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A HEALTH GUARD FOR VR GAMER

HP INC

A health guard for VR gamer

Abstract

VR gaming is high concertation and immerse, so people is easy to forget his physical conditions. We usually got news that persons get sudden faint due to epilepsy or some dangerous physical condition while in metaverse. For this, we provide a health monitor and a method to help to protect user while he/she is in Metaverse. We detect local epileptic responses by measuring changes in the sympathetic nerve and body hormones and ions including adrenal corticosteroid, sodium ions, potassium ions and from the indicator to provide one algorithm to trigger the mitigate method to protect the user.

Method

When the body feels physically, emotionally, or cognitively excited or depressed, the sympathetic nervous system begins to be active. During seizures, sympathetic activity in specific areas of the brain increases significantly. In human and animal experiments, we have learned that epilepsy affects the regulation of heart vessels by the autonomic nervous system. This disorder increases the pathogenicity and mortality of epilepsy patients.

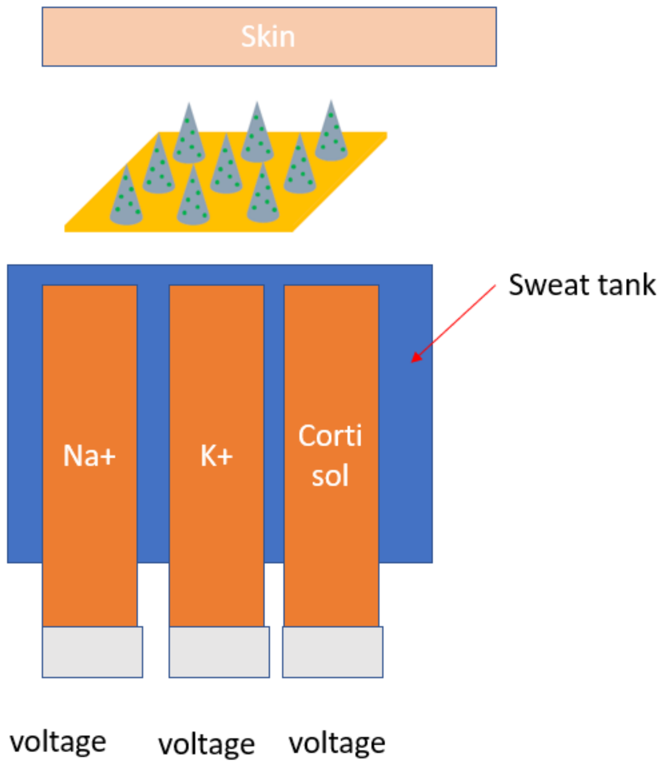
The autonomic nervous system consists of two branches: the Sympathetic nervous system and the Parasympathetic. When the human body is excited, undergoes an important event, or is under pressure, the sympathetic nervous system is activated as a result, and this activation of the sympathetic nervous system is related to the secretion of sweat glands on the surface of our skin, because the skin is only innervated by the sympathetic nerve.

The neuroendocrine system is the main pathway for stress-induced psychosomatic changes. The hypothalamus integrates the psychosomatic response, secretes adrenocorticotropin release hormone corticotropin releasing hormone CRH acts in the pituitary gland secretes adrenocorticotropic hormone ACTH, which in turn prompts the pararenal glands to secrete cortisol. the cortisol is so-called stress hormone. We collect skin fluids at different points in the day and then detect the levels of each of these indicators. The following is the structure of the disclosure.

We use sensors made of plastic material as an interface to the skin, while silicon chips on flexible circuit boards perform complex signal processing; The sweat sensor array contains two metabolite sensors to detecting the nephrotic corticosteroid and lactic acid and sensors to detect sodium ions and potassium. There are tiny holes in the bottom of the sensor, and sweat can flow through complex valves through passages about the width of human hair, into tiny reservoirs.

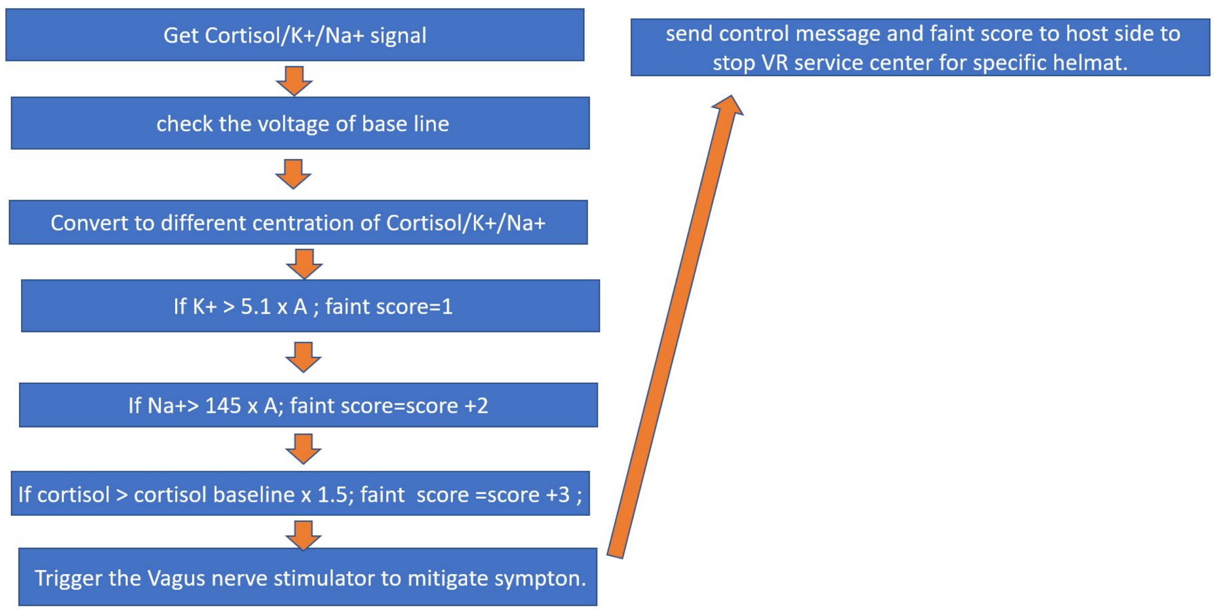
Each memory contains a sensor corresponding to the chemicals in the body fluids. Medical experiments have confirmed that the human body does not feel the sensation of a microneedle piercing into the skin under 0.095 mm.

We use probe arrays to measure by sub-stratum corneum composition of tissue fluids. The method of sensor detection of biomolecules is to adhere to the molecules on the surface of silica, and the adhesion of the biomolecules causes the surface pressure to cause the cantilever beam to bend or the surface electric field to change, resulting in a change in the capacitance of the cross electrode.



A change in capacitance due to a change in the surface electric field during antibody/antigen binding. A new type of sensor that senses the magnitude of the change in capacitance and is expected to be miniaturized and can accurately measure the capacitance. The capacitive biomedical sensor directly measures the capacitance of the cross-electrode type structure, and the voltage signal is obtained from the output of the circuit, and the capacitance change can be known.

Through surface chemical treatment and modification, when the gold nanoparticles are modified on the surface of the silica on the cross electrode, the change in capacitance will be caused by the change of the surface electric field, and then the capacitance change signal will be converted into a voltage signal through the sensing circuit. The following is the function flow which refer to the medical principle as well as our experience.



Tracking fluctuations in cortisol levels is important for understanding the body's endocrine response to stressful stimuli. We use transistors and electrodes made of graphene to measure the concentration of cortisol. Graphene aptamers are short fragments of single-stranded DNA or RNA that can bind to specific compounds.

When it encounters cortisol, it immediately captures the hormone, folding these chains up so that the charge is closer to the electrode surface. The sensor then detects the charge and is therefore able to measure the concentration of cortisol.

In addition to cholesterol, potassium and sodium ion concentrations in the blood are also important indicators of sudden death from fainting. Normal serum potassium concentrations are 3.5 to 5.0 meq/L, and hyperkalemia is seen if serum potassium concentrations greater than 5.1 meq/L. Common symptoms Muscle weakness and paralysis, arrhythmias. If you rise to 7 meq/L, you usually feel weak, your pulse slows, and if you reach 8.0 meq/L, you are at risk of cardiac arrest and sudden death.

Early signs of high sodium concentrations include extreme thirst and weakness. In severe cases, patients may experience unconsciousness, muscle spasms, and bleeding in or around the brain itself. Normal serum sodium concentrations should be between 135 and 145 mmol/L while hypernatremia is usually defined as serum sodium concentrations greater than 145 mmol/L. Severe hypernatremia is usually a serum sodium concentration greater than 160 mmol/L.

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