TOUCH SCREEN

An introduction to developing for Touch Screen
Definition

• A touch screen is a computer display screen that is sensitive to human touch, allowing a user to interact with the computer by touching pictures or words on the screen.
• Touch screen technology can be used as an alternative user interface with applications that normally require a mouse, such as a Web browser.
• Some applications are designed specifically for touch screen technology, often having larger icons and links than the typical PC application.
• Monitors are available with built-in touch screen technology or individuals can purchase a touch screen kit.
Introduction

- A Touchscreen is a display which can detect the location of touches within the display area. This allows the display to be used as an input device
- mouse as the removing the keyboard and/or the primary input device for interacting with the display's content
- Such displays can be attached to computers or, as terminals, to networks. Touchscreens also have assisted in recent changes in the design of personal digital assistant (PDA), satellite navigation and mobile phone devices, making these devices more usable.
Application

- Touchscreens have become commonplace since the invention of the electronic touch interface in 1971 by Dr. Samuel C. Hurst.
- They have become familiar in retail settings, on point of sale systems, on ATMs and on PDAs (personal digital assistant) sometimes used to manipulate the GUI and to enter data.
- The HP-150 from 1983 was probably the world's earliest commercial touch screen computer.
- It actually does not have a touch screen in the strict sense, but a 9" Sony CRT surrounded by infrared transmitters and receivers which detect the position of any non-transparent object on the screen.
• Touchscreens are popular in heavy industry and in other situations, such as museum displays or room automation, where keyboards and mouse do not allow a satisfactory

• the touchscreen sensor and its accompanying controller-based firmware have been made available by a wide array of after-market system integrators and not by display, chip or motherboard manufacturers

• With time, display manufacturers and System On Chip (SOC) manufacturers worldwide have acknowledged the trend toward acceptance of touchscreens as a highly desirable user interface component and have begun to integrate touchscreen functionality into the fundamental design of their products.
Basic Development

- A touch screen kit includes a touch screen panel, a controller, and a software driver.
- The touch screen panel is a clear panel attached externally to the monitor that plugs into a serial or Universal Serial Bus (USB) port or a bus card installed inside the computer.
- The touch screen panel registers touch events and passes these signals to the controller.
- The controller then processes the signals and sends the data to the processor.
- The software driver translates touch events into mouse events.
- Drivers can be provided for both Windows and Macintosh operating systems.
- Internal touch screen kits are available but require professional installation because they must be installed inside the monitor.
Technology

• There are a number of types of touch screen technology:
  1. Resistive
  2. Surface acoustic wave
  3. Capacitive
  4. Infrared
  5. Strain gauge
  6. Optical imaging
  7. Dispersive signal technology
  8. Acoustic pulse recognition
  9. Frustrated total internal reflection
Most Common types Of Touchscreen Technology

1. Resistive
2. Surface acoustic wave
3. Capacitive
4. Dispersive signal technology
5. Acoustic pulse recognition
Resistive

- **Resistive**: A resistive touch screen panel is coated with a thin metallic electrically conductive and resistive layer that causes a change in the electrical current which is registered as a touch event and sent to the controller for processing. Resistive touch screen panels are generally more affordable but offer only 75% clarity and the layer can be damaged by sharp objects. Resistive touch screen panels are not affected by outside elements such as dust or water.
Surface acoustic wave

- **Surface wave**: Surface wave technology uses ultrasonic waves that pass over the touch screen panel. When the panel is touched, a portion of the wave is absorbed. This change in the ultrasonic waves registers the position of the touch event and sends this information to the controller for processing. Surface wave touch screen panels are the most advanced of the three types, but they can be damaged by outside elements.
Capacitive

Capacitive: A capacitive touch screen panel is coated with a material that stores electrical charges. When the panel is touched, a small amount of charge is drawn to the point of contact. Circuits located at each corner of the panel measure the charge and send the information to the controller for processing. Capacitive touch screen panels must be touched with a finger unlike resistive and surface wave panels that can use fingers and stylus. Capacitive touch screens are not affected by outside elements and have high clarity.
Dispersive signal technology

- **Dispersive signal technology**: Introduced in 2002, this system uses sensors to detect the mechanical energy in the glass that occur due to a touch.
- Complex algorithms then interpret this information and provide the actual location of the touch.
- The technology claims to be unaffected by dust and other outside elements, including scratches. Since there is no need for additional elements on screen, it also claims to provide excellent optical clarity.
- Also, since mechanical vibrations are used to detect a touch event, any object can be used to generate these events, including fingers and stylus.
- A downside is that after the initial touch the system cannot detect a motionless finger.
Acoustic pulse recognition

- **Acoustic pulse recognition**: This system uses more than two piezoelectric transducers located at some positions of the screen to turn the mechanical energy of a touch (vibration) into an electronic signal.
- This signal is then converted into an audio file, and then compared to preexisting audio profile for every position on the screen.
- This system works without a grid of wires running through the screen, the touch screen itself is actually pure glass, giving it the optics and durability of the glass out of which it is made.
- It works with scratches and dust on the screen, and accuracy is very good. It does not need a conductive object to activate it. It is a major advantage for larger displays.
- As with the Dispersive Signal Technology system, after the initial touch this system cannot detect a motionless finger.
Most popular Usage

- Notebook computer lines featuring touchscreens
- Toughbook series by Panasonic
- ST series Stylistic tablets from Fujitsu
- P series and T series notebooks from Fujitsu
- C1 series notebook from LG
- TouchSmart PCs from HP (really an All-in-One PC and not a notebook PC)
- Latitude XT series by Dell
Applications

• touchscreen is an input device that allows users to operate a PC by simply touching the display screen.

• Touch input is suitable for a wide variety of computing applications.

• A touchscreen can be used with most PC systems as easily as other input devices such as track balls or touch pads.
A typical touchscreen input system is basically an input device like a mouse or trackpad. A touchscreen system is made up of a touch sensor, a controller card, and a software driver.

**What Are Touchscreens Used For?**

Touchscreen systems are being used in a variety of applications, including point-of-sale systems, public information displays, industrial control systems, and more.