

Implementation of multi-touch gestures using a resistive touch display

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# **Abstract**

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| **Abstract** |
| A system based on a standard resistive touch screen that is capable of detecting double point or finger taps or gestures, and districting them from single point or finger taps or gestures. The system uses either a standard analog touch controller capable of four measurement types or a modified analog touch controller capable of six or more measurement types, and the fixed known resistance ratio of the touch film layers, to calculate an approximation of the location of up to two separate touch points on the screen. A collection of the location samples is used to detect different single and double finger gestures. |

# **Relevant Classification Codes**

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| **USC Codes** | **Definitions** |
| G06F3/045 | Digitisers, e.g. for touch screens or touch pads, characterised by the transducing means using resistive elements, e.g. single continuous surface or two parallel surfaces put in contact |
| G06F3/0416 | Control or interface arrangements specially adapted for digitisers |
| G06F3/04883 | Interaction techniques based on graphical user interfaces [GUI] using specific features provided by the input device, e.g. functions controlled by the rotation of a mouse with dual sensing arrangements, or of the nature of the input device, e.g. tap gestures based on pressure sensed by a digitiser using a touch-screen or digitiser, e.g. input of commands through traced gestures for entering handwritten data, e.g. gestures, text |
| G06F2203/04104 | Multi-touch detection in digitiser, i.e. details about the simultaneous detection of a plurality of touching locations, e.g. multiple fingers or pen and finger |
| G06F2203/04808 | Several contacts: gestures triggering a specific function, e.g. scrolling, zooming, right-click, when the user establishes several contacts with the surface simultaneously; e.g. using several fingers or a combination of fingers and pen |

# **Claims**

1. A system for detection of single and double stylus and finger taps and gestures, comprising:
   1. a resistive touch screen, comprising:
      1. a dual layer of conducting film;
      2. an isolation layer between the two conducting films;
      3. two electrodes on each film sheet sides
   2. an analog touch controller capable of:
      1. applying voltage gap between two electrodes attached to one film and measuring the sensed voltage on both of the electrodes on the other sheet;
      2. applying voltage gap between two electrodes when one is attached to one film and the other to the second, and measuring the sensed voltage on the other two electrodes;
   3. a touch analysis controller operating as standalone device or embedded in a system controller
2. The system of claim 1 wherein touch said analysis controller uses measurements of DX, DY and D or Ry′ to determine if the touch screen is touched on a single or multiple points and to estimate the location of a single or double touch points.
3. The system of claim 2 wherein said touch analysis controller determines, based on the magnitude of the measurements of DX, DY, whether to approximate the gap between touch points (dX and dY) based on a calculation using DX and DY, or based on a calculation using D or DR.
4. The system of claim 1 wherein only a single finger touch is required to calibrate the touch display and derive the Ry value.
5. The system of claim 1 wherein consecutive samples of approximated touch points are used to detect single and double finger gestures.
6. The system of claim 1 wherein the controller samples X, Y, X′, Y′ and based on their results determines which Z measurement pairs to execute and/or use for the dual touch point calculations.
7. A system for detection of single and double stylus and finger taps and gestures, comprising:
   1. a resistive touch screen, comprising:
      1. a dual layer of conducting film;
      2. an isolation layer between the two conducting films;
      3. two electrodes on each film sheet sides;
   2. an analog touch controller capable of
      1. applying voltage gap between two electrodes attached to one film and measuring the sensed voltage on an electrode on the other sheet; and
      2. applying voltage gap between two electrodes when one is attached to one film and the other to the second, and measuring the sensed voltage on the other two electrodes;
   3. a touch analysis controller operating as standalone device or embedded in a system controller
8. The system of claim 7 wherein said touch analysis controller uses a value D or DR as described in this application as a distinction between single and double or more finger touch.
9. The system of claim 7 wherein said touch analysis controller uses the value D or DR as a distinction between single and double finger touch, and the sign of D or DR to distinguish between horizontal and vertical separation of the two fingers.
10. The system of claim 7 wherein said gestures include one of the following: double finger tap, double finger swipe up, down, left or right and double finger pinch in or out on the horizontal or vertical direction

# **Application Events**

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| **Date** | **Status** |
| 2010-02-07 | Priority to US30213410P |
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| 2011-02-03 | [Application filed by Itay Sherman](https://patents.google.com/?assignee=Itay+Sherman) |
| 2011-02-03 | [Priority to US13/020,026](https://patents.google.com/patent/US8416215B2/en) |
| 2011-08-11 | [Publication of US20110193819A1](https://patents.google.com/patent/US20110193819A1/en) |
| 2013-04-09 | Application granted |
| 2013-04-09 | [Publication of US8416215B2](https://patents.google.com/patent/US8416215B2/en) |