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Screen Display

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Abstract:
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 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.

Introduction:
Technology is making a huge modification in existing machines or tools in order to solve problem at higher level and make life comfortable. Screen less display is one of the most interesting subjects in technologies and research on this is increasing by exponential scale day by day. It is a system of transferring information/data though an electronic video source without using screen at all. Few parts of this technology is being used at present but they are not so advance yet.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. 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. Well screenless display, AKA hologram, has such amazing potential that my hope is that the internet can be a medium for collaboration of ideas and information about screenless display that could help break down the barriers that prevent us from making it a reality. Essentially screenless display is a projection that can be seen projected onto the air itself. The only screenless display that has been achieved to my knowledge still uses fog as a medium to reflect light. Other options have been to use mirrors and plastic film to imitate the idea, but no one has been able to reflect light off of air itself. Can it be done? It's quite possible that it can. Light does reflect off of large amounts of air as we see in our atmosphere but doing it in such a manner that we could pinpoint it to a single area is immensely difficult. So why not take some time and look over some ideas I have collected about the possibilities of screenless display and maybe even share some of your own. Check some of the links below to get a better grasp on the development of the technology.

Technology used in Screenless Display
Interactive Projection and Visual Display System
The biggest impact in screenless technology has been seen in the use of optical technology. Whether talking of VRD (virtual retinal display), RSD (retinal scanning display) or LOE (light-guide optical element), optical technology is being used by consumer electronic corporations like Apple to the military and even the health care industry. Optical technology enables personal screenless displays by projecting images and data from computers, DVD players, or VCRs into the viewer's eye, displaying them in the visual field of the viewer.

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For instance, Microvision Inc. has created helmet mounted displays in which an Army tank commander can view the surrounding area from topside while still viewing a translucent map that floats a couple of feet away.

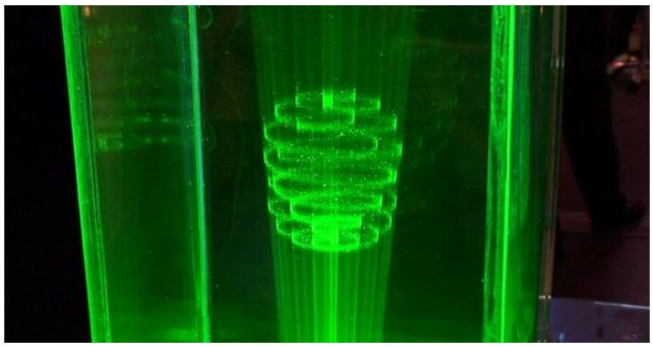

Fig 2. Interactive projection

1.3.2. 3D Display Projection Technology

With the large influx of new displays into the market boasting '3D support', we thought we would produce an article which outlines some of the key technologies being used, where they differ and how they work. We will look at the two main techniques being used today, those being active shutter and passive polarization technologies. We will also discuss the trends in desktop displays from a 3D point of view as well as looking at the other aspects being developed to support 3D, such as panel technology. To begin with an explanation, a modern 3D display / monitor is capable of conveying a stereoscopic perception of 3D depth to the viewer. The basic requirement is to present offset images that are displayed separately to the left and right eye. Both of these 2D offset images are then combined in the brain to give the perception of 3D depth. Although the term "3D" is ubiquitously used, it is important to note that the presentation of dual 2D images is distinctly different from displaying an image in 3 full dimensions. The most notable difference is that the observer is lacking any freedom of head movement and freedom to increase information about the 3-dimensional objects being displayed. Holographic displays do not have this limitation, so the term "3D display" fits accurately for such technology.

In modern displays the term 3D is actually an overstatement of capability and is referring to dual 2D images as being "3D". The accurate term "stereoscopic" is more cumbersome than the common misnomer "3D", which has been entrenched after many decades of unquestioned misuse. It is generally expected that most consumers have the desire to migrate to 3D systems from 2D. It is predicted that the 3D market will grow tremendously as soon as the problems in the existing products are eliminated and the issues on basic infrastructure, such as price competitiveness and 3D content, will be resolved. It is highly likely that the content industry will also make a fast transition into 3D in all areas such as TV, film, and game and have already begun to make this change.

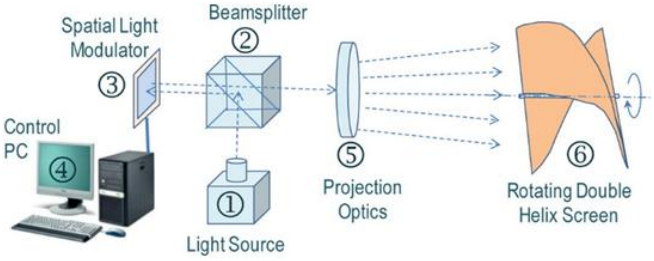

Fig 3. 3D projection

The Bees Knees:

Screenless display is the emerging display technology. In these examples you see that the user is able to interact with a three dimensional image projected into thin air. Imagine your desktop floating in the space before your eyes waiting for your interaction.

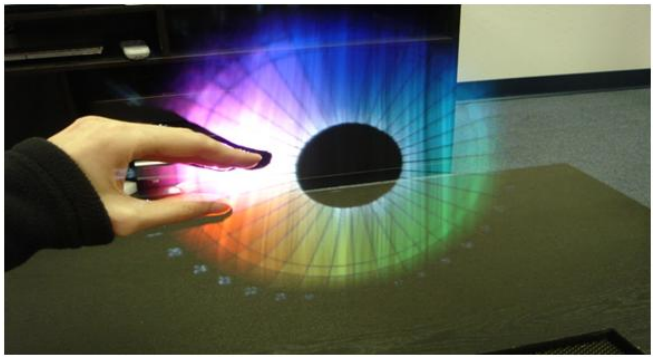

Fig 4. Bees Knees display

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Screenless display technology is likely to affect

1. Lighting and projection technologies
2. Software development/design
3. Lifestyles of the visually impaired
4. Career opportunities for the visually impaired

Screen less computing systems can bedivided mainly into 3 groups:

1.Visual image
2.Retinal direct
3.Synaptic interface

VISUAL IMAGE:

Visual Image screen less display includes any screen less image that the eye can perceive. The most common example of Visual Image screen less display is a hologram. Holographic messages, which we previously saw only in movies like Star Wars are about to become reality through a new technology arrived directly from Japan. It's True 3D, which is based on older technology, developed by AIST and Keio University in 2006. This new projection system can be used to present images without the need for a screen.

The system works by focusing a laser beam that generates a plasma environment from the oxygen and nitrogen present in air, thus enabling it to display holographic images. According Ubergizmo.com, the projected holographic images appear as 3D floating objects in mid-air. At this point, the system creates approximately 50,000 points per second and features a frame rate of 10-15 FPS, but Japanese scientists are trying to increase it to 24-30 FPS. So far, the images are only monochromatic (single color), green, but multi-colored images but can also be created using lasers emitting at different wavelengths e.g. blue and red.

Fig 5. Visual display

HOLOGRAM:

Holograms were used mostly in telecommunications as analternative 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.

Fig 6. Example of visual Image

Debatably, virtual reality goggles (which consist of two smallscreens but are nonetheless sufficiently different from traditional computer screens to be considered screen less) and heads-up display in jet fighters (which display images on the clear cockpit window) also are included in Visual Image category. In all of these cases, light is reflected off some intermediate object (hologram, LCD panel, or cockpit window)before it reaches the retina. In the case of LCD panels the light is refracted from the back of the panel, but is nonetheless a reflected source[3].

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The new software and hardware will enable the user to, in effect; make design adjustments in the system tofit his or her particular needs, capabilities, and preferences. They will enable the system to do such things as adjusting to users' behaviors in dealing with interactive movable type.

Fig 7. Hologram Display

Holographic technology has unfortunately not gone very far past trickery with mirrors. This form of photography provides a three dimensional image, and some technologies are now creating images using lenses, helium neon and holographic film. Scientists will not have a fully working holographic table prepared for market any time soon, but it is definitely on the cards for the future. The only downfall of this kind of system, however, is that the orientation and viewing angle of a viewer will determine the quality of the image that can be seen – meaning that so far, holographs are not ideal for media or information consumption. Holographs can work by using a laser beam that can interfere with an object beam. When these two beams get in the way of one another, they can create what looks like a three dimensional image. This image can then be recorded for processing by recording the diffraction of the light and the way in which the beams interfere with one another.

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.

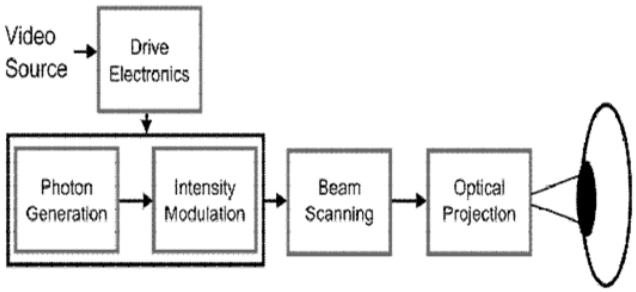

Fig. Block diagram of Retinal Display

Fig. Retinal Display

With a retinal display light is not reflected off an immediate object, like in a visual image, but it is projected directly onto the retina. This can be handy in that one is not limited by physical screen size because there is no immediate object to be viewed, retinal display can be used to keep things such as financial information safe from snooping eyes. The image can take up the entire field of vision.

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We've seen the potential of retinal displays in movies like Terminator.

Fig. 10. Retinal Display in Glass Format

2.3 SYNAPTIC INTERFACE:

Synaptic Interface screen less video does not use light at all. Visual information completely bypasses the eye and istransmitted directly to the brain. While such systems have yetto be implemented in humans, success has been achieved in sampling usable video signals from the biological eyes of a living horseshoe crab through their optic nerves, and in sending video signals from electronic cameras into the creatures' brains using the same method.

Fig.11. Synaptic Interface

Brain–computer interface

A brain–computer interface (BCI), often called a mind-machine interface (MMI), or sometimes called a direct neural interface (DNI), synthetic telepathy interface (STI) or a brain–machine interface (BMI), is a direct communication pathway between the brain and an external device. BCIs are often directed at assisting, augmenting, or repairing human cognitive or sensory-motor functions.

Research on BCIs began in the 1970s at the University of California Los Angeles (UCLA) under a grant from the National Science Foundation, followed by a contract from DARPA. The papers published after this research also mark the first appearance of the expression brain–computer interface in scientific literature. The field of BCI research and development has since focused primarily on neuroprosthetics applications that aim at restoring damaged hearing, sight and movement. Thanks to the remarkable cortical plasticity of the brain, signals from implanted prostheses can, after adaptation, be handled by the brain like natural sensor or effector channels.[3] Following years of animal experimentation, the first neuroprosthetic devices implanted in humans appeared in the mid-1990s.

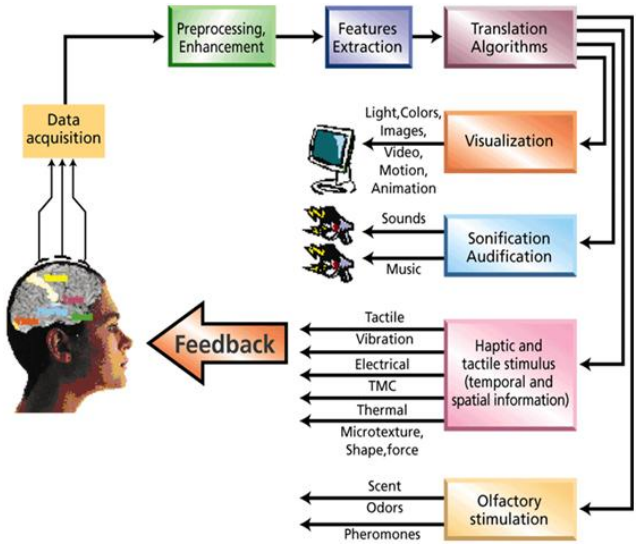

Fig. 12. Brain-computer interface

The most profound effect will come from the development of the synaptic interface technology. This technology will allow people who are visually impaired to see just as the hearing impaired are able to hear through cochlear implants. Imagine a visually impaired person gaining the freedom to drive again! This will also remove occupational limitations of the visually impaired. The ability to control a computer using only the power of the mind is closer than one might think.

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Brain-computer interfaces, where computers can read and interpret signals directly from the brain, have already achieved clinical success in allowing quadriplegics, those suffering "locked-in syndrome" or people who have had a stroke to move their own wheelchairs or even drink coffee from a cup by controlling the action of a robotic arm with their brain waves. In addition, direct brain implants have helped restore partial vision to people who have lost their sight. Recent research has focused on the possibility of using brain-computer interfaces to connect different brains together directly. Researchers at Duke University last year reported successfully connecting the brains of two mice over the Internet (into what was termed a "brain net") where mice in different countries were able to cooperate to perform simple tasks to generate a reward. Also in 2013, scientists at Harvard University reported that they were able to establish a functional link between the brains of a rat and a human with a non-invasive, computer-to-brain interface.

ADVANTAGES AND DISADVANTAGES OF THE TECHNOLOGY

ADVANTAGES:

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

2. 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.

3. Greater portability- The combination of diodes, lenses, and processing components in a retinal projector system will weigh only a few ounces.

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

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

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

7. 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.

8. 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. The use of the far-point images that can be provided by retinal projector systems could reduce the incidence of myopia and, hence, the growing need for and use of eyeglasses.

9. 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.

DISADVANTAGES:

1. The principle disadvantage is that Virtual retinal display (VRD) is not yet available in the significant number.

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2. Prototypes and special experimental models are now being built, but their cost per unit is high.

3. The VRD technology is still under progress and Development.

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. Technology has become perhaps the greatest agent of change in the modern world. While never without risk, positive technological breakthroughs promise innovative solutions to the most pressing global challenges of our time, from resource scarcity to global environmental change. However, a lack of appropriate investment, outdated regulatory frameworks and gaps in public understanding prevent many promising technologies from achieving their potential. This field saw rapid progress in 2013 and appears set for imminent breakthroughs of scalable deployment of screenless display. Various companies have made significant breakthroughs in the field, including virtual reality headsets, bionic contact lenses, the development of mobile phones for the elderly and partially blind people, and hologram-like videos without the need for moving parts or glasses.

 Microsoft in 2001 began thework on an idea for an Interactive table that mixes both the physical and the Virtual worlds.

 Multi touch is a human computer interaction technique and the hardwire 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.

 Development of the enhancement of the micro vision also gives the improved and the futuristic view of the screen less displays. This technology of the micro vision is the very well useful in the Artificial Retinal Display properties.

 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

 Several laboratories are working under progress on the electron beam lithography which includes the advanced enhancement of the futuristic screen less display.

 Adobe systems are also working out for the development and deployment cross platform of the several applications which are to be viewed without the actual screen.

CONCLUSION

The paper has elaborately discussed screenless displays which is one of the most emerging computer technologies and has become a new exciting rage for the upcoming generations as a field of the futuristic technology. Due to the ability of having several advantages which are involved in the making, designing, coding of the screenless, this needs plenty of knowledge and process for the development is still under the improvement. May be in the future the world may be dominated with the screen less display technologies and this enriches the world of technological empowerment in the field of the computer technology. Screenless displays promises the cost effective aspect and also brighter future in the computer technology.

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