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# A Review on Surface Computing

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## ABSTRACT

Surface computing is based on a single platform where only a screen plays the entire role without taking any support from keyboard or mouse; it is touch screen in nature or GUI delivering results on commands given. The user interacts with a surface often looking like a coffee table with a live screen on it.

**Keywords**: GUI, Touch sensitive screen, two dimensional and three dimensional.

## I. INTRODUCTION

Surface computing or coffee table computer is one of the best technologies in this generation; the tech is touch screen in nature and covers a wide area almost of size a normal table. The users or viewers can sit around and look at the screen and have discussion avoiding being an audience and looking at a screen projected by a projector and allowing only one speaker. Surface computing allows at least 4 members to be the part of discussion and be a key role in it. Members can sit around and see or use the surface computer comfortably and at the same time having access to a table meeting to discuss ideas and strategies. It was in the University of Toronto that the actual work started on surface computing, Alias research and MIT also being key players in building the tech. Surface computers are widely used in corporate for various purposes. The idea proposed was to enable multiple users to interact with the device and not have a single user, at the same time not keeping the access of tech limited to mobile phones only, the new innovative way of people interacting with it, and its response to objects sets surface computing unique in nature.

## II. HISTORY

- ✓ In 2001, Steve Bathiche and Andy Wilson from Microsoft developed the idea of interactive tables which can sense and understand the manipulation of physical objects kept on it.
- ✓ In October of same year DJ Kurlander, Michael kim, Joel Dehiin , Steve Batiche and Andy Wilson formed a team to take the idea ahead for its development.
- ✓ In 2003 JSL prototype model named TI which is based on IKEA table was introduced.
- ✓ 2005: tub prototype was designed
- ✓ Surface computer was finally introduced in 2007 May 29 at D5confernece.
- ✓ The latest version is from Microsoft surface 2.0

## III. TYPES OF SURFACE

There are two types of surface type available they are:

- Flat
- Non-Flat

**FLAT**:

It is two dimensional and one of the most used surface computing as analyzed by Microsoft. iTables also seem to have done a good job in the same sector. The best part about two dimensional surface

computing is ease and reliability of interaction, at the same time it actually limits the range of interaction of the user to perform. Interactions are only detected when direct contact with the surface is made.

**NON FLAT**:

It was the extra dimension which added more value to the non flat surfaces spherical cylindrical and parabolic surfaces .we often uses non flat surfaces, so the researchers have started to explore three-dimensional and curved modes. Spherical, cylindrical and parabolic are some of these types. One of the benefits of non flat is that it provides an extra dimension of interaction.

## IV. WORKING

It implements natural user interface which lets you interact in ways that 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. It has packed its NUI, software and hardware inside a single device. The surface 1.0 hardware features a series of camera that sense a user's touch or other objects placed on top, the surface software processes these images taken from the camera and then responds as appropriate for the application you are currently using. The screen displayed on the table top is actually the result of interaction posed to be on its display coming from underneath the table top.

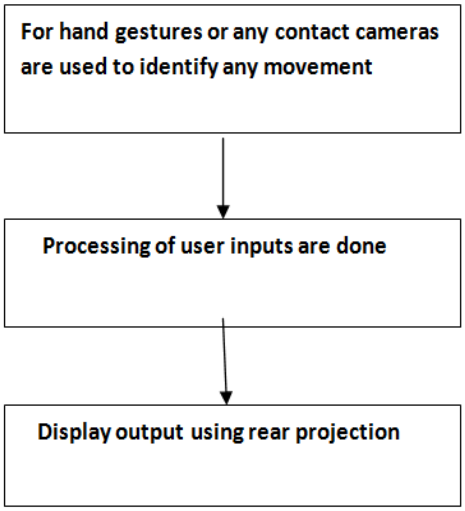


**Figure 1**

## V. STRUCTURE

Screen: there is a diffuser which turns the surface's acrylic table top into a large horizontal multi touch screen; it is capable of processing multiple inputs.

Infrared: surfaces machine vision operates in the near infrared spectrum, when anyone keeps the object the table recognizes, the light reflects back and is picked up by infrared cameras.

CPU: it is usually the very same components which are found in everyday computers.

Projector: Mostly digital light processing light engine found in many rear projections DTV's.

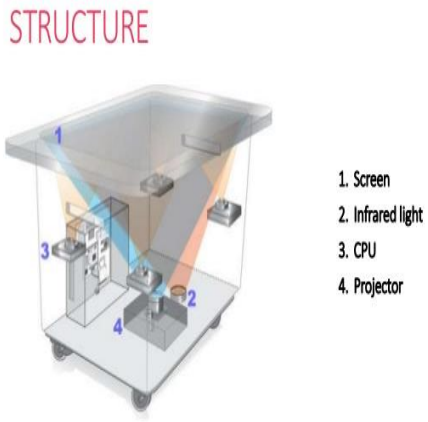


**Figure 2**

## VI. INTERACTION METHODS

**Two dimensional:**

Usually traditional surfaces are of two dimensional and it requires two dimensional touch interactions only. It supports pinch to zoom (multi touch gesture). These gestures help the users to manipulate what they see on the surface by their touch and move fingers on the surface.

**Three dimensional:**

We can create three dimensional gestures by using depth aware cameras. It helps to move in three dimensions of space without having any contact to the surface. These cameras can detect users' gestures and computer processes it.

## VII. SURFACE HARDWARE

- ✓ 40 inch LED screen
- ✓ 4 GB DDR3 RAM
- ✓ 320 GB hard drive
- ✓ Corning gorilla glass to protect the surface.
- ✓ 2.9 GHZ 64 bit AMD Atholn X2 dual core processor.
- ✓ Wired(1gb Ethernet) and wireless(802.11 and Bluetooth ) network hardware
- ✓ Physical connectors include HDMI, stereo RCA, SD card and USB
- ✓ Corning Gorilla Glass for surface protection

## VIII. HAND MOTIONS

**Touch**: we just have to touch on the object to select that particular object.

**Drag**: drag any icon or pictures on the screen or from the menu.

**Scaling**: we can scale a picture by touching its any 2 corners and operate functions like zoom in and zoom out.

**Turning**: by moving the object in a circular motion we can turn the object.

**Flickering**: we can swipe across the surface of an object to set them aside.

## IX. FEATURES

1) Multi touch user interaction- the horizontal form factor makes it easy for the people sitting around the table to have access at the same time, providing collaborative face to face computing.
2) Tangible user interface- surface aims to provide physical form digital information.
3) Multi user interface: users can also place physical objects on the surface which will trigger different types of digital responses. They are identified by their shapes and embedded ID tags.
4) Object recognition: it also possesses an ability to recognize physical objects that have identification marks similar to Bar codes.

## X. APPLICATIONS

One can easily digitally handle photos with finger tips, it can also instantly compare while shopping, interacting with digital content by share, drag, drop, digital images. Surface restaurant has been one of the most interesting on which people have enjoyed, quickly browse through play list entries dragging favorite song to the current track, easy to take complex shopping decisions.

**ADVANTAGES:**

- ✓ Multiple users at a time.
- ✓ No wires or USB are required.
- ✓ One can instantly uploaded/download pictures.
- ✓ Time saving by eliminating more processes.
- ✓ Esily to understand and use.

**DISADVANTAGES:**

- ✓ Not portable
- ✓ Expensive
- ✓ Poor accuracy with fat fingers.
- ✓ Objects need to be tagged.

## XI. CONCLUSION

Although surface computers have marked their presents in the current tech world it is yet to break many barriers because of its cost and heaviness. Surface computing is definitely is the future for many organizations to attend their meeting upon. It is just not a touch screen but more of touch, move, grab and place an object on top of the surface screen and taking the tech world to next level.

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