



CTC(T&IT), CRPF



Monthly

e-Newsletter

May- 2022



Never stop learning, Because life never stop Teaching

**"He who can listen to the music in the
midst of noise can achieve great things."**

– Vikram Sarabhai

MAY-2022

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READER'S CENTER

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- 4. New Innovative Technologies**



3D Printing Technologies

3D printing, or additive manufacturing (the official term for production based on 3D technology), has been used by the automotive and aerospace industries to build prototypes for some time now, and over the last few years, 3D printing technologies have evolved at a rapid pace. Fashion designers, architects, artists, and food technicians are experimenting with it in their respective fields. The new technology's potential seems almost boundless. Nike, for example, recently launched the first athletic shoe including 3D-printed components.



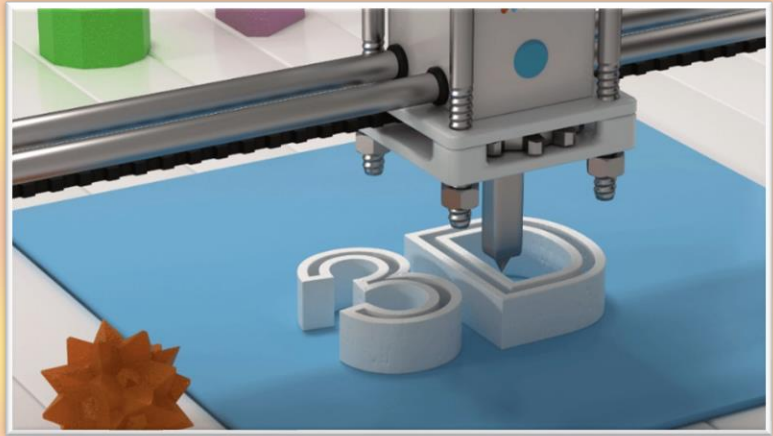
3D print technology makes it possible to create nearly any geometric form with the help of design software – incorporating hollow spaces and filigree honeycomb structures, for example, that are much lighter than traditionally manufactured components, but offer the same stability. In medical technology, 3D printing has already achieved standards on a par with traditional manufacturing methods.

Dental crowns, hip joint prosthetics, and customised hearing aid shells: 3D printing is used wherever “replacement parts” for the body are needed. The medical industry will see even more revolutionary developments in the years to come. Researchers are experimenting with the printing of human cells: artificial skin for burn victims, artificial ears, and artificial kidneys are no longer a utopian vision. A Swiss-made 3D printer is designed to manufacture lung tissue, and soon it will also print jawbone implants.

Manufacturers from all industry sectors are exploring which items they may be able to produce using 3D print technology, and logistics service providers are launching pilot projects to identify the need, potential and options for adjusting their business models to include 3D print services. Components manufactured with 3D printing offer the same safety and stability as the traditionally manufactured components they replace, but at a fraction of the weight. Integrating such components into finished aircraft, for example, helps save fuel and reduces CO2 emissions.

3D printing enables decentralisation, saving transport costs and driving down overall logistics expenses. It is also useful for small production batches or limited mass production, and for creating the required moulds for this type of manufacturing. In the future we may store replacement parts in virtual warehouses rather than distribution centres and print them based on demand, which would significantly reduce required storage space and resources. This may also provide the foundation for high-wage countries to “near shore” production back home following earlier outsourcing to low-wage countries, and saving customs duties based on electronic transmission of digital design plans for local production rather than importing the actual goods.

At this point in time, however, it is still unclear to what extent 3D printing is capable of outstripping traditional manufacturing and logistics processes, or even replacing them. Despite its potential, 3D print technology is also subject to limitations. To begin with, it cannot compete with the speed of traditional manufacturing processes and is



not yet suitable for mass production. Plus, traditional processes for mass production are significantly cheaper than producing large quantities based on 3D print technology. Additionally, if products require smooth surfaces, they will need finishing following 3D print production, because it leaves a rough surface structure on objects made of synthetic fibres. Various product liability issues remain unresolved, too: if anyone can become a manufacturer or producer, who assumes liability when something breaks? 3D printing is still so young that the law lags behind on such issues.

On the regulatory side, 3D printing also has the potential to undermine control mechanisms that ensure products are safe and appropriate for the market. Customs authorities lose their oversight capabilities when goods are no longer transported across borders; they would not be able to conduct consumer protection or safety controls, or keep counterfeit goods off the market the way they do now.

With 3D printing, goods may no longer need to be shipped halfway around the world, because they can be printed close to the consumer. But this doesn't mean that we will soon only be shipping raw materials and 3D print cartridges. Not quite yet. In fact, experts are sceptical that the technology will have much of an impact on global transport volumes in the near future. The trend toward custom production is currently more likely to boost "last-mile" shipping, i.e. the movement of goods from a transport hub to their final destination in the area.

But one thing is certain: The market share of 3D printing technology will increase and the trend toward customisation will continue. We will all benefit from the new technology's ability to accommodate individual customer requests during production. Manufacturers will no longer keep large volumes of standardised products in stock, moving instead to a more flexible manufacturing model based on the "made to order" principle. The most likely outcome is that 3D printing will take its place alongside traditional production technologies, rather than replace them.

ASI/T Nagapooshanam

Introduction about the working of Touch Screen Technology



INTRODUCTION

- Touch screen technology is the direct manipulation type gesture based technology . Direct manipulation is the ability to manipulate digital world inside a screen without the use of command-line-commands. Touch screen is an input device and normally layered on the top of an electronic visual display.
- Device which works on touch screen technology is coined as Touch screen. A touch screen is an electronic visual display capable of 'detecting' and effectively 'locating' a touch over its display area.
- It is sensitive to the touch of a human finger, hand, pointed finger nail and passive objects like stylus. Users can simply move things on the screen, scroll them, make them bigger and many more.
- Touch screen displays are widely used in computers, user interactive machines, public kiosks, point of sale applications, gaming consoles, PDAs, Smartphone's, tablets, ATM etc.

HISTORY:-

- The first ever touch screen was developed by E.A Johnson at the Royal Radar Establishment, Malvern, UK in the late 1960s.
- Evidently, the first touch screen was a capacitive type; the one widely used in smart phones now a days. In 1971.
- A milestone to touch screen technology was developed by Dr G Samuel Hurst, an instructor at the University of Kentucky Research Foundation. It was a touch sensor named 'Elograph'. Later in 1974, The first real touch screen featuring a transparent surface. In 1977.
- First touch screen Phone launch by IBM namely IBM SIMON in 1992.

Sony's smart skin introduces mutual capacitive touch recognition in 2002. Microsoft introduces the surface technology as pixel scene in 2012.

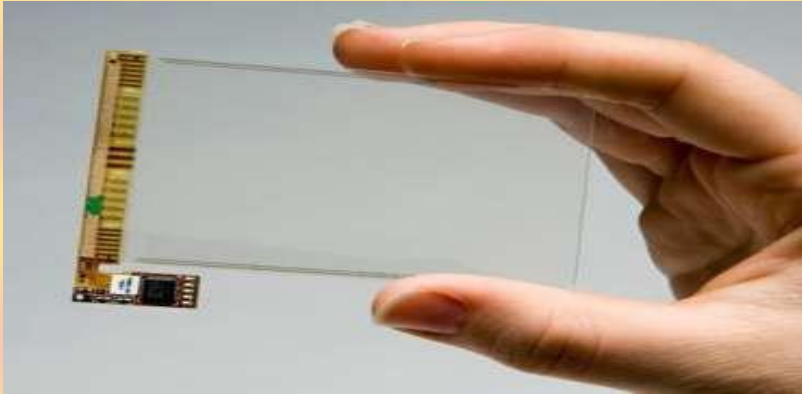
Working of smart phone Touch screen:-

Main components:-

- Touch sensor
- Controller
- Touch panel Driver

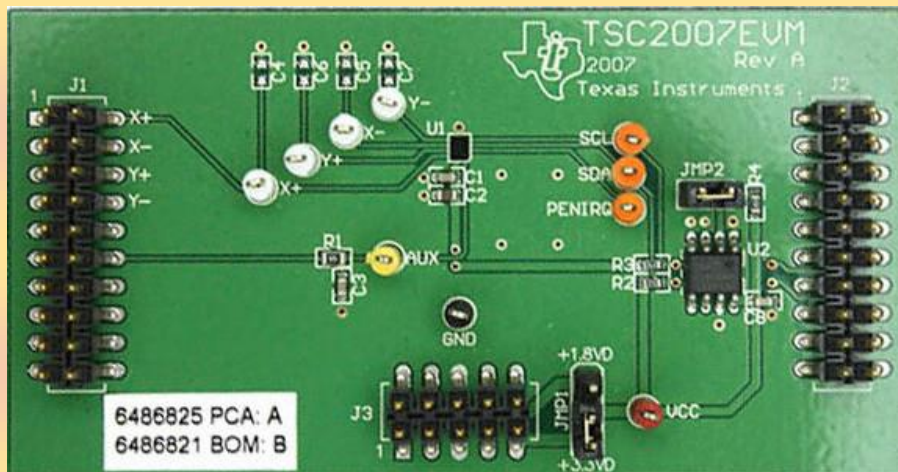
Touch Sensor:-

- A touch screen sensor is a clear glass panel with a touch responsive surface made by Polyethylene(PET) with coating of Indium Tin Oxide (ITO)
- The sensor generally has an electrical current or signal going through it and touching the screen causes a voltage or signal change.



Controller:-

- The controller is a small PC card that connects between the touch sensor and the PC motherboard.
- The controller determines what type of interface/connection you will need on the PC/Mobile Phones.



Driver:-

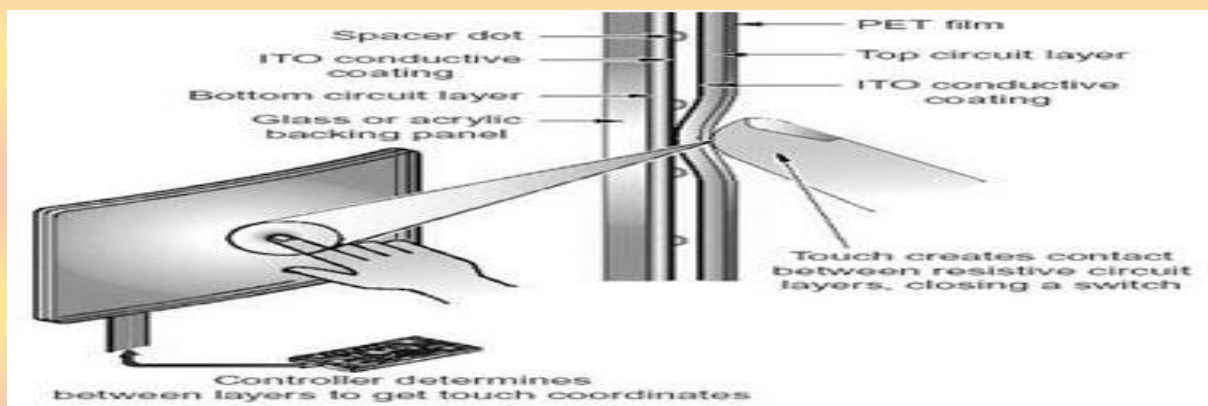
- The driver is a software that allows the touch screen and computer to work together.
- Most touch screen drivers today are a mouse-emulation type driver. They emulate function of mouse and action completed through Touch screen.

Types of Touch screen Technology :-

- The revolutionary technology Touch screen is a 2 dimensional sensing device made of 2 sheets of material separated by spacers.
- There are four main touch screen technologies:
 - 1) Resistive
 - 2) Capacitive
 - 3) Surface Acoustic Wave
 - 4) Infrared

1. Resistive Touch screen Technology:-

The resistive touch screen consists of a flexible top layer made of Polyethylene (PET) and a rigid bottom layer made of glass. Both the layers are coated with a conducting compound called Indium Tin Oxide (ITO) and then spaced with spacers. While the monitor is operational, an electric current flows between the two layers. When a touch is made, the flexible screen presses down and touches the bottom layer. A change in electrical current is hence detected and the coordinates of the point of touch is calculated by the controller and parsed into readable signals for the Operating system to react accordingly.

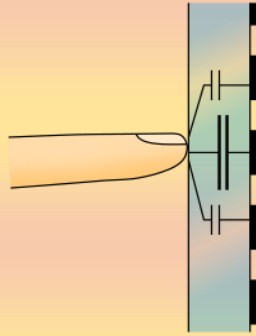
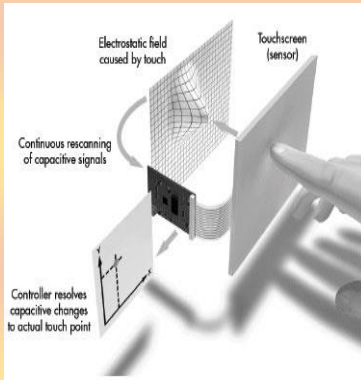


Resistive touch screen further divided into:-

- 4-wire Resistive Touch screen
- 5-wire Resistive Touch screen
- 6-wire Resistive Touch screen
- 7-wire Resistive Touch screen
- 8-wire Resistive Touch screen

2. Capacitive Touch screen Technology -

The Capacitive Touch screen Technology is the most popular and durable touch screen technology used all over the world at most. It consists of a glass panel coated with a capacitive (conductive) material Indium Tin Oxide (ITO).



In this technique only one side of the insulator is coated with a conducting layer. While the monitor is operational, a uniform electrostatic field is formed over the conductive layer. Whenever, a human finger touches the screen, conduction of electric charges occurs over the uncoated layer which results in the formation of a dynamic

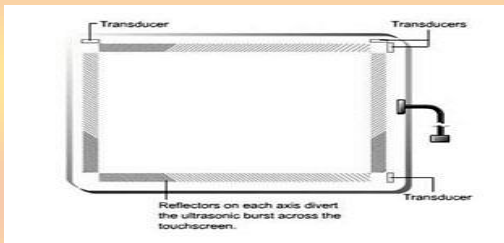
capacitor. The computer or the controller then detects the position of touch by measuring the change in capacitance at the four corners of the screen.

They further divided into:-

- Surface Capacitive Touch Screen
- Projected capacitive Touch Screen

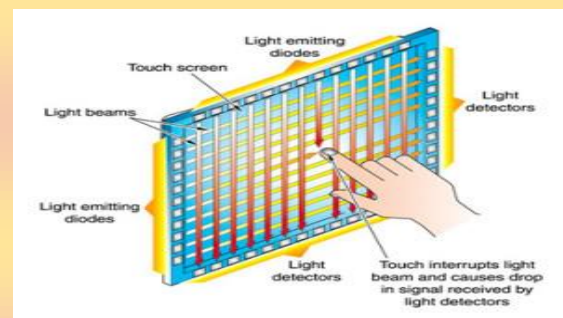
3.Surface Acoustic Wave Touch screen Technology:-

The Surface Acoustic Wave Touch screen technology contains two transducers (transmitting and receiving) placed along the X-axis and Y-axis of the monitor's glass plate along with some reflectors. The waves propagate across the glass and are reflected back to the sensors. When the screen is touched, the waves are absorbed and a touch is detected at that point. These reflectors reflect all electrical signals sent from one transducer to another. This technology provides excellent throughput and image clarity.



4. Infrared Touch screen Technology: -

In the Infrared Touchscreen Technology, an array of X- and Y- axes are fitted with pairs of IR Leds and photo detectors. The photo detector detect any change in the pattern of light emitted by the Leds whenever the user touches the monitor/screen.



ASI/T Deepak Jha

What is Education Technology?

Education technology is a classification of technology that is used to promote and access education. This can encompass hardware, software, and other related items used by educators and students during the learning process. These tools help students attend their classes, collaborate, engage with remote students, or learn in a new way, inside the classroom or outside of it. EdTech is often a synonym for education technology.

The EdTech Industry

Education technology as an industry is growing exponentially, valued at almost 90B in 2020 and rising at a projected rate of 20% year over year through 2028. Industry experts predict continued growth in EdTech tools, and a boom in AI-powered, AR-enhanced, and VR-integrated educational technology products in the coming years. Specifically, K-12 has seen a rapid increase in game-based learning that relies on EdTech, which is evolving alongside more project-based learning in schools.

Why is EdTech important?

McKinsey data found that students in schools with sufficient technology devices performed better than those without access to technology and high speed internet. EdTech enables teachers to support hybrid learning, which creates an inclusive classroom environment that provides access to learners, no matter their location or ability to physically be present in class.

Benefits of Education Technology

1. Education technology keeps hybrid classrooms connected.

The easiest area to see the benefits of education technology is in remote learning. Remote learning— attending lectures or classes virtually with video or audio communication to participate— requires the use of EdTech to keep the classroom engaged. Having a video call set up for a class of students allows people to attend no matter where they're located, bringing education to even more people.

2. Education tech software allows students to work more effectively.

EdTech software brings a new degree of flexibility to remote learning. Thanks to the variety of online courses and digital textbook libraries that students have access to through EdTech tools, students can access their work virtually, turn in homework online, and learn at their own speed. If a student has trouble with one section or really knows another, they can move ahead or relearn sections as they need it— allowing all students to tailor their learning experience to their needs.

3. EdTech helps teachers stay organized.

Using EdTech platforms, teachers can create digital repositories of teaching materials, videos, and slide decks used, then provide access to students and caregivers to review on their own time. It's easy to see what material you have available to teach with and saves energy of having

to look through piles of old paper resources. When all classes are being taught remotely they have a tendency to bleed into one another. For teachers juggling multiple remote and hybrid classes, EdTech allows them to show up to each new class and lesson prepared and organized.

Examples of Educational Technology

Here are some popular EdTech companies and products that are contributing to the expanding options for technology in the classroom. These examples of education technology in the form of learning management systems, hardware products like video conferencing cameras for the classroom, and educational gaming platforms show the range of how technology can be infused in both teaching and learning. :

The Meeting Owl

The Meeting Owl is a video conferencing camera for classrooms that enables hybrid collaboration for students and teachers. The Meeting Owl turns any classroom environment into a hybrid classroom with its unique 360-degree camera that can capture audio and video from everyone in the room.

Cengage

Cengage is an online textbook and course distributor that also focuses on testing. Students can buy their textbooks for their specific course and take notes and quizzes all within the Cengage portal. This makes it a one-stop-shop for learning tools for students.

Civitas Learning

Civitas Learning is a company dedicated to improving student outcomes in colleges and universities. Their tools are used to track student data to see which subjects or areas they might need help in, as well as what fields they might work well in.

Google Classroom

Teachers can use Google Classroom to organize assignments and create a collaborative online learning environment for students. It's an all-in-one online tool where educators can create classes, distribute and grade assignments, provide feedback, and connect with students.

Kahoot!

Kahoot! is a quiz game that can be created by teachers and answered by students about any topic they want. Students answer questions together and win points for the more answers they get correct. It's a fun way to get students learning in a format they're interested in.

HC/RO Ramesh Mahto

New Innovative Technologies

Datafication



Data is a key enabler for all of these trends. All of the digitization in our world today means we have enormous amounts of data available, and data has now become the number one business asset for every organization. We can use data to better understand our customers, research key trends, and get insight into what's working inside our organizations.

Artificial Intelligence and Machine Learning

Organizations and researchers are now using all their data and computing power to provide advanced AI capabilities to the world.

One of the key trends in the AI world is machine vision. We now have computers that can see and recognize objects on a video or photograph. Language processing is also making big advances, so machines can understand our voices and speak back to us.

Low-code or no-code will also be a huge trend this year. We will be able to build our AI using drag-and-drop graphical interfaces, so we can develop extraordinary applications without being limited by our coding skills.

Extended Reality

We now have more augmented reality (AR) capabilities on our devices (particularly our phones and tablets), and we're seeing an even bigger push toward virtual reality (VR). In 2022, we'll see new, lighter, more portable VR devices, so instead of having clunky headsets that require WiFi connections, we will have devices that are more like glasses that connect to our phones and give us superior VR experiences on the go.

These extended reality advances pave the way for incredible experiences in the metaverse, a persistent, shared virtual world that users can access through different devices and platforms.

Digital Trust

Blockchain technology, distributed ledgers, and non-fungible tokens (NFTs) are transforming our world, and we will continue to see advances in this technology in 2022. These innovations go beyond Bitcoin to things like smart contracts that allow us to verify ownership with NFTs. This year, we will see more companies and individuals enhancing physical objects with blockchain technology and tokens.

Genomics

The 2020 Nobel Prize in Chemistry was awarded to two scientists, Emmanuelle Charpentier and Jennifer A. Doudna, for their work developing a method for genome editing. Genomics, gene editing, and synthetic biology are a top trend of 2022 because these advancements can help us modify crops, cure and eradicate diseases, develop new vaccines like the COVID-19 shot, and other medical and biological breakthroughs.

Nanotechnology will also allow us to give materials new attributes by manipulating them on a subatomic level, so we can create things like bendable screens, better batteries, water-repellent, self-cleaning fabrics, and even self-repairing paint this year.

New Energy Solutions

The last hugely important trend is new energy solutions. As we tackle climate change, we'll see continued advances in the batteries we use in our cars, as well as innovations in nuclear power and green hydrogen. These new trends will allow us to power our ships, our planes, our trains and generate energy for the general public.

HC/RO Sunil Kumar

Acknowledgement

We are highly thankful for reading out this compilation and hope it will be useful for you in day to day professional and personal life .We would like to hear your interest areas, suggestions from you to make this newsletter more informative and interesting. Your views will definitely help us to create this newsletter as an effective medium to reach you with latest development in the fields of communication and technology.

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