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Mission

Moulding young minds to explore & acquire technical knowledge .

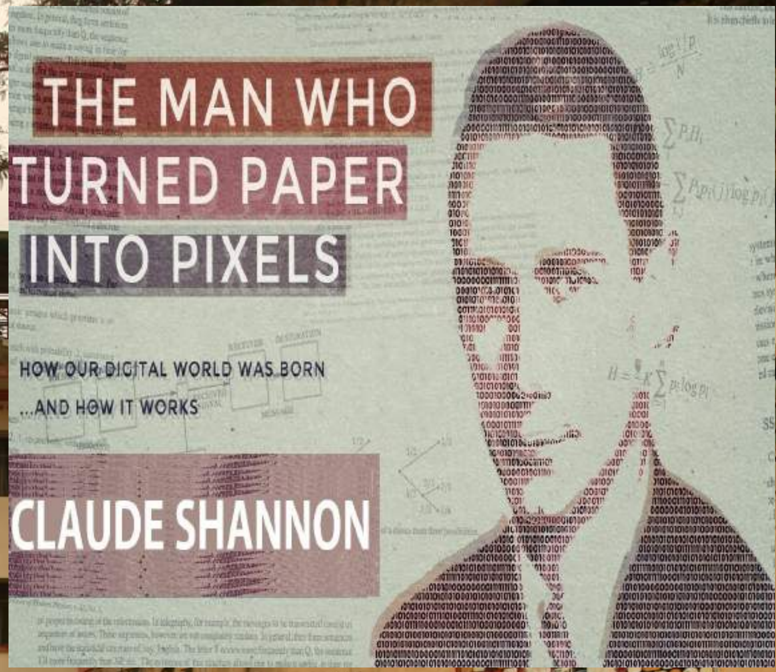
To develop an innovative center for excellence

To impart technical exposure of

Vision

global standard in the field of electronics and communication engineering

To develop intellectual and ethical outlook



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FATHER OF ELECTRONIC COMMUNICATION

According to British filmmaker Adam Westbrook — Shannon is "the most important man you've probably never heard of" and his work impacted the modern world as profoundly as Einstein's did. Claude Elwood Shannon is considered as the founding father of electronic communications age. He is an American mathematical engineer, whose work on technical and engineering problems within the communications industry, laying the groundwork for both the computer industry and telecommunications. After Shannon noticed the similarity between Boolean algebra and the telephone switching circuits, he applied Boolean algebra to electrical systems at the Massachusetts Institute of technology (MIT) in 1940. Later he joined the staff of Bell Telephone Laboratories in 1942. While working at Bell Laboratories, he formulated a theory explaining the communication of information and worked on the problem of most efficiently transmitting information. The mathematical theory of communication was the climax of Shannon's mathematical and engineering investigations. The concept of entropy was an important feature of Shannon's theory, which he demonstrated to be equivalent to a shortage in the information content (a degree of uncertainty) in a message. His contributions are saluted by the world and his work not only helped translate circuit design from an art into a science, but its central tenet .

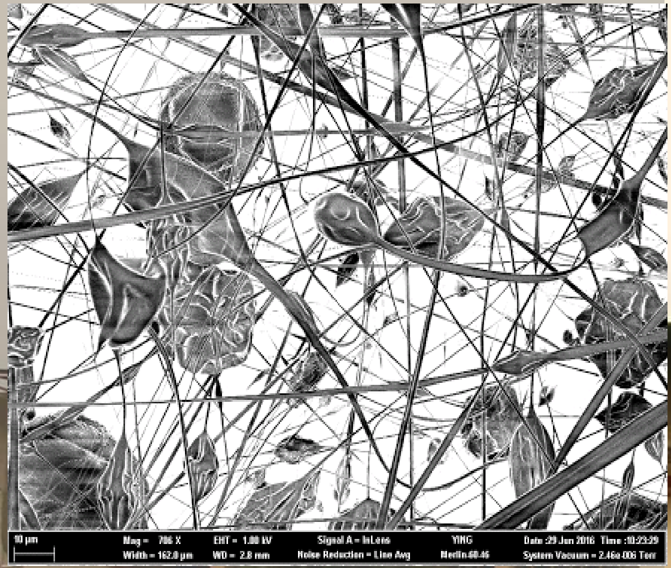
Shannon is first and foremost known as a pioneer of the information age, ever since he demonstrated in his seminal paper "A Mathematical Theory of Communication" (1948) that information could be defined and measured as a scientific notion. The paper gave rise to "information theory," which includes metaphorical applications in very different disciplines, ranging from biology to linguistics via thermodynamics or quantum physics on the one hand, and a technical discipline of mathematical essence, based on crucial concepts like that of channel capacity, on the other. Shannon never showed much enthusiasm for the first kind of informal applications. He focused on the technical aspects and also contributed significantly to other fields such as cryptography, artificial intelligence, and domains where his ideas had their roots and could be readily applied in a strict fashion, that is, telecommunications and coding theory.

CELEBRATION TIME!

Mr. Arun Pradhan (Sr. lecturer), successfully completed his Masters degree (Power Electronics) form SMIT in June 2016. It's a proud moment for our department, heartily congratulations to you sir. We hope to get you valuable knowledge and experiences soon for betterment of our department and college.

NANO-PLASMONICS

The transfer of information within a modern computer employs nanoscale metal wires. But they are restricted in terms of speed due to its resistance. Fiber optics use light to move information faster, but they require the critical dimensions, in size, to be at least half the wavelength of the light (larger than that of current commercial nanoscale electronics).



Plasmonics blend miniaturization and manufacturability with the high speed of optics. A plasmon is a quantum of plasma oscillation. It can be considered as a quasiparticle since it arises from the quantization of plasma oscillations. When light waves interact with electrons on a metal's surface, strong fields with dimensions much lesser than the wavelength of the initial light can be obtained. These plasmons are now free to travel down nanoscale wires or metal gaps. This technique is expected to enable computers to process data very much faster than today's machines. NIST researcher Vladimir Aksyuk believes that the devices could be shortened by a factor of 10(scaling its footprint down by a factor of 100), based on their calculations. And as they get scaled down, more of them can be put on the same chip making practical realization possible.

SPACE EXPOLARATION

Humans have dreamed about spaceflight since antiquity. The Chinese used rockets for ceremonial and military purposes centuries ago, but only in the latter half of the 20th century were rockets developed that were powerful enough to overcome the force of gravity to reach orbital velocities that could open space to human exploration.
As often happens in science, the earliest practical work on rocket engines designed for spaceflight occurred simultaneously during the early 20th century in three countries by three key scientists: in Russia, by Konstantin Tsiolkovski; in the United States, by Robert Goddard; and in Germany, by Hermann Oberth.
In the 1930s and 1940s Nazi Germany saw the possibilities of using long-distance rockets as weapons. Late in World War II, London was attacked by 200-mile-range V-2 missiles, which arched 60 miles high over the English Channel at more than 3,500 miles per hour.
After World War II, the United States and the Soviet Union created their own missile programs. On October 4, 1957, the Soviets launched the first artificial satellite, Sputnik 1, into space. Four years later on April 12, 1961, Russian Lt. Yuri Gagarin became the first human to orbit Earth in Vostok 1. His flight lasted 108 minutes, and Gagarin reached an altitude of 327 kilometers (about 202 miles).
The first U.S. satellite, Explorer 1, went into orbit on January 31, 1958. In 1961 Alan Shepard became the first American to fly into space. On February 20, 1962, John Glenn's historic flight made him the first American to orbit Earth.
"Landing a man on the moon and returning him safely to Earth within a decade" was a national goal set by President John F. Kennedy in 1961. On July 20, 1969, Astronaut Neil Armstrong took "a giant step for mankind" as he stepped onto the moon. Six Apollo missions were made to explore the moon between 1969 and 1972.
During the 1960s unmanned spacecraft photographed and probed the moon before astronauts ever landed. By the early 1970s orbiting communications and navigation satellites were in everyday use, and the Mariner spacecraft was orbiting and mapping the surface of Mars. By the end of the decade, the Voyager spacecraft had sent back detailed images of Jupiter and Saturn, their rings, and their moons.
Skylab, America's first space station, was a human-spaceflight highlight of the 1970s, as was the Apollo Soyuz Test Project, the world's first internationally crewed (American and Russian) space mission.
In the 1980s satellite communications expanded to carry television programs, and people were able to pick up the satellite signals on their home dish antennas. Satellites discovered an ozone hole over Antarctica, pinpointed forest fires, and gave us photographs of the nuclear power-plant disaster at Chernobyl in 1986. Astronomical satellites found new stars and gave us a new view of the center of our galaxy.
In April 1981 the launch of the space shuttle Columbia ushered in a period of reliance on the reusable shuttle for most civilian and military space missions. Twenty-four successful shuttle launches fulfilled many scientific and military requirements until January 1986, when the shuttle Challenger exploded after launch, killing its crew of seven.
The Challenger tragedy led to a reevaluation of America's space program. The new goal was to make certain a suitable launch system was available when satellites were scheduled to fly. Today this is accomplished by having more than one launch method and launch facility available and by designing satellite systems to be compatible with more than one launch system.
The Gulf War proved the value of satellites in modern conflicts. During this war allied forces were able to use their control of the "high ground" of space to achieve a decisive advantage. Satellites were used to provide information on enemy troop formations and movements, early warning of enemy missile attacks, and precise navigation in the featureless desert terrain. The advantages of satellites allowed the coalition forces to quickly bring the war to a conclusion, saving many lives.
Space systems will continue to become more and more integral to homeland defense, weather surveillance, communication, navigation, imaging, and remote sensing for chemicals, fires and other disasters.

EDITIORIALS: THARMEDNRA CHETTRI (LECTURER) STUDENT BODY : PRAVESH ADHIKARI , LIZA PINTSO BHUTIA

THE INTERNET OF THINGS

The “Internet of things” (IoT) is becoming an increasingly growing topic of conversation both in the workplace and outside of it. It’s a concept that not only has the potential to impact how we live but also how we work. But what exactly is the “Internet of things” and what impact is it going to have on you, if any? There are a lot of complexities around the “Internet of things” but I want to stick to the basics. Lots of technical and policy-related conversations are being had but many people are still just trying to grasp the foundation of what the heck these conversations are about
.

Let’s start with understanding a few things.

Broadband Internet is become more widely available, the cost of connecting is decreasing, more devices are being created with Wi-Fi capabilities and sensors built into them, technology costs are going down, and smartphone penetration is sky-rocketing. All of these things are creating a “perfect storm” for the IoT.

So What Is The Internet Of Things?

Simply put, this is the concept of basically connecting any device with an on and off switch to the Internet (and/or to each other). This includes everything from cellphones, coffee makers, washing machines, headphones, lamps, wearable devices and almost anything else you can think of. This also applies to components of machines, for example a jet engine of an airplane or the drill of an oil rig. As I mentioned, if it has an on and off switch then chances are it can be a part of the IoT. The analyst firm Gartner says that by 2020 there will be over 26 billion connected devices… That’s a lot of connections (some even estimate this number to be much higher, over 100 billion). The IoT is a giant network of connected “things” (which also includes people). The relationship will be between people-people, people-things, and things-things.

How Does This Impact You?

The new rule for the future is going to be, “Anything that can be connected, will be connected.” But why on earth would you want so many connected devices talking to each other? There are many examples for what this might look like or what the potential value might be. Say for example you are on your way to a meeting; your car could have access to your calendar and already know the best route to take. If the traffic is heavy your car might send a text to the other party notifying them that you will be late. What if your alarm clock wakes up you at 6 a.m. and then notifies your coffee maker to start brewing coffee for you? What if your office equipment knew when it was running low on supplies and automatically re-ordered more? What if the wearable device you used in the workplace could tell you when and where you were most active and productive and shared that information with other devices that you used while working? On a broader scale, the IoT can be applied to things like transportation networks: “smart cities” which can help us reduce waste and improve efficiency for things such as energy use; this helping us understand and improve how we work and live. Take a look at the visual below to see what something like that can look like.

The reality is that the IoT allows for virtually endless opportunities and connections to take place, many of which we can’t even think of or fully understand the impact of today. It’s not hard to see how and why the IoT is such a hot topic today; it certainly opens the door to a lot of opportunities but also to many challenges. Security is a big issue that is oftentimes brought up. With billions of devices being connected together, what can people do to make sure that their information stays secure? Will someone be able to hack into your toaster and thereby get access to your entire network? The IoT also opens up companies all over the world to more security threats. Then we have the issue of privacy and data sharing. This is a hot-button topic even today, so one can only imagine how the conversation and concerns will escalate when we are talking about many billions of devices being connected. Another issue that many companies specifically are going to be faced with is around the massive amounts of data that all of these devices are going to produce. Companies need to figure out a way to store, track, analyze and make sense of the vast amounts of data that will be generated.

So what now?

Conversations about the IoT are (and have been for several years) taking place all over the world as we seek to understand how this will impact our lives. We are also trying to understand what the many opportunities and challenges are going to be as more and more devices start to join the IoT. For now the best thing that we can do is educate ourselves about what the IoT is and the potential impacts that can be seen on how we work and live.

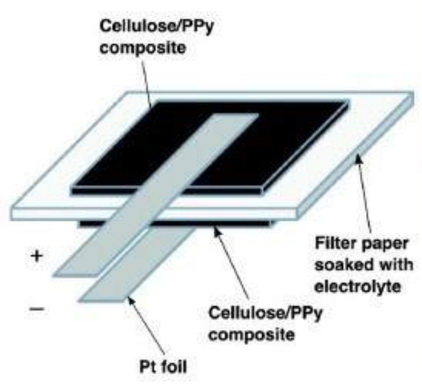
PAPER BATTERY

A paper battery is an ultra-thin, flexible energy storage device that is used as a battery and also as a good capacitor. It is created by combining two things: nano composite paper and nanotubes (nano composite paper made from cellulose and nanotubes made from carbon). Nanocomposite paper is a hybrid energy storage device made of cellulose, which combines the features of super capacitors and batteries. It takes the high-energy storage capacity of the battery and high-energy density of the super capacitor producing the bursts of extreme power.
A carbon nanotube material is a cylinder shaped material, made of carbon. These tubes have different structures that differ in thickness, length, type and number of layers. Carbon nanotubes are characterized into different types based on their structure. They are single walled carbon nanotube, double-walled carbon nanotube, triple-walled carbon nanotube and multi-wall carbon nanotube.

Paper Battery= Paper (Cellulose) + Carbon Nanotubes

This combination permits the battery to provide both long term, bursts of energy, steady power and production. Paper batteries have the potential to power the next generation of medical devices, electronics and hybrid vehicles. Paper batteries can be folded, twisted, molded, crumpled, shaped and cut for various applications without any loss of efficiency.

Paper Battery Properties:
Paper battery properties are mainly attributed to the properties of its parts such as cellulose and carbon nanotubes.
The properties of Cellulose include high-tensile strength, biodegradability, low-shear Strength, biocompatibility, good absorption capacity and excellent Porosity, non-toxic, reusableness & recyclability.
The properties of Carbon Nanotubes are the ratio of width: Length (which is 1:107) high-tensile Strength (which is Greater than Steel) high packing density and low mass density, Lightness, Flexibility, Electrical Conductivity (which is better than Silicon) Low resistance (~33 ohm per square inch) and thickness is typically about 0.5 to 0.7mm



Construction of a Paper Battery:
A paper battery construction involves the following components:

- Cathode: Carbon Nanotube (CNT)
- Anode: Lithium metal (Li+)
- Electrolyte: All electrolytes (including bio Electrolytes like sweat, blood and urine)
- Separator: Paper (Cellulose)

Construction of a paper battery mainly includes these steps:

- Step 1: Black carbon ink is applied on a cellulose-based paper.
- Step2: Black carbon ink is being spread on a paper spread on the paper.
- Step3: A thin lithium film is laminated over the exposed cellulose surface.
- Step4:The cellulose paper is heated at 80^{0}C for 5 minutes.
- Step5: Next, the film is peeled off from the substrate
- Step6: The film acts as electrodes of the paper battery. One film is connected to the electrolyte LTO (Li4Ti5012) and another film is pasted to the electrolyte LCO (LiCo02).

Step7: Next, Connect a LED on both the ends of the battery and check its functionality.

EARLY SATELLITES

The first artificial satellite was Sputnik 1, launched by the Soviet Union on October 4, 1957, and initiating the Soviet Sputnik program, with Sergei Korolev as chief designer (there is a crater on the lunar far side which bears his name). This in turn triggered the Space Race between the Soviet Union and the United States.

Sputnik 1 helped to identify the density of high atmospheric layers through measurement of its orbital change and provided data on radio-signal distribution in the ionosphere. The unanticipated announcement of *Sputnik 1*'s success precipitated the Sputnik crisis in the United States and ignited the so-called Space Race within the Cold War.

Sputnik 2 was launched on November 3, 1957 and carried the first living passenger into orbit, a dog named Laika.[10]

In May, 1946, Project RAND had released the Preliminary Design of an Experimental World-Circling Spaceship, which stated, "A satellite vehicle with appropriate instrumentation can be expected to be one of the most potent scientific tools of the Twentieth Century."[11] The United States had been considering launching orbital satellites since 1945 under the Bureau of Aeronautics of the United States Navy. The United States Air Force's Project RAND eventually released the above report, but did not believe that the satellite was a potential military weapon; rather, they considered it to be a tool for science, politics, and propaganda. In 1954, the Secretary of Defense stated, "I know of no American satellite program."[12] In February 1954 Project RAND released "Scientific Uses for a Satellite Vehicle," written by R.R. Carhart.[13] This expanded on potential scientific uses for satellite vehicles and was followed in June 1955 with "The Scientific Use of an Artificial Satellite," by H.K. Kallmann and W.W. Kellogg.[14]