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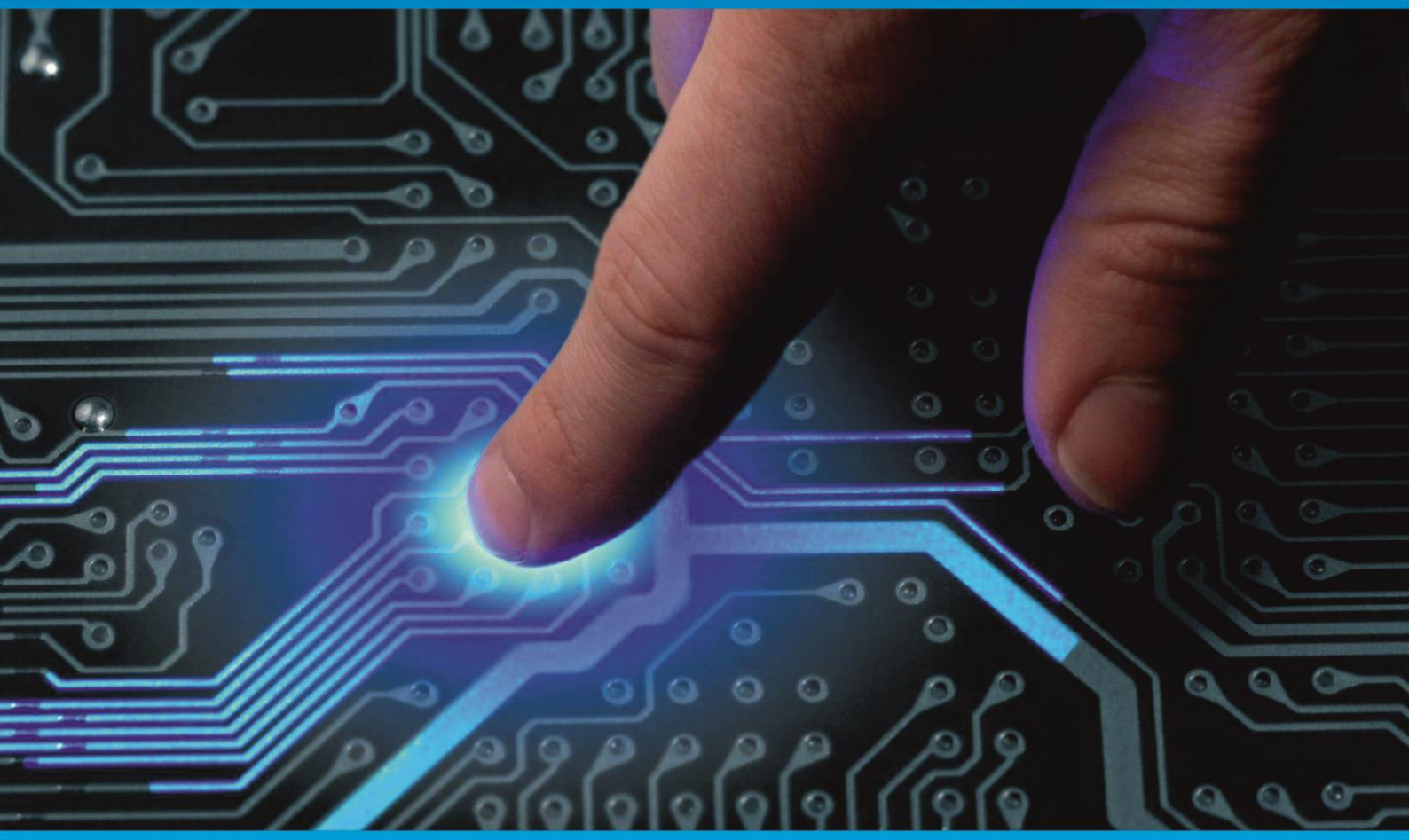

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Screenless Displays – The Emerging Computer Technology

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ABSTRACT: This paper discusses advent of the Screen less display which is an emerging new technology, has become a good prospect in the near future for a wide range of applications. Technological advancement nowadays is moving to a faster pace. The latest display technology -Touch Screen Display, commonly used in our smart phones and tablet computers will move to a mere history in the coming future. Lack of space is one of major problem faced by screen displays. This emerging new display technology will replace this touch screen environment and will solve the problems at higher level, making life more comfortable. The main aim of the Screenless Display is to display or transmit the information without the help of a screen or the projector. Using this display, we can directly project images onto the human retina, open space and even to the human brain. It avoids the need of high weight hardware and it will provide privacy at a high rate. . It involves the following 3 different working principles. The Visual image, Virtual retinal display, Synaptic interface This field came into progress during the year 2013 by the arrival of products like holographic videos, virtual reality headsets, retinal displays, mobiles for elderly, eye tap etc. At present, we can say that only part of the Screenless Display Technology is brought up which means that more advancement is necessary for a boost in the technology. This problem will surely provide a pathway for screenless display.

KEYWORDS: Foot, Hologram, Hand, LCD, Screenless, voice.

I. INTRODUCTION

Screenless display is the present evolving technology in the field of the computer-enhanced technologies. It is going to be the one of the greatest technological development in the coming future years [1] several patents are still working on this new emerging technology which can change the whole spectacular view of the screenless displays. Screen less display technology has the main aim of displaying (or) transmitting the information without any help of the screen (or) the projector. Screen less displays have become a new rage of development for the next GEN-X. Screenless videos describe systems for transmitting visual information from a video source without the use of the screen [2]. Screen less computing systems can be divided mainly into 3 groups:

- Visual image
- Retinal direct
- Synaptic interface

1.1Visual Image

Visual image is one of the types of screen-less display where the eye or the retina can perceive any screen-less image. The principal working of this display is that light gets reflected by any intermediate object before reaching the human retina. Intermediate object can be holograms, windows or even LCDs. Some examples of visual image are Holographic display, Virtual reality goggles and Heads up Display.

1.1.1 Hologram

This technique is used to generate hologram called as Holography. Hologram is consisting of two Greek words holos (whole) and gramma (message). It is a three dimensional image created by photographic projection shown in fig. 1. Holography technique is used to create and generate hologram. Holograms were mostly used in telecommunication as an alternative to screens. Holograms could be transmitted directly, or they could be stored in various storage devices (such as holodiscs) the storage device can be hooked up with a holoprojector in order for the stored image to be accessed [1].

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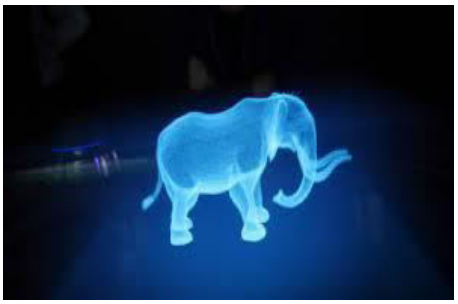

Fig. 1 Hologram

The fig. 2 shows the basic working principle of hologram. When a laser beam is passed through beam splitter, in which it is then divides the beam into two parts; one is illumination beam and another which is made to fall on mirror. When object is placed in front of beam, splitter is illuminated by the illumination beam and the reflected beam is captured on the recording medium (photographic plate). At the same time the reference beam, is made to fall on photographic plate. In fig. 2, the arrangement of mirrors is made so that it reflects entire light in every direction with equal consistency, and the photographic plate is placed in such a way to capture the entire light incident on it. Thus this interference pattern gets engraved on photographic plate.

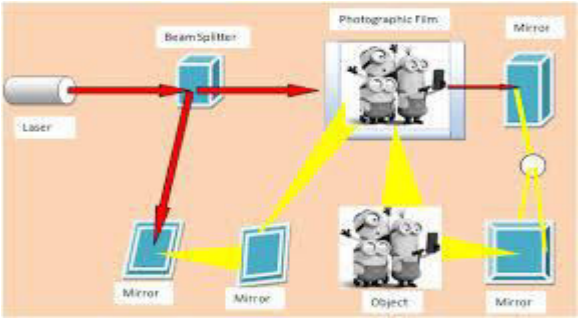

Fig. 2 Block diagram of Holographic display

1.2 RETINAL DISPLAY

Virtual retinal display systems are a class of screen less displays in which images are projected directly onto the retina as shown in figure 3. They are distinguished from visual image systems because light is not reflected from some intermediate object onto the retina; it is instead projected directly onto the retina. Retinal Direct systems, once marketed, hold out the promise of extreme privacy when computing work is done in public places because most inquiring relies on viewing the same light as the person who is legitimately viewing the screen, and retinal direct systems send light only into the pupils of their intended viewer[6].

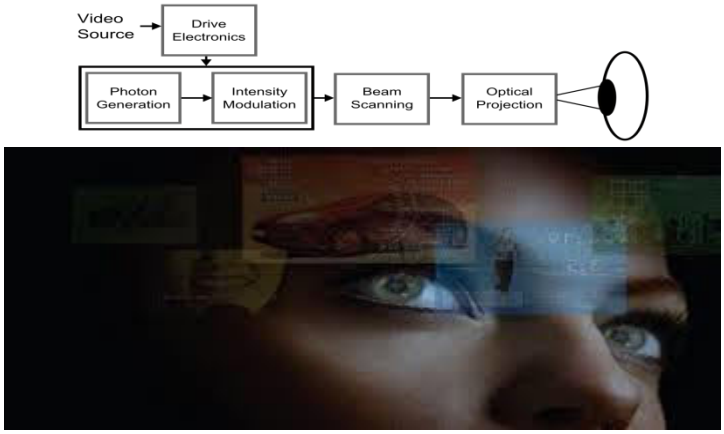

Fig. 3. Retinal Display

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1.3 SYNAPTIC INTERFACE

Synaptic display is a type of screen-less display that does not display an image in a free media or onto the retina. In Synaptic interface the images of videos does not require light at all. It displays images by transmitting the signals directly into the brain through the optic nerve. As the light is not required it makes use of electrical impulses. This technology was tested on horse shoe crabs. Through the nerves they passed the samples of video signals from the horse shoe crab's eyes, and the other video signals were sampled from the electronic cameras into the brains of the creatures. Synaptic interface allows interaction between human brain and external device. It is also called as Brain Computer Interface.

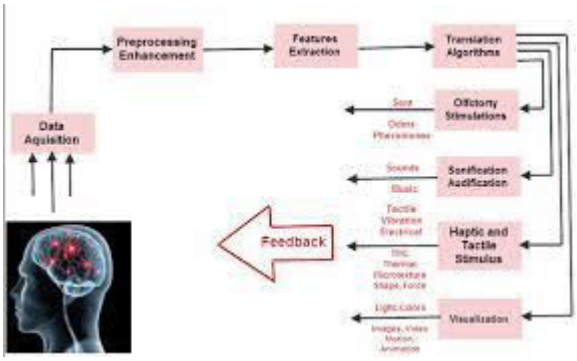

Fig. 4 Synaptic Interface

1.3.1 Brain-computer interface

A brain-computer interface (BCI) is also called as mind-machine interface (MMI) and synaptic telepathy interface (STI). It is used for researching, mapping, assisting, augmenting, or repairing human cognitive. It is a direct communication between the brain and an external device. It mainly focuses on the neuroprosthetics application. The research on BCI's is done in the 1970s at the University of California Los Angeles (UCLA) under a grant from the national science foundation, followed by a contract DARPA. Recently it focuses on the possibility of using brain-computer interfaces which directly connects different brains together.

II. THE WORKING PRINCIPLE

There are several new emerging ways for the technological development of the working principle of the screen less displays [4]. Several software's are merging for the GEN-X wonder view. Any computer system that can run the mudoc software can present text that has been set in interactive movable type. Most of the mudocs that are consumed in the next few years will be consumed with conventional personal computers, e-book readers, and other kinds of display and projection devices that are now in use. Very soon it appears to be a new kind of input/output system will facilitate communication and interaction between the computer and the computer user. This new human/computer interface is the telereader terminal. Visual Image is a bitmap manipulation and composition product. Bitmaps can be manipulated independently, in the Image Mode or multiple bitmaps can be composited Together in the Object Mode to create a "collage". Visual Image can create and Manipulate images of any size: the only limitation is the amount of memory resources your system has.

2.1 Creating Visual Catalog Files with Visual Image

Visual Image gives you the ability to create files in the EYE file format for use in the Visual Catalog program. These EYE files can be used to create catalogs of images in logical sub groupings: for example, you can create a catalog file in the EYE format that lists all images of building materials (brick, concrete, stone, etc.). The File, Export Project command creates an EYE file that refers to all of the images that are currently loaded into Visual Image. When you select this command, you are prompted to enter a filename for the EYE file that is to be created. If you have created any image in Visual Image that are not yet saved to disk you will be asked if you wish to include those images in the EYE file and if so, you are prompted to store those images as bitmaps. The File, Exports Editor Command in Visual Image allows you to pack and choose those image files on disk that you wish to include in a catalog EYE file [5]. When you

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select File in Export Editor, a file browser appears from which you can choose the image files to include. Use this browser to select images to add to a project file for use in Visual Catalog.

2.2 Additional Software and Hardware Requirements

- To facilitate the interactivity
- To optimize the user's perceptual and cognitive capabilities
- To provide the most healthful visual environment for the user.
- Responding to a variety of user commands (using voice, hand, foot, or other signal methods)
- Providing blink cues or blinks responses
- Modifying output to compensate for changes in user's physiology or reaction time, etc. The new software and hardware will enable the user and the system to better exploit each other's capabilities and to function as a fully integrated team.

III. ADVANTAGES AND DISADVANTAGES OF THE TECHNOLOGY

ADVANTAGES:

Low power requirements- Only six diodes are required and a few of a watts to deliver their images to the user's eyes [3].

Higher resolution images- The pixels in the images projected by the diodes can be made smaller than is possible with any CRT or flat panel display, so higher resolution can be achieved. With retinal projectors, the only limitation in the resolution of visual images will be the resolving power of the users' eyes. Greater portability- The combination of diodes, lenses, and processing components in a retinal projector system will weigh only a few ounces.

Wider angle of view- Retinal projectors will be able to provide a wider field of view than is possible with display screens.

More accurate color- By modulating light sources to vary the intensity of red, green, and blue light, retinal projectors can provide a wider range of colors – and more fully saturated colors – than any other display technology.

Greater brightness and better contrast- Retinal projectors can provide higher levels of contrast and brightness than any other display system.

Ability to present 3D images- With their capability of presenting high definition image-pairs, retinal projectors can deliver the most highly realistic stereoscopic movies and still pictorial images to their users.

Ability to present far-point images- The human visual system is a far-point system. With today's desktop and laptop computers users must employ their near-point vision. The excessive use of our near-point vision in using computers, reading, sewing, playing video games, etc., is making myopia a very common impediment.

Lower costs- The present cost of retinal projector systems is high. Nevertheless, there are no hard-to-overcome manufacturing problems in mass-producing and low-cost components, so inexpensive systems will soon become available. Environmental and disposal costs of these tiny delivery devices will also be minimal because toxic elements such as lead, phosphorus, arsenic, cadmium, and mercury are not used in their manufacture [4]

DISADVANTAGES:

- The main disadvantage of screen less display is inaccessibility in large number as it is still in implementation.
- It is non affordable to all people due to high cost per unit.
- The VRD technology is still under progress and construction.

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IV. FUTURE ENHANCEMENTS

For the future development of this emerging new technology, several researches are being conducted and the several renowned IT sector companies and other best labs present in the world are handling over the project of screenless displays.

- The main disadvantage of screen less display is inaccessibility in large number as it is still in implementation
- Multi touch is a human computer interaction technique and the hardwares devices that implement it, which allows users to compute without conventional input devices.
- CUBIT is being developed for the future use of the multi Touch use of the program.
- Japanese scientists have invented the pair of intelligent Glasses that remembers where people last saw their keys, Handbags, iPod, and mobile phones.
- Smart Google is developing the compact video camera which films everything the wearer looks at the information what the viewer wants will be directly being seen in through the glasses where there is no screen or projector present.
- It is non affordable to all people due to high cost per unit.

V. CONCLUSION

This paper presents the over view of the screen less display technology which is one of the emerging technologies. Screen less display replace the touch screen display technology which overcomes the drawback of the touch screen display. In this paper we see the benefits of the screen less display like portability, low power requirement and lightweight. It will be the latest technology in the world.

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