1 Working Principle of Resistive Touch Screen

- Two sheets of transparent layer with metallic (resistive) coating facing each other
- Four wires connection
- Excite alternate axes with voltage
- Touch acts as voltage divider for coordinate estimation

1.1 Properties

- Used with finger or any pointing device (passive)
- Requires certain amount of pressure.
- Difficult, but can be altered for multi-touch (only two-points touch)

2 Capacitive Touch Screen

- Screen is covered in a capacitive material: Indium-tin-oxide (conductive, optically 90% transparent)
- Capacitance = ability to store electrical charge (Works through glass)
- Human beings act as small capacitors
- Touching the screen modifies its electrostatic field

2.1 Surface Capacitance

- Cover the screen with a uniform conductive material
- Apply a small voltage to generate an electrostatic field. Touching with a finger creates a dynamic capacitor
- Measure effective capacitance at each corner of the screen
    - The larger the change, the closer to the corner the touch is
    - Combine measurements from all corners = location of the touch
- Will not work with multi-touch as clicking two points would confuse the field

3 Projected (Mutual) Capacitance

- Conductive material is etched with rows / columns
- An electronic field is projected through the top layer of glass
- An electrostatic field is created
- Human acts as a conductor
- Decrease of capacitance between electrodes is detected during touch
- Measure capacitance at each electrode grid point

3.1 Properties

- More accurate / multi-touch
- Sensing requires an active touch: Non-conductive materials will not change the electrostatic field: fingers, capacitive glove, capacitive stylus
- State-of-art technique for smart phone, tablets.
- Can be manufactured to the top glass layer (on-cell) or the display layer (in-cell)

4 Touch and UI

- Touch relies on finger contact with the display. This has to alter the way we design our displays

- Size of the finger sets the properties of the UI, not the size of a display

Reference section

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