Surface Technology: "User Defined Gestures"

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ABSTRACT

The study of Surface technology is phenomena of the operational behavior of components or part is defined by the interactions between environment, the working conditions and properties of this components or parts. Surface technologies are applied to a variety of materials for many applications, including thermal, electrical and environmental protection, increased conductance and the building up of thick layers having superior mechanical and thermal properties.

In this paper we focus on "How Surface technology merge with different sectors?" and "More stress is on the Surface computing". Now a day technologies are changing drastically, and reducing stress of work load. It's changing the old structure and converts it into new form which is without keyboard & mouse. Surface computing machine is a coffee-table machine as the first of many such devices. It uses a blend of wireless protocols, Special machine readable tags and shape recognition to seamlessly merge the real and the virtual world.

1. INTRODUCTION

The name Surface Technology is combination of two words "SURFACE" and "TECHNOLOGY". Word technology comes from the Greek technologia. Technology is the process by which humans modify nature to meet their needs and wants. Surface is the best way quickly get an impression of the actual thing would be too formally. Surface is a combination of hardware that has some new input qualities and software APIs that come along with it to support them.

Surface technologies are applied to a variety of materials for many applications, including thermal, electrical and environmental protection, increased conductance and the building up of thick layers having superior mechanical and thermal properties.

Interactive surfaces allow us to manipulate digital content in new ways, beyond what is possible with the desktop computer. Many different interactive surface technologies have been developed over the past few decades.

Technology changed the revolution by creating a new way of touch in the Microsoft history, its useful ways that can help in today's technology and other future Tense of this gadget. Microsoft Surface will revolutionize the way people live and work on a daily basis. It will have a huge impact on the way people around the world use Computers and other technology. Therefore, my technology would change the way you see the world in many ways.

2. SURFACE COMPUTING

Surface computing is a new way of working with computers that moves beyond the traditional mouse-and-keyboard experience. It is a natural user interface that allows people to interact with digital content the same way they have interacted with everyday items such as photos, paintbrushes and music their entire life: with their hands, with gestures and by putting real-world objects on the surface. Surface computing opens up a whole new category of products for users to interact with.

It blurs the lines between the physical and virtual worlds. We really see this as broadening content opportunities and delivery systems. Surface computing is a powerful movement. In fact, it's as significant as the move from DOS [Disk Operating System] to GUI [Graphic User Interface]. It's about technology adapting to the user, rather than the user adapting to the technology. Bringing this kind of natural user interface innovation to the computing space is what Surface Computing is all about.

3. HISTORY

Microsoft Tabletop can do many more things that people may not think is Possible. The technology that is responsible for Microsoft surface is called multi-touch and has at least a 25-years story of history behind it that begins as far back as the year of 1982. May be even back to the 1970's, which continued to expand. The first touch sensor was created back in 1971 by an instructor at the University of Ken-

tucky named Dr. Sam Hurst. The University of Toronto introduced the first multi-touch piece of technology in 1982.
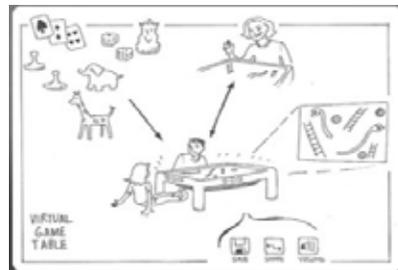
In 2001, *Stevie Bathiche* of Microsoft Hardware and *Andy Wilson* of Microsoft Research began working together on various projects that took advantage of their complementary expertise in the areas of hardware and software. In one of their regular brainstorm sessions, they started talking about an idea for an interactive table that could understand the manipulation of physical pieces and at the same time practical for everyone to use.

·   In 9th October 2001, a virtual team was formed to fully pursue bringing the idea to the next stage of development; Bathiche and Wilson were key members of the team.
·   In early 2003, the virtual team expanded, and within a month, through constant discussion and brainstorming, the first humble prototype was born and nicknamed T1. The model was based on an IKEA table with a hole cut in the top and a sheet of architect vellum used as a diffuser. The evolution of Surface had begun. A variety of early applications were also built, including pinball, a photo browser and a video puzzle.
     "T1 Prototype"
·   By late 2004, a number of different experimental prototypes were built including "the tub" model, which was encased in a rounded plastic shell, a desk-height model with a square top and cloth-covered sides, and even a bar-height model that could be used while standing. After extensive testing and user research, the final hardware design (seen today) was finalized in 2005.

"Tub Model"

· **2007:** Final structure finalized, interactive tabletop device was built that seamlessly brings both the physical and virtual worlds into one.

"Microsoft Surface"

4. KEY ATTRIBUTES
Surface computing features four key attributes:

- **Direct interaction.** Users can actually "grab" digital information with their hands and interact with content through touch and gesture, without the use of a mouse or keyboard.
- **Multitouch contact.** Multi-touch contact refers to the ability to have multiple contact points with an interface, unlike with a mouse, where there is only one cursor.


- **Multiuser experience.** Multi-user is a benefit of multi-touch; several people can orient themselves on different sides of the surface to interact with an application simultaneously.
- **Object recognition.** Users can place physical objects on the surface to trigger different types of digital responses, including the transfer of digital content.

5. TECHNOLOGY BEHIND SURFACE TECHNOLOGY
Essentially, Microsoft Surface is a computer embedded in a medium-sized table, with a large, flat display on top that is touch-sensitive.

Table about three feet high, with a solid base that hides a fairly standard computer equipped with the following components:
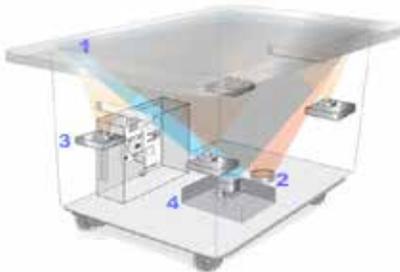
(1) Screen: A diffuser turns the Surface's acrylic tabletop into a large horizontal "multitouch" screen, capable of processing multiple inputs from multiple users. The Surface can also recognize objects by their shapes or by reading coded "domino" tags.

(2) Infrared: Surface's "machine vision" operates in the near-infrared spectrum, using an 850-nanometer-wavelength LED light source aimed at the screen. When objects touch the tabletop, the light reflects back and is picked up by multiple infrared cameras.

(3) CPU: Surface uses many of the same components found in everyday desktop computers. Wireless communication with devices on the surface is handled using WiFi and Bluetooth antennas.

(4) Projector: Microsoft's Surface uses the same DLP light engine found in many rear projections HDTV's (High Definition Televisions). The footprint of the visible light screen, at 1024 x 768 pixels, is actually smaller than the invisible overlapping infrared projection to allow for better recognition at the edges of the screen. The cameras can read a nearly infinite number of simultaneous touches and are limited only by processing power. Right now, Surface is optimized for 52 touches, or enough for four people to use all 10 fingers at once and still have 12 objects sitting on the table.

The display screen is a 4:3 rear-projected DLP display measuring 30 inches diagonally. The screen resolution is a relatively modest 1024x768, but the touch detection system had an effective resolution of 1280x960. Unlike the screen resolution, which for the time being is constant, the touch resolution varies according to the size of the screen used—it is designed to work at a resolution of 48 dots per inch. The top layer also works as a diffuser, making the display clearly visible at any angle.

6. SOFTWARE AND HARDWARE SPECIFICATION
- The software platform runs on a custom version of Windows Vista.
- Wired Ethernet 10/100,
- Wireless 802.11 b/g,
- Bluetooth 2.0 connectivity.
- Intel Core Quad Xeon @ 2.66GHz
- 4GB DDR2-1066 RAM
- 1TB 7200RPM Hard Drive
- It has a custom motherboard form factor about the size of two ATX motherboards.
- Surface applications are written using either Windows Presentation Foundation or Microsoft XNA technology.
- 5 video infrared cameras.

7. APPLICATIONS
i. Water
Water is used as an "attract mode" for the Surface desktop, and it is certainly attractive. A unique feature that comes preinstalled with Surface is the *pond effect "Attract" application*. Simply, it is a "picture" of water with leaves and rocks within it. By touching the screen, you can create ripples in the water just like you were putting your hand into a real stream Additionally, the pressure of touch alters the size of the ripple created, and objects placed into the water create a barrier that ripples bounce off, just as they would in real life.

ii. Music
The Music application works like a virtual jukebox, displaying music arranged by album and allowing the user to flip over albums, select songs, and drag them to the "Now Playing" section. In addition to playing music that is already stored on the unit's hard drive, Music can also transfer songs from portable music players.

iii. Photos
Sharing photos is a much more unrestricted activity. Photos are arranged into albums that look like piles. Tapping the pile once spreads it around the screen and from there user can drag, rotate, and resize the images. Since Surface can detect many touches at the same time, multiple people can sort and resize pictures.

iv. Dining Restaurant uses
The application allows diners to see a virtual menu on screen. Items can be dragged into a central "ordering area" order right from the table beverages and food selections then split the bill and pay electronically at the same time by putting customer's card on the surface.

v. T-mobile stores
Two cell phones can be placed on the surface and compare the differ-

ent price points and features, experiment with ring tones and look at plans then program the phone to your liking and have it all set to use before you walk out of the store

vi. Paint
There are three draw modes that can be toggled by touching an icon on the bottom of the toolbar: brush, paint, and reveal, the last of which is kind of a negative brush that shows a background bitmap underneath. The brush mode is a bit spotty and tends to skip, but the paint mode is smooth and fun. You can draw using one finger, all your fingers at once (good for drawing hair), the palm of your hand, or using any natural object such as a regular paintbrush. Using the program is like having a flashback to finger painting back in kindergarten (minus the mess), and certainly children will have tons of fun with this kind of application.

8. ADVANTAGES
- Large surface area to view different windows and applications.
- Data Manipulation - Selecting, moving, rotating and resizing (manipulating objects on the screen is similar to manipulating them in the manual world).
- Quick and easy to use.
- More Than One User –Several people can orient themselves on different sides of the surface to interact with an application simultaneously (Max 52 points of touch).
- Objects Recognition - Increased functionality aiding user in speed and ease of use.

9. DISADVANTAGES
- Incredibly expensive and not portable.
- Currently designed only in some areas.
- Must own devices such as a cell Phone to upload photos into or Share with others
- Loss of Privacy - Open for many to view.
- Have to be careful of table surface to not damage it
- Tailored to high end clients.

10. TODAY'S USERS OF SURFACE COMPUTING
- Currently only commercially available and being used in the retail, hospitality, automotive, banking and healthcare industries.
- Current customers are AT&T, T-Mobile, the Rio All Suite Hotel & Casino in Las Vegas, Sheraton Hotels, Disney Innovations House in California, Hotel 1000 in Seattle, Harrah's Entertainment, and Starwood Hotels and Resorts Worldwide.

11. FUTURE SCOPE
Although surface computing is a new experience for consumers, over time Microsoft believes there will be a whole range of surface computing devices and the technology will become pervasive in people's lives in a variety of environments.

As form factors continue to evolve, surface computing will be in any number of environments— schools, businesses, homes — and in any number of form factors — art of the countertop, the wall or the refrigerator.

12. CONCLUSION
Computers with touch screens have been around for years and have already found niches in ATMs, ticket ordering machines, and restaurant point-of-sale devices. Surface takes existing technology and presents it in a new way. It isn't simply a touch screen, but more of a touch-grab-move-slide-resize-and-place-objects-on-top-of-screen and this opens up new possibilities that weren't there before.

By utilizing the best combination of connected software, services and hardware developing surface computing products that push computing boundaries, deliver new experiences that break down barriers between users and technology.

Imagine a multiplayer real-time strategy game where you and another human opponent can move units around as quickly as you can point to them or perhaps an educational environment, where university students could assemble and disassemble anything from molecules to skyscrapers quickly and easily.

'A computer on every desktop' Now we say

'Every desktop will be a computer'

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