Screenless Display – The Next Generation of Display

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Abstract- *This paper discusses advent of a new computer technology i.e, Screenless display .The Screenless display is upcoming and emerging technology. It is making our life more comfortable day by day. The main idea behind this technology that displaying the several things without use of physical screen like LCD, projector etc. Today's almost all gadgets used the touchscreen technology but it will become history tomorrow. Touchscreen technology will replace by Screenless display. This paper involves that how to screenless display work and examples of the Screenless display, it's types which are comes under the 3 different working principle. The Visual image display, virtual retinal display and Synaptic interface. This paper specifies applications, advantages and disadvantages about screenless display technology. Screenless display also introduce futuristic application of this technological innovation. It will provide the high privacy and with help of this technology we can directly project image and video onto, human's retina, in the open space or free medial and the brain of human. Keywords, Hologram ,VRD, LCD , Screenless.*

Keywords- Screenless

I. INTRODUCTION

Screen Less display is the very advance and rising display technology. In these days technology is changing very drastically in existing machines and tools of this technology is use in order to solve problem at higher level. In another word Screenless show could be a life-changing concept and have in curiously point for inquire about. The main goal of this technology transferring the all type of data, information, video without any need of the screen. Screenless videos explain systems for convey visual information from a video source not having the use of the screen. Screenless display is a fascinating subjects in technologies and research the rate of growth on this is increasing exponentially It will help to replace the touchscreen display. It is latest display technology where user is relater elate with a three dimensional projected into open space. Screenless display means 'no screen'. So it can be defined as a display which helps to display and even transmit any information without the help of screens. By using the screenless technology videos, images can be transmitted into air, in the human brain and directly onto the retina. There are many types of screenless display which are developing and describe as-

- Visual Image display
- Retinal Direct display
- Synaptic Interface

II. TYPES OF SCREENLESS DISPLAY

Visual image display

The basic example of this is the hologram. It works on the principle i.e. light is reflected by an intermediate object before it reaches to the retina. Visual image are known as hologram. Holograms were utilized generally in broadcast communications as another to screens. The another examples of Visual Images are Heads-up Display in Airplanes, Virtual Reality Goggles etc. In this the system is created around 50,000 points per seconds and a frame rate of 10-15 FPS. In this the images are monochromatic.

(A) Hologram

A hologram is a two-dimensional or three-dimensional recording of a reflection pattern created when a point of fixed wavelength (reference beam) encounters light of the same wavelength of an object (ray object). When the hologram is illuminated only by the reference beam, the diffraction pattern reproduces the light wavefront from the original object. Therefore, the image seen by the viewer is indistinguishable from the original object. Holograms are

often used to replace screens in communications. Holograms can be sent directly or stored on various storage devices. It is stored in a storage device called as holodisk. Holodisk can be hooked up with a holoprojector in order for the stored image to be accessed. This technique is used to generate hologram called as holography.

There are mainly two types of hologram.

→Reflection holograms
→ Transmission holograms

Reflection hologram-

In the reflection hologram , the image is stored in a thick emulsion and can be viewed in white light and the hologram is illuminated by a "spot" of white incandescent light, held at a specific angle and distance and located on the viewer's side of the hologram. It is direct beam reflection hologram In this case the coordinate pillar by the film serves as reference bar.

Transmission holograms-

Transmission holograms are the second types of the hologram that are illuminated from the back side. These type of hologram can project the image either spectral color or a single color. It can be created from solid sculptural objects , computer generated image and live people.

Working process of Hologram

Hologram works on the principle of reflection of light. Holographs can work by using a laser beam that can interfere with an object beam and light is reflected off some intermediate object like as LCD panel, or cockpit window before it reaches the retina.

(B) LCD (Liquid Crystal Display)

LCD is used to display the image and videos and it sends the beam of light from the metal-halide lamp through a prism or series of dichroic filters that divides the beam of light to three polysilicon panels blue ,red and green(rgb panels). In LCD have lower surface's crystal which is provided by dichroic mirror. The LCD works on the principle of the reflection of light and here the light reflected from back side of the panel but how be it a reflected source.

Retinal direct display

Retinal display (VRD) systems are the second type of screenless displays . The VRD innovation employments checked light pillars anticipated specifically onto the retina. In this display the images and videos are directly projected on the retina (eyes mechanism of sight -the retina) of the eye without an intermediate object . In this display there are no reflection of light by any substance. This technique of retinal display makes more safe ,private and high secure.

The best example of retinal display is Google glasses. It's just look like a classical glass.

Virtual retinal display consists of photon generation, vertical scanner, horizontal scanner and intensity modulation. Firstly Coherent beam of light is generated by photon. With the help of photon generation laser diodes uses as a coherent source with retinal display and it gives the diffraction on retina of human's eyes. The light which is generated by the photon generation is called a intensity modulated then the intensity of image match with modulated intensity of light beam . the real image is displayed in conversational display. The virtual image can be presented in by making use of optical system or it can be viewed directly as well then matched the intensity of the image with light beam by modulating beam. firstly the beam of light is generated then it's modulated. After that with the help of scanning modulation each pixel is positioned on the retina. There are two types of scanner first is the Horizontal scanner and second one is the Vertical scanner .These are used for scan the image. The Horizontal scanner is used for moving the beam to make a row of pixel. And after for the next line vertical scanner moves and draw the row of pixel. After these process and scanning the image optical projection must be projected accurately into the retina of the eyes and virtual retinal display should be projected into the same plane with the eyes pupil of the eye then only image will be projected on the eye. The position of the image is depends on the incidence angle to the eye then the position can be determined with the help by the angle of the incidence to eye.

Synaptic interface

Synaptic Display is the third type of screenless displays .This type of screenless display does not projected the image in the open space like as air , free media or onto the retina. In synaptic interface technology the images and videos does not require light at all. Itis directly transmitted the images and videos into the brain with the help of optic nerves. Itis also known as brain computer interface. With the help of synaptic interface human brain can directly interact with external device. Firstly this method is tested on the horseshoe crabs and recorded their nerve images. Therefore, further by optic nerve the neural code has submitted to the brain. It can be very beneficial for view the image in a greater coordination and complexity eyes are easily to capable of producing it.

III. APPLICATION OF SCREENLESS DISPLAY TECHNOLOGY

- **Transportation System** – Any transportation system it can be very beneficial by providing the screenless display that can project the virtual map of the surrounding area ins siding the vision of providing state train and craft instrumentation.
- **Medical field** - Screenless display is used in the medical field to show the virtual images. These are produced by VRD. During the surgery of the patient by using the physician to view the virtual images X-ray of infected areas.
- **Manufacturing field** :- In manufacturing field and medical field have same concept is used. It can be used in production of environment by displaying virtual blue print that uses C3 images to define placement and manage input data.
- A laptop and mobile that is without an LCD and another screen can be very portable and helpful. There is no need to connected the CRT or fixed the LCD monitors. So screenless display is very helpful for mobile technology.
- It is also used in Hologram projections that is helps in touch less holographic interface for telecommunication. Hologram projected the high quality of 3D images, that it will feels as if we can touch them.
- It is also implemented in Screenless TV's. By using this technology picture can be displayed in the thin air.

Advantages

- **Low power requirements**- In Screenless display Only six diodes are required and a few watt of electricity is to be consume to deliver the images to user's eyes.
- **Wider viewing angle** - By utilizing the Retinal projectors we are going able to show a more extensive recorded of see than is conceivable with show screen. It has very wide angle of view.
- **High resolution Image** - By utilizing the Retinal projectors we are going able to show a more extensive recorded of see than is conceivable with show screen or CRT display, so here we can achieved the higher resolution.
- **More verified color** - By balancing the light source to every intensity of rgb(red, blue and green) light, retinal projectors can provide a large range of color .Here the colors is accurately used.
- **Ability for display 3D images** - Screenless Display is to of capable to presenting the heigh definition retinal- projectors ,image-pairs can be delivered the most highly realistic 3D movies and it is still pictorial images to their users.

Disadvantages

- The main disadvantage of screen less display is inaccessibility in large number as it is still in implementation.
- Cost per unit of the Screenless Display is very high so It is non affordable and usable to the all people.
- The VRD technology is still comes under the progress and development

Future Enhancements

In future there will be many technology developed . In these technology, Screenless display will one of the most useful futuristic technology for us.

- In year 2001 Microsoft had begun to do the work on an idea of for an Interactive table and telecommunication that mixes both the virtual and the Physics worlds.
- Multi touch is an interaction technique for human - computer and the hardwired devices that implement it, which allows users to compute it without any conventional input devices.
- Development and improving micro vision also provide update and the futuristic views without screen. This micro vision technique is useful in revealing the feature of retinas.

- Japanese scientists have invented the pair of intelligent Glasses that are able to remember last time where people saw their keys, Hand-bags, iPods, and mobile phones.
- In the futuristic technology CUBIT is being developed for use of the multi Touch use of the program.

IV. CONCLUSION

In this paper has been elaborately discussed about the Screenless Display Technology. This technology which is one if the emerging and advance technologies. Screenless technology reduced the drawback of the touch screen display, and it is replace the screen less display. In this paper have to seen the many advantage of the Screen less display like portability, lightweight and low power requirement. It will be the latest and upcoming technology in the world.

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