

Development of Brain Port Vision Device

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ABSTRACT: In our world 280 million people are visually diminished. In which Approximately 30 million people are complete blind and remain of which approx. 240 million people are having low visualization. So here a new device which helps blind people to see. There is a lollipop shaped electric device or brain port device which capture picture using a small camera and formerly it convert the pictures into small angles on the tongue, then the tingles(Stings) are sent to the mind which also change the stings into images. Then Later some days, practicing by the persons who are blind now they were able to make some shapes, sign and also read letter. So using these unique resources, the goal is to make the device better and construct the device and re-establishing vision that will keep going for life for blind people. So, as blind people can read words, some blind people are now able to see objects . It is a device which convert images which was capturing by a small camera into a electrical stings, which can easily felt on tongue. And turn the tingles into picture.

KEYWORDS: Brain port vision device, Tongue Device, Electro tactile Stimulation for Sensory substitution.

I. INTRODUCTION

A lollipop shaped electric device allows a blind to see the objects and this is created by the scientists.



Fig 1: Position of Brain Port device

The machine is named the Brain Port device and manufactured by Wicab, Inc, a biomedicine engineering company based in Middleton Wisconsin in United States. It relies on sensory replacement in which one sense is broken then the part of brain that might control that sense will learn alternative operate. The more than one frequencies that lift sensory records to our brain, collecting the information from our body parts like eyes ear as well as skin etc. For replacement of channels, we need to efficaciously encrypt the signals for the sensory tournament and ship them to talent via different channel. "Device may be new pathway to the brain". Regarding two million optic nerves needed to transmit visuals indications from membrane [2]. The portion where lightweight data is decrypted or transform into the nerve pulses to brain primary optical area. With Brain Port device, visual information are collected via a little digital video camera regarding 1.5cm in diameter that sits within the center of glasses worn by user. Side-step the eyes info are transferred to handheld base part, that maybe a very little bigger than a telephone. This unit homes such options as zoom management, lightweight settings and shockwave intensity levels further CPU(Central processing unit),that changes the computerized signal to electrical heartbeats substitution the operate of the membrane. Some portion of the test of Brain Port is to prepare the mind to decipher the data it gets via incitement gadget and uses like information from natural sense. Analysis from model gadgets demonstrated showed such preparing is conceivable as patients with a serious two

sided vestibular misfortune could, aftertime keep up close typical stance whereas sitting and strolling even on lopsided surface. The ideas of work behind this electro tactile stimulus for sensory substitute are advanced and also the mechanism of operation are not any much therefore. The concept is to speak non tactile data through electrical stimulus of sense of bit. [5]

II. BACKGROUND STUDY

The Brain is capable of main reformation of operate in the least ages, and for several years follows the Brain harm. Brain is also additionally capable of adapting to substitute sensory info follows sensory loss like blindness loss of tactile in Leprosy; broke sensory system due to ototoxicity, or overall balance deficit as consequences of Stroke or Brain trauma), which provides an acceptable human machine interface is employed in Bach-y-Rita[3],1995;in press. An only interface is that the tongue Brain Port interface Bach-y-Rita, at 1998 and Tyler, 2003. Sensual substitute permits studies of mechanism lately brain malleability additionally to providing the likelihood of sensible answer for people with high sensory harm or loss. It additionally offering the chance to review the image of Brain which relates to sensory activity learns with proper system. The named PET studies demonstrate the graphical area of people who are blind exposes activity when a couple of hours of sight substitution practicing. [4]

The TDU (Tongue display unit) is that the initial model of skill which has changed in nowadays Brain Port device [1]. This study model works well for the people,the people who are blind and haven't any higher than lightweight observation. Meanwhile we have a tendency to don't inspire the attention or nerves optic, our knowledge has the power to figure across a large vary adjustment to handle the requirements for those people having low sight similar to devolution.

III. PARTS OF BRAIN PORT DEVICE

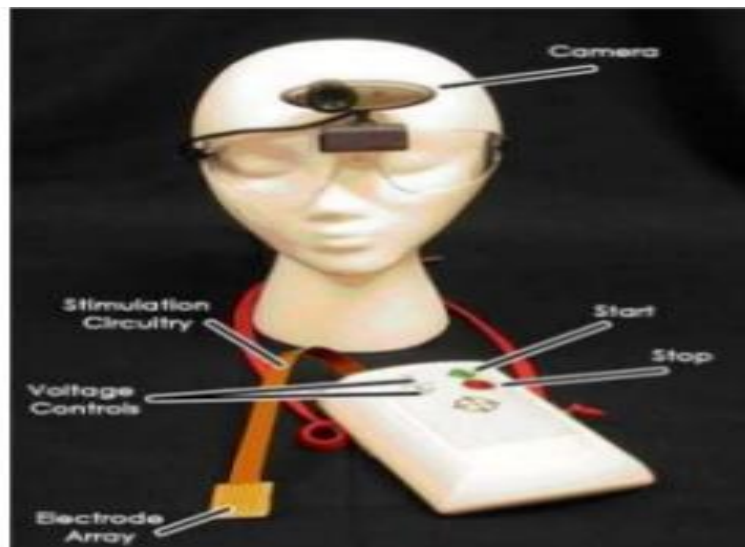


Fig 2: Parts of Brain Port device

(A). Digital Video Camera

The hidden camera that is placed inside of spectacles type shown in the above figure. Spectacles get signal from camera and then send it to the Brain Port device from a cable and then to that lollipop shaped stick that is placed already on the tongue.

(B). Control Unit

Control unit consists of central Processing Unit and battery central processing unit and we use hair to change the digital output that we get from the camera into electrical shock beats. Brain Port balance device work by the need of battery.

(C). Power Button

We use it to turn on and off the device.



Fig 3: Brain Port Balance

(D). Lollipop Shaped Stick

As shown in fig 3 it has three parts and they are, electrode array, stimulation circuitry, and accelerometer is also used.

(i) **Electrode Array:** This electrode is a cubical grade consisting of more than 400 electrodes placed above the tongue. Brain port vision device is the main component of the system that helps in the conversion of images in Grey white and black pictures respectively[6]. Then we release this picture to that electrode that is played on the tongue and send electronic pulses to the tongue matching the intensity of the light of a particular picture in a particular area.



Fig 4: Electrode array

Mostly view strong beat of vibrations from the electrode that signify white pixels and intermediate pulses used to signify grey and no vibration at all is used to represent black which also signifies absence of current.

(ii) **Stimulation Circuitry:** It consists of-

- User interfaces- this represent the selection of voltage mode or current in the system.
- Processor- Brain port device is configured by processor.

(iii) **Accelerometer:** Accelerometer is used at the connection side of electrode array to provide info on how body and head position are placed and send to brain through electric simulation on the tongue.

IV. WORKING



Fig 5: Working of Brain Port device

We can divide the brain port vision device into three stages.

(i) Camera to CPU

In this Stage camera click the images and then send to the CPU.

(ii) CPU to tongue

In second stage CPU changes over the pictures into an example of electronic impulses and sends them to the cathode cluster set on the tongue.

(iii) Tongue to Brain

In third stage, these impulses are sent to the sensory cortex of the brain.

V. CONCLUSION

Science has consistently given humankind answers also, arrangements, and science will keep on doing as such, while at the same time providing us with upgrades upon past innovations or new advancements out and out. Today, humankind owes most of our items, from appendages to iPod, to long stretches of logical investigation and coordinated effort amongst various logical corrections. Tragically, anyway skill may have added to improving our lives, there is still a lot of progress to be complete. We are continually searching for territories in which our interdisciplinary qualities can be utilized to alter territories of science, designing what's more, innovation, and to improve personal satisfaction for millions of people. To additional one solid info network for alternative, you have to precisely encrypt the nerve signs for the tactile occurrence and send them to the mind through the additional network. It's a great pleasure that how this procedure takes place however mind can do it if you provide the accurate info.

REFERENCES

- [1] Vuillerme, N.; Chenu, O.; Fleury, A.; Demongeot, J.; Payan, Y. "Optimizing the Use of an Artificial Tongue Placed Tactile Biofeedback for Improving Ankle Joint Position Sense in Humans " EMBS '06. 28th Annual International Conference of the IEEE, Year: 2006, DOI:10.1109/IEMBS.2006.260826
- [2] Thanh Huong Nguyen; Thi Hue Nguyen; Thi Lan Le; Thi Thanh Hai Tran; Vuillerme, N.; Tan PhuVuong, "Wireless assistive device for visually-impaired persons using tongue electro tactile system", Advanced Technologies for Communications (ATC), 2013 International Conference. Year: 2013, DOI:10.1109/ATC.2013.6698183
- [3] Bach-y-Rita P, Kerel SW. Sensory substitution and the human-machine interface. Trends Cogn Sci. 2003;7:541-546.
- [4] Chebat, D.R., Rainville, C., Ptito, M. "Navigation Skills in the Early Blind Using a Tongue Stimulator" Soc. Neurosci. Abstr. 2007.
- [5] Kaczmarek KA, Bach-y-Rita P, Tyler ME. Electro tactile pattern perception on the tongue. In: Proceedings of the 33rd Annual Meeting of Biomedical Engineering Society; Cleveland, Ohio. BMES. 1998; 26 Suppl 1:S131.
- [6] Kupers, R., Chebat, D. R., Madsen, K.H., Paulson, O.B., Ptito, M. "Neural correlates of virtual route recognition in congenital blindness." Proceedings of the National Academy of the Sciences of the United States of America, 2010; 107(28): 12716-12721.