



New Approach To Work On A Single Surface

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Abstract:

A new type of technology that is surface technology which is based on switchable interaction screen can be made spread under electronic control. It has a 360-degree user interface, a 30-inch reflective surface with a XGA DLP projector beneath the surface which projects an image onto its base, while five cameras in the machine's housing record reflections of infrared light from objects and human fingertips on the surface. The surface is skilled of object recognition, object/finger orientation recognition and tracking, and is multi-touch and is multi-user. Users can work together with the machine by touching or dragging their fingertips and objects such as paintbrushes across the screen, or by placing and moving placed objects. The user interface works without a mouse or keyboard, allowing people to share content and information by using their hands and natural movements.

1.Introduction

Over the past couple of years, a new class of interactive device has begun to merge, what can best be described as “surface computing. It is user friendly computer which make possible the user to use computer without relying on other devices like mouse, keyboard.

Today’s computers allow you to have multiple applications in multiple windows. But they may have only one key board and one mouse. And only one person can operate at a time. If you want to watch photo album on your computer along with three or four of your friends, just imagine every one trying to see them. Microsoft Surface allows people to sit across in different positions and watch the images. Spread the photos across the Microsoft Surface and any one can pull photos towards them like you pull physical photos, with fingers.

Its display just looks like a coffee table or carom board with 30 inch wide screen with three dimensional images. This is complete rebellion in computing because keyboard was in since many years. It was modified form of type writer. It was not much significant change with respect to surface.

There are many convincing aspects to such systems – for example the interactions have analogies to real-world interactions, where objects can be directly operated with our fingers and hands. It can be easily used separately by more then one persons at a same time and share information with each other .Multi use helps to communicate easily which will not affect the efficiency of machine.

It makes use of various rear projection vision system used in many research prototypes. It gives information by single touch. It acts as a communication machine which interacts with the user by just touching and grabbing. Such systems support capabilities beyond that of regular touch screens, permitting multiple fingers, and even other tangible objects near the surface to be sensed.

Digital pictures can be easily resized and can be easily moved by using fingers. Two opposite corners of the picture can be grabbed and will be enlarged. Pictures can be transferred by placing digital cameras on the top by wireless connection. The *diffuser* is a key part of these systems. It displaying the projected image and ensure that the camera can only detect objects close to the surface.

2. Microsoft Surface Architecture

2.1. The architecture of Microsoft windows consists of following components

- Screen
- Infrared
- CPU
- Projector

These four parts use the various technologies and various functions of Microsoft .It gives the result which are just unimaginable by a normal human being.

2.2. Screen

The first aspect that is to be discussed is the screen. Screen of other computing campaign are used to show the output and the working of the processes that are running. But the Microsoft surface technology use screen as both for input and output. It works same as the touch screen technology that is been used in mobiles, iPods and other computing devices. The chemistry of dispersal process is taken for the purposes that are accountable for prove at every single part of screen. The diffusion also makes the touch screen technology enabled at the device that is been used.

2.3. Infrared

The second part of the structural design of the Microsoft technology is known as infrared. This Infrared is similar to the infrared used in mobiles. This infrared technology is generally used by everyone each and every person knows about this particular technology. This infrared has an important role in providing the touch screen technology and some other functions of the Microsoft surface.

An LED is present behind the screen. The choice of LED depends on the reason for which the device is being used. For example for a packet size device composed of Microsoft technology the LED will be different when compared to the device that is been made for the purpose of presenting lectures in United Nations conferences.

When the screen of the device is touched the light present behind it are disturbed(using the diffusion process) and the functionality of touch screen is in movement. The light moves at different corners and for each and every corner a function has been made to work and produce outputs. For each corner there is a function that is being developed whenever it feel the touch of any finger the function of that particular place get activated and the desired operation is being produced. There are several cameras installed there for taking use of light and they are intended particularly for the working of the infrared . The number of cameras depends on the constraint similar to the range of LED's. The working of those cameras is quite similar to the optical mouse.

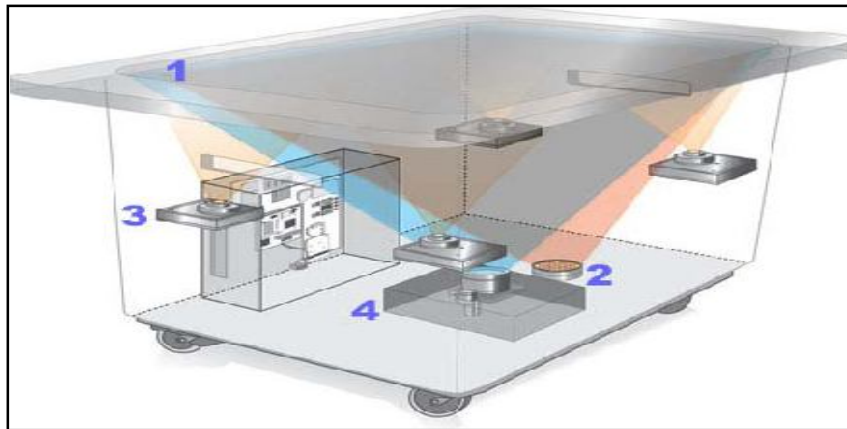


Figure 1

2.4.CPU

The third main feature of the Microsoft surface is the CPU installed inside the computing device. Its processor is dependent on the environment for been which it has to work for. The CPU has RAM present for the use of Microsoft surface, that RAM could be upgraded naturally to make it ordered and up to date. A graphics card is attached inside for the colorful layer of lights. Wi-Fi and Bluetooth are also been used here in Microsoft surface technology for dealing with the electric signals emitted by the movement of light.

The CPU is the significant part of the device as all the working is planned and controlled by it. It is intelligent and can manage the whole of device. The speed of the functionality of the device been used if very much reliant on the CPU. It detects and processes the movement of lights and generates the exact output for the function to perform.

2.5. Projector

The last part of the Microsoft architecture is the Projector that is currently been used in the High definition televisions. Its working is to route the lights inside the device and transfer those to the CPU to take action as it has been planned.

The surface present is designed in such a way that it has the ability to take action against fifty four touches at the same time without any break. This is a very gigantic accomplishment done by the engineers.

The disadvantage that the architecture of Microsoft surface technology has is that the electric signals greatly affect its users in worst way. So the challenge will be to reduce the hazards and the disadvantages of surface will be some great changes in the architecture of the Microsoft surface that is much and more friendly and is not harmful to the people using it.

T-mobile company of USA is using surface technology in stores for displaying their products. It facilitates the client for comparing two different cell phones their features applications and their pieces. By this highly developed technology small store are being turned into a big stores where customers have the surety of getting information about variety of things in their own manner. Coverage of 2008 American presidential elections was examined through surface technology.

3. Working Of Surface Computing

- **Screen:** A large horizontal “multitouch” screen, The Surface can recognize objects by reading coded “domino” tags.
- **Projector:** The Surface uses DLP light engine found in many rear projection HDTV's. The footprint of the visible light screen (1024 x 768 pixels) Projector. Wireless Communication
- **Infrared (IR cut filter):** Surface uses a 850-nm light source.
- **CPU:** Core2Duo processors 2GB of RAM 256MB graphics, The same components found in everyday desktop computer
- **Camera (IR pass filter):** The Camera is used for the capturing process. Images are displayed onto the underside of the screen. Fingers, hand gestures and objects are visible through this screen to cameras placed underneath the display. Camera images

are then processed using an image processing system which detects, fingers, and objects such as paint brushes. These objects are then recognized and the correct application begins running.

4.The Four Key Attributes

- Direct interaction
- Multi-user experience.
- Multi-touch.
- Object recognition
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4.1.Direct Interaction

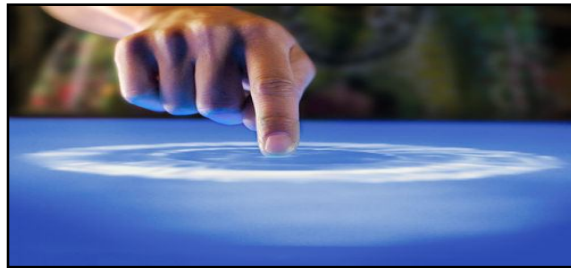


Figure 2:Direct Interaction

- Direct interaction means that, we can interact with the Surface by using our fingers.
- No other input device is needed to give input.
- This provides a natural interface effect

4.2.Multi-user Experience



Figure 3:Multi-user experience

- A single touch screen can support more than one user.
- Each user can interact independently with the surface.

4.3. Multi-touch Contact:



Figure 4: Multi-touch Contact



Figure 5: Multi-touch

- Ordinary touch screens provide only single touch sensing
- In surface more than one touch can be recognized at the same time.

4.4. Object recognition:

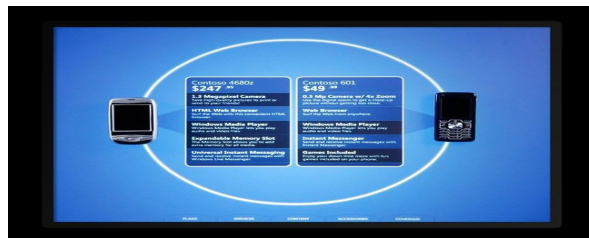


Figure 6: Object recognition

- Object recognition is done in the surface by using special bar codes called Domino tags.
- These are infrared sensitive patterns which are read by the infrared sensing cameras inside the Surface.

The objects can be recognized by the domain tags. The infrared sensing cameras can able to read the object placed on the surface of the screen. If any two mobiles are placed on the

surface screen then the entire features are displayed, through this the mobile features can be known. No requirement to have any external wires as the entire touch screen components are situated safely behind the glass which enables the user for easy accessing an infrared ray of light is projected under the table, then reflected by the fingertip. All the infrared light changes are then processed by the webcam and sent to the software.

4.4.1. Downloading Images & Videos To Mobile



Figure 7: Placing Mobile on the Screen

Just place a mobile on the screen the different images can be viewed and directly it can be loaded into a mobile device. Similarly videos can also be downloaded. It's an easy process of downloading.



Figure 8: Viewing Images



Figure 9: Selecting Images



Figure 10: Loading Images to Mobile

The size of the images can be changed just by the finger gestures. For example take a digital camera and just by placing the camera on screen all the images in the camera gets displayed, then the images can be resized or the selected image can be directly downloaded into the mobile device. The work becomes more and faster and multiple users can use any image on the screen and can resize the entire images on the screen.

4.4.2. Music Player Audio Tracks

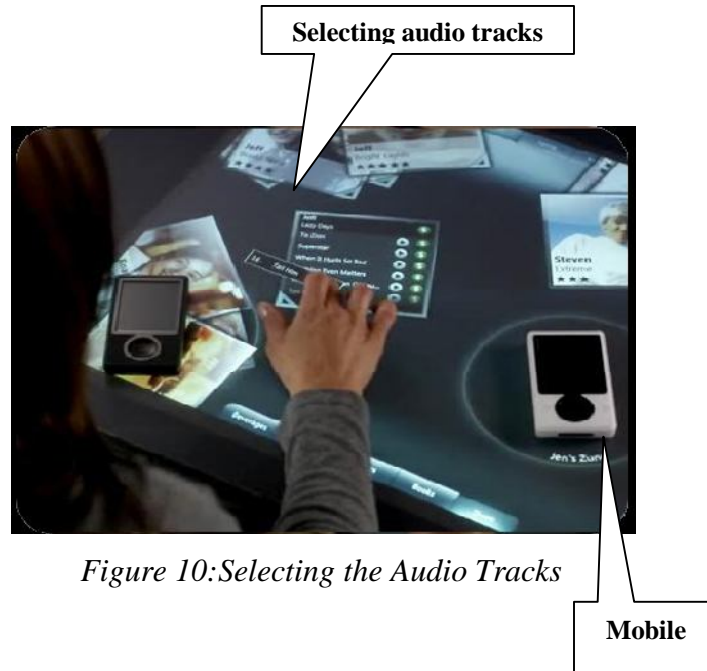


Figure 10: Selecting the Audio Tracks

The songs can be downloaded and also we can listen the songs by placing the mobile on the surface of the screen and selecting the tracks and forwarding it to the mobile device. This reduces the process of using the USB cables, because the downloading and uploading process is done directly and also in an easy manner.

6. Future Aspects

It is future approach in schooling as well as in hospitality.

6.1. Future approach in schooling

In future every wooden desk would be replaced by surface table top. Every desk will be equipped by surface computer. It will reduce the burden of carrying lots of heavy books and

bags that are also very much difficult to handle. Teacher will use the same technology to teach the students by keeping an eye over all the students individually or in the form of groups.

6.2.Future approach in Hospitality

Patients will be examined online using this technology. They will be checked using the surface only there diagnosis will be possible on the surface itself. online operations could be launched.

6.3.Future approach in defense field

Generally in defense area people spend there time on interact with the computer by using keyboard, mouse and various other traditionally used devices surface computing would save there time by interacting with the system just by surface of the computer.

7. Conclusion

It is a step towards next generation. The traditional input devices are just completely ignored and they are being replaced by the very new surface technology. This is easy to use, handle and allow direct interaction between user and the system. It allows interactions beyond the display. The technology brings together varied ideas and concepts from many different research areas and integrates these into single, self-contained conclusions. Various factors which affects to its wide usage are:

- The use of switchable diffusers for interactive surfaces.
- Simultaneous projection.
- FTIR multi-touch on the surface and on secondary displays above the surface with the sensing and processing integrated in the tabletop unit.

These various factors helps in concluding that surface computing can become a part of this vast world in technological and industrial field. This can be helpful for each and every person in this world either for his personal utilization or for his professional tasks. We have described the hardware and software we used to create our model in some detail, allowing others to explore these new forms of interactive surfaces.

8.Reference

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