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Immersive Technology for Connecting Human Conscious into Computer - Nerve Access

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ABSTRACT :Consciousness is an individual awareness of memories, feelings, sensations, and environments. Consciousness is an awareness of yourself and the world around you. Consciousness emerges on the interface between three components of animal behaviour that are communication, play and use of tools. Five human senses are Sight, Sound, Smell, Taste, and Touch. These senses are basic which gives information about the environment to the brain. Human response and knowledge of the environment can be manipulated with the help of human senses. Converting human senses into computer programs and vice versa is an easy way to connect ourselves. It creates an immersive technology and new way of connection to the digital world. Virtual Reality is currently used technology to create an immersive environment which uses sound and visualisation to experience virtual reality. Virtual Reality uses two of the human senses to create a virtual environment by adding the remaining human senses will lead to create the next level in this technology.

I. INTRODUCTION

Nerve Access is the technology where our brain plays a major role in it .Everyone of us will have a different imagination, what if they all come true? What if you can create your own dream world? It is possible with help of nerve access.The neurotransmitters are created by an electrostatic impulse known as the Action Potential. Brain Machine Interface (BMI) is a communication system that allows a direct connection between the brain and peripheral devices and systems. Unlike traditional communication systems that rely on peripheral nerves and muscles, BMI uses brain activity to command, control, actuate, and communicate with the world. This direct integration with the brain allows for faster and more accurate communication without the traditional output pathways[3].

Similarities between human brain and computer brain:Brain receives information in the form of nerve impulses which reach the spinal cord through sensory neurons .These impulses are transmitted to the brain through the interneurons of the spinal cord. Receptor senses the environment and produces the chemical signals which change the electrical activity of the cell. The electrical impulse was transmitted with the help of neurons and reached the brain. In computer hardware units produce signals and the signals convert into electrical signals and reach the CPU. Both humans and computers use electrical signals to transmit data.

II. WORKING

Nerve access is divided into 3 units.

I. Visual unit

How Visual System Organized

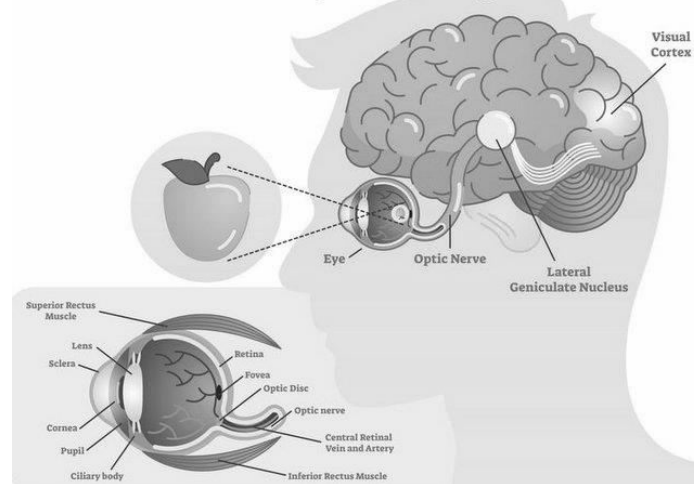


Fig2: Visual system

Light falls on the retina, where the retina converts the light into an electrical impulse which is done in the input layer of the neural network. A series of ultra thin electrodes are placed in the optical nerve which give an electrical impulse to the brain. By connecting electrodes to a computer which generates the pattern of the visual signals and sends it to the optical nerve with the help of electrical signals with limited voltage. In this process users can create their own visualisation and see through visuals even if their eyes are closed. By analysing the pattern of impulse created by the optical nerve and recreating the pattern of the signals is one way to artificially create visuals. Visual unit is a single way communication unit which only sends electrical impulses to the brain.

II. Sound unit

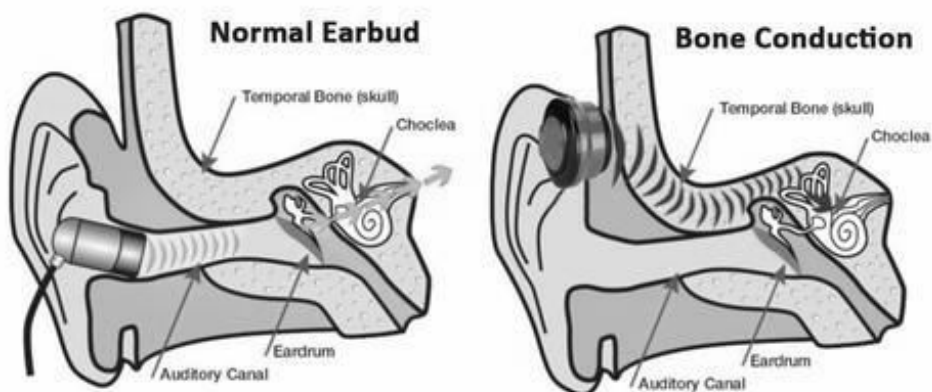


Fig3: Difference between normal and bone conduction

Normal ear phones use air as a medium for transporting sound but bone conductivity ear phones use solid as a medium to transport the sound. Which is the efficient way to achieve sound transmission. This technology is already created and implemented in various fields[4].

III. Touch unit

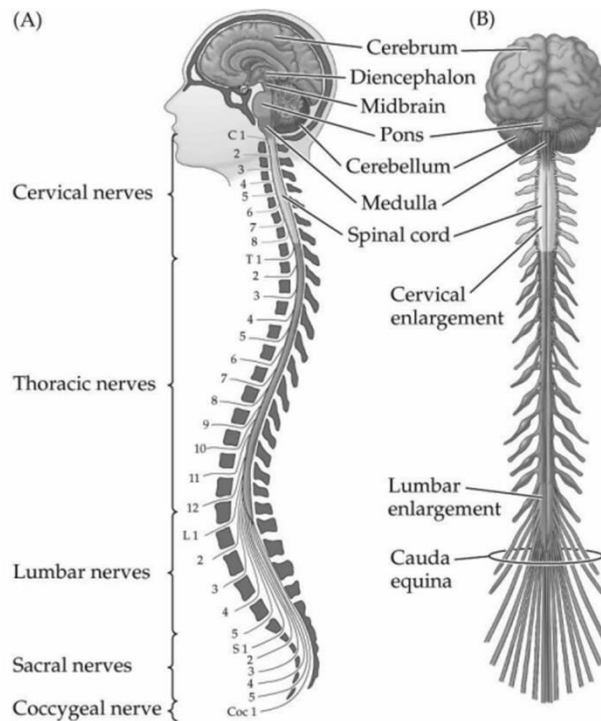


Fig4: Image of spinal cord

The brainstem connects the brain and the spinal cord. By placing a mesh of electrodes in the region of the brainstem we can access the in and out signals of the brain and body. Ultra thin polymers which consist of electrodes are placed in this region to access the motor commands and touch senses[1]. This is the only unit which consists of human to computer transmission and vice versa. The signals gathered from the electrode are sent to the computer and processed with help of Brain-Machine Interfaces(BMI) and the data is converted into electrical signals as ones and zeros. The touch data in the computer is converted into electrical impulse and transmitted via electrodes in an regulator manner which produced an illusion of an object to the brain and this process did not affect the human organs. Brain-Machine Interfaces uses fine thread like structure which directly connected to brain tissues and collect electrical signals from grey matter. By changing the position of electrodes in the brainstem, the risks were reduced. To send the information to the brain the reverse Brain-Machine Interface(BMI) technique is used.

III. LITERATURE REVIEW

Brain-Machine Interface (BMI) is used to transfer signals through electrodes from the brain to the computer. The transferring of signals from the optical fibre will be in lesser bandwidth but we need higher bandwidth to transfer the signals from brain to computer. Neuralink can be used to transfer the signals from the brain to a computer with higher bandwidth[1]. This can be done with the help of direct connection to the brain and electronics which are built around Neuralink's chip known as application specific integrated circuit (ASIC). Brain Computer Interface (BCI) in which a brain chip is placed directly to the brain and the signals are transferred to the computer. The electrodes are used to receive signals from the brain[1]. Which has more risk to place directly to the brain that's why electrodes can be placed

in the brainstem located in the spinal cord this will reduce the risk. Brain-Machine Interface and Brain Computer Interface are only aimed for disabled people with high risk[3]. By combining these three units of nerve access the Virtual Reality is pushed to the next generation which introduce new technology in the field of entertainment. By placing the electrodes in the brainstem will make the process easy. Reverse engineering process of Brain computer Interface creates Computer Brain Interface[4]. Computers can send signals to the brain and it can react to the signals. By this process a fully immersive virtual environment is created and users can access the environment. This process can be implemented in Entertainment purposes. The disabled people who are in a rest position can experience a fully immersive virtual world.

IV. CONCLUSION

Computer Brain Interface integrates with Brain-Machine Interface to create a complete bridge between human and computer. By implementing this system into virtual reality which makes creation of a user own virtual environment becomes an easy one. This development can create a new way of environment and users can enjoy their own reality by keeping their body at rest. By enjoying their own reality, stress will be drastically reduced and they feel fresh. Nerve access will not affect the human physical body and human organs because they do not have direct connection with the brain. Compared to Neuralink the data process rate will be reduced because the electrodes are not directly placed in the brain[1]. Well trained person can only handle the connection of the system with the human body. The risk of paralysis is high in this process.

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