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SURFACE COMPUTING

Raag Vohra[1], Isha Dhimar[2], Asst.Prof. Vatsal Shah[3]

[1] *I T Department, Birla Vishvakarma Mahavidyalaya Engineering College, raag_090994@yahoo.com*
[2] *I T Department, Birla Vishvakarma Mahavidyalaya Engineering College, isha.dhimar@gmail.com*
[3] *I T Department, Birla Vishvakarma Mahavidyalaya Engineering College, vatsal.shah@bvmengineering.ac.in*

Abstract — *In this paper we introduce a new type of computing technology which allows manipulation of digital content in new ways that is beyond the possibility of simple desktop computers. This technology is known as surface computing based on a switchable project screen which can be diffused or cleared under electronic control. It uses a special rear projection system that displays on the underside of a thin diffuser. The surface computer was a technology created by Microsoft using the idea of a coffee-table like design which was based on a multi-touch interface. The surface is a horizontal display on a table like form which supports multiple touches and uses them to manipulate and navigate all the content. It is a computing technology that allows a user to communicate through the surface of an ordinary object rather than a keyboard or mouse, with the computer. All the interaction can be done by touching the computer's screen by hands or brushes. It also provides the feature of wireless interaction with other devices such as smart phones, digital cameras, etc.*

Keywords- *Surface Computer; GUI (Graphical-User Interface); multi-touch; multi-user; Technology*

I. INTRODUCTION

A surface computer is a computer that interacts with the user through the surface of an ordinary object, rather than through a monitor and keyboard. A Surface computer is able to recognize physical objects from a paintbrush to a cell phone and allows hands-on, direct control of content such as photos, music and maps [2]. The surface computer is nothing more than a rear projection television inverted. The only differences are in the touch interface. The screen is surrounded by infrared L.E.D.'s. When you touch the screen, an infrared sensitive camera below the screen can pick up on the sensitive touches. The main role of surface computing is recognizing touch and objects on the screen's surface and to interact with those objects seamlessly. If you use a surface computer, you wouldn't need a mouse, keyboard or even a USB port connected to the computer. Surface computing is the term for the use of a specialized computer GUI in which traditional GUI elements is replaced by intuitive, everyday objects. Instead of a keyboard and mouse, the user interacts directly with a touch-sensitive screen. It has been said that this more closely replicates the familiar hands-on experience of everyday object manipulation [1] [4]. You're probably already familiar with the concept of a graphical user interface (GUI). A GUI, like the windows and menus on your computer, presents information to you on a screen and prompts you to use an attached keyboard, mouse, touchpad or other input device to enter information. Surface computing implements a Natural User Interface (NUI), which lets you interact in ways that what comes naturally to you. A NUI is driven by the direct touch of the user or object it's interacting with rather than separate input devices connected to the computer [3].

II. ATTRIBUTES OF SURFACE COMPUTING

A. Simplicity

Surface's main feature is the apparent simplicity with which common computing tasks can be performed. Pictures in a digital camera placed on the surface are automatically downloaded to the device and displayed on the screen. Transferring those pictures to another device, such as a compatible cell phone, simply requires the user to place the cell phone on the surface and to drag the pictures in its direction. While the potential security implications of this type of interaction are obvious, and Microsoft's solutions to the issue are vague at best [4].

Figure 1. Simple and Easy to Use [6]

B. Multi-Touch Contact:

As part of its NUI, Surface also includes multi-touch technology. This means that Surface can detect and process several touch points simultaneously. Therefore, if you have several people browsing through pictures at one time, they can each drag, zoom and turn photos at the same time without waiting for each other [3].

Figure 2. Multi-touch [7]

C. Object Recognition

Users can place physical objects on the surface to trigger different types of digital responses, including the transfer of digital content [5]. In Surface object recognition incorporates TUI (Tangible User Interface).

Figure 3. Object Recognition[8]

D. *Multi User Experience*

The horizontal form factor makes it easy for several people to gather around surface computers together, providing a collaborative, face to face computing experience[5].

Figure 4. Multi-user[9]

III. HARDWARE UNDER THE SURFACE

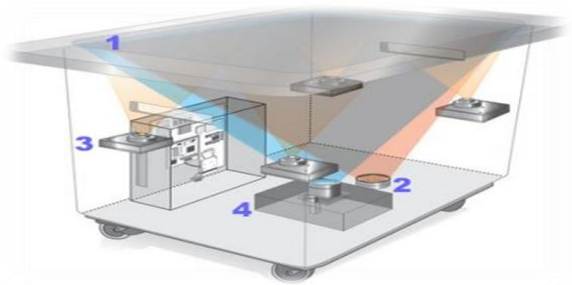

Figure 5. Hardware of a Surface Computer[10]

A. Screen

A diffuser is used to convert the Surface's tabletop which is acrylic in nature into a large, horizontal multi-touch screen. The surface can recognize objects by their shapes or codes. It is also capable of processing multiple inputs from multiple users.

B. Infrared

It is said to be the "machine vision" of the surface. It operates in the near-infrared spectrum, using an 850 nm wavelength LED light source aimed at the screen. When the objects touch the tabletop, the light reflects back and is picked up by multiple infrared cameras with a net resolution of 1280 x 960.

C.CPU

It uses a Core 2 Duo processor, 2GB of RAM and a 256MB graphics card, the same components as an everyday desktop. Wireless communication with the devices on the surfaces is handles using WIFI and Bluetooth antennas. The underlying operating system is the modified version of Microsoft Vista.

D. Projector

The surface uses a same DLP light engine that is found in many rear-projection HDTVs.

IV. CONCLUSION

Thus from this report, we can conclude that surface computer is the future of computers. It is predicted to breakdown the tradition barriers to technology, giving a new dimension to the digital content. It is an innovative technology that is not restricted to our cell phones or TVs. Surface computing opens up a whole new experience for the users as it provides an effortless interaction with digital content through hand gestures, touch and physical objects. A whole new range of surface computers is predicted to evolve in near future in a variety of environments. As the evolution of form factors continue, ssurface computer will be in many number of schools, businesses, homes and could be a form factor of the refrigerator, the wall or the countertop. Surface computing provides new opportunities for companies to engage with people.

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