

A Review Paper on Touch Screen

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Abstract- With the advancement of technology, touch screens are getting more attention of researchers to make life of mankind comfortable. This paper presents the design/construction, development and the various technologies behind touch screen using IEEE Standard 1621. A touchscreen is basically act as a input device .It takes input from by a proprietary pen or by human touch. There is no requirement of external devices like keyboard, mouse etc. because it takes directly input from its screen.

Index Terms— Resolution, Seal Ability

INTRODUCTION

The touchscreen enables the user to interact directly with what is displayed, rather than using a mouse, touchpad, or other such devices (other than a stylus, which is optional for most modern touchscreens).

Touchscreens are used in devices in gaming, personal computers, tablet, computers, electronic voting machines, point-of-sale systems, and mobiles or smartphones. They can also be attached to computers or, as terminals, to networks. They play a important role in the design of digital appliances such as personal digital assistants (PDAs) and some e-readers.

The popularity of smartphones/mobile phones, tablets, and many types of devices is driving the demand and acceptance of common touchscreens for portable and functional electronics. Touchscreens are found the use in the medical, heavy industry, Automated Teller Machines (ATMs), and such as Museum displays or room automation, where keyboard and mouse systems do not allow a suitably intuitive, rapid, or accurate interaction by the user with the display's content.

HISTORY

The first touch screen developed is capacitive touch screen. E.A Johnson in 1965 developed or world on capacitive touch screen at Malven, England. The article of the first screens published in 1967. For air traffic control the article was published in 1968.

Then in early 1970's engineers from CERN (European Organization for Nuclear Research) developed transparent touchscreen. The two Engineers Frank Beck and Bent Stumpe who developed this. After this George Samuel Hurst an American inventor developed first resistive touch screen who received US patent No. 3,911,215 on October 7, 1975. The first version was produced in 1982.



CONSTRUCTION

There are many or several ways to build or construct a touch-screen. The main goal is to recognize one or more fingers touching a display at a time, to interpret the command that this represents.

In the capacitive or resistive touch screen , the most popular touchscreens there are basically four layers:

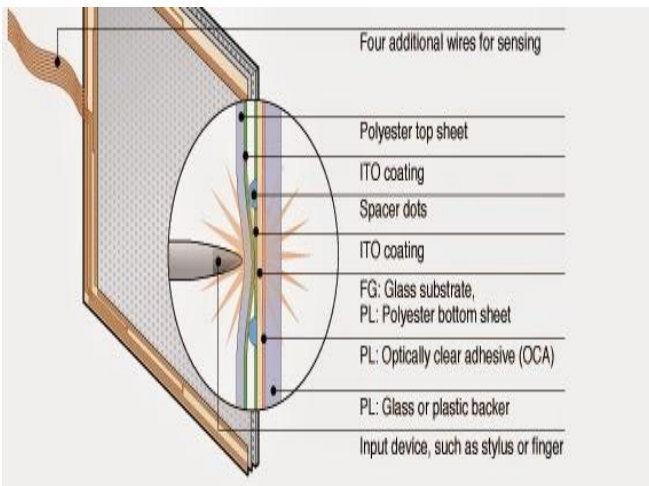
Top polyester-coated layer with a transparent metallic-conductive coating on the bottom.

Adhesive spacer, there is a gap between the layers and the touch sensor.

In top there is a glass layer coated with a transparent metallic-conductive

For mounting Adhesive layer is present on backside made up of the glass.

When a user touches the screen, the system records or stores the change in the electric current that flows through the touch sensor.



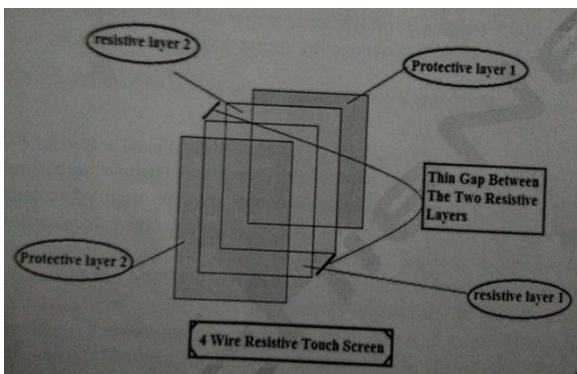
TECHNOLOGIES

There are a various types of touchscreen technologies with different methods of sensing the touch.

1. Resistive Touch-Screen

Resistive Touchscreen are the basic type of touch screen. It is a type of touch screen which is made by resistance grid layers. Resistive touch screen is made up of several layers i.e. (resistive layers and protective layers).It can be a 4 layers or 5 layers etc. We shall be talking about 4 layers touch screen here. In this type of touch-screen, there are two resistive layers and two protective layers.

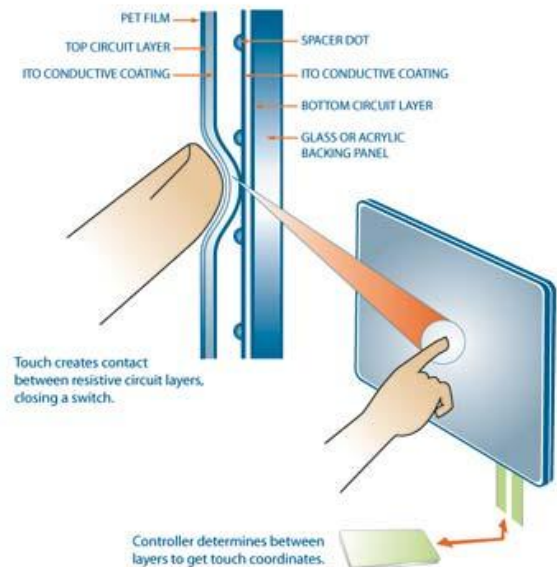
Placing of these layers we can understand by the figure shown below.



As we can see from the figure that there are four layers in which top and bottom layers are protective layers and between these layers two resistive layers with a conductive gap. These resistive layers are nothing but a grid of resistances in X direction .So we'll be having 4 terminals, two for X layer in X axis and two for Y layer in Y axis, as we can see in above diagram.

It works on the same concept of potentiometer .we apply voltage at the two terminals of the potentiometer and then analog voltage corresponding to the length is sensed by the jack in a potentiometer.

Similarly, a voltage is passed through one layer, and sensed at the other. When an object, such as fingertip or stylus pen, presses down on the outer surface, the two layers touch to become connected at that point .The panel then behaves as a pair of voltage dividers, one axis at a time. By rapidly switching between each layer, the position of a pressure on the screen can be read.



CAPACITIVE TOUCH –SCREEN

Capacitive touchscreen was the first touch screen that was invented first .It was built almost 10 years before the resistive touch screen.

Now a day’s capacitive touch screen are highly accurate and it respond very quickly when it is touched by human finger.

The capacitive touch screen is made up of only one insulating layer like glass, and inside it there is a conductive film present which is used to detect the touch.

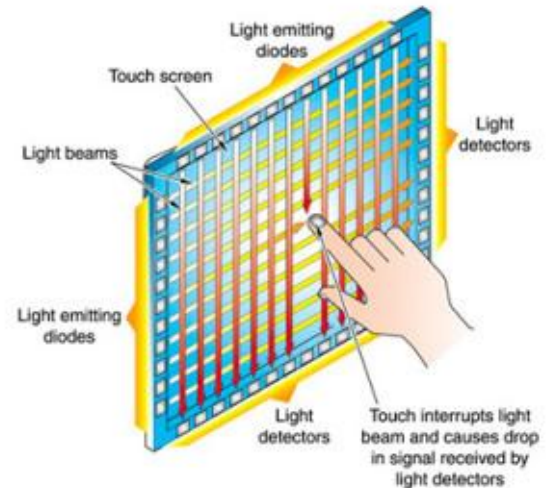
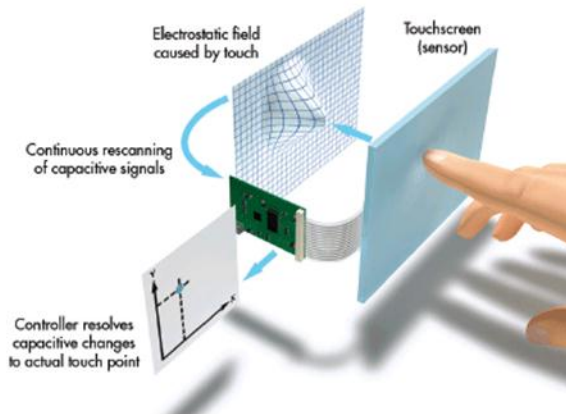
When you touch a capacitive touchscreen by your finger, you cause a effect in the screen’s electrical field.

This is enough to identify that where the finger is touched.

So, what is the difference between resistive touch screen and capacitive touch screen?

The basic difference between both of the above touch screen is that when u touch a capacitive touch screen can only detect the human touch or any conductive body while the resistive touch screen can detect any touch whether it is conductive or non-conductive.

You can’t touch capacitive touch screen by wearing leather gloves, because they are not conductive.



INFRARED TOUCH SCREEN

Infrared technology consists a small frame with Light Emitting Diodes (LED's) and photo-receivers or photo-detectors, and there is a transparent bazel and all these LED's and photo-detectors are hidden behind that bazel.

So when a object touch the screen, there is a portion in the screen where the loss of light happens. So this loss of light is used to detect the touched.

The loss of light means, the light is not reached or received by photo-receptors. And that is sufficient to determine the location of touch.

Benefits of infrared technology:

It can be reduced to any size without losing its resolution.

It has high clarity and light transmission.

It has high chemical, scratch, breakage, and liquid resistance.

High sealability from dust and liquids.

Touch can be sensed or detected by anything by including finger, gloved hand, or stylus etc.

It has high durability since a touch is only detected by light beams.

CONCLUSION

This paper basically trying to explain that, now a days everyone is familiar with touch screens, but they don't know what is the technology behind it i.e. how the touch is being sensed, what are the technologies behind it, how it is constructed and what are the various method to construct touch screen. So, this paper just give the review on touch screen and touch screen technologies.

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