Research Article

Analysis of Public Mental Health Status and Exploration of Social Anxiety in the Context of Epidemic

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To explore the mental health and social anxiety of the public in the context of the epidemic, this article combines intelligent analysis methods to explore social anxiety. In this article, the digital voltage signal output by the processor chip interface is converted into an analog voltage signal. Moreover, this article changes the changing law of duty cycle with the program designed to achieve the purpose of outputting a variety of mental health waveforms that is composed of the sine wave, triangular wave, and square wave. In addition, this article constructs an intelligent hardware system. The research shows that the system proposed in this article can play an important role in the analysis of mental health and social anxiety in the context of the epidemic and has a certain supporting role in the psychological counseling of the social masses in the context of the epidemic.

1. Introduction

COVID-19 is highly contagious and people are generally susceptible [1]. The World Health Organization pointed out that when community transmission of major infectious diseases occurs, providing timely information to the public to take action (such as symptom identification and medical consultation guidelines) is one of the important public health measures [2]. Moreover, providing information to the public is an important part of epidemic prevention and control [3]. At the same time, providing sufficient and in-depth information can effectively mobilize the enthusiasm of the public to take self-protection measures and participate and cooperate with the epidemic prevention and control measures. Governments, at all levels in China, have launched a press conference system since January 2020 to report information on the epidemic daily and release scientific information on prevention and control. In addition, the National Health and Health Commission uses new media channels such as the official WeChat of "Healthy China" to carry out public health communication and health education on time. In addition to reprinting the press conference, major media also conducted in-depth interviews with relevant experts and reported the latest relevant research progress.

Health literacy is an important factor affecting health. Improving health literacy can strengthen the grasp of correct health knowledge, establish correct health concepts, and develop correct healthy behaviors and habits of the public. Moreover, psychological factors are also crucial to healthy behavior. For example, different levels of anxiety can cause sleep disturbances, adverse reactions to the body, and even suicidal tendencies in severe cases. Therefore, improving public health literacy can effectively improve the existing medical and health services, and is conducive to solving the imbalance and insufficiency of health resources of a country in terms of regions, population, and other factors. The health literacy of residents is affected by factors such as national political and economic level, regional education and medical level, and population characteristics, among them, occupational type also has a greater impact.

This article analyzes the mental health status of the public in the context of the epidemic and combines intelligent analysis methods to explore social anxiety, to improve its effectiveness.

2. Related Work

Literature [4] systematically discusses psychological crisis, arguing that each of us is striving to maintain a stable state of
our own, to balance and coordinate ourselves with the environment, and when major social problems or stressful events occur, individuals feel difficult to cope with. When the time comes, the balance will be broken, the normal lifestyle will be disturbed, the inner tension will continue to accumulate, there will be a loss or even disordered thinking and behavior, and will enter a state of psychological crisis. The research of disaster psychology shows that both individuals and the public have different psychological and behavioral response characteristics in the face of natural disasters at different stages. Therefore, different psychological intervention strategies and contents should be formulated at different stages [5]. Some studies summarize the different stages of people’s psychological reactions when natural disasters occur. First, the acute stress stage generally develops within 1–2 days after the disaster, when people experience negative emotions such as shock, numbness, anxiety, worry, fear, guilt, and sadness. At this stage, the affected population may fall into a state of uncontrollable and panic-stricken psychological imbalance, and generally do not seek help from others. Psychological assistance at this stage focuses on stabilizing emotions, eliminating anxiety and fear, and providing psychological services based on psychological support and companionship. Second, the chronic stress stage generally develops from the second day to the third month after the disaster, where the psychological symptoms of the affected population may show different characteristics according to the degree of trauma exposure of the disaster-affected people [6]. Disaster survivors often have symptoms such as flashbacks and hypersensitivity, and their emotions are mainly characterized by anxiety, fear, sadness, helplessness, anger, and guilt. People affected by disasters will experience anxiety, fear, helplessness, and other emotions. They often have a strong motivation to seek help during the chronic stress stage, so this stage is a critical period for psychological assistance. Emotional counseling and psychological education should be the main focus to deal with various emotions and find resources to solve problems [7]. Third, the psychological rehabilitation stage (also known as the psychological recovery and reconstruction stage) generally develops within 3 months to several years after the disaster. For most people, the direct impact of the disaster is not obvious, the corresponding stress symptoms have also eased over time, and life has slowly returned to the right track; however, some people may experience posttraumatic stress disorder syndrome, depression, anxiety disorders, etc. [8]. The focus of psychological assistance at this stage is to strengthen the identification, assessment, and treatment of mental disorders, to continue to pay attention to psychological distress, and to prevent symptoms from worsening. Major public health emergencies will have an important impact on the psychological behavior of people, and this impact has different development and changes in different stages of the event. Emotional problems are the most prominent experiences and feelings of the public in the face of public health emergencies, and the common manifestations include psychological symptoms such as panic, anxiety, hypochondriasis, depression, and obsessive-compulsive reactions [9]. Literature [10] divides the development of the epidemic into the high-incidence period, decline period, and subsidence period. The study found that during the epidemic, the most sought help from the psychological hotline was for emotional problems. The issue is getting more and more attention. The panic period is the first 1–2 weeks after the hotline is opened. The seekers are generally in an emotional state of anxiety, tension, and panic, and are prone to irrational behaviors such as panic buying and hypochondriasis. The depression period is the 3rd to 4th week, when people are in the stable or problem-solving stage in response to the crisis, the panic gradually subsides and the depression begins to highlight. As the normal pace of study, life, and work is disrupted, and it is difficult to predict when the epidemic will end, people are easily psychologically uncertain or insecure, which induces depression, anxiety, irritability, and other emotions; anxiety intensified. The recovery period began in the 5th week. With the gradual improvement of the epidemic and the gradual recovery of the pace of study, work, and life, the mentality of the people became normal, and the amount of help from the psychological hotline also decreased [11].

In the face of public health emergencies, people will have different degrees of psychological crisis, among which emotional problems are the most prominent. With the progress of time and the intervention of government departments, people will gradually recover from the psychological crisis brought about by public health events [12]. However, what are the characteristics of changes in people’s psychological symptoms in different periods of the epidemic? What role does the time course play in the gradual reduction of people’s psychological symptoms? Research on these issues is still very lacking. In the face of major public health emergencies such as the new crown pneumonia, it is necessary to accurately grasp and analyze the psychological crisis response and characteristics of the people in the event and to dynamically monitor and track the psychological changes of the people in different stages of the epidemic. The department provides important information such as the psychological trend and risk characteristics of the people so that they can take different psychological interventions, according to the psychological characteristics of different stages, and builds a psychological crisis intervention model for public health emergencies [13]. Continuous monitoring of the psychological reactions of the people under the new crown pneumonia epidemic can not only grasp the psychological changes of the people in time and make psychological interventions more targeted but also help to build a social and psychological early warning system for public health emergencies, which is beneficial to Government departments make decisions and improve their response capabilities during the epidemic [14].

### 3. Hardware System of Social Anxiety and Mental Health Detection System

According to the aforementioned overall demand analysis, to realize the various functions of the instrument, this article adopts the modular concept to design the instrument. This...
design uses the microprocessor ATmega128 as the main control core chip to control the peripheral chips and circuits to complete the task. Moreover, this article uses the following hardware circuit design framework diagram to implement the concrete representation (Figure 1):

This design divides all circuits into five modules to better distinguish the functions of each hardware circuit: stimulation main circuit, power circuit, music playback circuit, low-pass filter, and peripheral circuit. The stimulation main circuit module is the core of the hardware part. This module can generate output that meets the requirements and is composed of the main control chip, H bridge circuit, and current limiting circuit. The power circuit module is used to generate 100 V to ensure that the output of the instrument can effectively form a conduction current on the acupoints. At the same time, a step-down chip is also configured in the power supply circuit module to provide the 5 V power supply voltage required by the microcontroller and peripheral circuit chips. The core of the music playback module is the audio decoding circuit, which decodes the audio files to be played, so that patients can listen to soft anxioy music while receiving physical therapy. The function of the low-pass filter module is to filter out the high-order harmonics in the SPWM output waveform to ensure that the output waveform is not distorted. The peripheral circuit module includes circuits such as D/A conversion circuit, temperature monitoring circuit, LCD liquid crystal display circuit, and key circuit. While realizing the auxiliary functions of the instrument, this module can also help the user to input commands and obtain the working status of the instrument to complete the human-computer interaction. This article will describe the design ideas and working principles of each module of the hardware circuit in detail from the next section.

The common boost circuit is designed to obtain a 100 V AC input with the help of transformer boost, and then realize AC to DC conversion and ripple and noise suppression through bridge full-wave rectifier circuit and large-capacity filter capacitor. Although this circuit is relatively mature, the transformer used is large in size, large in heat dissipation, high in price, and has obvious defects. This design uses the BOOST boost chopper circuit as the boost scheme, which has the advantages of lightness, simplicity, and high conversion efficiency.

In the BOOST boost circuit, the control of the boost multiple depends on the value of the duty cycle. The formula is [15]:

\[ D = \frac{V_o - V_i}{V_o} \]

In engineering design, when the duty cycle reaches 0.9, the boost limit of about 10 times can be reached. Therefore, if you want to get 100 V through the BOOST circuit, you need to use an external power supply above 10 V. In order to facilitate the use of the instrument and no longer increase the number of instrument power lines in the operating room, the external power supply of this design uses a 12 V battery for power supply. The boost circuit inside the device uses a BOOST boost chopper circuit to achieve a boost from 12 to 100 V DC. Substituting 12 and 100 V into the formula as \( V_i \) and \( V_o \) respectively, we get a duty cycle of 88%.

Based on this, the design requires a PWM boost control chip that can achieve a high duty cycle of about 90% to complete the design of the boost circuit. This design selects UC3843, which is a high-performance fixed-frequency current-mode control chip with a fine-tuning oscillator and a maximum duty cycle of more than 90%. Moreover, it can perform accurate duty cycle control, temperature compensated reference, equipped with high gain error amplifier, current sampling comparator, and high current totem pole output, which is an ideal device for driving power MOSFET. Its internal principle block diagram is shown in Figure 2.

By combining the working principle of the BOOST boost circuit and the UC3843 chip data, the boost circuit is designed. The circuit diagram is shown in Figure 3.

The switch \( Q_2 \) periodically turns on and off according to the frequency of the UC3843 chip oscillator to guide the charging and discharging of the inductance \( L_3 \). When \( Q_2 \) is on, the power supply charges \( L_3 \) at a speed of \( V_i / L \). After \( Q_2 \) is turned off, \( L_3 \) releases reverse voltage to act as a power supply, and its stored energy is absorbed by output capacitor \( C_{11} \) after passing through diode \( D_4 \) at a speed of \( (V_i - V_0) / L \). The capacitor ability to store energy determines the output voltage, and the peak value of the inductor current determines the efficiency of energy transfer to the capacitor.

In theory, the designed circuit output voltage is 100 V, but since the load is human skin, the resistance value varies greatly when it is dry, wet, or diseased. Moreover, the skin resistance value of different parts of the human body is also different, and the resistance value between two points on the skin can range from several hundred to tens of thousands of ohms. At the same time, the output voltage stability will be affected due to load changes. To ensure the stability of the output voltage, two closed-loop feedbacks are designed in the circuit for control [16].

![Figure 1: Hardware circuit frame diagram.](image-url)
In closed-loop 1, after the output voltage of 100 V is divided by $R_{18}$ and $R_{21}$, a feedback voltage $V_{fb}$ of 2.5 V is obtained, which is fed back to the boost chip through pin 2. Here is a 2.5 V reference voltage obtained by dividing the 5 V inside the chip. $V_{fb}$ is compared with the reference voltage, and the generated error is amplified by the error amplifier (Error AMP) and then enters the post-stage, modulates the pulse width of the PWM signal, changes its duty cycle, and changes the output voltage. In closed-loop 2, pin 3 of the UC3843 chip is a current detection terminal. The current flowing through the source of the switch tube generates a voltage-type signal through $R_{22}$ to enter the non-inverting terminal of the PWM comparator and compares it with the output signal of the error amplifier. The comparison result will be input to the PWM pulse width modulator (PWM latch) to control the change of the duty cycle of the PWM output signal, thereby adjusting the output voltage. In addition, when the source current of the switch tube is too large, the chip will stop working, and the switch tube will enter the off state, which plays the role of overcurrent protection.

The combined action of the two closed-loop feedback circuits ensures the stability of the output voltage and peak current. The following will calculate the important parameters of the boost circuit and select the components.
3.1. Chip Oscillator Frequency. The frequency of the oscillator is determined by the desired maximum duty cycle of the PWM signal, which can be up to 500 kHz. According to the definition of duty cycle, the formula is as follows:

\[ D_{\text{max}} = 1 - \left( \frac{t_{\text{dead}}}{t_{\text{period}}} \right) \]  

(2)

The duty cycle required for this design is approximately 88%. The relationship between oscillator frequency \( F_{\text{osc}} \) and \( t_{\text{period}} \) is as follows [17]:

\[ t_{\text{period}} = \frac{1}{F_{\text{osc}}} \]  

(3)

\( R_T \) is connected to the \( V_{\text{ref}} \) terminal, the output current is through this pin, and \( R_T \) is charged by \( C_T \). The desired frequency can be generated by adjusting the values of the resistor \( R_T \) and the capacitor \( C_T \). Looking at the chip data, it can be found that when \( C_T = 10 \text{ nf} \), and it is substituted into the above formula and Figure 5 to calculate and obtain \( t_{\text{dead}} = 3 \text{ us} \), \( t_{\text{period}} = 30 \text{ us} \), \( F_{\text{osc}} = 33.33 \text{ kHz} \). We take \( F_{\text{osc}} d = 30 \text{ kHz} \) and substitute it into the formula [18]:

\[ F_{\text{osc}} \text{(kHz)} = \frac{1.72}{(R_T (K) \times C_T (\mu F))} \]  

(4)

\( R_T \) is obtained as 5.7 kΩ. Therefore, \( C_{17} = 10 \text{ nf} \), \( R_{17} = 5.7 \text{ kΩ} \).

3.2. Calculation and Selection of Energy Storage Inductance. We make the power supply circuit work in continuous operation mode to ensure the continuity of the charging of the inductor to the capacitor, and the critical conditions are as follows:

\[ I_{L(\text{avg})} \geq \frac{\Delta I_L}{2} \]  

(5)

That is, the average current value of the inductor must be at least half of the ripple current.

According to the definition of duty cycle and the conservation, the input power of the inductor is equal to the output power, the formula for the average current of the inductor can be deduced as:

\[ I_{L(\text{avg})} = \frac{I_0}{1 - D} = 41.67 \text{ mA}. \]  

(6)

The formula for calculating the ripple current of the inductor is:

\[ \Delta I_L = \frac{(V_I - V_S)I_{\text{on}}}{L} = \frac{(V_I - V_S)D}{L_f}. \]  

(7)

In this operating state, the minimum value of the inductance is:

\[ L \geq \frac{2(V_I - V_S)D(1 - D)}{I_0 f} = 15.6 \text{ mH}. \]  

(8)

In actual work, underrated output conditions, the ripple current of the inductor is usually 20% to 30% of the average current, and 20% is taken in the design to obtain: \( \Delta I_L = 20% \times I_{L(\text{avg})} = 8.34 \text{ mA} \).

Therefore, the peak current of the inductor is \( I_{LP} = I_{L(\text{avg})} + \Delta I_L = 45.83 \text{ mA} \), which is also the peak current of the switch. By substituting the data into formula (7), \( L = \frac{(V_I - V_S)D}{\Delta I_L f} = 39.0 \text{ mH} \) is obtained.

Considering the margin and the convenience of winding, we take \( L_3 = 50 \text{ mH} \).

3.3. Calculation and Selection of Capacitors. In continuous operation mode, the selection of capacitors must meet the following conditions [19]:

![Figure 4: Relationship between resistance \( R_T \) and frequency \( f \).](image)

![Figure 5: Relationship between capacitance \( C_T \) and dead time.](image)
\[ C \geq \frac{I_0 \times D}{f \times \Delta V} \]  

In the formula, \( \Delta V \) is the ripple voltage of the capacitor, because the output is 100 V, considering that the output voltage will directly act on the human body, the output ripple noise is best controlled within \( \Delta V = 1\% \). By plugging the relevant data into the formula, we calculate and derive \( C \geq 1.37 \mu F \).

The equivalent series resistance (ESR) of the capacitor is calculated as shown in formula.

\[ \text{ESR} \leq \frac{\Delta V_0}{(I/1-D) + (\Delta I/2)} = 1.2. \]  

According to the ESR and the calculated minimum value of the capacitor, the capacitor is selected. Finally, the capacitor \( C_{11} \) is selected as 2.2 \( \mu F \), and the withstand voltage value is 400 V, so that the peak voltage is within the withstand voltage range to ensure the safety of the circuit.

### 3.4. Selection of Switches and Diodes

After the above calculation, the peak current of the switch tube is 45.83 mA. Considering other factors such as withstand voltage, IRF640 is selected as the boost switch. The drain and source withstand voltage of this type of switch is as high as 200 V, the on-state resistance (\( R_{ds} \)) is only 0.4 \( \Omega \), the drain current \( I_D \) can reach 9.2 A, and the on-time is 170 ns, which can fully meet the requirements of this design.

When selecting a diode, it is necessary to consider whether its hardware parameters such as withstand voltage, maximum current, conduction time, and maximum frequency meet the design requirements. After research, 1N4003 is selected as the diode in the power supply part. Its maximum withstand voltage value of 200 V and the maximum allowable current value of 1 A can meet the design requirements and prevent reverse breakdown.

### 3.5. Calculation of Voltage Divider Resistance

When the load resistance changes, the 100 V output voltage is likely to be changed. The chip needs to adjust the pulse width and change the duty cycle to restore the output voltage to the normal value. Therefore, it is necessary to design the resistors \( R_{18} \) and \( R_{21} \) to divide the voltage, so that the 2.5 V \( V_{fb} \) can be fed back to the UC3843 and compared with the reference voltage. We take \( R_{21} = 1 \) k\( \Omega \). According to the formula:

\[ \frac{R_{21}}{R_{21} + R_{18}} = \frac{V_{fb}}{V_0} \]  

We can get \( R_{18} \) to be 39 k\( \Omega \).

### 3.6. Design of PI Adjustment Compensation Circuit

To make the value of the feedback voltage more accurately and also to allow UC3843 to more accurately adjust the pulse width and duty cycle, so that the switch \( G \) pole of the switching power supply circuit can generate the required on-off waveform, this design designs a proportional-integral adjustment circuit (PI adjustment circuit) around pin 1 of the chip. It consists of resistance \( R_{19} \) and capacitance \( C_{15} \). According to the design experience of similar circuits, the value of \( C_{15} \) is 10 nf, and repeated experiments are carried out by inserting a sliding varistor, and the resistance value of \( R_{19} \) is determined when the \( G \) pole generates an on-off waveform to meet the requirements. The final value of \( R_{19} \) is 160 k\( \Omega \), and the output of the \( G \) pole of the switch tube measured by the oscilloscope is shown in Figure 6.

To supply the 5 V power of the microcontroller and peripheral circuit chips, a step-down circuit needs to be designed to convert the 12 V input voltage to 5 V. This design uses the LM2596S chip to design a step-down circuit. As shown in Figure 7, the circuit is composed of four peripheral devices such as general inductors and diodes in conjunction with the chip. The structure is simple and the cost is low.

Before designing the low-pass filter, the principle of sine wave pulse width modulation (SPWM) is introduced. The positive half cycle of a full sine waveform is divided into \( n \) equal parts. If each aliquot is considered a pulse, it will have a pulse width of \( \pi/n \), but its amplitudes will vary sinusoidally. However, pulses with equal and unequal shapes have the same effect when loaded on the same object with inertia. Therefore, if the \( n \) equal pulses of the positive half cycle of the sine wave are replaced by rectangular pulses, the center lines corresponding to the two pulses are kept coincident, and the amplitude of the rectangular pulse is specified as a fixed value, allowing the pulse width to change. Under the above conditions, ensuring that each rectangular pulse has the same area as the corresponding sinusoidal pulse within the response interval, a set of PWM waveforms with sinusoidal pulse widths can be obtained, as shown in Figure 8. Such PWM waveforms are called SPWM waveforms. For the negative half cycle of the sine wave, the negative SPWM can also be generated according to the above principle, to obtain a bipolar SPWM waveform. It can be seen that the essence of the SPWM waveform is still a PWM waveform. The amplitude of each pulse is equal but the pulse width is unequal, and the pulse width keeps changing according to the sinusoidal law. It overcomes the shortcomings of pulse width waveforms such as PWM and...
achieves frequency adjustability. Therefore, it has been widely and maturely used in the field of inverter and single-chip design.

The PWM triangular wave generated by the single-chip microcomputer is used as the carrier wave \( U_c \), and the sine wave whose frequency is much lower than the triangular wave is used as the reference wave \( U_r \). By modulating the sine wave to make the two intersect, the duty cycle of the obtained output pulse also has the law of sinusoidal variation, as shown in Figure 9.

It can be seen that the output voltage \( U_0 \) is centrosymmetric in the \( 2\pi \) period and axi symmetric in the half period. Therefore, the Fourier expansion of the output voltage is:

\[
U_0(t) = \sum_{n=1,3,5...} A_n \sin n\omega t,
\]

\[
A_n = \frac{2}{\pi} \int_0^\pi U_0(t) \sin n\omega t \, dt.
\]

Due to the symmetry of the graph, the output voltage \( U_0 \) can be regarded as the combination of two square waves with amplitude \( U_i \) and frequency \( f \) on the positive and negative half cycles. The first negative-going pulse starts at \( a_1 \) and ends at \( a_2 \), and subsequent positive-going pulses start at \( a_2 \) and end at \( a_3 \). Therefore,

\[
\begin{align*}
A_n &= \frac{2}{\pi} \left[ \int_0^\pi U_i \sin n\omega t \, dt - \int_{a_1}^{a_2} U_i \sin n\omega t \, dt \\
&\quad - \int_{a_2}^{a_3} U_i \sin n\omega t \, dt - \cdots - \int_{a_{2p-1}}^{a_2p} U_i \sin n\omega t \, dt \right] \\
&= \frac{2U_i}{n\pi} \left[ 1 - \sum_{k=1}^{\infty} \left( \cos na_{2k-1} - \cos na_{2k} \right) \right].
\end{align*}
\]

Substituting into formula (12), we get:

\[
U_0(t) = \sum_{n=1,3,5...} \frac{2U_i}{n\pi} \left[ 1 - \sum_{k=1}^{\infty} \left( \cos na_{2k-1} - \cos na_{2k} \right) \right] \sin n\omega t.
\]

It can be seen that the obtained output \( U_0 \) has a large number of high-order harmonic components, and these high-order harmonics will seriously distort the sinusoidal waveform. Therefore, a low-pass filter (LPF) needs to be designed to filter out the high-order harmonics in the output.

The normalization method is a parameter calculation method commonly used in the design of LPF. The so-called normalized LPF refers to the calculation of the parameters of the target filter based on the LPF of the characteristic impedance of 1 \( \Omega \) and the cutoff frequency of 1 rad/s (=0.159 Hz). First, it determines the parameters of the normalization method. According to the demand, the highest frequency of SPWM in the treatment mode is 100 Hz. In this design, the output loss is expected to be 3 dB in the state of 300 Hz, that is, the response amplitude at 300 Hz is attenuated to 0.707 times the amplitude of the output at 100 Hz. However, the loss is 20 dB at the extreme maximum frequency of 1000 Hz of low-frequency physiotherapy, that is, the response amplitude is attenuated to 1/10 of the original value. At this point, the normalized angular frequency is \( \omega' = 1000/300 = 10/3 \), and the loss is \( x = 20 \) dB, which is substituted into the formula:

\[
n = \frac{\log \left( 10^{0.1x} - 1 \right)}{2 \log \omega'}
\]

We get \( n = 1.908 \). Here \( n \) represents the number of reactive components required, so a second-order LC filter
consisting of an inductor and a capacitor can meet the design requirements. The characteristic impedance of the LC filter generally needs to be determined according to several factors such as the internal resistance of the output source, the load resistance, and the characteristic impedance of the reference filter. In this design, to improve the input resistance and load capacity, an emitter follower is added to the filter, and the output is connected to the acupoints on the surface of the human body. According to the above, the output resistance can be determined to be about 10 kΩ. Considering it comprehensively, take K as 200, \( L_{\text{base}} \) and \( C_{\text{base}} \) as 1H and 1F. According to the above data, substitute the relevant formula of the normalization method for calculation.

\[
M = \frac{f_1}{f_2} = \frac{300}{1/2\pi} = 1883.24.
\]

In the formula, \( f_1 \) is the cutoff frequency of the filter to be designed (Hz); \( f_2 \) is the cutoff frequency (Hz) of the reference filter.
\[ L_{\text{new}} = \frac{K \times L_{\text{base}}}{M} = 106.2 \text{ mH}, \]
\[ C_{\text{new}} = \frac{C_{\text{base}}}{M \times K} = 2.65 \mu\text{F}. \]

To facilitate the selection of common standard parts to build the circuit, the value of the inductance in the LC filter is 100 mH, and the value of the capacitor is 2.2 \( \mu \text{F} \). Since the output current is only up to 5 mA, the inductors can be made by winding thin 0.1 mm diameter copper wires on manganese, zinc, and ferrite alloys. The fabricated inductor has the advantages of high magnetic permeability, high magnetic flux density, and high efficiency. In addition, customized inductors can also be used directly. The output waveform filtered by LPF will directly act on the human body and will no longer be specially grounded. Therefore, it is necessary to choose a capacitor type that can withstand frequent polarity changes. Therefore, this design uses a CBB capacitor commonly used as a starting capacitor for AC motors.

4. Analysis of Public Mental Health Status and Exploration of Social Anxiety in the Context of Epidemic

After constructing the above hardware system, the analysis of the mental health of the public and social anxiety in the context of the epidemic is carried out to explore the effectiveness of this system. First of all, this article studies the effect of the system in the analysis of public mental health status, obtains data from the survey, processes the data through the system, and obtains the results shown in Table 1.

It can be seen from the above research that the system proposed in this article can play a certain role in the analysis of public mental health under the background of the epidemic. On this basis, this article conducts analyzes social anxiety in the context of the epidemic and obtains the results shown in Table 2.

It can be seen from the above research that the system proposed in this article can play an important role in the analysis of social anxiety in the context of the epidemic and has a certain supporting role in the psychological counseling of the social masses in the epidemic.

5. Conclusion

The public awareness of the basic knowledge of COVID-19 and how to deal with it need to be further improved, but they still lack the ability to convert knowledge into active preventive behaviors, and the anxiety of the public is relatively serious. For the whole society, large-scale anxiety and stress will cause panic, leading to the emergence of unhealthy behaviors, that have a negative effect on the development of the disease and the outcome of the disease, and even cause social security turmoil. Therefore, improving public health awareness, preventive behavior, and psychological state are conducive to curbing the spread of public health emergencies and infectious diseases in my country, and at the same time slowing down the occurrence and development of the high incidence of chronic noncommunicable diseases. This article analyzes the mental health status of the public under the background of the epidemic and explores social anxiety by combining intelligent analysis methods. The research results show that the system proposed in this article can play an important role in the analysis of mental health and social anxiety in the context of the epidemic and has a certain supporting role in the psychological counseling of the social masses in the epidemic.

Data Availability

The labeled dataset used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares no conflicts of interest.

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