MEMORANDUM

DATE: June 1, 2015
TO: The reader of Technology magazine
FROM: Yi Shen, Beijing University of Posts and Telecommunication
SUBJECT: Study of holographic display development and application

INTRODUCTORY SUMMARY

Holographic projection technology follows the principle of interference and diffraction to recording and reproducing the real three dimensional image from the object.

The first step is to use the principle of interference to record information which is known as the filming. The second step is following the wave diffraction theory to reproduce the wave of the object.

We study the application of holographic display and will show it in this report.

The development

1. The reproduction of holographic technology

Although the technology of holographic stereo camera has already started, the reproduction of holographic technology which known as the second step was invented in 2001. The German Laboratory pioneered and developed the holographic film technology, makes the reconstruction of three-dimensional images come true. After the development for seven year, the holographic film has developed from the first generation to fourth generation, which thickness is only 0.2 mm and the transmittance is 97%. Relying on the thin transparent film, no matter the brilliant T - shaped stage or illusory image on the stage can be realized. The holographic film is very expensive, According to the survey, the price of holographic film whose transmittance rate is 70% has already reached 1800-2200 yuan / square meter.

2. The development of light source

Nowadays, the light source which is the most commonly used in holographic projection is the light from the projector. Since the brightness of the light source is relatively stable. And the projector can magnify the image of holographic display as well. As for the

holographic technology, it is very practical. Holographic projection technology will bring magnificent image to audience. The audience will be taken to another world as well. Holographic projection technology to break through the traditional limitations of sound, light, electricity and image color. The contrast and sharpness of it is very high. Besides, it is owns a great sense of space and perspective. It can not only produce air phantom stereo, but also can make the phantom interact with the performers.

3. The 360 degree holographic projection

360 degree holographic projection phantom imaging is the most magical effect of the technology, developed by Denmark Corporation ViZoo in 2006. They built a funnel geometry model of an inverted Pyramid shape by the holographic film. The video image cast by four projectors. After a series of optical diffraction it confluent into a holographic image which looks like a image floating in the air. This system can also be matched with a touch screen. With the screen, audiences can use a variety of gestures and movements to manipulate the 3D product model and make it of rotate or component decompose. In this way, the audience will be able to understand the performances of product deeply. Therefore, as soon as the holographic display system became available, it quickly used as a new advertisement carrier appears in various exhibition and conference frequently. In addition, this technology also can be used in the museums, it will reproduce some precious cultural relics in order to make the real object preserve properly.

The application in different industry

1. The application in the Industry

At present, the application of holographic in the industry has been very mature. Including designing of automotive and manufacturing of ship, designing of aeronautical and space technologies, designing of machinery and electronics, city planning and so on.3D technology brings a revolution to the design mode and user interface. Lots of the software which is commonly used, including PROE, CAD, 3Dmax, MAYA and other tools have become essential software in the industry. In the field of industrial design, PROE and CAD have 3D own rich of designing function, and they are widely used in

engineering industry. In graphic industry, 3Dmax, MAYA has been widely used.

2. Medical industry

Doctors and experts can provide a real-time treatment in remote diagnosis of live to doctors and experts. In addition, the prospect of 3D technology in endoscope image display, MRI, CT, type-B ultrasonic test and virtual hospital is mind-boggling.At present, scientists try to apply the holographic technology in more field of medicine. Some countries establish the institutions and put into a lot of manpower and material resources research. For example, high dimensional medical imaging research laboratory in Japanese Jikei University recently developed a virtual 3D system of human anatomy.

3. Military industry

3D display technology is widely used in the military, such as the 3D virtual military. It is through the virtual world to imitate military activities, including military exercises. The user can exercise the teamwork ability with others. It make the test of equipment without warring available

CONCLUSION

Our display allows freely moving naked eye participants to share a three dimensional scene with fully continuous, observer independent, parallax. The image quality of our prototype is comparable to nowadays projector-based Geowall displays, with the additional advantages of not requiring users to wear any kind of viewing device. The display looks like an ideal solution for high end multi-user applications. We are currently working on exploiting it for large scale model visualization.

Besides the application mentioned above. Holographic projection is not only can be used alone, it can also be used with other multimedia devices. The meaning of its application is to provide a convenient, inexpensive technology to make people enjoy different planar media visual. It will be popularized to household media.