ABSTRACT

Surface is the first commercially available surface computer from Microsoft Corp. It turns an ordinary tabletop into a vibrant, interactive surface. The product provides effortless interaction with digital content through natural gestures, touch and physical objects. In essence, it’s a surface that comes to life for exploring, learning, sharing, creating, buying and much more. Soon to be available in restaurants, hotels, retail establishments and public entertainment venues, this experience will transform the way people shop, dine, entertain and live.

“With Surface, we are creating more intuitive ways for people to interact with technology”.

In this paper we discussed about what is surface computing? How it works? how it helps developing the human technology? We also discussed the key attributes of surface computing, how does surface computing benefit consumers?, History of Surface Computer? and what is beyond Surface computing in future.

INTRODUCTION

What is Microsoft Surface?

Surface is a 30-inch display in a table-like form factor that’s easy for individuals or small groups to interact with in a way that feels familiar, just like in the real world. Surface can simultaneously recognize dozens and dozens of movements such as touch, gestures and actual unique objects that have identification tags similar to bar codes. Surface will ship to partners with a portfolio of basic applications, including photos, music, virtual concierge and attract mode, that can be customized to provide their customers with unique experiences.

A Surface Computer

What is 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.

How does Surface work?

At a high level, Surface uses cameras to sense objects, hand gestures and touch. This user input is then processed and the result is displayed on the surface using rear projection.

HISTORY OF SURFACE COMPUTER

Beyond the Mouse and Keyboard

Surface computing is a major advancement that moves beyond the traditional user interface to a more natural way of interacting with digital content. Microsoft Surface, Microsoft Corp.’s first commercially available surface computer, breaks down the traditional barriers between people and technology to provide effortless interaction with all forms of digital content through natural gestures, touch and physical objects instead of a mouse and keyboard. Although customers will be able to interact with Surface in select restaurants, hotels, retail establishments and public entertainment venues by the end of the year, the product has been years in the making at Microsoft.

An Idea Inspired by Cross Division Collaboration

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. Although there were related efforts happening in academia, Bathiche and Wilson saw the need for a product where the interaction was richer and more intuitive, and at the same time practical for everyone to use. This conversation was the beginning of an idea that would later result in the development of Surface, and
over the course of the following year, various people at Microsoft involved in developing new product concepts, including the gaming-specific PlayTable, continued to think through the possibilities and feasibility of the project. Then in 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.

An initial tub prototype model

**Humble Beginnings on an IKEA Table**

In early 2003, the new Consumer Products Group, led by David Kurlander, presented the idea to Bill Gates, Microsoft chairman, in a group review. Gates instantly liked the idea and encouraged the team to continue to develop their thinking. 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. As more applications were developed, the team saw the value of the surface computer beyond simply gaming and began to favor those applications that took advantage of the unique ability of Surface to recognize physical objects placed on the table. The team was also beginning to realize that surface computing could be applied to a number of different embodiments and form factors. Over the next year, the team grew significantly, including the addition of Nigel Keam, initially software development lead and later architect for Surface, who was part of the development team eventually tasked with taking the product from prototype to a shipping product. Surface prototypes, functionality and applications were continually refined. More than 85 early prototypes were built for use by software developers, hardware developers and user researchers.
One of the key attributes of Surface is object recognition and the ability of objects placed on the surface to trigger different types of digital responses, including the transfer of digital content. This feature went through numerous rounds of testing and refining. The team explored various tag formats of all shapes and sizes before landing on the domino tag (used today) which is an 8-bit, three-quarter-inch-square tag that is optimal thanks to its small size. At the same time, the original plan of using a single camera in the vision system was proving to be unreliable. After exploring a variety of options, including camera placement and different camera lens sizes, it was decided that Surface would use five cameras that would more accurately detect natural movements and gestures from the surface.

Hardware Design

By late 2004, the software development platform of Surface was well-established and attention turned to the form factor. 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. Also in 2005, Wilson and Bathiche introduced the concept of surface computing in a paper for Gates’ twice-yearly “Think Week,” a time Gates takes to evaluate new ideas and technologies for the company.

The Human Touch

Microsoft Surface puts people in control of their experiences with technology, making everyday tasks entertaining, enjoyable and efficient. Imagine ordering a beverage during a meal with just the tap of a finger. Imagine quickly browsing through music and dragging favorite songs onto a personal playlist by moving a finger across the screen. Imagine
creating and sending a personal postcard of vacation pictures instantly to friends and family, while still wearing flip-flops.

Surface also features the ability to recognize physical objects that have identification tags similar to bar codes. This means that when a customer simply sets a wine glass on the surface of a table, a restaurant could provide them with information about the wine they’re ordering, pictures of the vineyard it came from and suggested food pairings tailored to that evening’s menu. The experience could become completely immersive, letting users access information on the wine-growing region and even look at recommended hotels and plan a trip without leaving the table.

Surface computing at Microsoft is an outgrowth of a collaborative effort between the Microsoft Hardware and Microsoft Research teams, which were struck by the opportunity to create technology that would bridge the physical and virtual worlds. What started as a high-level concept grew into a prototype and evolved to today’s market-ready product that will transform the way people shop, dine, entertain and live. It’s a major advancement that moves beyond the traditional user interface to a more natural way of interacting with information.

KEY ATTRIBUTES OF SURFACE COMPUTING

Surface computing has four key attributes:

- **Direct interaction.** Users can actually “grab” digital information with their hands and interact with content by touch and gesture, without the use of a mouse or keyboard.
SURFACE COMPUTING

• **Multi-touch contact.** Surface computing recognizes many points of contact simultaneously, not just from one finger, as with a typical touch screen, but up to dozens and dozens of items at once.

• **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.

• **Object recognition.** Users can place physical objects on the surface to trigger different types of digital responses, including the transfer of digital content.

FEATURES

**Multi-touch display:**

The Surface display is capable of multi-touch interaction, recognizing dozens and dozens of touches simultaneously, including fingers, hands, gestures and objects placed on the surface.
**Horizontal orientation:**

The 30-inch display in a table-sized form factor allows users to share, explore and create experiences together, enabling a truly collaborative computing experience.

**Dimensions:**

Surface is 22 inches high, 21 inches deep and 42 inches wide.

**Materials:**

The Surface tabletop is acrylic, and its interior frame is powder-coated steel.

**Benefit to Customers**

**Surface Puts People in Control**

Surface will be shipped to partners with a portfolio of basic applications, including photos, music and virtual concierge applications that can be customized to provide their customers with unique experiences. Harrah’s Entertainment Inc., Starwood Hotels & Resorts Worldwide Inc., and T-Mobile USA Inc. will be some of the first companies to provide unique Surface experiences for their customers. These first partners are exploring a variety of avenues for Surface, which may include the following:
• **Harrah’s Entertainment:**
  Guests at Harrah’s Entertainment’s Las Vegas properties, including Caesars Palace and the Rio All-Suite Hotel & Casino, can explore the wide variety of dining, entertainment, night life and gaming experiences available at its network of area casinos. Using the interactive virtual concierge in Microsoft Surface, guests can reserve tickets to an Elton John concert, review the menu at chic eatery Bradley Odgen, take a tour of the world-famous PURE nightclub, book a luxurious spa treatment or redeem Total Rewards loyalty program credits for a broad range of merchandise. The virtual concierge can directly connect users to amenities available at any of Harrah’s seven Las Vegas casinos, allowing guests to “visit” multiple venues and plan their itineraries without ever getting up from their table. “When visitors to Las Vegas choose to stay at one of our casinos, they can enjoy the amenities at all of them,” said Tim Stanley, Harrah’s chief information officer and senior vice president of innovation, gaming and IT. “Microsoft Surface is a great way to help our guests get the most out of their trips to Las Vegas by putting all the offerings and experiences we make available at their fingertips.”

• **Starwood Hotels & Resorts Worldwide:**
  Starwood Hotels & Resorts Worldwide Inc. (NYSE: HOT) will initially launch Surface at Sheraton Hotels & Resorts, Starwood’s largest and most global brand. Surface will help bring interaction, connectivity and play to Sheraton hotels’ new lobby experience, currently being rolled out in key cities worldwide. To provide guests with greater service, unique experiences and entertainment, Sheraton embraced Surface as a key component of its lobby transformation. Surface will enable guests to browse and listen to music, create their own playlists, send photos home, download books, and even order food and drinks — all with the drop of a credit card or their Starwood Preferred Guest loyalty card. “We are creating new and engaging ways for our guests to connect with their passions while away from home. Microsoft Surface puts us at the forefront of technology and allows guests to
interact with each other and our hotel in a revolutionary way,” said Hoyt H. Harper II, senior vice president for Sheraton.

- **T-Mobile USA:** Customers in T-Mobile retail stores might place different cell phones on Surface’s interactive surface where product features, prices and phone plans would appear so they could be easily compared. “We are continuously working to build the greatest retail experience we can for our customers,” said Bonita Inza, vice president of Retail at T-Mobile USA. “They tell us they want more information about our products and services, but in a way that is easily accessible, at their own pace and with the amount of detail that they prefer. Surface is one example of how we’re turning our stores into a playground where customers can comfortably explore exciting new products in their own personal way.”

**Beyond Surface — Surface Computing Tomorrow**

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 — part of the countertop, the wall or the refrigerator.

**REFERENCES**

[1] www.microsoft.com