



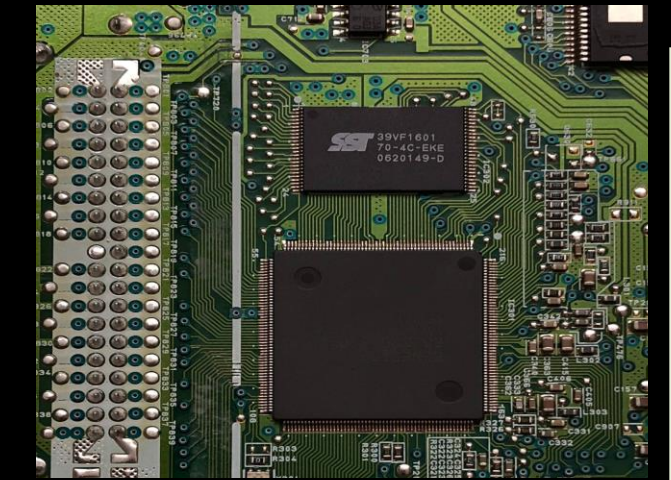
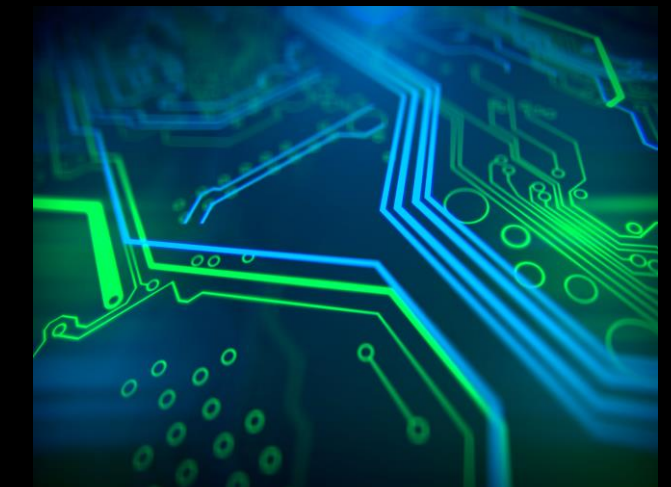
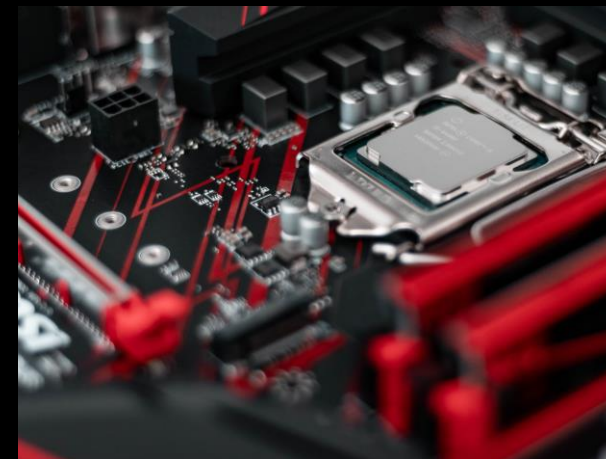
# PANIMALAR ENGINEERING COLLEGE

(A CHRISTIAN MINORITY INSTITUTION)  
JAISAKTHI EDUCATIONAL TRUST  
(AN ISO 9001 : 2000 CERTIFIED INSTITUTION)

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



### TECHNICAL MAGAZINE - 2020



## FUERZA '2020

**"It's not that we use technology, we live technology"—Godfrey**

## PREFACE

*We the students of Panimalar Engineering College are at immense pleasure in publishing Tech Magazine -2020 on behalf of Electronics and Communication Engineering department.*

*We believe that this magazine would create a platform to enhance the students and also forms a bridge between their subjects and current standards of the industries and industrial applications.*

*We trust that this will prove a very successful endeavour, in future every student will contribute in a magazine like this for the growth of this institution and our Nation as a whole’.*

*With this Technical Magazine being released on the special occasion of our National Level Technical Symposium “**FUERZA’20**”.*

*We in this Magazine attempted to achieve*

- *An Effective interface between industry, business and community.*
- *Inculcation of scientific eagerness, analytical thinking and to train students in modern day trends in electronics and communication.*
- *Provide versatile knowledge in field of electronics and communication.*
- *Develop the department in a full fledged centre of learning in various fields and increase student enthusiasm in our field.*

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# CONTENTS

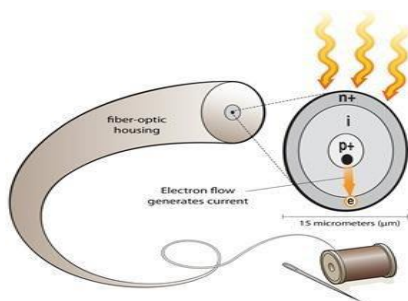
<b>SLNo.</b>	<b>ARTICLES NAME</b>	<b>PAGE NO.</b>
1.	<b>WEARABLE SOLAR CELL</b>	<b>5</b>
2.	<b>THE EAGLE EYE</b>	<b>7</b>
3.	<b>3-D PRINTING</b>	<b>9</b>
4.	<b>FALCON HEAVY –THE EPIC</b>	<b>12</b>
5.	<b>RECYCLABLE ELECTRONIC SKIN</b>	<b>13</b>
6.	<b>POWER AT FINGER TIPS</b>	<b>15</b>
7.	<b>STRATELLITE</b>	<b>16</b>
8.	<b>GRAPHIC DESIGNER TECHNOLOGY</b>	<b>19</b>
9.	<b>SEAT BELT PRETENIONER</b>	<b>21</b>
10.	<b>TECHNOLOGY IN HEALTH CARE</b>	<b>22</b>
11.	<b>SOFT ELECTRONICS FOR SHAPE SHIFTING CIRCUITS</b>	<b>25</b>
12.	<b>WIRELESS ACCESS PROTOCOL</b>	<b>28</b>
13.	<b>GOOGLE SELF DRIVING BIKE</b>	<b>29</b>
14.	<b>IBM WATSON</b>	<b>31</b>

<b>15.</b>	<b>NOVEL OF MEMISTER</b>	<b>36</b>
<b>16.</b>	<b>PUZZLE</b>	<b>38</b>

# WEARABLE SOLAR CELLS POWER ELECTRONICS

A drained smart phone battery often sends us hunting for the nearest outlet, if there even are any. But within a decade, we might be wearing the outlet.

In a world of fabrics, infused with the power of sun, recharging could be as simple as plugging devices into our dress. Helping this potential future along, chemist John bedding and his colleagues at Pennsylvania state university recently embedded solar cells within flexible wires that can be woven into fabric.



Bedding's solar cell functions just like a common, rigid kind, but with a fiber-optic housing that enables it to bend into a loop

Light particles pass through the outer layer freeing a cascade of electrons through the material. The movement of free electrons and the gaps created by those loosed particles generate an electric current. Electrodes to transfer the power are attached to the solar cell. The flexible wires assume the same basic arrangement as a common type of rooftop solar cell, which contains a negatively charged layer, a positively charged layer and a neutral layer is sandwiched between

reactions access the charged layers, ultimately generating usable power.

Bedding and his group devised a new way of creating that semiconducting sandwich by starting with a flexible, hollow fiber – optic thread; inner and outer walls of the thread corresponds to the positive and negative Bedding's team has designing these threads as a 3-foot long wires, each thinner than a human hair and flexible enough to be wound into a coil The potential applications for this solar threads include flexible garments that could draw power from the sun and allow people to recharge their phones and other devices on the run.

**RAJESWARI M**  
**III-ECE**

# **WHAT DO YOU GET WHEN YOU CROSS AN AIRPLANE WITH A SUBMARINE?**

## **INTRODUCTION:**

The first unmanned, fixed-wing aircraft that is capable of traveling both through the air and under the water – transitioning repeatedly between sky and sea. The Eagle Ray XAV, which was developed with funding and assistance from Teledyne Scientific, holds promise for use in applications such as tracking and observing wildlife.

## **DESCRIPTION:**

"The Eagle Ray can conserve energy by spending time in the air. For example, the Eagle Ray could track a fast-moving pod of dolphins from the air, then spend time loitering in the water if the dolphins stop to take advantage of a good feeding spot.

The Eagle Ray could then resume flight when the dolphins begin moving again." "The Eagle Ray could also rapidly move underwater sensors from location to location. Stewart, "It could even perform underwater monitoring that most unmanned aerial vehicles can't.

"For example, sonar only works underwater. If you're seeking a sonar target, the Eagle Ray could fly to a site, submerge to take sonar readings, and then resume flight to take readings elsewhere.

Historically, an aircraft would have to drop sonar buoys to collect sonar data."

A key point regarding the Eagle Ray design is that it is scalable – you can make larger or smaller models as needed," Stewart says. "It

really depends on the size of the desired payload, how long you'd need it to operate, and so on."

The current model of Eagle Ray has a wingspan of 59 inches and is 55 inches long, weighing in at 12.6 pounds. It has a dual-use propeller, powered by an electric motor that propels it through both air and water

**HEMANTH.R**

**III-ECE**

# 3D PRINTING

3D printing refers to processes in which material is joined or solidified under computer control to create a three-dimensional object, with material being added together (such as liquid molecules or powder grains being fused together). 3D printing is used in both rapid prototyping and additive manufacturing (AM).

Objects can be of almost any shape or geometry and typically are produced using digital model data from a 3D model or another electronic data source such as an Additive Manufacturing File (AMF) file (usually in sequential layers). Stereo lithography (STL) is one of the most common file types that are used for 3D printing.



3D printable models may be created with a computer-aided design (CAD) package, via a 3D scanner, or by a plain digital camera and photogrammetric software.

3D printed models created with CAD result in reduced errors and can be corrected before printing, allowing verification in the design of the object before it is printed

Before printing a 3D model from an STL file, it must first be examined for errors. Most CAD applications produce errors in output STL files, of the following types:

1. holes;

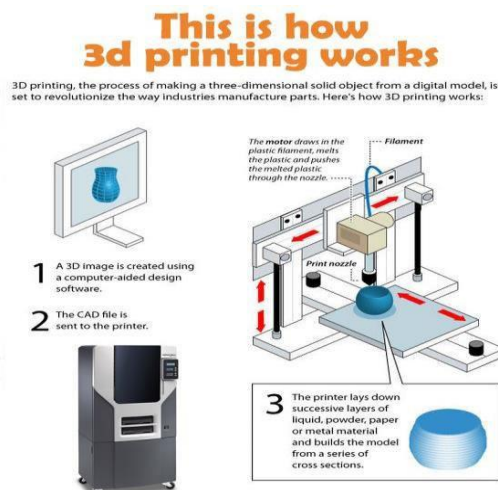
2. faces normal's;
3. self-intersections;
4. noise shells;
5. Manifold errors.

STL is a file format native to the stereo lithography CAD software created by 3D Systems. STL has several after-the-fact acronyms such as "Standard Triangle Language" and "Standard Tessellation Language".

## How does a 3D printer work?

Imagine building a conventional wooden prototype of a car. You'd start off with a block of solid wood and carve inward, like a sculptor, gradually revealing the object "hidden" inside.

Or if you wanted to make an architect's model of a house, you'd construct it like a real, prefabricated house, probably by cutting miniature replicas of the walls out of card and gluing them together. Now a laser could easily carve wood into shape and it's not beyond the realms of possibility to train a robot to stick cardboard together—but 3D printers don't work in either of these ways!



A typical 3D printer is very much like an inkjet printer operated from a computer. It builds up a 3D model one layer at a time, from

the bottom upward, by repeatedly printing over the same area in a method known as fused depositional modelling (FDM).

3D-printed plastic hearts make it possible for surgeons to practise operations with no risk. Model by Dr. Matthew Bram let. Public domain photo published on Flickr courtesy of US NIH Image Gallery and 3D Print Exchange

**THARUN.M**

**III-ECE**

## FALCON HEAVY – THE EPIC

The maiden launch of the Falcon Heavy occurred on 6 February 2018, marking the launch of the most powerful operational rocket since the Energia, with a ability to lift 64 metric tons-a mass greater than a 737 jetliner loaded with passengers ,crew, luggage and fuel. Falcon has three boosters where both side boosters of Falcon landed successfully at, Cape Canaveral air force station, designated landing pads Space uses to recover its reusable rockets simultaneously after a ten-minute flight. The attempted landing of the central core “Of Course I Still Love You,” on a floating platform at Atlantic Ocean was not successful



The rocket was designed to meet or exceed all current requirements of human rating. The Heavy configuration consists of a structurally

Strengthened Falcon 9 as the "core" component, With two additional Falcon 9 first stages acting as liquid fuel strap-on boosters and the payload which is sent is the original tesla roadster car. The Roadster was not modified, nor apparently tested, to guarantee its survival on its trip into deep space. The spacesuit worn by the mannequin in the roadster was not a costume, but rather marked the first in-space use of a garment designed for NASA astronauts to wear on SpaceX's upcoming Dragon spacecraft crewed flights to the

**PRAVEEN NITHI**

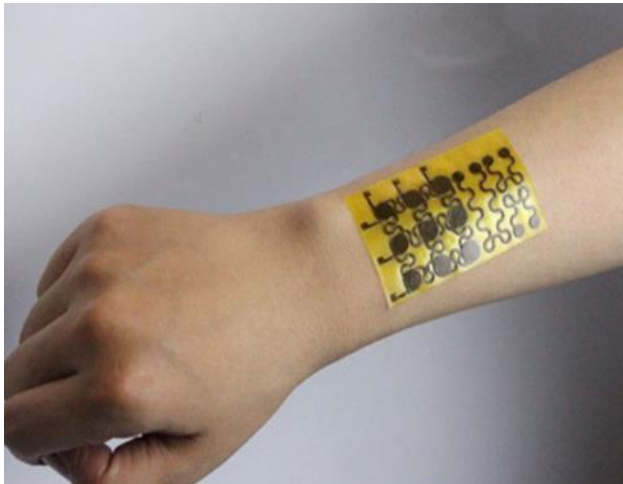
**III-ECE**

# FULLY RECYCLABLE SELF HEALING

## ELECTRONIC SKIN UNVEILED

Technology that mimics the functions and sensations of human skin may sound futuristic, but it isn't exactly new. In 2010, scientists at Stanford University and at University of California, Berkeley, developed an artificial skin that could feel even a gentle touch. Dubbed e-skin, the device holds great potential to help future robots more delicately interact with humans.

But now in 2018, researchers at the University of Colorado Boulder are giving e-skin an environmentally friendly upgrade. The latest iteration of the device can re-heal itself and be recycled to make new layers of skin.



pressure, temperature, humidity and other kinds of sensors to mimic the function and mechanical properties of human skin. It's made from a polymer and silver nanoparticles

The recyclable e-skin looks like a thin, yellow adhesive sticker. Embedded in this thin layer are sensors that measure

Which allows it to bend and move with curved spaces like fingers or toes? It's also soft, but not quite as stretchy as human skin. One weakness of the previous e-skin is that the chemical bonds used to make them were relatively weak. Although they were malleable like human skin, 'they were not very robust'.

The new e-skin is not only malleable, but also laced with silver particles only billions of a meter thick that boost its mechanical strength and chemical bonds lead to stronger e-skin and 'It's definitely more robust than the peoples skin'.

It was noted that if the e-skin gets cut or torn, it will heal with the application of three compounds dissolved in alcohol. During this healing, new molecules grow across the broken surfaces, leading to chemical bonds joining pieces together, mimicking the natural skin healing process.

If it is sliced, the researchers can simply just add more of the original three active compounds that make up the film and the ensuing chemical reaction will knit the e-skin back together, 'healing' the wound. If ever damaged beyond repair, it can also be soaked in a solution that separates out the silver nanoparticles and then be recycled into new e-skin.

The healing process happens fast, too. It only takes a few minutes at 140 degrees Fahrenheit or 30 min at room temperature, while the recycling process takes about 30 minutes at 140 degrees or 10 hours at room temperature.

We could see a future where we can reuse materials from old electronics by just soaking a cell phone or laptop in a solution

**VARSHA C.B**

**III-ECE**

## **POWER AT FINGERTIPS**

A conductor is a material in which electricity, heat or sound can flow through. An electrical conductor conducts electricity. We are also an example of conductor. As our body cells contain various ions like sodium ion, potassium ion, chloride ion etc. which have the tendency to conduct electricity and this makes our body good conductor of electricity. Ever wondered why we haven't made use of ourselves as a conductor? Isn't it a Sin, that we have forbidden such a wonderful phenomenon? University of Buffalo had conducted a research based upon this. They have used turboelectric Nano generator. This makes use of turboelectric effect (i.e.) a type of contact electrification which you see when rubbing two glasses. The tab they developed is both easy to manufacture also cost efficient.

The device comprises two thin layers of gold, with a layer of polydimethylsiloxane (PDMS) sandwiched in between. When a finger is bent, for example, the motion leads to friction between the gold layers and PDMS. This causes electrons to flow back and forth between the gold layers. The tab they created was able to light 48 LED red lights simultaneously. Further research is done to improve its performance also they have planned to create a portable battery to save the energy that is being produced by the tab.

**S.DIVYA**  
**II-ECE**

# **STRATELLITE**

## **Introduction**

Wireless communication is simply data communication without the use of landlines. This may involve cellular telephone, two-way radio, fixed wireless (broadband wireless), laser (free space optics) or satellite communication systems. Mobile wireless technologies are going to act as glue towards bringing together the wired and wireless to share and distribute information seamlessly across each other's areas of reference. Since from the beginning of wireless communications, there have been a number of developments in each generation.

Stratellite is a brand name trademark of sans wire for a future emissions-free, high-altitude stratospheric airship that provides a stationary communications platform for various types of wireless signals usually carried by communications towers or satellites. The Stratellite is a concept that has undergone several years of research and development, and is not yet commercially available; sans wire, with its partner TAO Technologies, anticipates its current testing sequence to include the launch of a Stratellite into the stratosphere. A new generation of cellular standards has appeared approximately every tenth year since 1G systems were introduced in 1981/1982. Each generation is characterized by new frequency bands, higher data rates and non-backwards compatible transmission technology. The first release of the 3GPP Long Term Evolution (LTE) standard does not completely fulfil the ITU 4G requirements called IMT-Advanced. First release LTE is not backwards compatible with 3G, but is a pre-4G or 3.9G technology, however sometimes branded "4G" by the service providers. Its evolution LTE Advanced is a 4G technology. WiMAX is another technology verging on or marketed as 4G.

A "stratellite" is a high-altitude airship (HAA) "25 times larger than the Goodyear blimp" employed much like a satellite for remote sensing, navigation, and communications. Instead of being stationed on orbit, stratellites are positioned in the stratosphere approximately 13 miles above the Earth. This altitude places the airships above both commercial air traffic and weather effects but significantly lower than standard low earth orbits. From this height stratellites can service a 300,000-square-mile-area. The North American Aerospace Defence Command (NORAD) projects that eleven such airships could provide radar coverage of the entire maritime and southern borders of the United States.



The initial Stratellite was 188 feet long, 60 feet wide and 42 feet high. It is provided with a new steering method which uses a hybrid electric system that drives large, slow-turning propellers

This gives the airship helicopter-like agility by being able to move both up and down, and side to side. The outside layer, or "envelope," is made out of a high-tech material called Spectra - a fabric used in bullet-proof vests and parts of space shuttles. Spectra contain fibre 10 times as strong as steel of the same weight and has the unique feature of being easy to cut but virtually impossible to tear.

The inner layer, made from a thin but strong polyester film called Mylar, is fitted inside the envelope and filled with a mixture of helium and air as helium is an inert gas and is therefore not flammable. With this design, the helium expands as the airship rises, forcing air out and lifting the airship.

Projected to carry payloads as large as 4,000 pounds, and later models are expected to carry over 20,000 pounds of radars and

other remote imaging equipment, navigational aids, and telecommunications relays. Stratellites are planned to remain on station for a year at a time and will cost a fifth as much as a comparable satellite.

### **Applications it enables**

Once a Stratellite network is in place, it will provide a national broadband wireless network that will provide voice, video and broadband internet access to all parts of the country. By linking several Stratellites together they can provide a wireless broadband network that will cover thousands of miles. With a Stratellite network, subscribers will be able to sit in their homes and be connected on their laptops to the internet at high speed. If subscribers need to go to the office, across town, or even to another city, they can close their laptop and take off, reopening the laptop at their new destination and still be connected to the internet. This would allow subscribers the ease of not having to find local access numbers, tie up phone lines, deal with modem hassles, and more importantly, slow speeds.

### **Conclusion and Future Scope**

Stratellites provide the required facilities of wireless communication more efficiently than the ordinary towers. The Stratellite will allow subscribers to easily communicate in 'both directions' using readily available wireless technology." They minimise the cost of communication. Stratellites present a mobile, low-cost, high-capacity alternative to satellite relays and cell towers. Once the defects of Stratellites have been overcome and become more reliable, they play a vital role in the future generation wireless communication.

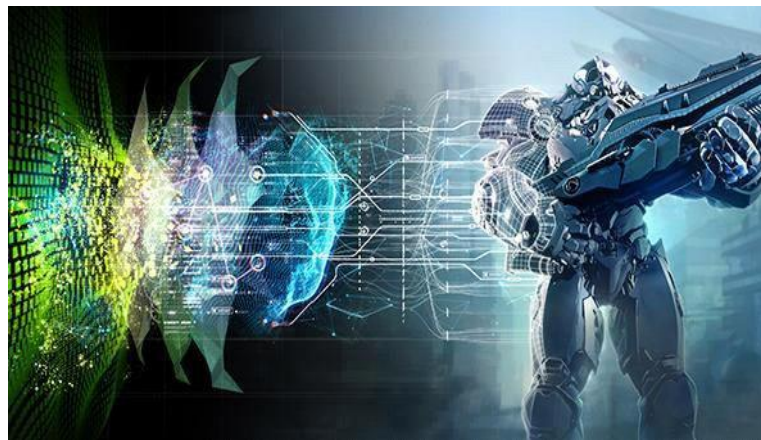
**BAVYA.S**

**III-ECE**

# **GRAPHIC DESIGN TECHNOLOGY**

Graphic Design Technology involves working with external and internal clients to create solutions to their needs, it may also include the printing or online publication production. People working in this industry often work closely with their clients and must be strong communicators so that they can achieve the client's objectives successfully. After completing the research and planning stage, a project is interpreted to form a design in appropriate industry specific software

became considerably a necessity for desktop computers. Shaders which had been introduced in the 1980s to perform specialized processing on the GPU would by the end of the decade become supported on most consumer hardware, speeding up graphics considerably and allowing for greatly improved texture and shading in computer graphics.



## **Layers**

Many modern graphic design software programs utilise layers, often arranged in floating tool palettes, to help designers lay out and organize design elements in their creations. Essentially, these layers provide the ability to add and stack a number of sheets or art boards on top of each other, so that editing and effects can be applied to each layer separately.

## **Models**

Three-dimensional (3D) models represent a physical body using a collection of points in 3D space, connected by various geometric entities such as triangles, lines, curved surfaces, etc. Today, 3D models are used in a wide variety of fields. The medical industry uses detailed models of organs; these may be created with multiple 2-D image slices. The process of transforming representations of objects, such as the middle point coordinate of a sphere and a point on its circumference into a polygon representation of a sphere, is called tessellation. The modeling stage consists of shaping individual objects that are later used in the scene.

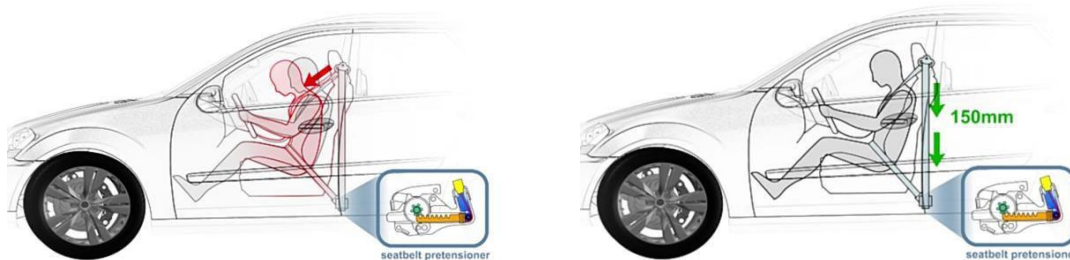
## **Recent Advancements**

Thanks to graphic tablets, new design software, and advances in printing, designers can really get creative and design -- almost without limitation! Imagine how much faster a graphic designer can create with a tablet, rather than using a mouse to do all of their work. And of course with design suites like Adobe Creative Suite releasing new, updated software consistently every few years, the programs feature improves options for designers to utilize in new and often unexpected ways! Now that technology has branched out, offering designers hundreds of programs to choose from, there are almost as many methods of graphic design as there are graphic designers! Seeing a designer's personality shine through in their work is always a bonus.

**ARTHI  
ECE**

# SEAT BELT PRETENSIONER SYSTEM

The idea of a pretensioner is to tighten up any slack in the belt webbing in the event of a crash. To make sure a seatbelt restrains an occupant as early as possible in a crash.



The pretensioner mechanism uses an explosive charge to drive concealed piston when sensors detect the signature abrupt deceleration of an accident. The piston, in turn, rapidly drives the spool around which the fabric strap of a seatbelt is wrapped. That incredibly fast retraction of the belt fabric removes the slack from the belt instantly. This seatbelt "pre-tensioners", moments prior to the full force of impact, pulls the bodies of the driver and front-passenger firmly into their seats. This positions them so as to receive the maximum protection benefit of the front airbags. It also helps prevent the unfortunate phenomenon car a crash –ologists calls "submarining".

**DHANUJA.V**

**III-ECE**

# **HOW TECHNOLOGY IS TRANSFORMING**

## **HEALTH CARE**

Digital innovations have now made it possible for consumers to use portable devices to access their medical information, monitor their vital signs, take tests at home and carry out a wide range of tasks

In the mid-20th century Joseph Schumpeter, the noted Austrian economist, popularized the term "creative destruction" to denote transformation that accompanies radical innovation. In recent years, our world has been "Schumpetered."

But the most precious part of our existence – our health – has thus far been largely unaffected, insulated and almost compartmentalized from this digital revolution. How could this be? Medicine is remarkably conservative to the point of being properly characterized as sclerotic, even ossified. Beyond the reluctance and resistance of physicians to change, the life science industry (companies that develop and commercialize drugs, devices or diagnostic tests) and government regulatory agencies are in a near-paralyzed state, unable to break out of a broken model determining how their products are developed or commercially approved. But that is about to change. Medicine is about to go through its biggest shakeup in history.

capability of printing an organ. Or, we can use a miniature, handheld, high-resolution imaging device that rapidly captures critical information anywhere, such as the scene of a motor vehicle accident or a person's home in response to a call of distress. We can determine all 6 billion letters ("life codes") of a person's genome sequence.

Think of the cellphone, which is not only a hub of telecommunications convergence, but also a remarkable number of devices all rolled into one gadget: camera, video recorder, GPS, calculator, watch, alarm clock, music player, voice recorder, photo album and library of books – like a pluripotent stem cell. Armed with apps, it carries out diverse functions from flashlight to magnifying glass. Then connect it to a wireless network, and this tiny device is a web surfer, word processor, video player, translator, dictionary, encyclopedia and gateway to the world's knowledge base. And, by the way, it even texts, emails and provides phone service. But now picture this device loaded for medicine, capable of displaying all of one's vital signs in real time, conducting laboratory analyses, sequencing parts of one's genome, or even acquiring ultrasound images of one's heart, abdomen or unborn baby.

We have early indicators that this train has left the station. The first individual, a five-year-old boy who had his life saved by genome sequencing, was recently documented. But it's not just about finding the root molecular cause of why an individual is sick . We can now perform whole genome sequencing of a fetus to determine what conditions should be watched for postnatally. At the other end of the continuum of life, we can do DNA sequencing to supplant a traditional physical autopsy, to determine the cause of death. We can dissect, decode and define individual granularity at the molecular level, from womb to tomb.

Yes, this does ring in the sci-fi concept of cyborgs, the fusion of artificial and biological parts in humans. We've already been there with cochlear implants for hearing loss, a trachea transplant, and we're going there in the creation of embedded sensors that talk to our cellphones via wireless body area networks in the future. With it comes the familiar "check engine" capability that we are accustomed to in our cars but

never had before for our bodies. Think true, real prevention for the first time in medical history.

We live in an extraordinary data-rich universe, a world that had only accumulated 1 billion gigabytes ( $10^9$  or 1,000,000,000 bytes of data) from the dawn of civilization until 2003. But now, we are generating multiple zettabytes – each representing 1 trillion gigabytes – each year and will exceed 35 zettabytes by 2020, roughly equivalent to the amount of data on 250 billion DVDs. Sensors are now the dominant source of worldwide-generated data, with 1,250 billion gigabytes in 2010, representing more bits than all of the stars in the universe.

The term "massively parallel" is an important one that, in part, accounts for this explosion of data and brings together the computer, digital and life science domains. Note the convergence: from single chips that contain massively parallel processor arrays, to supercomputers with hundreds of thousands of central processing units, to whole-genome sequencing that is performed by breaking the genomes into tiny pieces and determining the life codes in a massively parallel fashion. A revolution in technology that is based on the primacy of individuals mandates a revolution by consumers in order for new medicine to take hold. We desperately need medicine to be Schumpetered, to be radically transformed. We need the digital world to invade the medical cocoon and to exploit the newfound and exciting technological capabilities of digitizing human beings.

**JANANI.P**

**III-ECE**

# **TOWARDS SOFT ELECTRONICS FOR** **SHAPE-SHIFTING CIRCUITS**

Science fiction is inching closer to reality with the development of revolutionary self-propelling liquid metals—a critical step towards future elastic electronics. At present, electronic devices like smart phones and computers are mainly based on circuits that use solid-state components, with fixed metallic tracks and semiconducting devices. This leads to rigid structures. Besides, none of the current technologies is able to create homogeneous surfaces of atomically thin semiconductors on large surface areas that are useful for industrial-scale chip fabrication.

Advancements in electronics can be made through flexible and dynamically reconfigurable soft circuit systems. This involves taking electronics beyond the confines of solid-state circuits to soft-state circuits. The goal is to create elastic electronic components. These are a type of soft circuit systems that would function in a way analogous to biological cells. That means electronic circuits that can move independently and also interact with each other to construct new circuits. To achieve this, liquid metals are required.

The use of liquid metals in electronics has always fascinated the scientists due to their inherent advantages of fluidity and shape-shifting qualities. However, there are issues to be dealt with, like availability of only a few pure liquid metals at room temperature

## **GALLIUM ALLOYS: Liquid metals fit for electronics**

Though all the pure metals listed in the table (next page) are liquid at room temperature, these are not suitable for use in electronics due to reactivity and stability problems associated with them. Liquid metals also consist of alloys with very low melting points, which form a eutectic that is liquid at room temperature. The standard metal of choice used to be mercury, but gallium-based alloys, which are lower both in their vapor pressure at room temperature and toxicity, are being used as a replacement in various applications. Static circuit boards may one day give way to dynamic, changeable ones that can pop up on demand

Gallium shares similarities with aluminum, indium and thallium. It is commonly used to make alloys with low melting points, which are predominantly used in electronics. For example, gallium arsenide is used in microwave circuits. Some of the common gallium alloys are Ga-In-Sn, Ga-Al, Ga-In, Ga-Sb, Ga-Sn, Ga-Pb, Ga-Mg, Ga-Bi and Ga-Bi-Sn. Gallium alloys are ideal candidates for flexible electronics as these liquid metals are malleable and conductive. Also, the researchers could manipulate gallium alloys easily without touching them.

## **TECHNOLOGICAL DEVELOPMENTS**

Scientists are concerned that the fundamental technology of electronics has not progressed much for many decades, and mobile phones and computers today are no more powerful than they were five years ago. They are searching for a technology that will allow them to increase the processing power of electronic components.

Some researchers believe that the answer lies in ultra-thin components made by printing with liquid metals. The 2D printing technique can create many layers of incredibly thin electronic chips on the same surface, dramatically increasing the processing power while reducing costs. Using liquid metals to create integrated circuits that are just atoms thick could lead to the next big advance in electronics. The process opens the way for production of large wafers around 1.5 nanometres (nm) in depth; a sheet of paper, by comparison, is 100,000nm thick. Other techniques have proven unreliable in terms of quality, scaling and functioning at very high temperatures (550 degrees or higher). Researchers hope that creating electronic wafers just atoms thick could overcome the limitations of current chip production. It could also help produce materials that are extremely bendable, paving the way for flexible electronics.

### **CONCLUSION:**

Thus the developments of the new electronics are advanced day by day, in order to make cost efficient and user friendlier to consumers. These flexible kinds of wafers or chips will be at higher demand. These are the road to future electronics.

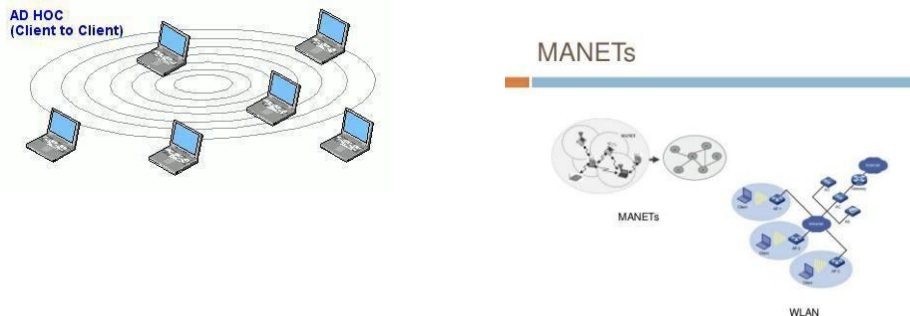
**SNEHA.S**

**II- ECE**

# WIRELESS ACCESS POINT

In computer networking, a wireless access point( WAP),or more generally just access point(AP)is a networking hardware device that allows a WIFIdevice to connect to a wired network. The AP usually connects to a router (via a wired network) as a stand alone device, but it can also be an integral component of the router itself. An AP is differentiated from a HOTSPOT,which is the physical location where WIFI access to a WLAN is available.

Some people confuse wireless access point with ADHOC network.An ADHOC networkuses a connection between two or more devices



without using a wireless access point.ADHOC connections are similar

## Limitations

ADHOC networks are not generally recommended for a permanent installation. The reason is that internet access via ADHOC networks using features like windows' Internet connection sharing\* may work well with a small number of devices that are close to each other,

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## GOOGLE SELF DRIVING BIKE



This self-riding bike could give a boost to the economy because people could also work on their bicycle as like they are working in office, home or car. This e-bike has some incredible features, some accessed through a personalised app. Relying on Google Map algorithms, it can pick you up; it has anti-theft immobilisation and location mechanics, and is powered by an extremely powerful battery. The bicycle runs on wireless phone networks, using Smartphone and GPS technology.

The new arrival from Google on this 1st April can make our life much more comfortable. Yes...Google is introducing the “Google Self Driving Bicycle” actually a fiction. Last year on this day Google released a short video explaining the concept of the self-driving bicycle in Amsterdam, the premier cycling city. The Dutch cycle more than any other nation in the world, almost 900 kilometres per year per person, amounting to over 15 billion kilometres annually. The self-driving bicycle enables safe navigation through the city for Amsterdam residents, and furthers Google’s ambition to improve urban mobility with technology. Google Netherlands takes enormous pride in the fact that a Dutch team worked on this innovation that will have great impact in their home

country. Now it decided to add two additional features. First, people can request the bike to pick them up wherever they are and it developed a "comfort mode," adjusting the pedals to a perfect resting position.

It can be driven to a specific place by sending an SMS text with the location information. Once the coordinates are in place, the bike is on its way, using mounted sensors to navigate around unexpected obstacles on the road. These kinds of inventions make the human life easier than before. Actually the kids will love it more because they will be just free. They can go anywhere they want, any time they want. Damn sure, and it will make us to feel this is the biggest invention since the invention of the bicycle itself.

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# ARTICLE ON IBM WATSON

- **What is IBM Watson?**

IBM Watson is a data analytics processor that uses natural language processing, a technology that analyzes human speech for meaning and syntax. IBM Watson performs analytics on vast repositories of data that it processes to answer human-posed questions, often in a fraction of a second.

- **Why does IBM Watson matter?**

IBM Watson's cognitive and analytical capabilities enable it to respond to human speech, process vast stores of data, and return answers to questions that companies could never solve before. As new data is entered into Watson's data repository, it uses machine learning that is the product of the processing it performs during analytics to continue to increase its knowledge of subject areas, and the insight it is capable of delivering to users.

- **Who does IBM Watson affect?**

IBM Watson is employed in nearly every industry vertical, as well as in specialized application areas such as cybersecurity. This technology is often used by a company's data analytics team, but Watson has become so user friendly that it is also easily used by end users such as physicians or marketers.

- **When is IBM Watson happening?**

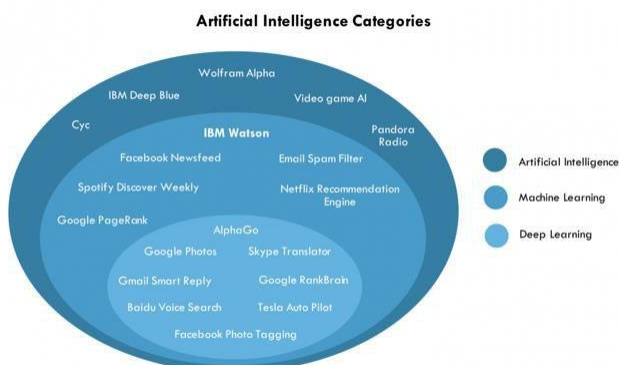
Companies in a host of industries are already running IBM Watson for predictive analytics and problem solving. IBM Watson

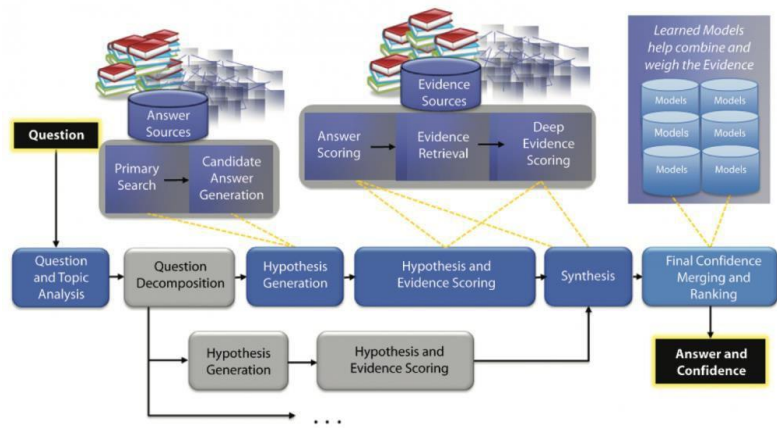
gives them a competitive advantage and helps them return more value to their customers and constituents.

## **IBM's Watson Is Everywhere** **But What Is it?**

To gauge the future of IBM (NYSE:IBM) one needs to understand its cognitive computing platform, Watson. As its core business declines, IBM is counting on Watson to drive growth in new areas such as analytics, healthcare, internet of things, and security. But, what kind of artificial intelligence (AI) is IBM Watson? And, how does it compare to the many deep learning based products entering the market today?

Watson started as a follow-on project to IBM DeepBlue, the computer and AI program that defeated world chess champion Gary Kasparov. DeepBlue demonstrated that a computer could defeat a human in chess, a game with well-defined rules and limited, fully visible solutions. The real world, however, is much more complicated: information often is unstructured, problems ill defined, and solutions probabilistic at best. To equip AI to deal with the real world, IBM challenged its computer and data scientists to create a program that could defeat human contestants at Jeopardy!, a quiz show requiring answers to natural language questions over broad domains of knowledge otherwise known as unstructured data..





Source: IBM

The diagram illustrates Watson’s system architecture. At a high level, it works as follows:

The natural language processing engine, “Question and Topic Analysis,” tries to understand a question by parsing it into words, mapping the relationship between words, and isolating the subject of the question. The parsing system is Slot Grammar, one of the few rules-based algorithms Watson uses.

After Watson interprets the question, it searches its myriad sources for answers, much like Google’s conventional search engine does. Watson can sift through unstructured data, such as Wikipedia and newswires, as well as structured databases and data.

After it generates potential answers, Watson gathers additional evidence. This secondary search surfaces new information that elevates strong answers and eliminates weak ones. Watson then computes a confidence score for each answer based on the supporting evidence.

Finally, IBM Watson selects the answer with the highest confidence score, and is correct 71% of the time.

Important to note, IBM Watson is a massively parallel program, so each stage of the inference process can generate many answer candidates. A single question, for example, can generate 100 answer candidates, each with 100 evidence sources, and each scored by 100 algorithms. Thus, one question can generate a million confidence scores, which must be reduced to a single confidence number. Moving

from a large number of inputs to a small number of outputs is a classification task which Watson calls “Final Confidence Merging and Ranking” and requires the use of classic machine learning.

According to IBM, to conquer the Jeopardy! challenge, the Watson team experimented with a number of machine learning algorithms, among them logistic regression, support vector machines, decision trees, and multi-layered neural networks or deep learning, and selected a logistic regression classifier as the most robust solution.

It’s interesting that IBM tinkered with deep learning for Watson but it didn’t perform well enough to justify inclusion. In the last five years, deep learning has outperformed other machine learning algorithms in a variety of tasks. Why didn’t it do the same for Watson?

### **IBM Watson supercomputer**

Watson is an IBM supercomputer that combines artificial intelligence (AI) and sophisticated analytical software for optimal performance as a “question answering” machine. The supercomputer is named for IBM’s founder, Thomas J. Watson.

The Watson supercomputer processes at a rate of 80 teraflops (trillion floating-point operations per second). To replicate (or surpass) a high-functioning human’s ability to answer questions, Watson accesses 90 servers with a combined data store of over 200 million pages of information, which it processes against six million logic rules. The device and its data are self-contained in a space that could accommodate 10 refrigerators.

Applications for the Watson's underlying cognitive computing technology are almost endless. Because the device can perform text mining and complex analytics on huge volumes of unstructured data, it can support a search engine or an expert system with capabilities far superior to any previously existing. In May 2016, BakerHostetler, a century-old Ohio-based law firm, signed a contract for a legal expert system based on Watson to work with its 50-

human bankruptcy team. ROSS can mine data from about a billion text documents, analyze the information and provide precise responses to complicated questions in less than three seconds. Natural language processing allows the system to translate legalese to respond to the lawyers' questions. ROSS' creators are adding more legal modules; similar expert systems are transforming medical research.

In the practice round, Watson demonstrated a human-like ability for complex wordplay, correctly responding, for example, to “Classic candy bar that’s a female Supreme Court justice” with “What is Baby Ruth Ginsburg?” Rutter noted that although the retrieval of information is “trivial” for Watson and difficult for a human, the human is still better at the complex task of comprehension. Nevertheless, machine learning allows Watson to examine its mistakes against the correct answers to see where it erred and so inform future responses.

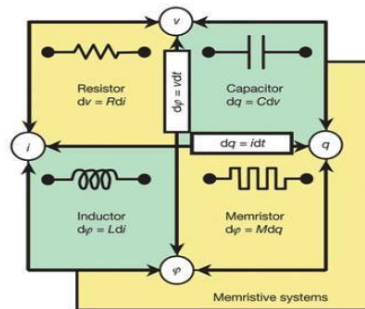
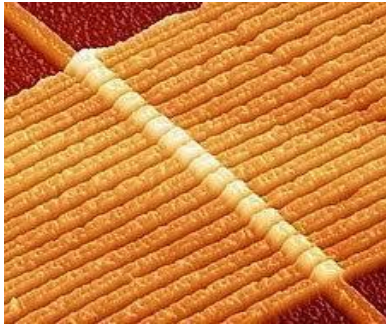
In an interview during the Jeopardy! practice round, an IBM representative evaded the question of whether Watson might be made broadly available through a Web interface. The representative said that the company was currently more interested in vertical applications such as healthcare

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# NOVEL OF MEMRISTOR

In the year 1971, the theory of memristic was developed by professor "Leon Chua". The behavior of the memristor was discovered by an "HP Lab Scientist" while he was trying to find out cross bar switches. Memristor is a switch used to connect several inputs to several outputs in a matrix it is known as Matrix Switch. The practical model of the memristor was advanced by Stanley in the year 2006. The memristor technology was developed several decades ago, but it got invented recently.



## MEMRISTOR

### MEMRISTOR TECHNOLOGY

Until now, to design various electronic circuits, passive elements are used like resistors, capacitors, and inductors, but a fourth important element also occurs which is named as "Memristor". It is a semiconductor that connects a resistor, capacitor, and inductor to make a fourth new type of element whose resistance is named as memristance that differs as a function of flux and current. Memristance is a just charge dependent resistance and the unit of the memristor is the Ohm.

### CONSTRUCTION

A physical memristor comprises a two terminal device on the polarity, magnitude, and also span of time of the voltage applied to it. When the

voltage is switched off, then the resistance leftovers as it did just already it was turned off. This makes this device has a nonlinear , nonvolatile memory device.

### **TYPES OF MEMRISTOR**

There are quite few vectors of review researching various types of memristors. The material execution of a memristor is significant to how they act in a memristive system. There are currently no memristor data sheets available for memristor data sheets available for memristor, as much of the material executions are trying and in progress. In which currently, Hewlett Packard's (HP) type of the Titanium Dioxide substrate memristor is the most common used.

### **BENEFITS**

- Nonvolatile memory, Memristors do not consume power when idle.
- It offers greater resiliency and reliability when power is interrupted.
- It allows for a faster boot up since information is not lost when the device is turned off.

### **APPLICATIONS**

- Logic circuits.
- Neuromorphic systems.
- Digital memory.

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# WORD SEARCH PUZZLE

Find and circle all of the Electronics related terms that are hidden in the grid.

The remaining letters spell the name of a common electronic component

A N A L O G L T I N N I N G R N Y  
R E W O P C A P A C I T O R E O T  
E I E D O R T C E L E R D A D R I  
C P T W G S A H C T E A I M L T C  
N O T M I N T A R V I N O P O C I  
A S A R O R T C A O R S D E S E R  
D I W D E H E C A O T I E R T L T  
E T E I O S U M T T N S O E T E C  
P I N D T U I C R E N T I C I L E  
M V E O M C U S G O A O I R A N L  
I E C T C D H A T L F R C T Y F E  
D P U U N I T E U A C S I F A H S  
A B I O R I L S S U N G N R L L T  
E G C H V R N I I M I C A A L U D  
L I O E C I E T S D H D E E R D X  
I N D U C T A N C E S O C G A T E  
E G A T L O V E T R O T S I S E R

**AMPERE ,ANALOG ,ANODE ,CAPACITOR ,CATHODE ,CELLS ,CHIP ,  
CIRCUIT,CONDUCTOR ,CONTACTS ,SPACER CURRENT ,DIGITAL ,DIODE ,  
ELECTRICITY ,ELECTRODE,ELECTRON ,FARADS ,FLUX ,GATE  
,IMPEDANCE ,INDUCTANCE ,INSULATORS,  
LEAD ,NEGATIVE ,OHMS ,POSITIVE ,POWER ,RESISTANCE ,RESISTOR ,  
SILICON ,SOLDER,  
SWITCHES ,THYRISTOR ,TINNING ,TRANSFORMER ,TRANSISTOR  
,VACUUM TUBE ,VOLTAGE,  
WATT ,WIRE.**

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