Touchscreens

There isn’t just one way of how touch screens work. There are several different kinds of technologies behind the touch screens: Resistive, capacitive, infrared etc. This article will shortly introduce resistive touchscreen, but will focus on capacitive touchscreen since it is the most common technology behind mobile devices' touchscreens.

**Resistive touchscreen**

In resistive touch screen there are two layers under a protective scratch-resistant layer: conductive and resistive. In between these layers there are separators which keep these two layers away from each other. Once a finger presses the screen of the device, conductive and resistive layers are forced to touch each other. This touch changes the electrical field that has been running through the layers. Then the computer/brain of the device notices the coordinates of the place where the electric field changed. These coordinates are translated by a driver into a form that operating system can understand. After that the operating system can operate.

Resistive touchscreen is commonly used, but it’s disadvantage is that it can not operate if more than one finger is touching the screen at one, since the computer cannot follow where the electric field is changing, if there are several places.

**Capacitive touchscreen**

Capacitive technology is the most commonly used technology in mobile devices. In capacitive touchscreen there are more layers (4-5) than in resistive.

**Top layer**

The top layer is the device’s protective layer and it is made of glass called aluminosilicate. Aluminosilicate is made stronger and more compressed after washing it in potassium. This layer’s function is to protect everything that happens beneath this layer.

**ITOs**

Humans are capacitive and when a finger touches the top layer of the device, it’s electric charge effects the device’s capacitance and charge. Then the computer calculates the difference in capacitances between finger and the device and the information where there finger touches the screen. After calculating, that information is passed on to devices software. Software then, based on the information given, passes the operational signal forward to the display of the touchscreen.

Capacitive touchscreen beats resistive touchscreens on one matter: it works even if there are more than one finger on the screen and it also senses the movement of the finger on the screen e.g. sliding.
ITO stands for Indium Tin Oxide and there are two of this ITO layers in capacitive touchscreens. These two ITO layers consists of electron lines and they are perpendicular to each other. One of these ITO's is called also the driving line, since it carries the current. The other is the sensing line, since it senses the amount of current and charge. It also notifies the spot where finger has touched the screen and changed the charge. In between of these two ITOs there are a separator. ITO's and the separator in between creates the devices capacitance. Underneath all these layers is the LCD, Liquid Crystal Display.

**Upgrades**

Previously described capacitive technology has already upgrades: On-cell and In-cell. In these upgrades all of the layers are made as one. This is a huge improvement when considering the thickness and weight of the device, since it doesn't have to have so many layers in it. Also one layer improves the colour saturation of the device since light only needs to penetrate one layer instead of four or five.

**Conclusion**

It depends on the device that one makes, which of the touch technologies should be used. All in all all of the technologies is based pretty much on charge, one way or the other. It was a surprise for me that there are no pressure nor heat of the finger included in non of these technologies.

**References**


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How do touch-screen monitors know where you're touching?, *read 4.1.15*:  http://computer.howstuffworks.com/question716.htm

Picture 1:
http://techexplainer.files.wordpress.com/2012/04/resistive-touchscreen.jpg

Picture 2:
https://www.youtube.com/watch?v=y9ikU-R57AU