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Holographic Projections Using Sixth Sense

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Abstract: *In the age of communicating even the trivial of things via social networks and texts, we have come across a time where the very nature of human interaction can be revolutionized. All of us visualize a time depicted in the classic movie "Star Wars" where holographic projections are the means of communication. Taking a step towards the visualization, this paper proposes combining two technologies viz., Sixth Sense and Holographic projection to achieve a more efficient and versatile projection system. Sixth Sense is a wearable gesture interface developed by Pranav Mistry. This integrates the real and the digital world. Simple devices like cameras, mouse sensors etc are used to create an interface and digitalize the world around us. Holography is a technique that enables a light field, which is generally the product of a light source scattered off objects, to be recorded and later reconstructed when the original light field is no longer present, due to the absence of the original objects. If we combine Sixth Sense technology's ability to map human physical movements onto a digital interface (say computer) and the ability of holoprojectors to realize digital data into physical projections, a class of projections can be achieved which can imitate every movement of a human. The obvious application of this proposal is in communication. Even the entertainment industry can greatly benefit. In conclusion, this class of projections can reach integrity and efficiency levels which current systems can never do owing to physical constraints.*

Keywords: *Holograms, Sixth Sense, Automation, Pranav Mistry, Communication, Projection.*

I. Introduction

A. *Sixth Sense*

In the words of Pranav Mistry, the inventor of the Sixth Sense Technology, "Sixth Sense is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information."[1]

In a world driven by computers, we are losing out on our connection with the physical world. Though we cannot eliminate the amazing potential of our virtual world, we must not isolate ourselves from what is real. This creates a need to bridge the gap between these two worlds so as to avoid complete isolation from or dependency on either of the two.

Fig .1. Sixth sense technology demonstration [2]

Sixth Sense technology tries to combine the real and the digital world which today, exist as two separate but equally important entities. It uses simple devices such as mirrors, mouse, projectors etc., to achieve a versatile interface which communicates with the real world and projects it on to the digital world. Daily jobs such as collating information from various newspapers, editing documents etc., can be performed without dependency on the conventional sources along with reduction in the use of time.

B. Holography

Holography is a technique that enables a light field, which is generally the product of a light source scattered off objects, to be recorded and later reconstructed when the original light field is no longer present, due to the absence of the original objects. It can be thought of as somewhat similar to sound recording where a sound field created by vibrating matter like musical instruments or vocal chords, is encoded in such a way that it can be reproduced later, without the presence of the original vibrating matter. [3]

Holography was the work of a British-Hungarian physicist named Dennis Gabor for which he was awarded the Nobel Prize for Physics in 1971. His work formed the basis of brilliant work in the field of X-ray microscopy which led to the invention of the electron microscope. The development of the laser enabled the first practical optical holograms that recorded 3D objects to be made in 1962 by Yuri Denisyuk in the Soviet Union and by Emmett Leith and Juris Upanieks at the University of Michigan, USA.

Holographic projection is a futuristic technology which has tremendous effects in various fields such as science, education, art and business among various others. 3D Holography is executed using a device known as a holoprojector.

A holoprojector uses the holography technology to project large scale, high resolution pictures onto numerous viewing surfaces, at different focal distances, from relatively small projection devices. Considering many of the latest movies being released in 3D and people talking about the future being 3D television, focus lies on 3D holographic projections using which the viewing of 3D movies can be enabled without 3D glasses![4]

C. Combination of Holography and Sixth Sense

For quite some time now, we have been trying to increase the efficiency and simplicity of communication to a maximum. Pranav Mistry's Sixth Sense technology has opened innumerous doors to the engineering world.

In this paper, we try to combine two technologies, viz., Holographic projection and Sixth Sense to achieve a hybrid-projection, a means to create a virtual presence of a human being. The Sixth Sense technology has the ability to map human movements on to the computer. We take this digital component and convert it into holograms at the other end using Holoprojectors.

Fig 2: Communication through holograms [5]

Since both the needed technologies are available of which one is even open source, it is cost effective and easily achievable.

II. Hardware requirements

The most basic requirement of the proposed hybrid-projection is a holoprojector which takes inputs specified by a computer and projects 3D holograms. The set of devices required to project actual human movement onto the digital world consists of the ones made use of by Pranav Mistry in his initial experiments viz., sensors, tracking device, camera, mirror, projector, microphone and a portable computing device. [7]

III. Fusing the two technologies

The first and foremost task is to map human movement onto a digital interface. This is achieved by the Sixth Sense devices. In his initial experiment with mouse rollers, Pranav Mistry maps the movements of a human hand onto a computer. The movement of a mouse is determined by the computer using the XY axes on which its rollers move. Pranav Mistry took this aspect, and connected the rollers to his fingers and let the computer determine their movements in a similar way it determined the movements of a mouse.

This paper proposes taking the same concept to a higher level by taking the whole human body into picture rather than just the hand. To achieve this, sensors are placed on every joint of a human body. The movements of these sensors are reproduced on a computer. Vision sensors such as CCD cameras are used to get visual input.

When the computer reproduces the movements of the sensors, the same needs to be reproduced by the holoprojector, only this time, as a projection. Since the holoprojector is connected to the same mapping device as the sensors, achieving exact movements will not be impossible.

The computer then sends the movement data of the sensors to the holoprojector. The holoprojector receives exact movements from the computer as was passed on by the sensors thus eliminating any need to manipulate it on the computer. Although, manipulation if needed can be done.

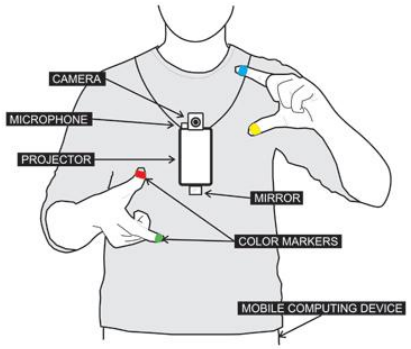

Fig 3: Basic hardware setup for sixth sense technology

IV.CONCLUSION

Hence by fusing two technologies, 'Sixth sense' and holography, we can achieve projections which can mimic the movements of man and this will be useful in many ways. This implementation, can be applied in various fields such as communication, entertainment etc. It can be used to increase the integrity and efficiency of a communication system.

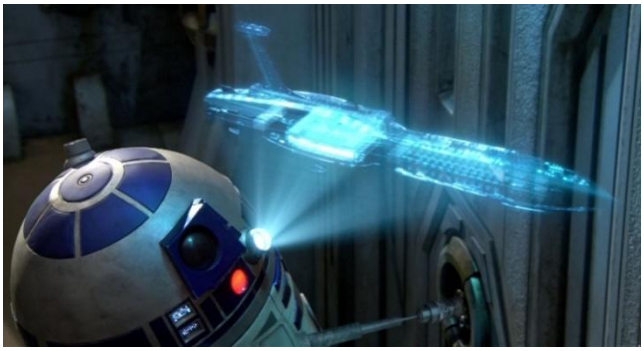

Fig 4. 3D Holographic Projection [6]

Many applications can be found in gaming, animation and film making where holograms can be used to mimic humanly movements and action.

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