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Exploration and Research of Intelligent Headband and APP Design Based on Brainwave Sensor

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Abstract: Amyotrophic lateral sclerosis (ALS), commonly known as frostbite, is one of the five end-stage diseases recognized by the World Health Organization (WHO). There are more than 200000 people suffering from ALS in China, most of whom are 30-60 years old. These diseases are major problems that plague most patients and nursing care. The front end of such technology is basically used in military and scientific research. The civil EEG application market is very wide, with tens of thousands of people in demand in China. Based on this, through the "Internet+AI+Medical Devices" model, it provides a dedicated communication platform for aphasia patients and their families.

Keywords: Emotion-intelligent headband based on brainwave sensor

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1. Project introduction

In recent years, with the gradual increase of patients with Alzheimer's disease and the number of patients with Alzheimer's disease, more and more people are concerned about this disease, which can only survive by thinking but can not be controlled by the body. The maintenance of these patients has always been a major problem for most patients and nursing care. Although the thinking of these patients is still active, they cannot communicate with others due to physical reasons. In order to make up for the connection between such patients and the outside world, the headworn EEG catcher, as a new technical means, establishes a simple information exchange between patients and the outside world. Based on this, the group will provide an exclusive communication platform for aphasia patients and their families through the mode of "Internet+AI+medical equipment".

2. Research contents

2.1 Product design

"Emotion - intelligent headband based on brainwave sensor" is a headwear design. The built-in EEG detection device and reading device are new products in the era of artificial intelligence. The product can distinguish the brain activity of the patient through a series of brain waves, and then output corresponding instructions for communication control. The helmet also has built-in massage facilities, which can help relax the patient's brain and make the experience more comfortable. Built-in infrared connection can connect similar products. In addition to the black thermoplastic rubber, the product frame is provided with a removable frame of various colors (such as red, yellow, blue, etc.) for users to choose and replace. In addition, we have also designed a charging box that matches the product. The charging box is made of metal elements, and uses laser jet code to print various patterns and signs to meet the personalized needs for consumers to purchase. The main features of the product are: (1) It integrates multiple functions and has multiple functions, which can meet various needs of users. (2) Convenient to carry; At the same time, the curved design also makes users more comfortable to wear. (3) The product form is novel, the frame can be removed and replaced, and the charging box supports customization, which can meet people's pursuit of personalization in the new era.

2.2 Product function

Product function plays a leading role in the design of headworn EEG catcher. A product should first achieve specific functions to meet the user's needs. The functions of the headworn EEG catcher can be divided into basic functions and additional functions. After analysis and research, combined with the actual needs of users, the headworn EEG catcher can complete the following functions: (1) translate and convey information; (2) Heartbeat detection function; (3) Data record; (4) Daily health; (5) Community knowledge exchange.

3. Innovation points and project characteristics

The "smart headband" is not a brainwave monitoring product. Like the sports bracelet, it just "simplifies the instrument and turns it into a headband". The head band is mainly used to solve the language needs of the aphasia, and the core principle is neural feedback training.

Brain-computer interface technology has existed for many years and is an effective way to improve concentration. Its full name is Brain-Computer Interface (BCI), which can read brain nerve signals and use programs to convert these signals into actions. They are defined as "biofeedback training". The performance mode is to show the concentration, relaxation and other related information of the device wearer's brain in a chart, and then set the corresponding goal, requiring the user to adjust the brain wave performance through emotional adjustment and psychological intervention to achieve the goal, thus forming a positive textual feedback.

The form of brain-computer interface can be divided into non-invasive (also called non-invasive), semi-invasive and invasive (also called implantable) according to the acquisition position in the brain. The human brain is composed of scalp, skull, dura mater, arachnoid membrane and cerebral cortex from inside to outside. The non-intrusive mode (EEG) only works on the scalp. Considering the safety issues, this product is non-intrusive. The non-invasive monitoring information is slightly biased, but the written expression can meet the needs of patients, so as to communicate with aphasia patients through software.

The product is an integrated headband body composed of an elastic inner sleeve and an elastic outer sleeve. A flexible electrode piece is arranged between the elastic inner sleeve and the elastic outer sleeve. The elastic inner sleeve is equipped with an electrode piece corresponding to the fitting surface of the flexible electrode piece. The outer side of the elastic outer sleeve is equipped with a power connection host. A flexible conductor wire is arranged between the flexible electrode piece and the power connection host, The power-on host is equipped with a power supply and an EMG controller for EMG stimulation control to the flexible electrode. There are three flexible electrodes between the elastic inner sleeve and the elastic outer sleeve, one of which is used to match the back of the brain, and the other two are used to match the temples.

4. Intelligent headband and App design

4.1 Smart head clamp

The interaction mode of EMotion-smart headband based on brainwave sensor is only limited to aphasia passing ideas to the outside world through software. Patients wearing EMotion-smart headband based on brainwave sensor can communicate with the outside world through EMotion-smart headband based on brainwave sensor and its corresponding software, or through EMotion-detection device inside smart headband based on brainwave sensor, Measure the patient's heart rate and other health status, and cooperate with the software to monitor the patient's physical status in real time. The accompanying staff can obtain the thoughts of the patient after the brain wave translation through the corresponding software, so as to provide better care. And caregivers can also check the real-time status of patients with other caregivers' mobile phone software. Through wireless network connection, patients' information and ideas can be obtained anytime and anywhere. Through the connection between patients and caregivers, Emotion - intelligent headband based on brainwave sensor can provide aphasia with communication channels with the outside world.

4.2 APP design

The brain wave catcher uses the way of translating the patient's brain waves to present the patient's thoughts and conversations to the caregivers' mobile phones through mobile phone software, so as to provide better care for the patients.

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5. Conclusion

The brain wave catcher uses the way of translating the patient's brain waves to present the patient's thoughts and conversations to the caregivers' mobile phones through mobile phone software, so as to provide better care for the patients. In this regard, through the understanding of aphasia patients and the analysis of aphasia by social groups, we need to pay attention to many aspects in the product positioning of intelligent communication headband and product external communication. The management and improvement of aphasia disease can be realized by detecting users' own physiological data and signals. Personalized detection and improvement of the health status of aphasia patients.

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