

Idea Presentation

Project Title: Human Vision Extractor.

Introduction

The eye contains over two million working parts and is considered the second most complex organ in the body and the most complex is the brain.

In order to produce a clear image, the eyes must complete a five step process:

(i) Light enters the eye through the cornea

When we look at an object, the light that is reflected off of the object enters the eye through the clear front layer of the eye, called the **cornea**. The cornea bends the light before it passes through a watery substance that fills the area behind the cornea, called the **aqueous humor**.

(ii) The pupil adjusts in response to the light

The light continues to travel through the black opening in the center of the iris, called the **pupil**. The **iris** is the colorful part of your eye that gives it its blue, green, hazel, brown or dark appearance. The pupil then automatically gets bigger or smaller, depending on the intensity of the light.

The iris is actually made up of muscles that expand and contract to control the pupil and adjust its size. So when you see your pupil getting bigger or smaller, it is really the iris that is controlling the pupil opening in response to the intensity of light entering the eye.

(iii) The lens focuses the light onto the retina

The light passes through the pupil to the **lens** behind it. The lens adjusts its shape to bend and focus the light a second time, to ensure that you have a clear image of what you are looking at.

At this point, the light has been bent twice— as it moved from the cornea through the lens, and then from the lens to the retina. This “double bending” has actually flipped the image upside down.

(iv) The light is focused onto the retina

The light then passes from the lens to the back of the eye which is filled with a clear, gelatinous substance called the **vitreous** until it reaches the **retina**, the light-sensitive layer at the back of the eye.

The light is then focused throughout the retina which contains nerves called **photoreceptors**. The photoreceptors are made up of rods and cones, and are responsible for transforming the light rays into electrical impulses. While the light is focused throughout the retina, most of the light entering the eye is focused onto the **focal point** on the retina, known as the **macula**.

(v) The optic nerve transmits visual information to the brain

The nerves of the retina collect all of the electrical impulses, which then travel through the **optic nerve** at the very back of the eye up to the occipital lobe in the back of the **brain**.

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Objectives

The main concept of this project is to convert optical nerves signal into image or video and storing that to storage device.

Connection between eye and brain

Electrical impulses are communicated to the visual cortex of the brain by way of the optic nerve. The visual cortex makes sense of the electrical impulses, and either files the information for future reference or sends a message to a motor area for action.

That's the signal we need to extract vision.

Bionic vision system

The bionic vision system consists of a camera, attached to a pair of glasses, which transmits high-frequency radio signals to a microchip implanted in the retina.

Electrodes on the implanted chip convert these signals into electrical impulses to stimulate cells in the retina that connect to the optic nerve.

Human vision extractor

Our Human Vision Extractor device will do the inverse work of Bionic Eye. It will read the electrical impulses sent by optical nerves to the visual cortex of the brain. Then the device will convert the signal into electrical video signal and store that to storage device.

Conclusion

Human vision mainly converts the optical nerves signal which is electrical impulse into image or video.