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НОСИМЫЕ УСТРОЙСТВА ДЛЯ КОНТРОЛЯ СОСТОЯНИЯ ЗДОРОВЬЯ

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В настоящее время с информационные технологии развиваются с небывалой скоростью, что также отражается на сфере здравоохранения. Необходимость постоянно следить за показателями нашего физического состояния и здоровья привела к такому феномену как носимые устройства для контроля состояния здоровья. Данная работа посвящена обзору таких устройств, их возможностям и тенденциям.

Ключевые слова: носимые устройства, мониторинг здоровья, инновации.

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WEARABLE HEALTH MONITORING DEVICES

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Currently, information technology is developing at an unprecedented rate, which also affects the healthcare sector. The need to constantly monitor the indicators of our physical condition and health has led to such a phenomenon as wearable devices for health monitoring. This work is devoted to an overview of such devices, their capabilities and trends.

Key words: wearable devices, health monitoring, innovation.

In recent years, due to the development of the internet, smart equipment, and big data, wearable technologies have seen rapid growth in various fields, including healthcare, education, culture, social media, and the military. These technologies are now becoming an integral part of daily life in the form of devices such as smartwatches, smart bands, arm bands, and glasses. In the healthcare sector, wearable devices, such as portable medical or wellness gadgets that can be worn on the body, are used for perception, recording, analysis, monitoring, and intervention to maintain health. They can even be utilized to treat illnesses with the assistance of various identification, sensing, connection, cloud-based services, and data storage technologies.

Wearable devices are advanced analytical units that incorporate sensitive physical, chemical, and biological sensors, capable of non-invasively and continuously monitoring vital physiological parameters. Recent developments in fields such as electronics, computing, and materials science have resulted in the creation of affordable and highly sensitive wearables, which are regularly employed to monitor and manage health and wellness. In conjunction with longitudinal monitoring of physiological indicators, wearables have the potential to revolutionize the early detection, diagnosis, and management of various clinical conditions.

Objective

To analyze the latest achievements in the field of molecular biology and the presentation of a modern review of the influence of molecular processes on various biological processes and diseases.

Material and methods

Medical journals, Internet resources, observation and fact-finding, analysis, and synthesis.

Results and discussion

As a standard medical intervention, wearable devices possess five key characteristics:

1. Wireless connectivity;
2. Interactive and intelligent functionality;
3. Environmentally friendly and durable design;
4. Simple operation and miniaturized form factor;
5. Wornability and portability.

From the perspective of modern medicine, the utilization of wearable technologies aligns with the 4Ps of medical care, which encompasses preventive, predictive, personalized, and participatory approaches. [5].

Today, a variety of wearable systems have been developed for broadband operation. These include micro sensors that can be seamlessly integrated into textiles and consumer electronics embedded in fashion garments. Computerized watches and personal computers (PCs) that can be worn on a belt, with a display mounted on the head or glasses, are also available. The field of wearable health monitoring systems is progressing towards smaller devices that measure more vital signs, using smartphone technology to transmit reliable and secure data [2].

Wearable devices, which have already established themselves as fitness and wellness tracking devices, have also shown to be reliable and cost-effective clinical tools for gaining a better understanding of changes in health and disease by means of objective and continuous monitoring of vital physiological parameters. As the percentage of the adult population in the United States who are already using wearable devices approaches 30% and is continuing to increase, wider consumer adoption presents new opportunities for the healthcare industry. Wearable devices can be particularly useful outside of the clinical setting in various areas, particularly in relation to cardiometabolic conditions, infectious diseases, and mental health [1].

In 2019, according to estimates by the World Health Organization, approximately 970 million people globally, or about 1 in every 8 people, experienced mental disorders. Anxiety and depression were the most prevalent conditions, affecting approximately 301 million (3.95%) and 280 million (3.59%) individuals, respectively. In the United States, one in five adults experience a mental disorder and the lifetime prevalence of these disorders is estimated to be 46.4% of the population [6].

Wearable devices, through passive and continuous monitoring of physiological and behavioral indicators in real-time, have the potential to provide a more objective assessment of mental health conditions, while also creating new opportunities for early detection and treatment at lower costs than traditional methods [4].

Cost

The cost of wearable devices may present challenges for individuals with lower socioeconomic status in accessing them, and could lead to new health inequalities if used indiscriminately. Public and private insurance schemes need to introduce cost-based reimbursement schemes, considering outcomes such as increased physical activity and lifestyle modifications. In addition to sensor accuracy, continuity monitoring is also a critical performance characteristic that is reduced by repeated disruptions due to short battery life or, even, abandonment of use due to irritation, discomfort, or other dissatisfaction [7]. Increasing the battery life, portability, accuracy of sensors, and ease of use will enhance utility, increase sample rates, and promote widespread participation in resource-limited environments.

Data security

Data security and protection of sensitive medical and personal information necessitate the use of appropriate encryption, authentication, and privacy controls [3].

Conclusion

In conclusion, I would like to say that the analysis makes it clear that medical wearable devices will help in the implementation of the treatment of chronic diseases, prevention of cardiovascular and respiratory diseases.

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