM. Therefore, phase rounding error $\varepsilon_p(n)$ is generated.

If the high (N-B) bit in the N bit of the phase accumulator is used to address the ROM table, and the low B bit is rounded off, the output phase sequence of the accumulator is:

$$\Phi_r(n) = nK \bmod 2^N - nK \bmod 2^B \tag{11}$$

The phase rounding error sequence is:

$$\varepsilon_p(n) = \Phi(n) - \Phi_r(n) = nK \bmod 2^B \tag{12}$$

Since bit operation is modulo 2 operations, its phase rounding error sequence $\varepsilon_p(n)$ is a periodic sequence, and its period is:

$$\lambda = \frac{2^B}{GCD\left(2^B,b\right)} \tag{13}$$

It is expressed as:

$$\varepsilon_p(t)=\sum_{n=0}^{\lambda-1}\varepsilon_p(n)q\left(nT_c\right),0\le t\le \lambda T_c \tag{14}$$

The spectrum curve of $\varepsilon_p(n)$ can be obtained by Fourier transformation of $\varepsilon_p(t)$. In $\left(0,f_c/2\right)$, there are $\lambda/2$ discrete stray spectral lines. Under the condition of rounding off the low bit addressing, the DDS output amplitude sequence is:

$$S_r(n)=cos\left[\frac{2\pi}{2^N}nK-\frac{2\pi}{2^N}\varepsilon_p(n)\right]=cos\left(\frac{2\pi}{2^N}nK\right)-\frac{2\pi}{2^N}\varepsilon_p(n)sin\left(\frac{2\pi}{2^N}nK\right) \tag{15}$$

Therefore, the waveform error sequence introduced by phase rounding is:

$$S_e(n)=\frac{2\pi}{2^N}\varepsilon_p(n)sin\left(\frac{2\pi}{2^N}nK\right) \tag{16}$$

The spurious source of DDS system's output spectrum is $S_e(n)$ in formula (16), and the sequence period is λ. It can be expressed as:

$$S_e(t)=\sum_{n=0}^{\mu-1}S_e(n)q\left(nT_c\right),0\le t\le \mu T_c \tag{17}$$

In the DDS actual parameter waveform output, there are a total of $r=2^{N-1}/GCD\left(2^N,K\right)$ discrete spectral lines within the frequency range $\left(0,f_c/2\right)$ of the physical health data, and there are at most $\lambda+1$ spectral lines whose amplitude is not zero. The frequency of stray physical health data is:

$$f=\left(MK2^{N-B}\pm K\right)mod\left(2^{N-1}\right)\left(f_c/2^{N-1}\right),M=1,2,\cdots\lambda/2 \tag{18}$$

It can be seen from formula (17) that the ratio of the main spectral line to the strongest stray is about $6(N-B)dB$.

2) Amplitude quantization error

In theory, the amplitude of a sinusoidal signal can only be represented by an infinite length binary code, but in practice, the capacity of the digital chip ROM is limited, so it is necessary to sample and quantize the binary code to represent the sinusoidal waveform. Thus, amplitude quantization error $\varepsilon_q(n)$ is introduced.

3) A/D conversion error

The A/D conversion error comes from the non-ideal characteristics of DAC devices. These include non-ideal characteristics such as burr, difference and integral nonlinearity.

The nonlinearity of DAC makes the amplitude sequence obtained by looking up ROM table a nonlinear process in DAC. Due to the sampling characteristics of DDS system, these harmonic components will be moved periodically. From formula (19), we can get:

$$f = uf_c \pm vf_o \tag{19}$$

Where u and v are arbitrary integers

Assumption: $r = (m \cdot f_o) mod\ f_c (m \cdot f_o$ represents the m-th harmonic)

When $r \leq f_c / 2$, the stray falls on the r frequency point.

When $r \geq f_c / 2$, the stray falls on the $f_c - r$ frequency point.

2.2 Phase Locked Loop Physical Health Data Frequency Synthesizer (PLL)

The structure block diagram of the phase-locked loop is shown in Figure 3, which mainly includes a phase detector (PD), a loop filter (LPF), a voltage-controlled oscillator (VCO), and a frequency divider.

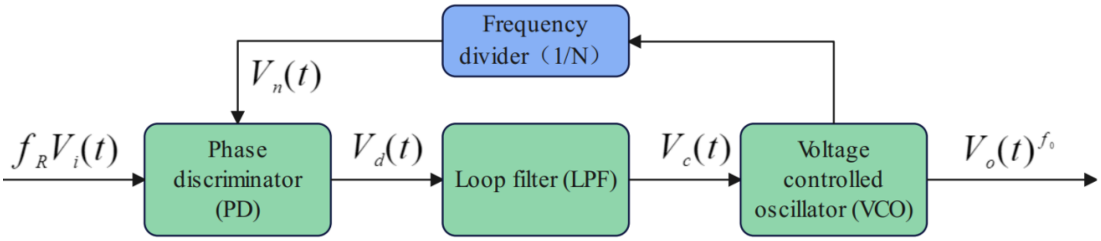


Figure 3: PLL Structure Block Diagram.

When the phase difference between the output signal and the reference signal is 0, the input reference signal of the phase-locked loop is locked by the output signal, so the phase-locked loop enters a "locked" state, at which time the output signal and the input reference signal are in the same frequency and phase. When this state is broken, the loop resumes its control function [18]. The phase of the input reference signal and the frequency of the physical health data are constantly tracked by the phase of the voltage-controlled oscillator and the frequency of the physical health data. Therefore, the system reaches the locked state again, which is the so-called "tracking" cycle process.

1. Phase detector (PD)

PD is also known as phase comparator. Its main function is to compare the signal divided by the frequency divider with the reference signal, so as to obtain its corresponding model as shown in Figure 4:

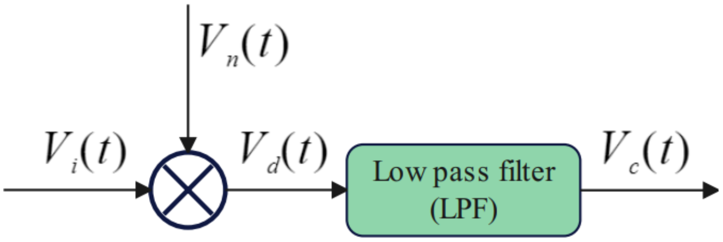


Figure 4: Phase Detector Model.

$V_i(t)$ and $V_n(t)$ in the figure are:

$$V_i(t)=A_i\cos\left(\omega t+\theta_1(t)\right)V_n(t)=A_n\cos\left(\omega t+\theta_2(t)\right) \tag{20}$$

It goes through a multiplier with multiplication factor K_m to obtain $V_d(t)$:

$$\begin{aligned}V_d(t)&=K_mA_iA_n\cos\left(\omega t+\theta_1(t)\right)\cos\left(\omega t+\theta_2(t)\right)\\&=\frac{1}{2}K_mA_iA_n\cos\left(2\omega t+\theta_1(t)+\theta_2(t)\right)+\frac{1}{2}K_mA_iA_n\cos\left(\theta_1(t)-\theta_2(t)\right)\end{aligned} \tag{21}$$

It then passes through the LPF to obtain the final error voltage $V_c(t)$:

$$V_c(t)=\frac{1}{2}K_mA_iA_n\cos\left(\theta_1(t)-\theta_2(t)\right)=A_d\cos\left(\theta_d(t)\right) \tag{22}$$

Among them, $A_d=\frac{1}{2}K_mA_iA_n,\theta_d=\theta_1(t)-\theta_2(t)$.

2. Loop filter (LPF)

Loop filter is actually a low-pass filter, which mainly consists of some passive devices, sometimes also used operational amplifiers.

3. Voltage controlled oscillator (VCO)

VOC is a voltage-to-health data frequency converter, and the output frequency of VOC is controlled by the voltage $V_c(t)$. Therefore, the oscillating frequency of VOC is changed with the change of $V_c(t)$, and the relationship is:

$$f_0(t) = f_c + K_{vco} V_c(t) \tag{23}$$

The phase model of PLL is a combination of the phase model of each basic part, which brings great convenience to the analysis of the system circuit of PLL, and the linear phase model of PLL is shown in Figure 5.

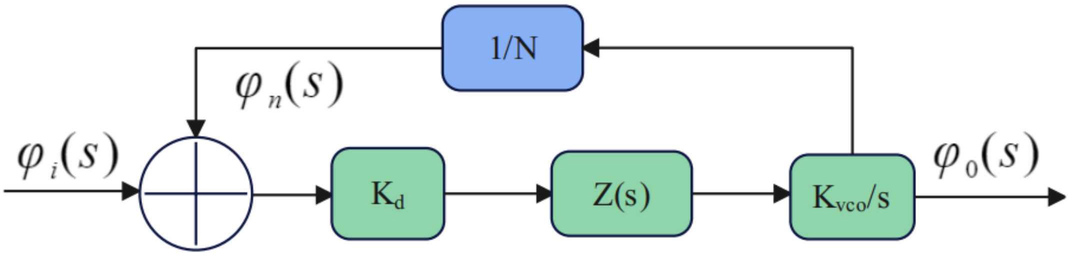


Figure 5: Linear Phase Model of PLL.

In Figure 5, K_d is the sensitivity of PD, Z(s) is the transfer function of LPF, and K_{vco} is the gain coefficient of VCO. From Fig. 5, we can obtain:

$$\varphi_e(s) = \varphi_i(s) - \varphi_n(s) \varphi_n(s) = \varphi_o(s) / N \tag{24}$$

The open-loop transfer function is:

$$H_K(s) = \frac{\varphi_o(s)}{\varphi_e(s)} = \frac{K_d K_{vco} Z(s)}{s} \tag{25}$$

The closed-loop transfer function is:

$$H_B(s) = \frac{\varphi_o(s)}{\varphi_i(s)} = \frac{K_d K_{vco} \dfrac{Z(s)}{s}}{1 + K_d K_{vco} \dfrac{Z(s)}{sN}} = \frac{N K_d K_{vco} Z(s)}{sN + K_d K_{vco} Z(s)} \tag{26}$$

The error transfer function is:

$$H_e(s) = \frac{\varphi_e(s)}{\varphi_i(s)} = \frac{sN}{sN + K_d K_{vco} Z(s)} \tag{27}$$

From the above equation, the relationship between H_K, H_B, H_e is obtained as:

$$H_B(s)=\frac{NH_K(s)}{N+H_K(s)}H_e(s)=\frac{N}{N+H_K(s)}H_e(s)=1-\frac{H_B(s)}{N} \quad (28)$$

Phase noise is used to describe the short-term stability of the system. In order to obtain a low-noise frequency synthesizer for physical health data, it is necessary to have a certain understanding of the theoretical knowledge of its phase noise. Therefore, a relatively complete modeling analysis of the phase noise of PLL is carried out in this paper. Then the main sources of phase noise of PLL are: the frequency source noise φ_{ni} of reference physical health data, the noise voltage V_{nPD} caused by the phase detector (PD), the noise voltage V_{nLPF} caused by the loop filter (LPF), the noise φ_{nVCO} of the voltage-controlled oscillator, the noise φ_{nN} of the frequency divider, and the output phase noise φ_{nOUT}. By combining the noise of each part, an equivalent model of the phase noise of the PLL can be built. The structure is shown in Figure 6.

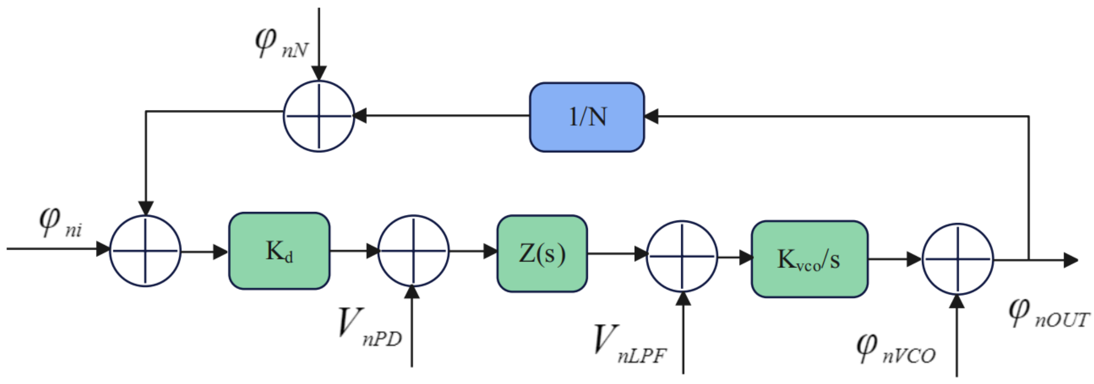


Figure 6: Phase Noise Equivalent Model of PLL.

The noise performance of each part can be obtained from Figure 6:

1. The relationship between φ_{nOUT} and φ_{nVCO} is:

$$\frac{\varphi_{nOUT}}{\varphi_{nVCO}}=\frac{1}{1+H_{op}(s)} \quad (29)$$

Among them, the open-loop gain is:

$$H_{op}(s)=K_dK_{vco}Z(s)\frac{1}{sN} \quad (30)$$

2. The relationship between φ_{nOUT} and φ_{nN} is:

$$\frac{\varphi_{nOUT}}{\varphi_{nN}} = \frac{N}{1+\frac{1}{H_{op}(s)}} \tag{31}$$

3. The relationship between φ_{nOUT} and V_{nPD} is:

$$\frac{\varphi_{nOUT}}{V_{nPD}} = \frac{1}{K_d}\frac{N}{1+\frac{1}{H_{op}(s)}} \tag{32}$$

It can be seen from the above formula that appropriately increasing the sensitivity K_d of the phase detector or decreasing $H_{op}(s)$ can effectively reduce the influence of the noise voltage V_{nPD} introduced by the PD on the output phase noise. However, it is impossible to increase K_d and $1/H_{op}(s)$ at the same time. It is then necessary to choose such a scheme.

4. The relationship between φ_{nOUT} and V_{nLPF} is:

$$\frac{\varphi_{nOUT}}{V_{nLPF}} = \frac{1}{K_d Z(s)}\frac{N}{1+\frac{1}{H_{op}(s)}} \tag{33}$$

This pulse spurious can be predicted from formula (34). Among them, I_{leak} is the charge and current, SG is the spurious gain. BasicLeakageSpur is the base leakage constant, $16dBc$.

$$LS = BasicLeakageSpur + 20\log\left(\frac{I_{leak}}{K_{\Phi}}\right) + SG \tag{34}$$

The mismatch value of the charge host current is not equal to the source current. The pulse spurious at this point can also be predicted. Its amplitude is related to the amplitude of these body health data frequency peaks. It is expressed in terms of the mismatch Ms:

$$Ms = \frac{I_{source} - I_{sink}}{2\left(I_{source} - I_{sink}\right)} \tag{35}$$

In general, the pulse spurious can be approximated by formula (36) when the mismatch is at 4%:

$$PS = BasicPulseSpur + 40\log\left(\frac{f_r}{1Hz}\right) + SG \tag{36}$$

3 ASSESSMENT OF COLLEGE STUDENTS' PHYSICAL HEALTH STATUS BASED ON BIG DATA ANALYSIS

Due to the different authority and responsibilities of school users and educational administrative unit users, the system has different functional modules. For school users, the main functions owned in this system include: organization management, basic information management, basic data management, teacher information, physical fitness test, and home page, and each major function is subdivided into several sub-modules, as shown in Figure 7.

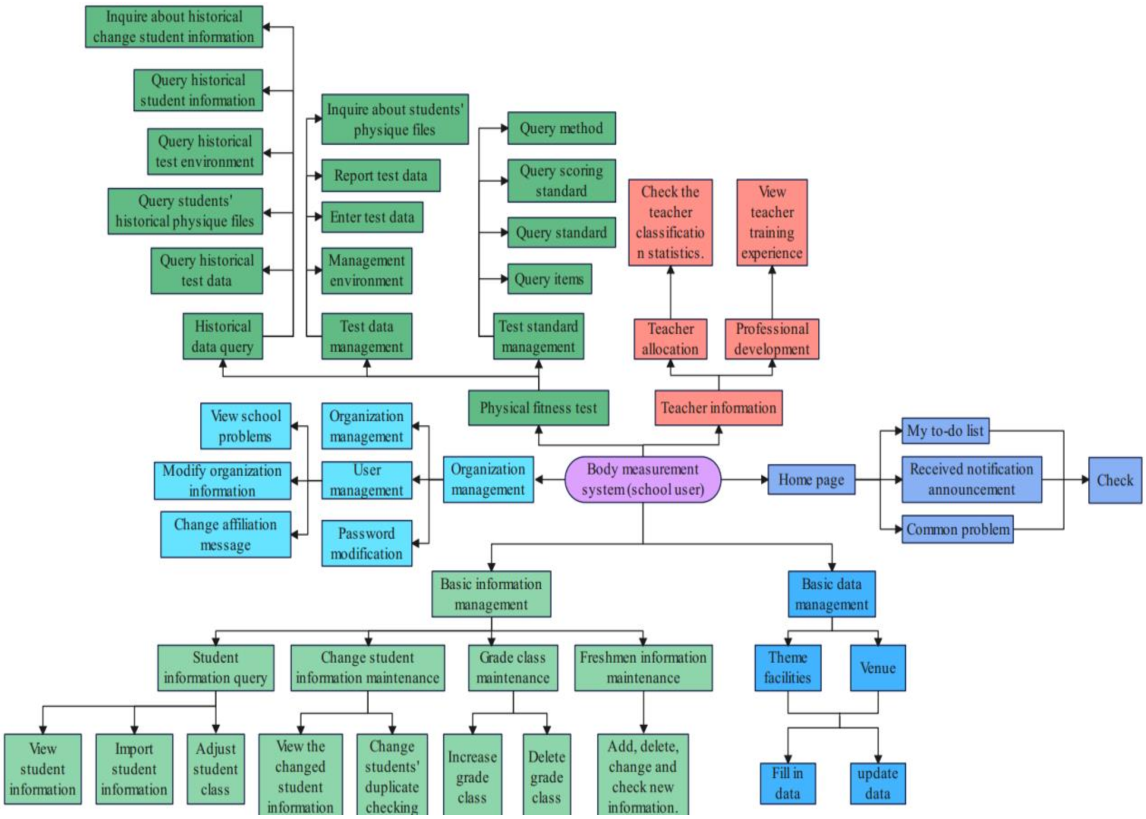
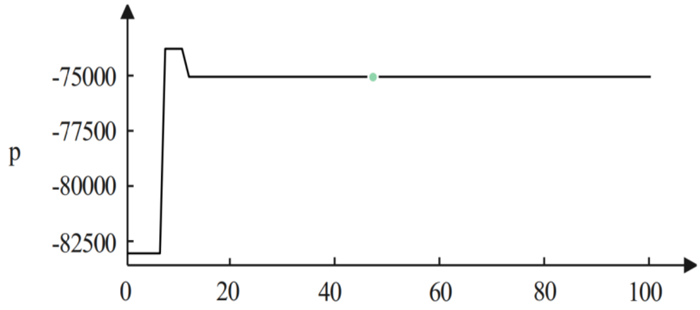
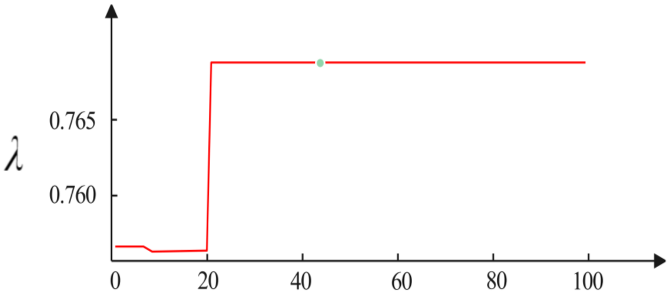


Figure 7: Functional Structure Diagram of the School User System.

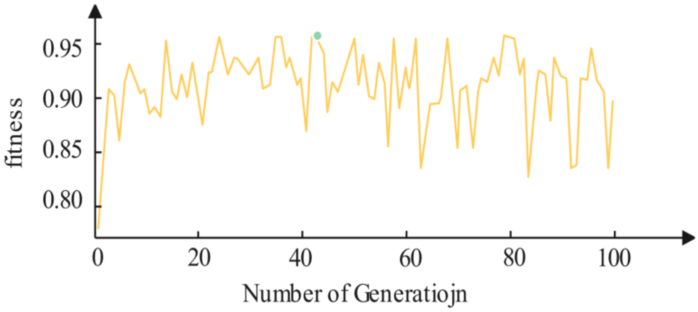
Next, an experimental study is conducted. These 200 records were used as sample data and the data are clustered using the human health assessment model. The best fitness value is obtained at the 43rd generation, corresponding to the value of the bias parameter p = -75095.71 and the damping factor λ= 0.772, as shown in Figure 8.



(a)



(b)



(c)

Figure 8: Optimal Fitness Value.

Then the clustering is completed based on the best bias parameter and damping factor values obtained from Figure 8 as the input to the GA_DPCA_AP clustering algorithm, and the obtained clustering results are shown in Figure 9. In the figure, 0 indicates healthy, 1 indicates sub-healthy, and 2 indicates high risk.

Through the above analysis, it can be seen that the physical health assessment system based on big data analysis can play an important role in the assessment of physical health status of college students.

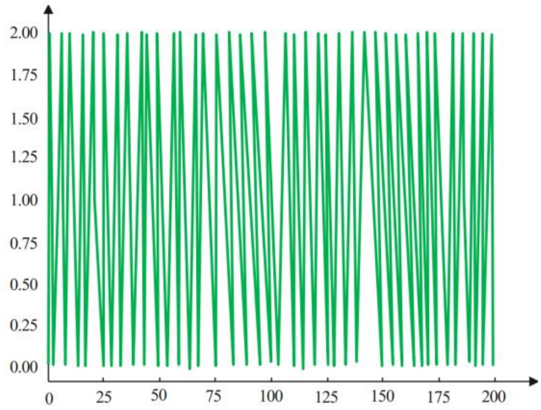


Figure 9: Clustering Results.

4 CONCLUSION

College students, as an important part of the youth team, their physical health can greatly affect the overall quality of the youth. However, at the present stage, some colleges and universities are affected by many factors and tend to ignore the education of students' physical health. This affects the physical health of students to a certain extent and leads to its gradual decline, which is not conducive to the study and life in school, and seriously affects the improvement of students' comprehensive quality. Therefore, this paper chooses to study the physical health of college students, which has certain theoretical value and practical significance. This paper combines big data technology to evaluate the physical health status of college students with the support of the intelligent physical health monitoring system, so as to improve the physical function of contemporary college students. Through the experimental analysis, it can be seen that the assessment system of college students' physical health status based on big data analysis constructed in this paper can play an important role in the assessment of college students' physical health status.

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