

**LBS INSTITUTE OF TECHNOLOGY FOR WOMEN, POOJAPURA
TRIVANDRUM**

**DEPARTMENT OF ELECTRONICS AND
COMMUNICATION**

E-ZINE

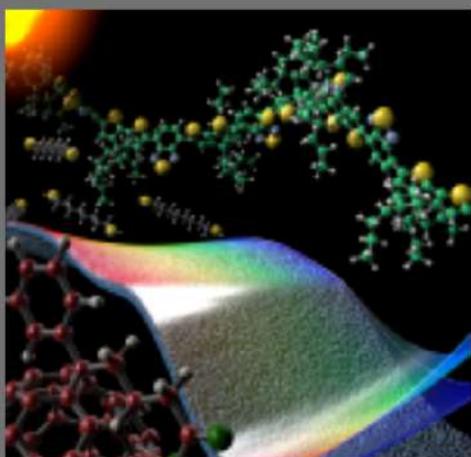
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	1.	Organic Electronics	Gowri N. S.
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ORGANIC ELECTRONICS



Global “Organic Electronics Market” study report examines the market’s top possibilities and gives a concise rundown of the elements that are driving and will continue to drive the development of the sector. While predicting the general development of the worldwide Organic Electronics market from 2023 to 2029, this article, also digs into historical growth trends, growth drivers, and current and upcoming trends.



Organic electronics is a field of materials science concerning the design, synthesis, characterization, and application of organic molecules or polymers that show desirable electronic properties such as conductivity.



“The organic electronics market revenue by the end of 2022 was US\$ 96.5 Bn. The organic electronics market is expected to reach US\$ 1,705.5 Bn by 2029, as it is estimated to grow at a CAGR of 29.5% for 2023-2029.”

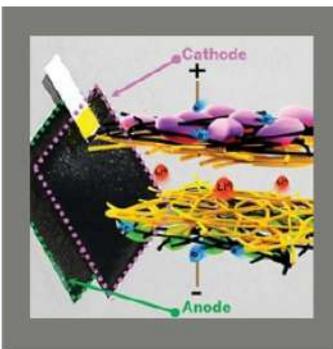
One of the promised benefits of organic electronics is their potential low cost compared to traditional electronics. Attractive properties of polymeric conductors include their electrical conductivity (which can be varied by the concentrations of dopants) and comparatively high mechanical flexibility. Challenges to the implementation of organic electronic materials are their inferior thermal stability, high cost, and diverse fabrication issues.

PAPER BATTERY



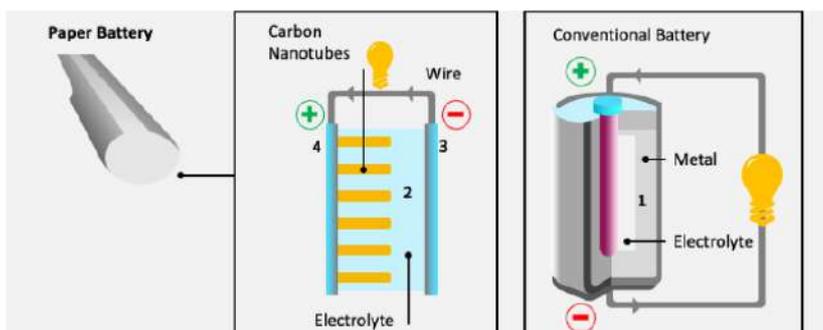
PAPER BATTERIES ARE BETTER FOR THE ENVIRONMENT THAN THE MODERN BATTERIES.

The modern batteries all use chemical build-up to produce electricity, but paper batteries do not use at all. So they do not create E-WASTE.



It is a flexible, ultra-thin energy storage and production device formed by combining carbon nanotube with a conventional sheet of cellulose based paper. It acts as both a high energy battery and super capacitor, combining two components that are separate in additional electronics.

The paper batteries are Non-toxic and hence can be used to power pacemakers and RF tags. There is no moisture present in the electrolyte, thus there's nothing in the batteries to freeze or evaporate, potentially allowing operation in extreme temperatures.



A paper battery is an electric battery that was designed to utilize a spacer shaped generally of cellulose - the significant constituent of paper.

The Energy Kite: Innovation to harness maximum wind power



If you associate kites with your childhood, it might be time to re-think the concept. A California-based company has developed a self-flying energy kite that may be the answer to tapping into increasing wind power around the world.

CNN Business recently interviewed Makani about technology they have developed that can harness the most powerful winds in the middle of the ocean, too far for offshore turbines to reach. Their autonomous kite looks like an airplane tethered to a base, installed on a floating platform in water. Tests are currently underway off the coast of Norway.

Currently only 6 per cent of the world's energy comes from wind power. Makani intends to use the energy kite to generate utility-scale power to electrify communities around the world.

Energy kites use a wing tethered to a ground station to efficiently harness energy from the wind. As the kite flies autonomously in loops, rotors on the wing spin as the wind moves through them, generating electricity that is sent down the tether to the grid.

In an interview with Rachel Crane, CNN's innovation correspondent, Makani CEO Fort Felker said: "There are many areas around the world that really don't have a good resource for renewable power but do have offshore wind resources, our lightweight kites create the possibility that we could tap that resource very economically and bring renewable power to hundreds of millions of people."

The CNN report further mentions that the technology is more cost-efficient than a traditional wind turbine and less labour intensive.

The kite is super lightweight as it's made of carbon fiber. It has an 85-foot wingspan, is launched from a base station and is constrained by a 1,400-foot tether as it flies autonomously in circles with guidance from computers. Crosswinds spin the kite's eight rotors to move a generator that produces electricity that's sent back to the grid through the tether.

The concept behind the kite power cycle is called the "yo-yo principle". Energy generated by the Airborne Wind Energy System can be fed into the grid, stored in batteries, or directly consumed. The power kite can land for maintenance or before forecasted weather extremes. Once it docks to the launch and landing mast, it is lowered to the ground, where it can be unmounted and stowed in a safe place.



5G

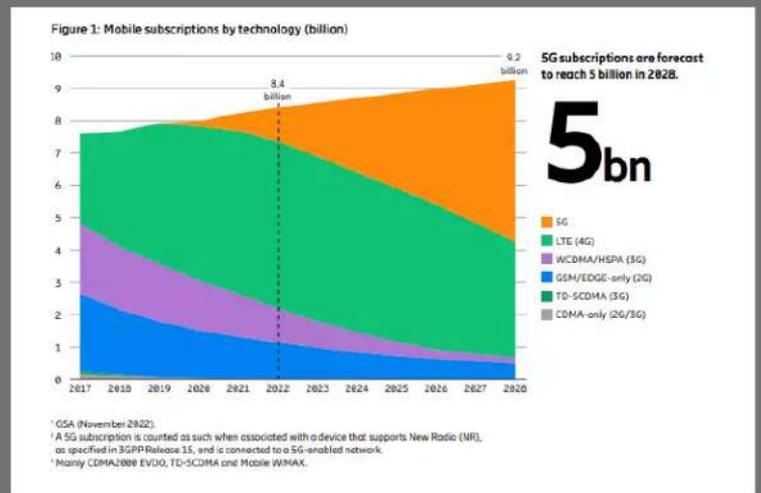


IN TELECOMMUNICATIONS, 5G IS THE FIFTH-GENERATION TECHNOLOGY STANDARD FOR BROADBAND CELLULAR NETWORKS, WHICH CELLULAR PHONE COMPANIES BEGAN DEPLOYING WORLDWIDE IN 2019, AND IS THE PLANNED SUCCESSOR TO THE 4G NETWORKS WHICH PROVIDE CONNECTIVITY TO MOST CURRENT CELLPHONES.

"5G is the network on top of which a 'real' virtual reality can and will be built"



ACCORDING TO INTERNATIONAL DATA CORP. (IDC), THE NUMBER OF 5G SMARTPHONES SHIPPED IN THE U.S. WILL HIT 118.1 MILLION UNITS BY THE END OF 2022, UP FROM 92.8 MILLION SHIPPED IN 2021. IDC FORECASTS THAT BY 2026, 161.2 MILLION 5G SMARTPHONE UNITS WILL SHIP IN THE U.S



5G HAS BECOME A GLOBAL PHENOMENON WITH THE 5TH GENERATION MOBILE NETWORKS NOW LIVE IN OVER 2400 COUNTRIES. ITS HIGH SPEED, HIGH BANDWIDTH LOW LATENCY, AND RELIABILITY PROMISE TO DRIVE SEVERAL NEW USE CASES IN BOTH THE CONSUMER AND ENTERPRISE SEGMENTS, WHICH WERE NOT POSSIBLE EARLIER WITH 4G.

IOT



>>> INTERNET OF THINGS(IOT)

IoT devices are the non-standard computing devices that connect wirelessly to a network and have the ability to transmit data, such as the many things on the internet of things. IoT devices include computer devices, software, wireless sensors, and actuators. These IoT devices are connected over the internet and enabling the data transfer among objects or people automating without human intervention.

HISTORY



IoT is a relatively recent innovation but the concept can be traced back to early 80's.

In 1982, computer science grad students at the Carnegie Mellon University had connected a coca cola vending machine to the internet. The programmers coded an application that would check the availability and temperature of the drink.



PAVING THE WAY FOR THE FUTURE OF IOT

The internet of things was a common topic used by the media at the beginning of the 21st century with several major developments paving the way for the future of IoT. LG electronics introduced the world's first refrigerator connected to the internet in 2000. Allowing consumers do their food shopping online and make video calls. This invention was followed by a small rabbit shaped robot in 2005 that could report the latest news, weather forecast and stock market exchange.



Bioelectronics



About

Bioelectronics is a multidisciplinary field which integrates biology and electronics for diagnostic and therapeutic healthcare treatments. The regulatory activities of the nervous system can be monitored and controlled with bioelectronic technologies that affect specific molecular processes neural signaling. Bioelectronic medicine manages a broad spectrum of diseases and disabilities, such as blindness, cardiovascular disease, diabetes, inflammatory and neurodegenerative diseases, and paralysis.



Principle

Bioelectronics establish the connection between electronic device and the biological body and enable the device to capture and detect physiological signals, so that the biological condition of the biological body can be detected and evaluated.

Bioelectronic devices function by stimulating, regulating, or even blocking specific electronic communication signals between the brain and bodily functions for personalized medical treatment. Common bioelectronic devices include cardiac pacemakers that modulate heart rate and robotic prostheses that emulate human movement. Biosensors, such as blood glucose monitors, detect enzymes, pathogens, or toxic substances.

RASPBERRY PI

"The world is your PI with
a Raspberry

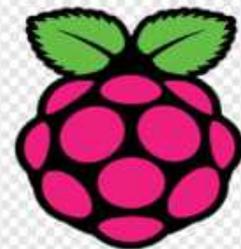


All over the world, people use the Raspberry Pi to learn programming skills, build hardware projects, do home automation, implement Kubernetes clusters and Edge computing, and even use them in industrial applications

About

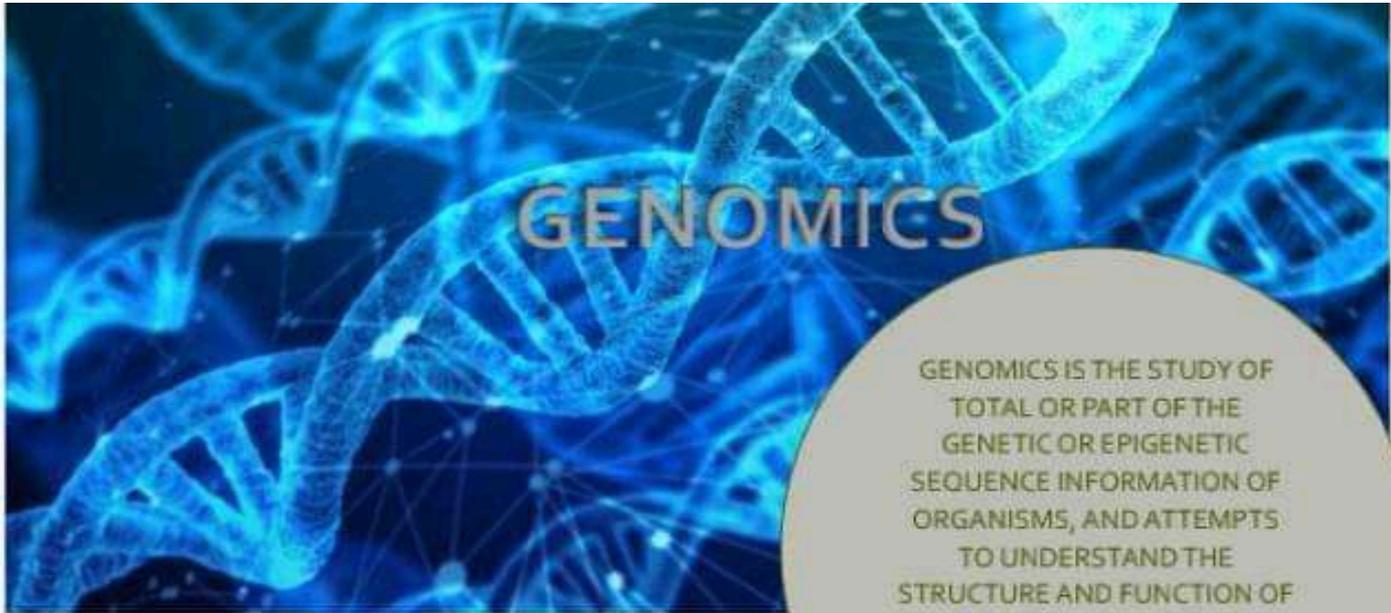
Raspberry Pi is a series of small single-board computers (SBCs) developed in the United Kingdom by the Raspberry Pi Foundation in association with Broadcom. The Raspberry Pi project originally leaned towards the promotion of teaching basic computer science in schools. The original model became more popular than anticipated, selling outside its target market for uses such as robotics. It is widely used in many areas, such as for weather monitoring, because of its low cost, modularity, and open design. It is typically used by computer and electronic hobbyists, due to its adoption of the HDMI and USB standards.

SPECIFICATIONS



RaspberryPi

This product's key features include a high-performance 64-bit quad-core processor, dual-display support at resolutions up to 4K via a pair of micro-HDMI ports, hardware video decode at up to 4Kp60, up to 4GB of RAM, dual-band 2.4/5.0 GHz wireless LAN, Bluetooth 5.0, Gigabit Ethernet, USB 3.0, and PoE capability



GENOMICS IS THE STUDY OF TOTAL OR PART OF THE GENETIC OR EPIGENETIC SEQUENCE INFORMATION OF ORGANISMS, AND ATTEMPTS TO UNDERSTAND THE STRUCTURE AND FUNCTION OF THE SEQUENCES AND OF DOWNSTREAM BIOLOGICAL PRODUCTS.

New CRISPR tool for editing RNA:

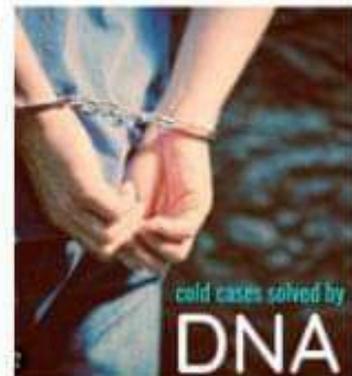
Researchers at the Broad Institute of MIT and Harvard have developed a new CRISPR-based tool called REPAIR that can edit RNA, the intermediate step between DNA and proteins. This new tool could be used to treat diseases caused by RNA mutations, including some forms of cancer and genetic disorders.



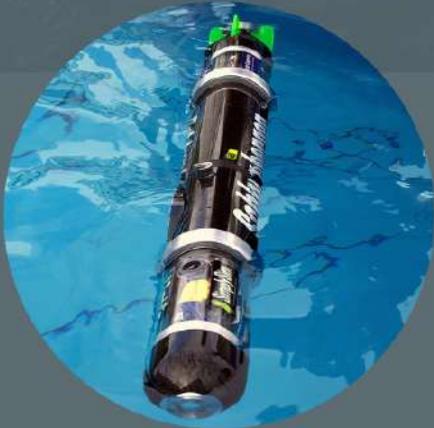
Advances in gene therapy for sickle cell disease:

Researchers at the National Institutes of Health (NIH) have reported promising results in a gene therapy trial for sickle cell disease, a genetic disorder that affects the shape of red blood cells. The therapy involves using a modified virus to deliver a functional copy of the gene that causes the disease. Patients who received the treatment showed an increase in the production of normal red blood cells, reducing the need for blood transfusions.

DNA testing used to solve cold case: DNA testing has been used to solve a 1985 murder case in Oklahoma. Investigators used genetic genealogy to identify a suspect, who was subsequently arrested and charged with the crime. Genetic genealogy involves using DNA from a crime scene to identify relatives of the suspect, and then building a family tree to narrow down the list of potential suspects.



AUTONOMOUS UNDERWATER VEHICLE



BLACKGHOST AUV

The blackghost AUV is designed to undertake an underwater assault autonomously with no outside control. This weighs about 7kg and is 1.1m long. A 1GHz computer, batteries, cameras and motors are crammed inside the 80mm diameter hull, which has been designed to deploy an ice bore hole for future scientific missions.

An autonomous underwater vehicle (AUV) is a robot that travels underwater without requiring continuous input from an operator. AUV's constitute part of a larger group of undersea systems known as unmanned underwater vehicles, a classification that includes non-autonomous remotely operated underwater vehicles (ROV's) - controlled and powered from the surface by an operator/pilot via an umbilical or using remote control. In military applications an AUV is more often referred to an unmanned undersea vehicle (UUV). underwater gliders are a subclass of AUV's.

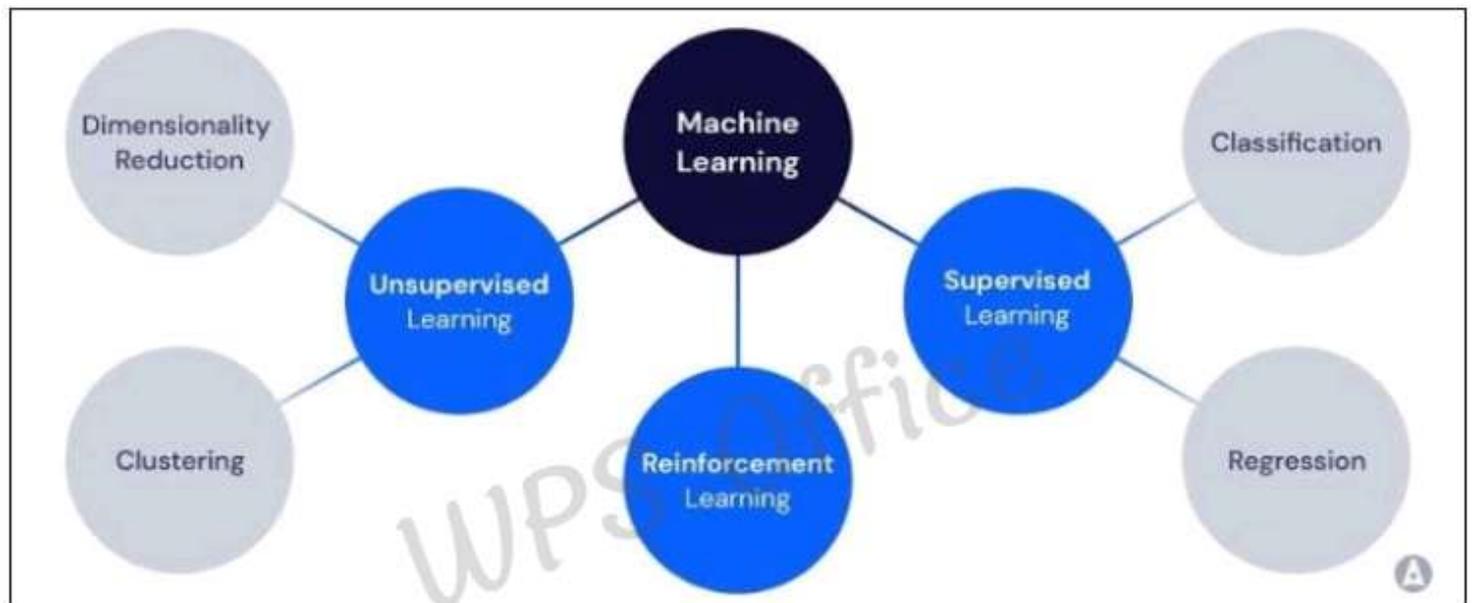


PLUTOPLUS AUV

Plutoplus AUV for underwater mine identification and destruction. From Norwegian minehunter KNM Hinnøy. The vehicle is battery operated, has maximum speed of 6kt and an endurance of 2-6 hours. It's ability to be fitted with a wireless link makes it suitable for counter-terrorism purposes. It's UUV family is developed and built by the company Gaymarine Srl in Lomazzo. The Columbia group is the exclusive licensee for fabrication of the plutoplus in the United States.

MACHINE LEARNING

Machine learning (ML) is a type of artificial intelligence (AI) that allows software applications to become more accurate at predicting outcome without being explicitly programmed to do so. Machine learning algorithms use historical data as input to predict new output values.



The three machine learning types are supervised, unsupervised, and reinforcement learning .



Although machine learning is continuously evolving with so many new technologies, it is still used in various industries.

Machine learning is important because it gives enterprises a view of trends in customer behavior and operational business patterns, as well as supports the development of new products. Many of today's leading companies, such as Facebook, Google, and Uber, make machine learning a central part of their operations. Machine learning has become a significant competitive differentiator for many companies.

VISION AND MISSION OF THE INSTITUTION

VISION OF THE INSTITUTE

To be a centre of academic Excellence empowering women in the technical domain.

MISSION OF THE INSTITUTE

Imparting value based technical education to young women transforming them to professionals excelling globally in academics, research and development and industry meeting social challenges

VISION OF THE DEPARTMENT

To become the centre of electronics communication and instrumentation and computer engineering to facilitate professional education and research keeping higher level of value systems

MISSION OF THE DEPARTMENT

M1: To transform young women to high quality engineers, entrepreneurs and researchers with ethical values.

M2: To contribute creative engineering solutions to industry by keeping pace with latest technological advancements

M3: To provide intellectual services to the society by application of electronics communication and instrumentation and computer engineering.