

An Artificial Light for Blind

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Abstract - According to Thesaurus Vision is defined as special sensation; light; perceptions of light. With the invent of technology at its best from chip to smart phones to digital camera, the world can be seen at the nearby screen at home or at out palm. The paper explains to add light to the vision of blind with the help of technology which is fast expanding and exploring. When the computers can be give artificial sense with the help of Artificial Intelligence, why not the same technology can be used to complete the inability or capability of human. The technology itself now is digital, just a click and can be send can across the world, so the same technology can be used within human to give artificial vision. The technology used for visually impaired is in the mode of assistive technology which can only help but not remove the disability, so using the modern technology of the Digital World can replace the disability of the blind to see the light and the world. The digital camera can be used to take the real time images which can be converted to infrared signals that can be send to infrared sensors placed near the eye which sends signals to the chip which would stimulate the ganglion cells to produce signals similar to photoreceptors cells which can be implanted under the optic nerve or to the artificial retina which sends the electric signals to the brain.

Key Words: Vision, Optic Nerve, Eyes, Blind, and Microchip

1. Human Vision

The Human Eye is the sense organ ,the mammalian eye that allows Vision. Rod cells and Cod cells in retina allows color differentiation and light perception and perception of depth.

- [1]. http://en.wikipedia.org/wiki/Human_eye
- [2]. [http://en.wikipedia.org/wiki/Lens_\(anatomy\)](http://en.wikipedia.org/wiki/Lens_(anatomy))
- [3]. www.stlukeseye.com/anatomy/OpticNerve.html
- [4]. <http://www.healthline.com/human-body-maps>
- [5]. <http://www.bioon.com/bioline/neurosci>
- [6] <http://www.cubithealthcare.net>

1.1 Functioning Of Eye

Eye works like a camera, the light enters through a small hole called the pupil and is focused on the camera film like structure retina. The focusing lens focuses images from different distances on the retina. The amount of light is controlled by iris, the colored ring, which closes for bright and opens for dim light. The sclera covers the outside of the eye, a transparent sheet which allows light to enter the eye, the cornea. Ciliary body consist of ciliary muscles that controls focusing of lens automatically. Nitrous supply to the eye is given by vascular layer called choroid. The optic nerve transmits the image formed by retina to the brain.

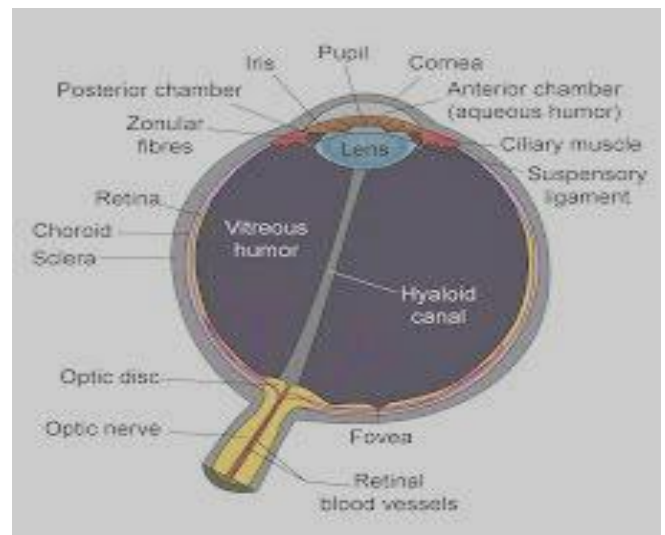


Fig -1: Functioning of Eye

1.2 Functioning of Optic Nerve

Optic nerve transmits to the brain electric impulses from the retina. It connects to the macula which is placed at the back of the eye. The back of the eye consist of optic disc. The optic nerve transfers visual information to the vision centers of the brain from the retina using electrical impulses. The optic nerve consists of ganglionic cells or nerve cells. Million of nerve fibers are also present in optic nerve structure.

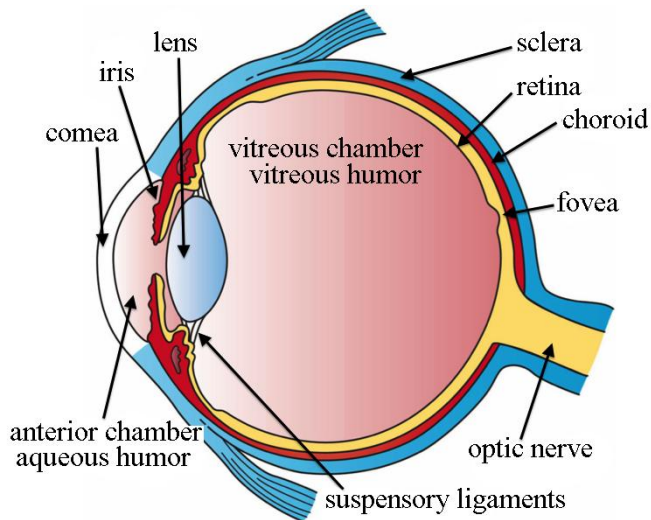


Fig -2: Functioning of Optic Nerve

1.3 Pathway of Vision

The photoreceptors in the retina generate vision, which is a layer at the back of the eye. The optic nerve sends the information through a partial crossing of axons which is called optic chiasm. After the chiasm, the axons are named as optic tract, which wraps around the midbrain to synapse the axons to get the LGN (Lateral Geniculate Nucleus). The LGN axons send the signals through the deep white matter called optic radiation of the brain, which is sent to the primary cortex situated at the back of the brain.

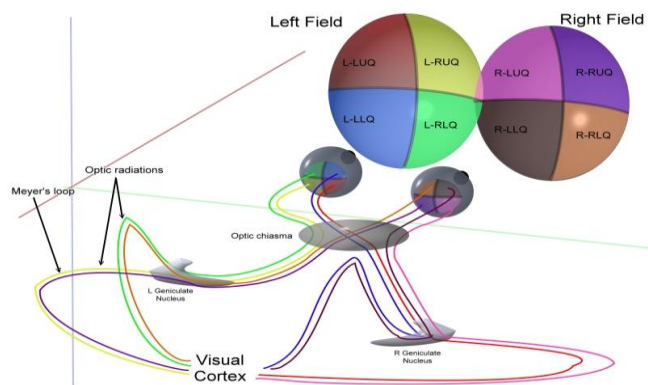


Fig -3: Optic Fiber Pathway

2. Digital Camera

A digital camera stores and records data in digital form, the data that are photographic image. The new technology allows to capture sound and video also. Captured technique of camera uses photo sensors using a Charged Coupled Device (CCD). The stored images can be

- [1] Uploaded to a computer
- [2] Can be archived on compact disc or external hard disk
- [3] Can be used to send data to IR sensors

- [1]. <http://www.libelium.com/video-camera-3g-sensors-stream-photo-video-to-cloud-for-security-military-applications/>
- [2] <http://searchmobilecomputing.techtarget.com/definition/digital-camera>

3. Infrared

Infrared is invisible electromagnetic radiation with longer wavelength than visible eyes. Infrared is emitted or absorbed by molecules when rotational movements are changed. It is used in many medical, scientific and industrial applications. IR is also used in astronomy to detect planets.

- [1] <http://en.wikipedia.org/wiki/Infrared>
- [2] <http://www.cubithealthcare.net>

Light comparison			
Name	Wavelength	Frequency (Hz)	Photon Energy (eV)
Gamma ray	less than 0.01 nm	more than 30 EHz	124 keV – 300+ GeV
X-ray	0.01 nm – 10 nm	30 EHz – 30 PHz	124 eV – 124 keV
Ultraviolet	10 nm – 380 nm	30 PHz – 790 THz	3.3 eV – 124 eV
Visible	380 nm – 700 nm	790 THz – 430 THz	1.7 eV – 3.3 eV
Infrared	700 nm – 1 mm	430 THz – 300 GHz	1.24 meV – 1.7 eV
Microwave	1 mm – 1 meter	300 GHz – 300 MHz	1.24 µeV – 1.24 meV
Radio	1 mm – 100,000 km	300 GHz – 3 Hz	12.4 feV – 1.24 meV

Table -1: Electromagnetic Spectrum

3.1 Infrared for Human

According to the International Team of Researches co-led by scientists at Washington University School Of Medicine In St.Louis has found that the retina can sense infrared light under certain conditions. Shorter the pulse, the more likely the person can see it. By packing in a short pulse, lot of photons by rapidly pulsing laser light make its two photons to be absorbed at one time by a single photo pigment and the combined energy of the two light

particles activate the pigment and allow the eye to see what normally is invisible.

4. Camera for the Eye

Infrared Digital Camera can be used to send the signals to the Infrared Sensors which can be implanted to send the signals to the chip placed under the optic nerve of the human eye and can be processed by the brain to get the sight.

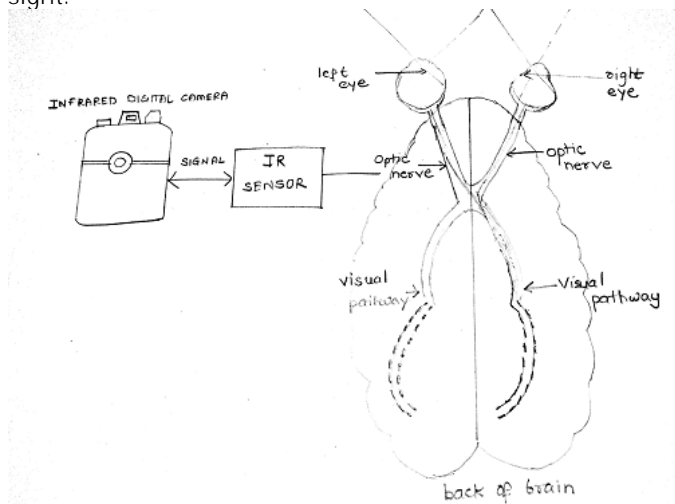


Fig-4 Technique

- [1] <http://www.clker.com>
- [2] <http://vtc.internshala.com>

5. CONCLUSIONS

The Near-Infrared can be used to send the electrical signals to brain for the blind to detect the image captured by the camera and send by the sensors to the chip.

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BIOGRAPHIES



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