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Ishare

Editorial

We would like to wholeheartedly thank our honorable Chairman, Secretary, Executive Director and Principal for their continuous encouragement and constant support for bringing out the magazine. We profoundly thank our Head of the Department for encouraging and motivating us to lead the magazine a successful one right from the beginning. Ishare serves as a platform for updating and enhancing upcoming technologies in Information and Communication. We are grateful to all the contributors to this magazine so far. The magazine has been sent to almost 60 Institutions in and around Tamilnadu. So far we have received feedbacks and appreciations from various Institutions.

We would be very pleased to receive your feedbacks. Please send your feedbacks to ishare@ksrcas.edu

By,

Editorial Board

CONTENT

BLENDER

R. PAVITHRA

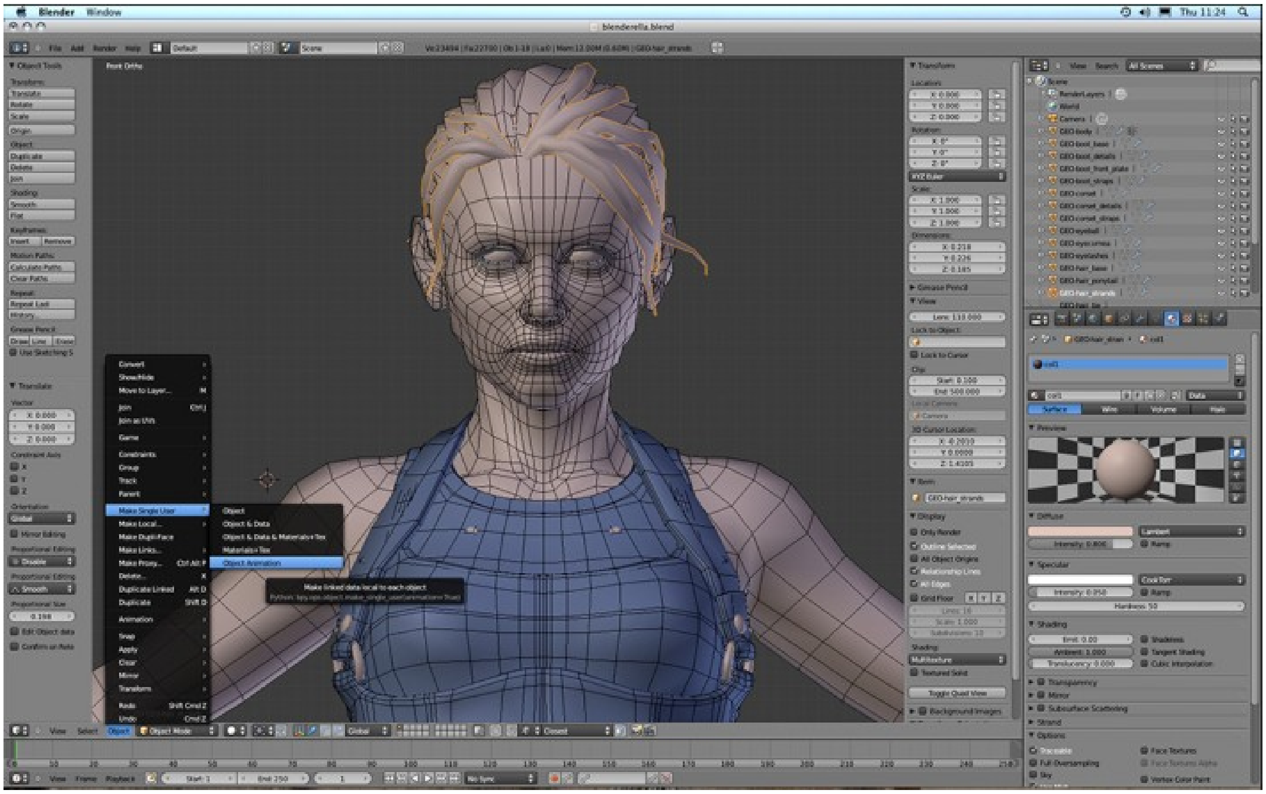
II CS A

It's great when the best gets better, and that's exactly what Blender has done by releasing its latest update to version 2.75a. Still in beta, FileHippo has it, ready for test driving. What makes the new and improved Blender update so great?

Apart from the expected bug fixes, this version of the software offers AMD OpenCL rendering and fully integrated stereo/multiview support. Not enough? Check this out, from the developers:

- Blender now supports a fully integrated Multi-View and Stereo 3D pipeline.
- Cycles has much awaited initial support for AMD GPUs, and a new Light Portals feature
- UI now allows font previews in the file browser.
- High quality options for viewport depth of field were added.
- Modeling has a new Corrective Smooth modifier.
- The Decimate modifier was improved significantly.
- 3D viewport painting now supports symmetry and the distribution of Dynamic Topology was improved.
- **Video Sequence Editor**: Placeholders can now replace missing frames of image sequences.

- **Game Engine** now allows smoother LOD transitions, and supports mist attributes animation.



For those of you not aware of Blender's opportunities and mission, the Blender Foundation is a Dutch organization whose primary goal is to put powerful rendering tools in artists' hands. Their free, open source software provides users with amazing capabilities, and their support and film contests can really give artists a leg up when it comes to getting their work in front of audiences and making a name for themselves.

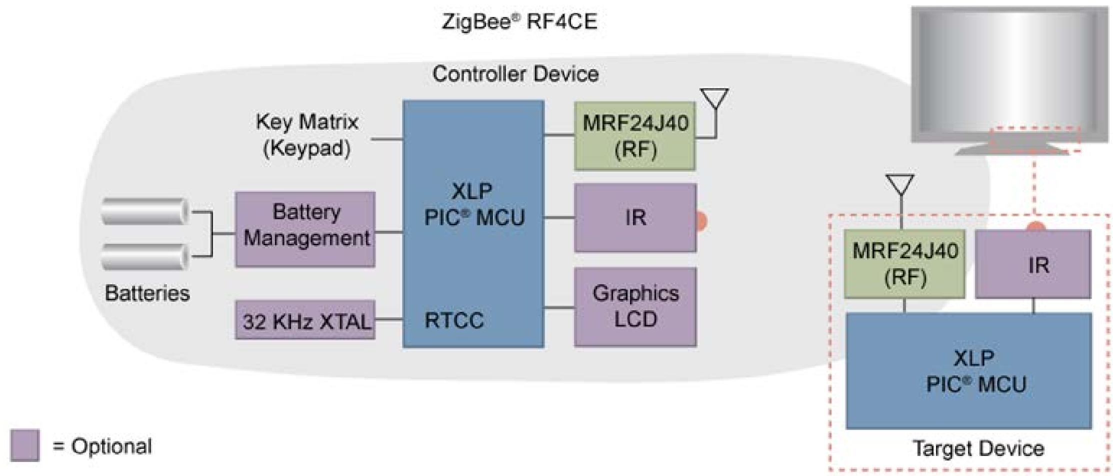
ZIGBEE WIRELESS TECHNOLOGY

D.NAMDAPERUMAL

II CS A

ZigBee is rather a new wireless technology that looks to have applications in a variety of fields. ZigBee is a technological standard based on the IEEE 802.15.4 specification for low data rates technology allows for devices to communicate with one another with very low power consumption, allowing the devices to run on simple batteries for several years. ZigBee is targeting various forms of automation, as the low data rate communication is ideal for sensors, monitors, and the like. Home automation is one of the key market areas for ZigBee, with an example of a simple network.

A concern that could arise may be related to the specific frequency band that ZigBee uses that is, the 2.4 GHz band, which is the same band used by IEEE 802.11 and Wi-Fi. A cursory reading of the previous sentence may seem to imply that ZigBee could not co-exist with these other technologies without interfering with one another. However, ZigBee based products can access up to 16 different 5 MHz channels within the 2.4 GHz band, several of which do not overlap those of 802.11 and Wi-Fi. Data packets are automatically retransmitted in case interference does happen to occur; and very few data packets are transmitted anyway, further reducing the probability that data will be lost. Thus, ZigBee, with its specific application focus, is not generally affected by other similar wireless technologies, but fits nicely into a field of even increasing technological innovations.



ZigBee is designed for wireless controls and sensors. It could be built into just about anything you have around your home or office, including lights ,switches, doors and appliances. These devices can then interact without wires,and you can control them all from a remote control or even your mobile phone. Although ZigBee's underlying radio communication technology isn't revolutionary, it goes well beyond single purpose wireless devices, such as garage door openers and "The Clapper" that turns light on and off. It allows wireless two way communications between lights and switches, thermostats and furnaces, hotel room air conditioners and the front desk, and central command posts. It travels across greater distances and handles many sensors that can be linked to perform different tasks.

ZigBee works well because it aims low. Controls and sensors don't need to send and receive much data. ZigBee has been designed to transmit slowly. It has a data rate of 250kbps (kilobits per second), pitiful compared with Wi-Fi,which is hitting throughput of 20Mbps or more. But because ZigBee transmits slowly, it doesn't need much power, so batteries will last up to 10 years. Because ZigBee consumes very little power, a sensor and transmitter that reports whether a door is open or closed, for example, can run for up to five years on a single AA battery. Also, operators are much happier about adding ZigBee to their phones than faster technologies such as Wi-Fi; therefore, the phone will be able to act as a remote control for all the ZigBee devices it encounters. ZigBee basically uses digital radios to allow devices to communicate with one another. A typical ZigBee network consists of several types of devices. A network coordinator is a device that sets up the network, is aware of all the nodes within its network, and manages both the information about each node as well as the information that is being transmitted/received within the network.

Every ZigBee network must contain a network coordinator. Other Full Function Devices (FFD's) may be found in the network, and these devices support all of the 802.15.4 functions. They can serve as network coordinators, network routers, or as devices that interact with the physical world.The final device found in these networks is the Reduced

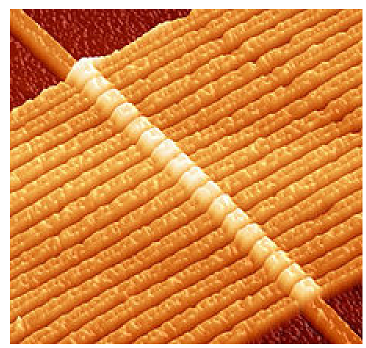
Function Device (RFD), which usually only serve as devices that interact with the physical world.

HOT TECHNOLOGIES THAT WILL CHANGE EVERYTHING

M. GOWTHAM

II CS A

MEMRISTOR:



The Memristor is a microscopic component that can "remember" electrical states even when turnedoff. It is expected to be far cheaper and flash storage. As a theoretical concept since 1971,it has now been built in laps and is already starting to revolutionize everything we know about computing, possibly making flash memory,RAM and even hard drives obsolete within a decade.

The Memristoris just one of the incredible technological advances sending shock waves through the world of computing. Other innovations in the works are more down-to-earth, but they also carry watershed signification from the technologies that finally make paperless offices a reality to those that deliver wireless power, these advances should make your humble PC a far different beast come the turn of the decade.

WIRELESS POWER TRANSMISSION:

Intel researchers demonstrated a method based on MIT research for

throwing electricity a distance of few feet without wires andwithout any dangers to bystanders.

Intel calls the technology a "**Wireless resonant energy link**" and it works by sending a specific, 10MHz signal through a coil of wire; a similar nearby coil f wires resonates in tune with the frequency, causing electronsto flow through that coil too. Though the design is primitive, it can light up a 60 watt bulb with 70 percent efficiently.

The wireless power transmission has been a dream since the days when Nikola Tesla imagined a world studded with enormous Tesla coils. But aside from advances in recharging electric toothbrushes, wireless power has so far failed to make significant inroads into consumer level gear.

HISTORY OF INFOSYS

V. SIVASANKARI

II B.Sc (CS) "A"

- ✓ **1981**
  - Infosys is established by N. R. Narayana Murthy and six engineers in Pune, India, with an initial capital of US$ 250
  - Signs up its first client, Data Basics Corporation, in New York
- ✓ **1983**
  - Relocates corporate headquarters to Bangalore.
- ✓ **1987**

- Opens first international office in Boston, US.

✓ **1993**

- Introduces Employee Stock Options (ESOP) program
- Acquires ISO 9001/TickIT certification
- Goes public

✓ **1994**

- Moves corporate headquarters to Electronic City, Bangalore.
- Opens a development center at Fremont

✓ **1995**

- Opens first European office in the UK and global development centers at Toronto and Mangalore.
- Sets up e-Business practice

✓ **1996**

- The Infosys Foundation is established

✓ **1997**

- Opens an office in Toronto, Canada
- Infosys is assessed at CMM Level 4

✓ **1998**

- Starts Enterprise Solutions (packaged applications) practice

✓ **1999**

- Touches revenues of US$ 100 million. Listed on NASDAQ
- Infosys becomes the 21st company in the world to achieve a CMM Level 5 certification
- Opens offices in Germany, Sweden, Belgium, Australia, and two development centers in the US

- Infosys Business Consulting Services is launched

✓ **2000**

- Touches revenues of US$ 200 million
- Opens offices in France and Hong Kong, a global development center in Canada and UK, and three development centers in the US

✓ **2001**

- Touches revenues of US$ 400 million. Opens offices in UAE and Argentina, and a development center in Japan
- N. R. Narayana Murthy is rated among Time Magazine/CNN's 25 most influential businessmen in the world
- Infosys is rated as the Best Employer by Business World/Hewitt
- Re-launches Banks 2000, the universal banking solution from Infosys, as Finacle

✓ **2002**

- Touches revenues of US$ 500 million
- Nandan M. Nilekani takes over as CEO from N.R. Narayana Murthy, who is appointed Chairman and Chief Mentor
- Opens offices in the Netherlands, Singapore and Switzerland
- Sponsors secondary ADS offering
- Infosys and the Wharton School of the University of Pennsylvania set up The Wharton Infosys Business Transformation Awards (WIBTA)
- Launches Progeon, offering business process outsourcing services

- **2003**
  - Establishes subsidiaries in China and Australia
  - Expands operations in Pune and China, and sets up a development center in Thiruvananthapuram
- **2004**
  - Annual Revenues reach US$ 1 billion
  - Infosys Consulting Inc. is launched
- **2005-2006**
  - Records the largest international equity offering of US$ 1 billion from India
  - Selected to the Global MAKE Hall of Fame
  - Infosys celebrates 25 years. Employees grow to 50,000+
  - Annual revenues double to $ 2 billion. It took 23 years to reach first billion, only 23 months to reach next billion in revenues .N. R. Narayana Murthy retires from the services of the company on turning 60. The Board of Directors appoints him as an Additional Director. He continues as Chairman and Chief Mentor of Infosys
- **2007-2013**
  - Kris Gopalakrishnan, COO takes over as CEO. Nandan M. Nilekani is appointed Co-Chairman of the Board of Directors(2007)
  - Quarterly revenues cross US$ 1billion(2007)
  - Infosys crosses revenues of US$ $ 4 billion(2008)
  - Annual net profits cross US$ 1 billion(2008)
  - Infosys selected as a member of The Global Dow(2009)

- Employee strength grows to over 100,000(2009)
- Infosys crosses the US$ 5 billion revenue mark(2010)
- N. R. Narayana Murthy hands over chairmanship to K.V. Kamath(2011)
- S.D. Shibulal, COO, takes over as the CEO and MD from Kris Gopalakrishnan(2011)
- Infosys crosses US$ 6 billion revenue mark, employee strength grows to over 125,000(2011)
- Listed on the NYSE market(2012)
- Infosys acquires Lodestone Holding AG, a leading management consultancy based in Switzerland(2012)
- Forbes ranks Infosys among the world's most innovative companies(2012)
- Infosys among top 25 performers in Caring for Climate Initiative(2012)
- Infosys Board appoints N. R. Narayana Murthy as Executive Chairman of the Board
- Infosys begins trading on NYSE Euronext London and Paris markets
- Infosys Edge™ wins the NASSCOM Business Innovation Award for 2013
- Infosys presented with '2013 Environmental Tracking Carbon Ranking Leader' award

✓ **2014**

- Dr. Vishal Sikka takes over as the CEO and MD from S.D. Shibulal

- Revenue crosses 50,000 core in rupee terms
- Board decides to increase the dividend pay-out ratio to up to 40% of post-tax profits
- Cash and cash equivalents (including Available-for-sale financial assets and certificates of deposit) cross 5 billion in dollar terms

✓ **2015**

- Infosys acquires Panaya, Inc., a leading provider of automation technology for large scale enterprise software management
- Infosys announces USD 250 million 'Innovate in India Fund' to support Indian start-ups.

TOUCH SCREEN

R. NIRMALA

ASSISTANT PROFESSOR, CS

Interactive Table, Ideen 2020 Exposition, 2013

HP Series 100 HP-150 c. 1983, the earliest commercial Touchscreen Computer

The IBM Simon Personal Communicator, c. 1993, the first touchscreen phone

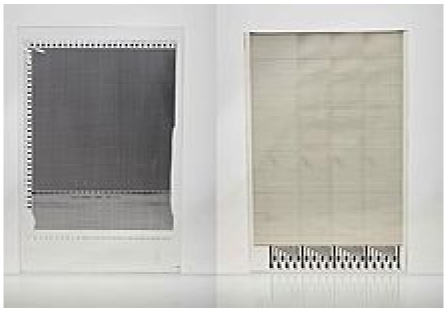
Apple iPad, a tablet computer with a touchscreen

A **touchscreen** is an input device normally layered on the top of an electronic visual display of an information processing system. A user can give input or control the information processing system through simple or multi-touch gestures by touching the screen with a special stylus/pen and-or one or more fingers. Some touchscreens use an ordinary or specially coated gloves to work while others use a special stylus/pen only. The user can use the touchscreen to react to what is displayed and to control how it is displayed (for example by zooming the text size).

The touchscreen enables the user to interact directly with what is displayed, rather than using a mouse, touchpad, or any other intermediate device.

Touchscreens are common in devices such as game consoles, personal computers, tablet computers, and smartphones. They can also be attached to computers or, as terminals, to networks. They also play a prominent role in the design of digital appliances such as personal digital assistants (PDAs), GPS navigation devices, mobile phones, and video games and some books (E-books).

The popularity of smartphones, tablets, and many types of information appliances is driving the demand and acceptance of common touchscreens for portable and functional electronics. Touchscreens are found in the medical field and in heavy industry, as well as for Automated Teller Machines (ATMs), and kiosks 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.Historically, 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. Display manufacturers and chip manufacturers worldwide have acknowledged the trend toward acceptance of touch screens as a highly desirable user interface component and have begun to integrate touch screens into the fundamental design of their products.



History

The prototype x-y mutual capacitance touch screen (left) developed at CERNin 1977 by Bent Stumpe, a Danish electronics engineer, for the control room of CERN's accelerator SPS (Super Proton Synchrotron). This was a further development of the self-capacitance screen (right), also developed by Stumpe at CERNin 1972.

E.A. Johnson described his work on capacitive touchscreens in a short article which is published in 1967 and then more fully—along with photographs and diagrams—in an article published in 1967.A description of the applicability of the touch technology for air traffic control was described in an article published in 1968. Frank Beck and Bent Stumpe, engineers from CERN, developed a transparent touchscreen in the early 1970s and it was manufactured by CERN and put to use in 1973.This touchscreen was based on Bent Stumpe's work at a television factory in the early 1960s. A resistive touchscreen was developed by American inventor

G. Samuel Hurst who received US patent #3,911,215 on October 7, 1975. The first version was produced in 1982.

In 1972, a group at the University of Illinois filed for a patent on an optical touchscreen. These touch screens became a standard part of the Magnavox Plato IV Student Terminal. Thousands of these were built for the PLATO IV system. These touchscreens had a crossed array of 16 by 16 infrared position sensors, each composed of an LED on one edge of the screen and a matched phototransistor on the other edge, all mounted in front of a monochrome plasma display panel. This arrangement can sense any fingertip-sized opaque object in close proximity to the screen. A similar touchscreen was used on the HP-150 starting in 1983; this was one of the world's earliest commercial touchscreen computers. HP mounted their infrared transmitters and receivers around the bezel of a 9" Sony Cathode Ray Tube (CRT).

In 1985, Sega released the TerebiOekaki, also known as the Sega Graphic Board, for the SG-1000 video game console and SC-3000 home computer. It consisted of a plastic pen and a plastic board with a transparent window where the pen presses is detected. It was used primarily for a drawing software application.In the early 1980s, General Motors tasked its Delco Electronics division with a project aimed at replacing an automobile's non-essential functions (i.e. other than throttle, transmission, braking and steering) from mechanical or electro-mechanical systems with solid state alternatives wherever possible. The finished device was dubbed the ECC for "Electronic Control Center", a digital computerand software control system hardwired to various peripheralsensors, servos, solenoids, antenna and a monochrome CRT touchscreen that functioned both as display and sole method of input. The ECC replaced the traditional mechanical stereo, fan, heater and air conditioner controls and displays, and was capable of providing very detailed and specific information about the vehicle's cumulative and current operating status in real time. The ECC was standard equipment on the 1985–89 Buick Riviera and later the 1988–89 Buick Reatta, but was unpopular with consumers partly due to technophobia on behalf of some traditional Buick customers, but mostly because of costly to repair technical problems suffered by the ECC's touchscreen which being the sole access method, would render climate control or stereo operation impossible.

Multi-touch technology began in 1982, when the University of Toronto's Input Research Group developed the first human-input multi-touch system, using a frosted-glass panel with a camera placed behind the glass. In 1985, the University of Toronto group including Bill Buxton developed a multi-touch tablet that used capacitance rather than bulky camera-based optical sensing systems.

In 1986, the first graphical point of sale software was demonstrated on the 16-bit Atari 520ST color computer. It featured a color touchscreen widget-driven interface. The ViewTouch point of sale software was first shown by its developer, Gene Mosher, at Fall Comdex, 1986, in Las Vegas, Nevada to visitors at the Atari Computer demonstration area and was the first commercially available POS system with a widget-driven color graphic touchscreen interface.

In 1987, Casio launched the Casio PB-1000 pocket computer with a touchscreen consisting of a 4x4 matrix, resulting in 16 touch areas in its small LCD graphic screen.

Sears et al. (1990) gave a review of academic research on single and multi-touchhuman–computer interaction of the time, describing gestures such as rotating knobs, adjusting sliders, and swiping the screen to activate a switch (or a U-shaped gesture for a toggle switch). The University of Maryland Human – Computer Interaction Lab team developed and studied small touchscreen keyboards, thereby paving the way for the touchscreen keyboards on mobile devices. They also designed and implemented multitouch gestures such as selecting a range of a line, connecting objects, and a "tap-click" gesture to select while maintaining location with another finger.In 1991–92, the Sun Star7 prototype PDA implemented a touchscreen with inertial scrolling. In 1993, the IBM Simon—the first touchscreen phone—was released.An early attempt at a handheld game console with touchscreen controls was Sega's intended successor to the Game Gear, though the device was ultimately shelved and never released due to the expensive cost of touchscreen technology in the early 1990s. Touchscreens would not be popularly used for video games until the release of the Nintendo DS in 2004. Until recently, most consumer touchscreens could only sense one point of contact at a time, and few have had the capability to sense how hard one is touching. This has changed with the commercialization of multi-touch technology.

Technologies

There are a variety of touchscreen technologies that have different methods of sensing touch.

- ✓ **Resistive Touchscreen**

A resistive touchscreen panel comprises several layers, the most important of which are two thin, transparent electrically-resistive layers separated by a thin space. These layers face each other with a thin gap between. The top screen has a coating on the underside surface of the screen. Just beneath it is a similar resistive layer on top of its substrate. One layer has conductive connections along its sides, the other along top and bottom. A voltage is applied to one layer, and sensed by the other. When an object, such as a fingertip or stylus tip, presses down onto 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.

Resistive touch is used in restaurants, factories and hospitals due to its high resistance to liquids and contaminants. A major benefit of resistive touch technology is its low cost. Additionally, as only sufficient pressure is necessary for the touch to be sensed, they may be used with gloves on, or by using anything rigid as a finger/stylus substitute. Disadvantages include the need to press down and a risk of damage by sharp objects. Resistive touchscreens also suffer from poorer contrast; due to having additional reflections from the extra layers of material placed over the screen.This is the type of touchscreen used by Nintendo in DS consoles and the WiiU.

- ✓ **Surface Acoustic Wave**

Surface acoustic wave (SAW) technology also uses ultrasonic waves that pass over the touchscreen 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 acoustic wave touchscreen panels can be damaged by outside elements. Contaminants on the surface can also interfere with the functionality of the touchscreen.

- ✓ **Capacitive Sensing**

A capacitive touchscreen panel consists of an insulator such as glass, coated with a transparent conductor such as indium tin oxide (ITO). As the human body is also an electrical conductor, touching the surface of the screen results in a distortion of the screen's electrostatic field, measurable as a change in capacitance. Different technologies may be used to determine the location of the touch. The location is then sent to the controller for processing.

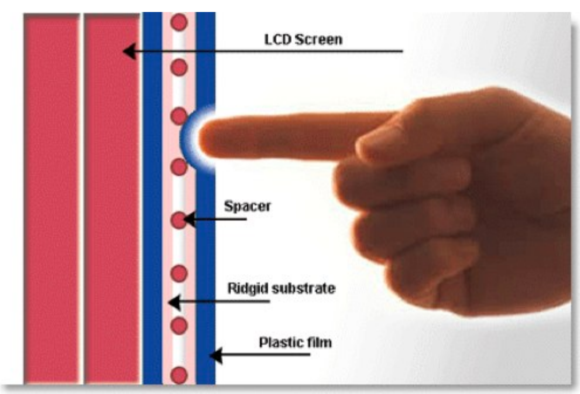
Unlike a resistive touchscreen, one cannot use a capacitive touchscreen through most types of electrically insulating material, such as gloves. This disadvantage especially affects usability in consumer electronics, such as touch tablet PCs and capacitive smartphones in cold weather. It can be overcome with a special capacitive stylus, or a special-application glove with an embroidered patch of conductive thread passing through it and contacting the user's fingertip.The largest capacitive display manufacturers continue to develop thinner and more accurate touchscreens, with touchscreens for mobile devices now being produced with 'in-cell' technology that eliminates a layer, such as Samsung's Super AMOLED screens, by building the capacitors inside the display itself. This type of touchscreen reduces the visible distance (within millimetres) between the user's finger and what the user is touching on the screen, creating a more direct contact with the content displayed and enabling taps and gestures to be more responsive.

A simple parallel plate capacitor has two conductors separated by a dielectric layer. Most of the energy in this system is concentrated directly between the plates. Some of the energy spills over into the area outside the plates, and the electric field lines associated with this effect are called fringing fields. Part of the challenge of making a practical capacitive sensor is to design a set of printed circuit traces which direct fringing fields into an active sensing area accessible to a user. A parallel plate capacitor is not a good choice for such a sensor pattern. Placing a finger near fringing electric fields adds conductive surface area to the capacitive system. The additional charge storage capacity added by the finger is known as finger capacitance, CF. The capacitance of the sensor without a finger present is denoted as CP in this article, which stands for parasitic capacitance.

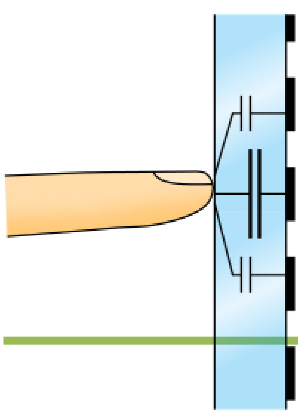
✓ **Surface capacitance**

In this basic technology, only one side of the insulator is coated with a conductive layer. A small voltage is applied to the layer, resulting in a uniform electrostatic field. When a conductor, such as a human finger, touches the uncoated surface, a capacitor is dynamically formed. The sensor's controller can determine the location of the touch indirectly from the change in the capacitance as measured from the four corners of the panel. As it has no moving parts, it is moderately durable but has limited resolution, is prone to false signals from parasitic capacitive coupling, and needs calibration during manufacture. It is therefore most often used in simple applications such as industrial controls and kiosks.

✓ **Projected capacitance**



Back side of a Multitouch Globe, based on Projected Capacitive Touch (PCT) technology



Schema of Projected-capacitive Touchscreen

Projected Capacitive Touch (PCT; also PCAP) technology is a variant of capacitive touch technology. All PCT touch screens are made up of a matrix of rows and columns of conductive material, layered on sheets of glass. This can be done either by etching a single conductive layer to form a grid pattern of electrodes, or by etching two separate, perpendicular layers of conductive material with parallel lines or tracks to form a grid. Voltage applied to this grid creates a uniform electrostatic field, which can be measured. When a conductive object, such as a finger, comes into contact with a PCT panel, it distorts the local electrostatic field at that point. This is measurable as a change in capacitance. If a finger bridges the gap between two of the "tracks", the charge field is further interrupted and detected by the controller.

The capacitance can be changed and measured at every individual point on the grid (intersection). Therefore, this system is able to accurately track touches. Due to the top layer of a PCT being glass, it is a more robust solution than less costly resistive touch technology. Additionally, unlike traditional capacitive touch technology, it is possible for a PCT system to sense a passive stylus or gloved fingers. However, moisture on the surface of the panel, high humidity, or collected dust can interfere with the performance of a PCT system. There are two types of PCT: mutual capacitance and self-capacitance.

- **Self-capacitance**

Self-capacitance sensors can have the same X-Y grid as mutual capacitance sensors, but the columns and rows operate independently. With self-capacitance, the capacitive load of a finger is measured on each column or row electrode by a current meter. This method produces a stronger signal than mutual capacitance, but it is unable to resolve accurately more than one finger, which results in "ghosting", or misplaced location sensing.

<u>Use of styli on capacitive screens</u>

Capacitive touchscreens don't necessarily need to be operated by a finger, but the special styli required can be quite expensive to purchase.

- ✓ **Infrared grid**

Infrared sensors mounted around the display watch for a user's touchscreen input on this PLATO V terminal in 1981. The monochromatic plasma display's characteristic orange glow is illustrated.

An infrared touchscreen uses an array of X-Y infrared LED and photodetector pairs around the edges of the screen to detect a disruption in the pattern of LED beams. These LED beams cross each other in vertical and horizontal patterns. This helps the sensors pick up the exact location of the touch. A major benefit of such a system is that it can detect essentially any input including a finger, gloved finger, stylus or pen. It is generally used in outdoor applications and point of sale systems which cannot rely on a conductor (such as a bare finger) to activate the touchscreen. Unlike capacitive touchscreens, infrared touchscreens do not require any patterning on the glass which increases durability and optical clarity of the overall system. Infrared touchscreens are sensitive to dirt/dust that can interfere with the IR beams, and suffer from parallax in curved surfaces and accidental press when the user hovers his/her finger over the screen while searching for the item to be selected.

- ✓ **Infrared Acrylic Projection**

A translucent acrylic sheet is used as a rear projection screen to display information. The edges of the acrylic sheet are illuminated by infrared LEDs, and infrared cameras are focused on the back of the sheet. Objects placed on the sheet are detectable by the cameras. When the sheet is touched by the user the deformation results in leakage of infrared light, which peaks at the points of maximum pressure indicating the user's touch location. Microsoft's PixelSense tables use this technology.

- ✓ **Optical imaging**

Optical touchscreens are a relatively modern development in touchscreen technology, in which two or more image sensors are placed around the edges (mostly the corners) of the screen. Infrared back lights are placed in the camera's field of view on the other side of the screen. A touch shows up as a shadow and each pair of cameras can then be pinpointed to locate the touch or even measure the size of the touching object. This technology is growing in popularity, due to its scalability, versatility, and affordability, especially for bigger units.

- ✓ **Dispersive signal technology**

Introduced in 2002, by 3M, this system uses sensors to detect the piezoelectricity in the glass that occurs 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.

Construction

There are several principal ways to build a touchscreen. The key goals are to recognize one or more fingers touching a display, to interpret the command that this represents, and to communicate the command to the appropriate application.In the most popular techniques, the capacitive or resistive approach, there are typically four layers:

1. Top polyester coated with a transparent metallic conductive coating on the bottom
2. Adhesive spacer
3. Glass layer coated with a transparent metallic conductive coating on the top
4. Adhesive layer on the backside of the glass for mounting.

When a user touches the surface, the system records the change in the electric current that flows through the display.There are two infrared-based approaches. In one, an array of sensors detects a finger touching or almost touching the display, thereby interrupting light beams projected over the screen. In the other, bottom-mounted infrared cameras record screen touches.In each case, the system determines the intended command based on the controls showing on the screen at the time and the location of the touch.

Development

The development of multipoint touchscreens facilitated the tracking of more than one finger on the screen; thus, operations that require more than one finger are possible. These devices also allow multiple users to interact with the touchscreen simultaneously.

With the growing use of touchscreens, the marginal cost of touchscreen technology is routinely absorbed into the products that incorporate it and is nearly eliminated. Touchscreens now have proven reliability. Thus, touchscreen displays are found today in airplanes, automobiles, gaming consoles, machine control systems, appliances, and handheld display devices including the Nintendo DS and multi-touch enabled cellphones; the touchscreen market for mobile devices is projected to produce US$5 billion in 2009.

The ability to accurately point on the screen itself is also advancing with the emerging graphics tablet/screen hybrids.

TapSense, announced in October 2011, allows touchscreens to distinguish what part of the hand was used for input, such as the fingertip, knuckle and fingernail. This could be used in a variety of ways, for example, to copy and paste, to capitalize letters, to activate different drawing modes, and similar.

Ergonomics and usage

- **Touchscreen accuracy**

Users must be able to accurately select targets on touchscreens, and avoid accidental selection of adjacent targets, to effectively use a touchscreen input device. The design of touchscreen interfaces must reflect both technical capabilities of the system, ergonomics, cognitive psychology and human physiology.

Guidelines for touchscreen designs were first developed in the 1990s, based on early research and actual use of older systems, so assume the use of contemporary sensing technology such as infrared grids. These types of touchscreens are highly dependent on the size of the user's fingers, so their guidelines are less relevant for the bulk of modern devices, using capacitive or resistive touch technology. From the mid-2000s onward, makers of operating systems for smartphones have promulgated standards, but these vary between manufacturers, and allow for significant variation in size based on technology changes, so are unsuitable from a human factors perspective.

Much more important is the accuracy humans have in selecting targets with their finger or a pen stylus. The accuracy of user selection varies by position on the screen. Users are most accurate at the center, less so at the left and right edges, and much less accurate at the top and especially bottom edges. The R95 accuracy varies from 7 mm in the center, to 12 mm in the lower corners. Users are subconsciously aware of this, and are also slightly slower, taking more time to select smaller targets, and any at the edges and corners.

This inaccuracy is a result of parallax, visual acuity and the speed of the feedback loop between the eyes and fingers. The precision of the human finger alone is much, much higher than this, so when assistive technologies are provided such as on-screen magnifiers, users can move their finger (once in contact with the screen) with precision as small as 0.1 mm

- ✓ **Hand position, digit used and switching**

Users of handheld and portable touchscreen devices hold them in a variety of ways, and routinely change their method of holding and selection to suit the position and type of input. There are four basic types of handheld interaction:

1. Holding at least in part with both hands, tapping with a single thumb
2. Holding with one hand, tapping with the finger (or rarely, thumb) of another hand
3. Holding the device in one hand, and tapping with the thumb from that hand
4. Holding with two hands and tapping with both thumbs

Use rates vary widely. While two-thumb tapping is encountered rarely (1-3%) for many general interactions, it is used for 41% of typing interaction.

In addition, devices are often placed on surfaces (desks or tables) and tablets especially are used in stands. The user may point, select or gesture in these cases with their finger or thumb, and also varies the use.

- **Combined with Haptics**

Touchscreens are often used with haptic response systems. A common example of this technology is the vibratory feedback provided when a button on the touchscreen is tapped. Haptics are used to improve the user's experience with touchscreens by providing simulated tactile feedback, and can be designed to react immediately, partly countering on-screen response latency. Research from the University of Glasgow Scotland demonstrates that sample users reduce input errors (20%), increase input speed (20%), and lower their cognitive load (40%) when touchscreens are combined with haptic or tactile feedback [vs. non-haptic touchscreens].

- **"Gorilla arm"**

Extended use of gestural interfaces without the ability of the user to rest their arm is referred to as "gorilla arm." It can result in fatigue, and even repetitive stress injury when routinely used in a work setting. Certain early pen-based interfaces required the operator to work in this position for much of the work day. Allowing the user to rest their hand or arm on the input device or a frame around it is a solution for this in many contexts. This phenomenon is often cited as a prima facie example of what not to do in ergonomics.

- **Fingerprints**

Touchscreens can suffer from the problem of fingerprints on the display. This can be mitigated by the use of materials with optical coatings designed to reduce the visible effects of fingerprint oils, or oleophobic coatings as most of the modern smartphones, which lessen the actual amount of oil residue, or by installing a matte-finish anti-glare screen protector, which creates a slightly roughened surface that does not easily retain smudges, or by reducing skin contact by using a fingernail or stylus

APANTESIS – 2K15

DEPARTMENT EVENT REPORT

B.SOWMYA

ASSISTANT PROFESSOR, BCA

The Department of Computer Science and Applications conducted Intercollegiate Meet on December 22, 2015 under the banner **"APANTESIS – 2K15".**

Various events were organized. They were Shot Gun, Multitasking, Try Catch Throw, and Idea Presentation. Nearly 250 Students of various colleges from Namakkal, Erode, Salem and Trichy districts participated and bagged prizes in the above events.

Apart from KSR Arts and Science College for Women, the students from Kongu Arts and Science College, Vysya College, Gobi Arts College, Government Arts and Science College-Komarapalayam, SNR College, SrimadAndavar College of Arts and Science, Gnanamani College, Dhirajlal Gandhi College of Technology, Erode Arts College, AVS College, Sengunthar Arts and Science College, Vivekanandha College participated in the events.

Our Principal Dr. V. Radhakrishnan, addressed the gathering about the importance of placement and the Chief Guest **Mr. TimothySamson, HR – Regional Head, Tech Mahindra,** presented a valuable key note on positive attitude and negative attitude of the students.

The office bearers from the Computer Science and Applications department took in-charge of ACAII and TRACE.

MAILING LIST – To Whom We Send

- **Mr.B.Murali, HOD of CS, PSG college of Arts and Science, Coimbatore-14.**
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- **Mr.S.SureshBabu, HOD of CS, Thiruvalluvar Government Arts College, Rasipuram.**
- **Dr.K.Thangavel, HOD of CS, Periyar University, Salem-11.**
- **Prof S. Joseph Gabriel, HOD of CS, MazharulUloom College, Vellore – 02**
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