GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

The science of today is the technology of tomorrow – Edward Teller

ELCTRO SPECTRUM 2021

VOLUME 6

Department Vision

Produce competitive engineers instilled with ethical and social responsibilities to deal with the technological challenges in the field of Electronics and Communication Engineering.

Department Mission

- Facilitate a value-based educational environment that provides updated technical knowledge.
- Provide opportunities for developing creative, innovative and leadership skills.
- Imbue technological and managerial capabilities for a successful career and lifelong learning.

Program Educational Objectives

After successful completion of the program, the graduates will be able to:

- PEO-1: Analyze and apply the knowledge of Mathematics, Science, and Engineering concepts for solving Electronics and Communication Engineering problems.
- PEO-2: Solve complex problems in Electronics and Communication Engineering and its allied areas to attain optimum solutions.
- PEO-3: Excel in chosen career by exhibiting life skills and professional ethics in multidisciplinary fields through continuous learning and research.

Program Specific Outcomes

Engineering Graduates will be able to:

- PSO-1: Acquire knowledge required for designing Electronics and Communication systems.
- PSO-2: Design, simulate and implement essential modules in the areas of Electronic circuits, VLSI, Embedded systems, Communication and Signal processing.

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PRINCIPAL'S MESSAGE

Prof (Dr.) RK Goswami

Principal, GVPCEW

It gives me immense pleasure in conveying my best wishes to the Department of Electronics and Communication Engineering for bringing out the technical magazine "Electrospectrum" in a timely manner and thereby providing the students and faculty a common platform to share and display their ideas including creative talents. It is important to note that the holistic development of the students goes beyond classroom teaching or any structured/ formal education and therefore bringing out the magazine Electrospectrum is an honest attempt in this direction, which will help students not only to grow but also to realize their true potential. The creativity, self-expression, learning experiences and writing skills which assumes high importance in today's era of competition are evident in the articles of the magazine.

I am sure that the Electrospectrum will be able to generate the enthusiasm, ignite the minds of the readers and inspire passion among the students and faculty members of the ECE Department, as it brings out various technical and analytical skills of the students to fore, for which all contributors and students deserve congratulations. I hope other students will also feel inspired and motivated to build up their writing and presentation skills. I wish all students to excel in their respective chosen fields, reach the pinnacle of their career and ensure that the flag of the college always flies high.

I complement the editorial team and all those who have been involved in bringing out the magazine for putting in their excellent and valuable work undertaken with full dedication.

Thank You and Jai Hind

Editorial message

Dear readers

It gives us immense joy and satisfaction to finally re introduce our very own e-magazine ELECTRO SPECTRUM – 2021, we have made sure that you enjoy reading the magazine and relish the experience. I hope that reading this magazine will have an impact on and encourage you to have an impact on others .we may never know how much our words or actions influence the lives of those around us.

This is the key motivation behind the launch of this magazine. Gayatri Vidya Parishad College of Engineering for Women was established in 2008 with the primary objective of enhancing quality education and vocational skills amongst women.

Finally, we urge our readers to send in their valuable suggestions to help us improve their reading experience and also make sure send in your articles which we will be more than happy to publish.

Dear students', learning is a continuous activity throughout our lives. We observe, dream, imitate and try to rediscover the things present around us through our learning. College is a place which transforms our dreams and aspirations into reality. We sincerely hope that the student fraternity receives the first issue enthusiastically and motivate us with their articles for the forthcoming issues.

We wish you a pleasant reading....

Cover story

The Importance of Low IQ in Energy-Harvesting System

Introduction:

Energy-harvesting-based wireless sensor networks (WSNs) are the result of enabling WSN nodes with the ability of extracting energy from the surrounding environment. There's no one single wireless technology or standard on which WSN works. However, numerous wireless standards help in the success of WSN systems. The most popular among these are Bluetooth, ultrawideband (UWB), and Zigbee wireless standards as per IEEE 802.15.4.

Fig:https://tse2.mm.bing.net/th?id=OIP.DWnTUMpEnDTG4bVnn94CHgHaD4&pid=Api&P=0&w=304&h=159

What is a WSN?

The main component in any WSN network is a WSN transceiver. The transceiver houses both the RF transmitter and RF receiver. The WSN transceiver complies with any of the WSN wireless standards, one of them being IEEE 802.15.4

Low I_Q PMICs

Power-management ICs (PMICs) usually integrate many of the following: low-dropout regulators (LDOs), dc-dc regulators, sequencers, load switches, supervisors, IoA PMIC needs to handle loads spanning from microamps to hundreds of milliamps and must be able to distribute power to devices employed in an energy-harvesting system. The PMIC will provide efficient system management for loads ranging from fractions of a microamp to a few hundred milliamps. It will typically operate over a 2.2- to 5-V input range.

Sleep Mode

If an energy-harvesting network becomes overly active, excess nodes must be kept in a sleep mode until it's necessary for coverage and connectivity, especially in the event of failures in other neighboring system nodes. Some energy-harvesting systems can draw all of their power from the surrounding environment, typically from either light or vibrational energy. Such devices could serve as platforms for running environmental or other types of sensors in remote locations.

Nanopower

Nanopower applications can make the best use of energy harvesting as their prime power source. Applications include smart homes, smart thermostats, smart locks, smart doors and windows, and even fitness bands, sports watches, and activity trackers.

Hard-to-reach remote applications will really benefit from energy harvesting.

Instead of sending out a technician every month or year to replace batteries, these types of applications will now run without a battery and virtually last forever. Most energy-harvesting components, like solar panels or piezoelectric devices, can produce only a few milliwatts (one-thousandth of a watt) or even microwatts (one-millionth of a watt) every hour. Even though small, such amounts, when banked, can power small systems due to recent improvements in lower-powered microcontrollers and transmitters. Using such self-powering systems, sensor networks could be set up where it wasn't formerly feasible to do so in the past, due to the inability to deliver power (by replacing batteries or running a power line) to the sensors.

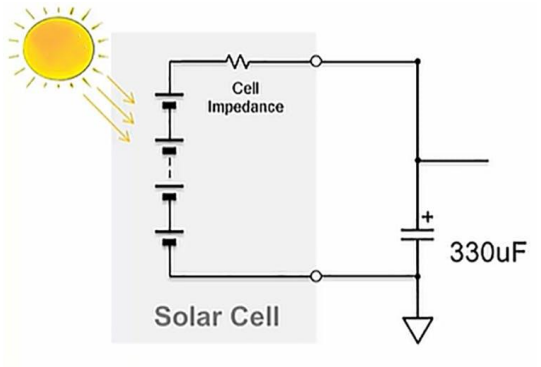
Even implantable medical devices in the human body can use energy-harvesting techniques. These kinds of applications run at low data rates and low duty cycles while running on nano average power.

Sources such as light, electromagnetic (EM) waves, vibrations on bridges, or even the heat generated by the human body, are viable energy sources. Light produces the most power per unit area by far. Solar-harvesting applications can sometimes use a low-I_Q buck converter in the design as well.

Solar-Power Energy Harvesting

So, how can designers use solar energy to transmit via a radio?

If we have solar cells receiving sunlight and they're arranged in series to create a higher voltage, we still will not have enough energy in those cells. The solution is to store that energy in something like a capacitor. In this way, we can now use a nanopower, low-I_Q, buck dc-dc converter to create a core rail needed to power a radio IC *(see figure)*.



Solar energy is harvested, stored in a capacitor, and then fed into a low quiescent-current buck converter.

Wireless Switch Using Energy Harvesting

The switch in this design is built like a linear dynamo and will transform its mechanical energy into electrical energy. This electrical energy is optimally harvested. Since the switch is wireless and cableless, it increases the flexibility and uptime when mechanical vibration or a chemically aggressive environment might render wires impractical.

Kinetic energy is the energy generated via the motion of an object. In this case, the object is a magnet in the switch that moves back and forth inside a coil. It changes the magnetic field and induces a voltage in that coil. This principle is well known as electromagnetic induction, or Faraday's law.

Energy-harvesting switches are quite suitable when lower maintenance and installation costs, increased flexibility, and system uptime are needed and when wiring would be impractical. These switches are a potential solution particularly in explosive-proof applications. That's because their inherent low-power operating characteristics enable the design to avoid the usage of intrinsically safe barriers, encapsulation, or other costly protection methods.

This kind of design targets applications that require on-off signals for machine start and stop control, presence and position sensing, counting, alarm signaling, and other desired digital inputs.

In this example, a buck converter regulates the rectified and doubled signal coming from the switch, feeding the output voltage to a 32-bit Arm Cortex-M3 multiprotocol, 2.4-GHz wireless MCU with 128 kB of flash. A voltage doubler is used at the input of the buck converter to charge capacitors from the switch output voltage and switch these charges in such a manner whereby exactly twice the voltage is produced at the output than that the input. All of these devices consume very low I_Q.

Summary

Engineers have harvested energy for hundreds of years, first with water and windmills, then hydroelectric dams, solar panels, and geothermal plants. Now, in today's advanced electronics environment, engineers can use tiny solar panels and thermoelectric generators to access power from seemingly insignificant temperature differences—piezoelectric devices that convert small mechanical vibrations into power to create electricity.

The amount of power can be small—measured in microwatts—and the devices don't usually generate power 24/7. But the ambient energy sources they use, including light, heat differentials, vibrating beams, transmitted RF signals, and others, provide that small amount of power for free. Low quiescent currents help make this possible.

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Faculty article

Internet of Nano Things

Ms. Ch. SIRISHA

The internet of nano-things (IoNT) is a network that connects a collection of very small devices to transport data. In IoNT, devices present inside it are miniaturised and small enough to be classified as nanoscale. This scale ranges from .1 to 100 nanometers (a nanometer is one billionth of a metre). For highly specialized applications, we can use various nanotechnologies included within an IoNT system. In a smart factory one can monitor temperature, humidity, gaseous pollutants, water quality, and possible carbon emissions from exhaust systems using IoNT devices. Vehicles connected with miniaturized sensors can exchange data such as environmental or spatial data. This data will improve the safety and accuracy of vehicle-assistance systems.

The connectivity of nanosensors and nanodevices with the Internet has resulted in the development of an IoT-based next-generation standard known as "Internet of Nano Things" (IoNT). It includes a combination of nano machines connected via internet. So let's take a look what the term nano machine meant.

Nano Machines

The ultimate end result generated using nanotechnology techniques for miniaturization and manufacture of devices is "nano-machine". An organized set of molecules results a nano-machine that can perform simple computational, sensing, and desired activities. We can also utilize nanomachines as a foundation for the creation of nanobots, nano-processors, nano-memory, and nano-clocks.

The below diagram shows how the concept of nano machines came into existence. Now let's take a look at nano machines architecture.

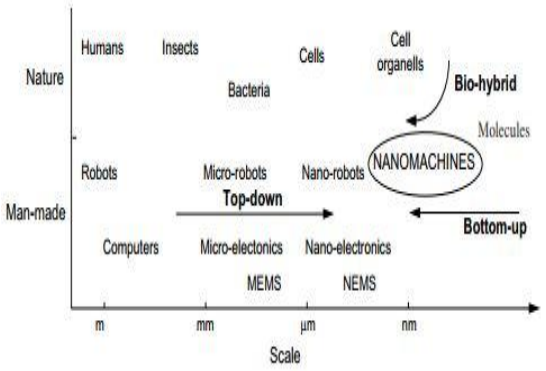

Fig: Development of nano machines

Nano-Machine Architecture

A nano machine includes following components:

1. **Control Unit:** The control unit acts as the machine's nano-heart and central nervous system. It executes all the instructions necessary to complete the required task. It also serves as a storage unit for all data saved by the nano-machine which the users can access.
2. **Communication Unit:** This unit is responsible for sending and receiving data at the nanoscale.
3. **Reproduction Unit:** The reproduction unit fabricates each component of the nano-machine from external elements and efficiently assembles them to form the nano-machine.
4. **Power Unit:** The Power Unit is in charge of providing power to all of the nanomachine's components. It gathers energy from a variety of external sources such as temperature, light, etc. to prepare for the next task of consumption and distribution.

5. **Sensors and Actuators:** Sensors and Actuators serve as a link between the nanomachine and the outside world. Sensors used in nanomachines include temperature, chemical, clamps, motor sensors,etc.

Nano Communication

Nano-machines communication is classified into two types:

1. Electromagnetic waves communication
2. Molecular communication

Electromagnetic waves (EM) communication

Electromagnetic waves (EM) communication is the most frequent method of interconnecting microelectronic devices. These waves can travel via wires or air with negligible losses. However, because nanomachines are so small, connecting a huge number of them is impossible. We can build Nano-scale antennas for very high frequency co-channeling to achieve bidirectional wireless communication.

Because of their size and current complexity, transceivers are currently difficult to integrate into nanomachines. The nano-output transceiver's power will be insufficient to establish a bidirectional communication link. Information transmission may take place from a microdevice to a nanomachine through electromagnetic communication. But not from nanomachines to microdevices or among nanomachines.

Molecular communication

The most promising method for nano-networking is molecular communication. Information is encoded onto information molecules by Sender Nano devices (e.g. DNA, proteins). We can convey the information within a DNA component. Ability to build communication systems and networks from natural biological components and processes.

In molecular Nano networks, routing at the micro gateway is query based.

The transmitter node, the receiver node, the messages, the carrier and the medium are the five different components.

Network Architecture of Internet of Nano Things

The Internet of Nano Things (IoNT) is gaining traction in a number of domains. The following components are the most important parts of the Internet of Nano Things Architecture, regardless of the application areas:

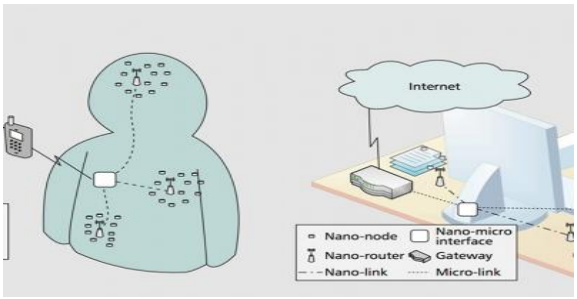

Fig: Typical Architecture and Common Components making up Internet of Nano Things (IoNT)

1. Nano-Nodes: Nano-nodes are the tiniest and simplest nano devices that perform functions such as processing and data transfer over short distances while having limited memory. Biological sensors embedded in the human body are referred to as Nano-Nodes in Body Sensor Networks.
2. Nano-Routers: In comparison to nano nodes, nano-routers have a lot of computing capacity and operate as aggregators of data from nano-nodes. Nano-routers are also important for controlling nano-nodes through the exchange of control commands.
3. Nano-Micro Interface Devices: These devices collect data from nano-routers and transmit it to the microscale and back. They function as hybrid devices, allowing them to communicate at the nanoscale using nano communication techniques

as well as with traditional communication networks utilising regular network protocols.

4. The gateway allows for remote control of the entire nanothings network through the Internet. Consider the Body Sensor Network: With the deployment of a Gateway, all sensor data from the human body may be accessible by doctors from anywhere in the world over the Internet.

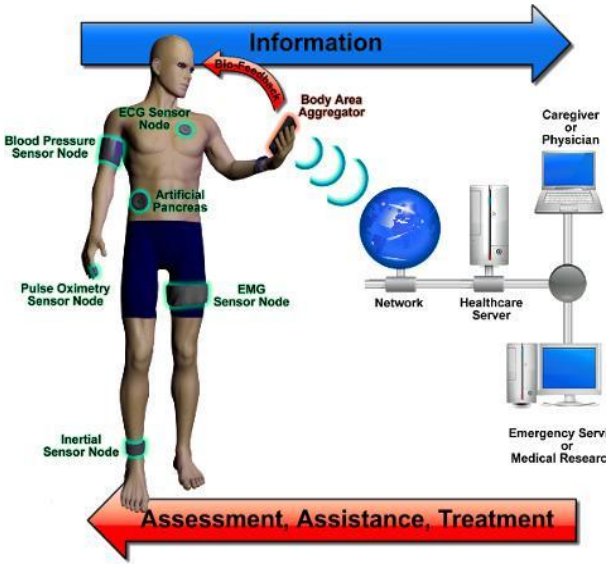

Fig: Use of Internet of nano things in medical

Applications of Internet of Nano things:

- **Healthcare**
- **Agriculture**
- **Environmental monitoring**
- **Food products quality control**
- **Smart homes and factories**

Following are the challenges of the internet of nano-things face during implementation:

Privacy and security:

As nanodevices collect large volumes of confidential data, concerns regarding privacy and security need to be addressed. The users of Internet of Nano Things infrastructure need to have the information regarding who has access to their data and how their data will be used. Also, the collected data needs to be stored in a secured location with encryption and state-of-the-art cybersecurity protocols. If left unsecured, cybercriminals can illegally access this confidential data. In the case of a cybersecurity attack, users may want to know who will be held responsible and which mitigation strategies can be executed. Hence, IoNT developers need to consider these issues before the mass production and utilization of IoNT devices.

Conclusion:

Nanotechnologies, nanomachines, the Internet of Things (IoT), and the Internet of Nano Things (IoNT) all will have a significant impact on improved development in the near future practically in every industry. Researchers are presently developing nano machines that use IoNT for live deployment in a variety of domains in the near future.

We should customize the nanotechnologies included into an IoT system according to the application. A smart factory, for example, will use IoNT devices to track temperature, humidity, gaseous fumes, water quality, and maybe carbon emissions from systems' exhaust.

Connected automobiles equipped with such miniature sensors, for example, could forecast proximity, surrounding conditions, and position data to help ensure the safety and accuracy of vehicle-assistance systems.

In a smart city application of network of nano-devices and the types of technologies integrated are responsible for monitoring dangerous gas or particulate concentrations. With devices planted at various sites across the city to monitor pollution level in order to protect the health and safety of the population. It becomes easy to detect the areas of improvement.

Reference:https://iot4beginners.com/

Student articles

INTERNET OF BEHAVIOR

JAGATHI MANIDEEPIKA-19JG1A0436-III ECE I

INTERNET OF BEHAVIOR: THE EXTENSION OF IOT

The Internet of Things (IoT) is defined as a source connecting an electric device to the Internet, and IoB (Internet of Behavior) is the extension of IoT that reveals significant information about our behavior. It is the interconnection of devices that provides vast data and valuable insights into user experience, search experience optimization, behavior, interests, and preferences. According to Gartner, IoB combines technologies focused on tracking location and facial recognition of the people, connecting the data, and mapping them to behavioral events.

The Internet of Behavior combines existing technologies that focus on the individuals directly. From facial recognition to location tracking, it connects the resulting data to associated behavioral events like cash purchases or device usage. Understanding the data collected from users' online activity from a behavioral psychology perspective is what exactly IoB does! How to understand the data and how to apply that understanding to create and market new products from a human psychology perspective, all come under IoB. IoB in simple words refers to the process by which user-controlled data is analyzed through a behavioral psychology perspective and the data thus collected is used to understand how to market

the end products and services offered by companies. To conduct IoB is technically not that complex as it is from a psychological perspective. This requires statistical studies to be conducted mapping everyday habits and behaviors without fully disclosing consumer privacy for ethical and legal reasons.

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ROLE & CONTRIBUTION OF INTERNET OF BEHAVIOR

Using emerging technological innovations and developments in machine learning algorithms, IoB helps in capturing, analyzing, understanding, and responding to all types of human behavior in a way that allows tracking and interpreting the behavior of people. This new technology is descriptive as well as proactive, meaning it helps in analyzing user behavior and detecting which psychological variables to influence to bring about a certain outcome. It influences consumer choice and enables companies to improve the customer experience of the products/services they

offer. Improving efficiency and quality is the main aim of IoB!

The Internet of Behavior can be considered as a combination of three fields viz. technology, data analytics, and behavioral science. Behavioral science can further be divided into four areas that we consider when we use technology. These are decisions, emotions, augmentations, and championships. For example, the health app on your smartphone can help you keep track of your sleeping patterns, blood sugar levels, or heart rate. The app can alert you to adverse health situations and suggest behavior changes for the positive and desired outcome.

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IMPORTANCE OF INTERNET OF BEHAVIOR (IOB)

We have far long understood the importance of consumer behavior in the world of business. Analyzing and capturing data from behavior is how marketing and sales thrive. They use these valuable insights to launch campaigns and drive product value. Internet of behavior is a huge game changer for many marketing teams. It is sought out by major companies such as Google, Microsoft, Apple to drive customers. They manage their competitive edge by reading into exactly what motivates a consumer's online activities and behaviors.

Not only companies but politicians and huge corporations have also long gained an edge from this sort of behavioral information. Politicians use it to increase their favourability while corporations use it to alter the behavior of their employees to increase efficiency and production.

Internet of behavior has such importance because of its ability to influence a customer's choice. Our preferences and motivation towards them can be changed as a result of IoB. When companies understand what triggers a behavior, or what drives the motivation toward the online purchase, it becomes a weapon to be utilized. Companies use incentives and boosters to drive these desired behaviors among consumers. The algorithm on social media and search engines also changes based on our actions.

Internet of behavior not only helps companies analyze a customer's buying process and motivations in purchasing journey. It also helps them gain valuable insights on what they should spend their big bucks on. Many companies spend their time and money on experimenting with various methods to increase awareness and drive actions. However, in this day and age, technology made it easier for us to show what genuinely works and what does not. When we continually work according to what the data suggests, we are guaranteed some deliverable that benefits the company. So why not save our energy and money by investing in technology that will help us analyze behaviors.

Internet of behavior can come across as extremely intrusive. And people are acutely aware of how many use our online behavior. We know that we are being monitored every time we give out or

email or sign up for new letters. We also know that every time we download a fitness tracker every viable information is now under them. However, most of us really don't care despite a bunch of strangers having our valuable information. The secret behind this complete laidback-ness is that we as consumers have high expectations. We crave data-driven value. And that is exactly what IoB provides company. The data-driven value is useful in improving the services and products. If Apple continues to use our data but never improves its services and innovates, we will be deeply disappointed. They will not only lose customers but they also lose the trust if they choose not to utilize the data, we provide them with. Or rather the data they took from us.

Curtacy:https://www.e-spincorp.com/wp-content/uploads/2021/01/IoB.jpg

Customers not only expect good products and innovation now. With the number of information companies has, they know our lives better than our mothers do. With that sort of intrusion, we expect a better relationship as well. Companies need the Internet of behavior to establish a relationship with customers and create a connection to the brand. Investing in brand loyalty from customers starts from understanding your customers.IoB programs are only predicted to increase over the years. Government, school, health care providers, tech start-ups will all use IoB for their benefit. As IoT continues to grow so will the application of IoB. We expect to see the same in Malaysia. In fact, it is already happening. Major services and products such as the TM Unifi package is pioneered based on our online behaviors. Devices and innovations only work when we include the human psyche in the equation as well.

ADVANTAGES OF INTERNET OF BEHAVIOUR

This evolving technology is going to prove beneficial in multiple ways. From positively engaging customers, knowing where the customer's interest in a product begins, their journey of purchase, and the methodology they use to make their purchase; there are many aspects of IoB. The IoB makes it easy to study previously unattainable data on how users interact with devices and products, obtain more detailed information about where a customer is in the buying process, and analyze customer buying habits across all platforms. Moreover, it provides real-time notifications, targeting and resolving problems quickly to close sales and keep customers satisfied.

Companies currently are using IoB to observe and help make changes in our behavior to achieve the desired goals by selling their products/services. The Internet of Behaviors provides companies with cutting-edge ways of marketing products and services, along with influencing user and employee behaviors. It can be used to monitor health protocol compliance at an industrial site to capture behavioral events.

For example, sensors/RFID tags on a person or in the environment can be used to check if the employees are washing their hands regularly or not. Similarly, computer vision can be used to determine if employees are complying with mask protocols or not. Besides, speakers in the

environment can be used to warn people of protocol violations.,

CONCLUSION

This new technology is definitely proving beneficial for businesses since they can optimize their relationship with the consumer based on the collected data. While IoT converts data into information, we will have to wait to see if IoB can convert our knowledge into real wisdom.

Curtacy:https://solution.itage.jp/wpcontent/uploads/2021/05/blog_10557_01-300x213.png

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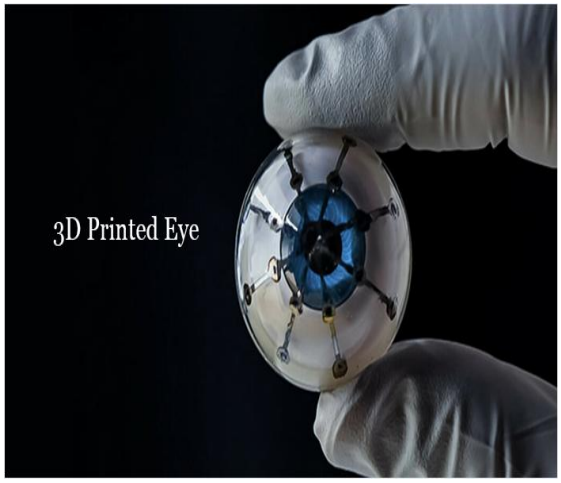
Medical Upgrade- The Rise of 3D Printing

J.Sreeya-19JG1A0438-III ECE I

3D printing will open a new business of advanced prosthetics as many universities are expanding their research in 3D printing of bionic body parts.



Introduction:

Among the different manufacturing processes that are currently adopted by the industry, the 3D printing is an additive technique. It is a process through which a threedimensional solid object, virtually of any shape, is generated starting from a digital model. Medical 3D printing was once an ambitious pipe dream. However, time and investment made it real. Nowadays, the 3D printing technology represents a big opportunity to help pharmaceutical and medical companies to create more specific drugs, enabling a rapid production of medical implants and changing the way that doctors and surgeons plan procedures. this technology has multiple applications, and the fastest growing innovation in the medical field has been represented by the advent of the 3D printing itself. Five technical steps are required to finalize a printed model. they include selecting the anatomical target area, the development of the 3D geometry through the processing of the medical images coming from a CT/MRI scan, the optimization of the file for the physical printing, and the appropriate selection of the 3D printer and materials. A patient-specific model with anatomical fidelity created from imaging dataset is finally obtained. In this way, the 3D printing has the potential to significantly improve the research knowledge and the skills of the new generation of surgeons, the relationship between patient and surgeon , increasing the level of understanding of the disease involved, and the patient-specific design of implantable devices and surgical tools and optimize the surgical process and cost .

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Transformation Process and Materials Used

Materials used in 3D printing are transformed during the production of the specific model by changing their consistency. this process is named cure and can be done in different ways: a melting of a hard filament in order to give the desired form to the model by the material distortion, liquid

solidification for the construction of the structure and powder solidification. All these processes require filler or support material in lattice forms avoiding distortion of the model while the material is being cured. 'e support material can be easily removed by hand with a cutting tool; however, there is the risk to leave impression on the surface requiring an additional polishing in order to obtain a good quality printing. the risk of damaging the model, losing details, or break the geometry is really high.

The correct selection of the material is directly linked to the selection of the 3D-printing process and printer, as well as the requirements of the model. Related to medical application, similarly to other applications, different anatomical structures need different mechanical properties of the materials to fulfil the required performance of the printed object. the main distinction among the different materials that characterize the human body is between rigid and soft materials. Human bones are an example of rigid tissue and ligaments or articular cartilage are examples of soft materials. Bones are the simplest and easiest biological tissue to be produced by 3D printing as the majority of the materials are rigid. the materials used in 3D printing to model the bone structure are for example acrylonitrile butadiene styrene (ABS), powder of plasters , and hydroquinone. Relating to soft tissues, deeper research is still needed in order to decrease the gap between a 3D-printed anatomical model and the human structure. Most of the 3D-printing materials present a lack of realism to mimic adequately a soft human biological tissue. thus, postprocessing may be necessary in order to soften the printed structures. Some examples are given in the reproduction of cartilaginous tissues, arteries for practicing valve replacement, hepatic segment , and hearts . An interesting example is the development of a 3D-printed brain aneurysm using the flexible Tango Plus photopolymer that represented a useful tool to plan the operative strategy in order to treat congenital heart disease. Furthermore, some of the materials used are urethane and rubber-like material, mixed with a rigid photopolymer, to reasonably mimic the artery structure due to their Shore value and elastic properties similar to the physiological one . For a promising future, the multi material composites seem to represent a good chance for the 3D printing of human tissues since none of the current available material is able to fully mimic elastic and biological tissues. Multi material composites may be designed based on the capacity of the selected biological material to replicate the mechanical properties of human tissue. Mechanical testing may represent a necessary tool to analyse the biomechanical response and validate the artificial material.

Prostheses Tailor-Made for Patients

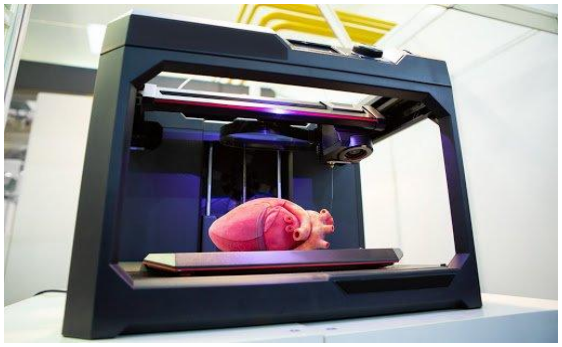
Prostheses made using traditional manufacturing methods are expensive and not necessarily adapted to a patient’s unique morphology. If a patient does need a custom prosthesis, the costs can skyrocket, and it would take some time for the order to be fulfilled. Prostheses, by definition, need to be custom-made for the patient. After all, no two people are exactly alike or have the exact same injuries. Doctors can use 3D modelling software to help create detailed, three-dimensional images of prostheses that they can collaborate with each other - and perhaps more importantly, with the patient - to ensure a proper fit. Then, using 3D printing, they can create customized prostheses that are perfectly suited to

fit their patients' exact needs in a timely, cost-effective manner.

Bone and Joint Reconstruction

Just like prostheses, you can also use medical 3D printing to help with bone and joint reconstruction. Instead of using a one-size-fits-all implant (that often doesn't "fit all"), you can use additive manufacturing to create customized implants.In addition to bone reconstruction, healthcare providers are also starting to 3D print synthetic cartilage that can be used to rebuild joints and other body parts. Here are just a few of the major applications for which 3D printing can be used:

- Jaw reconstruction
- Hip replacements
- Knee replacements
- Breast reconstruction
- Facial reconstruction



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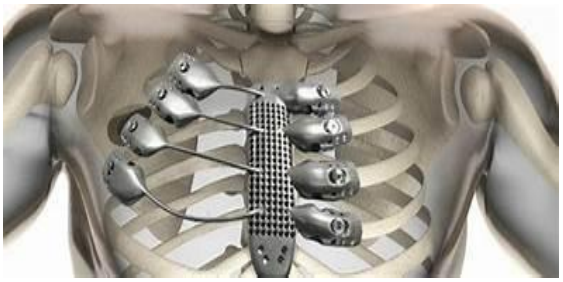
Bioprinting Artificial Organs and Tissue

Thanks to a process called bioprinting, medical 3D printers are now able to print functional tissue. Rather than using metal or plastic, bioprinters can create models with living cells. Soon, 3D printers in the medical field will be able to create tissue to help with skin grafting and reconstructive surgery. Labs are also starting to experiment with printing liver and intestinal tissue to help manage certain diseases. In a more miraculous form of bioprinting, experts are using 3D printing to create functional human organs. So far, researchers have been able to replicate a working lung and an artificial heart. It won't be long before patients won't need to wait on transplant lists or spend inordinate amounts of money to get the organs they need.



Curtacy:https://www.sculpteo.com/blog/wp-content/uploads/2015/10/3D_Printed_Rib_Cage-829x325_c.jpg

3D medical printing for Dental Applications

Dentists and orthodontists need customized solutions to help their patients, as no two mouths are the same. Instead of taking the time to make moulds and create custom apparatuses, dentists can now 3D print braces, crowns, dentures, or anything else they might need based on patient X-ray and CT images .The entire process - from the scan to creating the 3D model to pressing the print button - can be done by a single person, not a team, which can save time, labor, and money. Those savings can then potentially be passed along to the patients for more affordable dental care.

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Conclusions

the 3D printing in medical field and design needs to think outside the norm for changing the health care. the three main pillars of this new technology are the ability to treat more people where it previously was not feasible, to obtain outcomes for patients and less time required under the direct case of medical specialists. In few words, 3D printing consists in enabling doctors to treat more patients, without sacrificing result . therefore, like any new technology, 3D printing has introduced many advantages and possibilities in the medical field. Each specific case in which 3D printing has found application shown in this analysis is a demonstration of this. However, it must be accompanied by an updated and current legislation in order to guarantee its correct use.

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5G NETWORK

CH.GYANAMRUTA - 19JG1A0417

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 cell phones. 5G networks are predicted to have more than 1.7 billion subscribers worldwide by 2025, according to the GSM Association.

Like its predecessors, 5G networks are cellular networks, in which the service area is divided into small geographical areas called cells. All 5G wireless devices in a cell are connected to the Internet and telephone network by radio waves through a local antenna in the cell. The main advantage of the new networks is that they will have greater bandwidth, giving higher download speeds, eventually up to 10 gigabits per second (Gbit/s).

In addition to 5G being faster than existing networks, 5G can connect more different devices, and even if people are in crowded areas, the servers will be more unified, improving the quality of Internet services. Due to the increased bandwidth, it is expected the networks will increasingly be used as general internet service providers (ISPs) for laptops and desktop computers, competing with existing ISPs such as cable internet, and also will make possible new applications in internet-of-things (IoT) and machine areas. Cell phones with 4G capability alone are not able to use the new networks, which require 5G-enabled wireless devices.

Fig: https://www.gettyimages.in/photos/5g

Overview

All 5G wireless devices in a cell communicate by radio waves with a cellular base station via fixed antennas, over frequency channels assigned by the base station. The base stations, termed Node Bs, are connected to switching centres in the telephone network and routers for Internet access by high-bandwidth optical fibre or wireless backhaul connections. As in other cellular networks, a mobile device moving from one cell to another is automatically handed off seamlessly to the current cell. 5G can support up to a million devices per square kilometre, while 4G supports only one-tenth of that capacity.

Several network operators use millimetre waves called FR2 in 5G terminology, for additional capacity and higher throughputs. Millimetre waves have a shorter range than microwaves, therefore the cells are limited to a smaller size. Millimetre waves also have more trouble passing through building walls. Millimetre-wave antennas are smaller than the large antennas used in previous cellular networks. Some are only a few centimetres long.

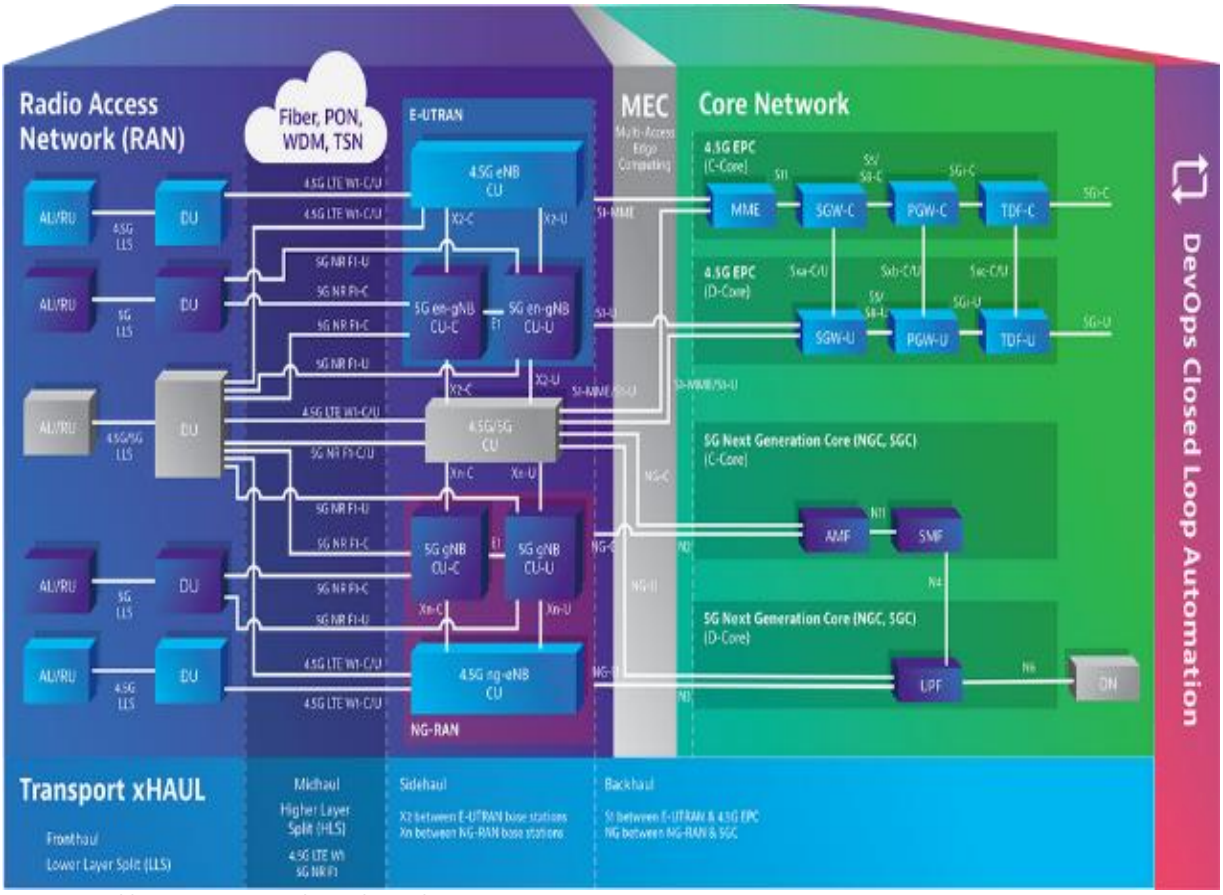

Fig: https://www.digi.com/blog/post/5g-network-architecture

The increased speed is achieved partly by using additional higher-frequency radio waves in addition to the low- and medium-band frequencies used in previous cellular networks. However, higher-frequency radio waves have a shorter useful physical range, requiring smaller geographic cells. For wide service, 5G networks operate on up to three frequency bands – low, medium, and high.

Fig:https://www.shutterstock.com/search/5g+architecture

5G can be implemented in low-band, mid-band or high-band millimetre-wave 24 GHz up to 54 GHz.

Low-band 5G uses a similar frequency range to 4G cell phone, 600–900 MHz, giving download speeds a little higher than 4G: 30–250 megabits per second (Mbit/s).[4] Low-band cell towers have a range and coverage area similar to 4G towers. Mid-band 5G uses microwaves of 2.3–4.7 GHz, allowing speeds of 100–900 Mbit/s, with each cell tower providing service up to several kilometres in radius. This level of service is the most widely deployed, and was deployed in many metropolitan areas in 2020. Some regions are not implementing the low band, making Mid-band the minimum service level. High-band 5G uses frequencies of 24–47 GHz, near the bottom of the millimetre wave band, although higher frequencies may be used in the future. It often achieves download speeds in the gigabit-per-second (Gbit/s) range,

comparable to cable internet. However, millimetre waves (mm Wave or mm W) have a more limited range, requiring many small cells. They can be impeded or blocked by materials in walls or windows. Due to their higher cost, plans are to deploy these cells only in dense urban environments and areas where crowds of people congregate such as sports stadiums and convention centres. The above speeds are those achieved in actual tests in 2020, and speeds are expected to increase during rollout. The spectrum ranging from 24.25 – 29.5 GHz has been the most licensed and deployed 5G mm Wave spectrum range in the world.

The industry consortium setting standards for 5G is the 3rd Generation Partnership Project (3GPP). It defines any system using 5G NR (5G New Radio) software as "5G", a definition that came into general use by late 2018. Minimum standards are set by the International Telecommunication Union (ITU).

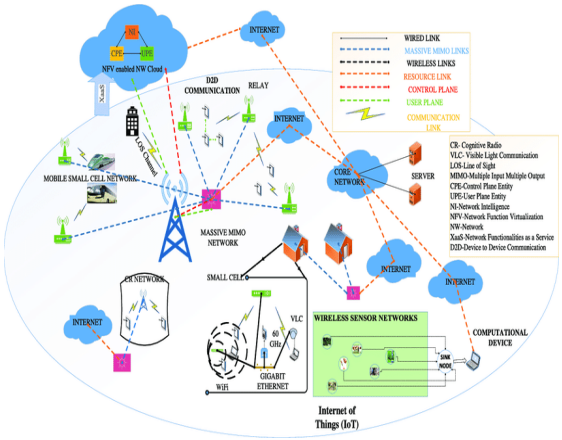

Fig:https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.researchgate.net%2Ffigure%2FGeneral-5G-physical-architecture.

Rollout of 5G technology has led to debate over its security and relationship with Chinese vendors. It has also been the subject of health concerns and misinformation, including discredited conspiracy theories linking it to the COVID-19 pandemic.

Application areas

The ITU-R has defined three main application areas for the enhanced capabilities of 5G. They are Enhanced Mobile Broadband (e MBB), Ultra Reliable Low Latency Communications (URLLC), and Massive Machine Type Communications (m MTC). Only e MBB is deployed in 2020; URLLC and m MTC are several years away in most locations.[8]

Enhanced Mobile Broadband (e MBB) uses 5G as a progression from 4G LTE mobile broadband services, with faster connections, higher throughput, and more capacity. This will benefit areas of higher traffic such as stadiums, cities, and concert venues.

Ultra-Reliable Low-Latency Communications (URLLC) refer to using the network for mission critical applications that require uninterrupted and robust data exchange. The short-packet data transmission is used to meet both reliability and latency requirements of the wireless communication networks.

Massive Machine-Type Communications (m MTC) would be used to connect to a large number of devices. 5G technology will connect some of the 50 billion connected IoT devices. Most will use the less expensive Wi-Fi. Drones, transmitting via 4G or 5G, will aid in disaster recovery efforts, providing real-time data for emergency responders. Most cars will have a 4G or 5G cellular connection for many services. Autonomous cars do not require 5G, as they have to be able to operate where they do not have a network connection. However, most autonomous vehicles also feature teleoperations for mission accomplishment, and these greatly benefit from 5G technology.

Conclusions

5G will be able to sustainably satisfy the requirement of the 1000-time traffic growth. 5G will provide users with fibre-like access data rate and “zero” latency user experience. 5G will be capable of connecting 100 billion devices. 5G will be able to deliver a consistent experience across a variety of scenarios including the cases of ultra-high traffic volume density, ultra-high connection density, and ultra-high mobility. 5G will also be able to provide intelligent optimization based on services and users awareness and will improve energy and cost efficiency by over a hundred of times, enabling us all to realize the vision of 5G, “information a finger away, everything in touch.”

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ROBOTIC PROCESS AUTOMATION

N.GAYATRI - 19JG1A0467

Introduction: Robotic process automation (RPA) is a software technology that makes it easy to build, deploy, and manage software robots that emulate humans actions interacting with digital systems and software. Just like people, software robots can do things like understand what's on a screen, complete the right keystrokes, navigate systems, identify and extract data, and perform a wide range of defined actions. But software robots can do it faster and more consistently than people, without the need to get up and stretch or take a coffee break.

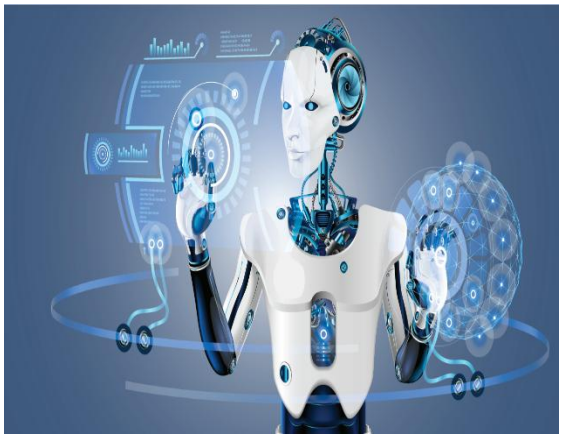

Fig:https://www.themanufacturer.com/articles/robotic-process-automation-rpa-for-manufacturing/

What are the business benefits of RPA?

Robotic process automation streamlines workflows, which makes organizations more profitable, flexible, and responsive. It also increases employee satisfaction, engagement, and productivity by removing mundane tasks from their workdays.

RPA is non invasive and can be rapidly implemented to accelerate digital transformation. And it's ideal for automating workflows that involve legacy systems that lack APIs, virtual desktop infrastructures (VDIs), or database access.

Why is Rpa transformed?

RPA technology is changing how the world gets work done.

Software robots—instead of people—do repetitive and lower-value work, like logging into applications and systems, moving files and folders, extracting, copying, and inserting data, filling in forms, and completing routine analyses and reports. Advanced robots can even perform cognitive processes, like interpreting text, engaging in chats and conversations, understanding unstructured data, and applying advanced machine learning models to make complex decisions.

When robots do these types of repetitive, high-volume tasks, humans are freed to focus on the things they do best and enjoy more: innovating, collaborating, creating, and interacting with customers. Enterprises get a boost too: higher productivity, efficiency, and resilience. It's no wonder that RPA is rewriting the story of work.

Fig:https://www.istockphoto.com/photo/robotic-process-automation-concept-with-tablet-computer-gm

Where can RPA Used?

Today, RPA is driving new efficiencies and freeing people from repetitive tedium across a broad swath of industries and processes. Enterprises in industries ranging from financial services to healthcare to manufacturing to the public sector to retail and far beyond have implemented RPA in areas as diverse as finance, compliance, legal, customer service, operations, and IT. And that's just for starters.

RPA has become so widespread because it is broadly applicable. Virtually any high-volume, business-rules-driven, repeatable process is a great candidate for automation—and increasingly so are cognitive processes that require higher-order AI skills.

What features and capabilities are there in RPA?

To build and manage an enterprise-wide RPA program, you need technology that can go far beyond simply helping you automate a single process. You require a platform that can help you create and manage a new enterprise-wide capability and help you become a fully automated enterprise™. Your RPA technology must support you end-to-end, from discovering great automation opportunities everywhere, to quickly building high-performing robots, to managing thousands of automated workflows.

Why is RPA the fastest growing enterprises software in the world?

When you combine RPA's quantifiable value with its ease of implementation relative to other enterprise technology, it's easy to see why RPA adoption has been accelerating worldwide.

- RPA can help many different types of industries address their specific operational issues in new and powerful ways.
- Leaders of functional areas from finance to customer service to marketing to human resources and beyond find that RPA improves many processes, yielding higher capacity, faster throughput, and fewer errors for key processes.
- From a CFO's perspective, an investment in RPA technology delivers rapid ROI and requires minimal upfront spending compared to other enterprise technology.
- IT executives find that RPA can be implemented with little disruption. And because software robots can easily access and work within legacy systems, RPA has become a key enabler for digital transformation. And modern RPA technology offers scalable, enterprise-ready platforms.
- Employees find that it's easy to adopt robotic assistants into their workdays, and that RPA's low-code approach lets them become citizen developers who can build their own simple automations)?

Fig:https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.accelirate.com%2Frobotic-process-automation-

Is rpa same as artificial intelligence(AI)?

RPA is not AI; AI is not RPA. But the combination of RPA and AI unlocks massive new possibilities for enterprises everywhere. For one thing, RPA technology now makes it possible to insert advanced AI skills in the form of machine learning models, natural language processing (NLP), character and image recognition, and more into RPA robots. Giving robots these AI skills dramatically expands their ability to handle cognitive processes that require things like:

- Understanding documents including semi-structured or unstructured data
- Visualizing screens (including virtual desktops)
- Comprehending speech and carrying on conversations and chats

AI is also making it possible to scientifically discover a complete range of automation opportunities and build a robust automation pipeline through RPA applications like process mining.

And at a time when companies need to accelerate their integration of AI into front-line activities and decisions, many are finding that RPA can serve as AI's 'last-mile' delivery system. Robots can be configured to apply machine learning models to automated decision-making processes and analyses, bringing machine intelligence deep into day-to-day operations.

What are the benefits of RPA?

RPA provides organizations with the ability to reduce staffing costs and human error. David Schatsky, a managing director at Deloitte LP, points to a bank's experience with implementing RPA, in which the bank redesigned its claims process by deploying 85 bots to run 13 processes, handling 1.5 million requests per year. The bank added capacity equivalent to more than 200 full-time employees at approximately 30 percent of the cost of recruiting more staff, Schatsky says.

Bots are typically low-cost and easy to implement, requiring no custom software or deep systems integration. Schatsky says such characteristics are crucial as organizations pursue growth without adding significant expenditures or friction among workers. "Companies are trying to get some breathing room so they can serve their business better by automating the low-value tasks," Schatsky says.

Enterprises can also supercharge their automation efforts by injecting RPA with cognitive technologies such as ML, speech recognition, and natural language processing, automating higher-order tasks that in the past required the perceptual and judgment capabilities of humans.

Such RPA implementations, in which upwards of 15 to 20 steps may be automated, are part of a value chain known as intelligent automation (IA), Viadro says. "If we were to segment all of the major enterprises and ask them what's on their agenda for 2018, close to 100 percent would say intelligent automation," Viadro says. By 2020, automation and artificial intelligence will reduce employee requirements in business shared-service centers by 65 percent, according to Gartner, which says the RPA market will top $1 billion by 2020. By that time, 40 percent of large enterprises will have adopted an RPA software tool, up from less than 10 percent today. For a deeper look at the benefits of RPA, see "Why bots are poised to disrupt the enterprise" and "Robotic process automation is a killer app for cognitive computing."

Conclusion

Due to its non-invasive integration into the existing system landscape, Robotic Process Automation

can be easily introduced and initial processes can be automated quickly. This makes it a good way to approach the topic of digitization in your company or to expand it further.

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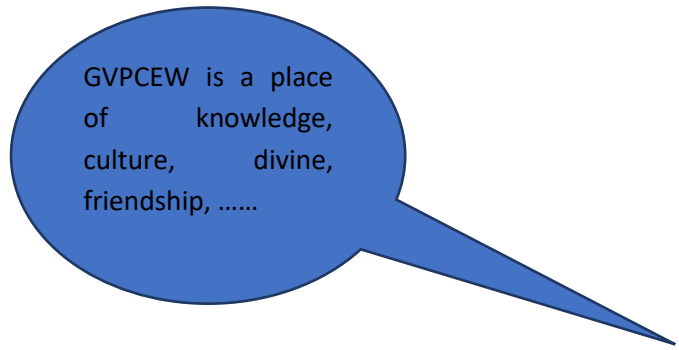

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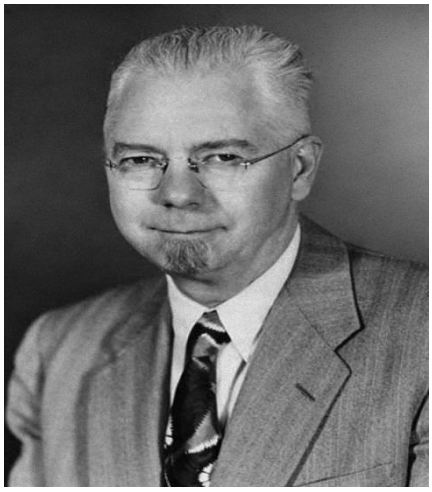

(Dr. Robert M. Page Retired as Director of Research, U.S. Naval Research Laboratory, 1967).

Robert Morris Page, (born June 2, 1903, St. Paul, Minnesota, U.S.—died May 15, 1992, Edina, Minnesota), American physicist known as the "father" of U.S. radar.

Page changed his major from theology to physics in his senior year at Hamline University in St. Paul, Minnesota. After graduating in 1927, he moved to Washington, D.C., where he joined the U.S. Naval Research Laboratory (NRL) and attended George Washington University (M.A., 1932). In 1934 he began work on developing pulse radar. In spite of its receiving low priority and limited support from the U.S. Navy administration, he successfully demonstrated a radar in 1936 and tested it at sea in 1937. By the time the United States entered World War II, there were 79 radars installed on various ships of the U.S. Navy. These radars, and those that followed, were credited with providing the U.S. Navy a significant advantage over the Japanese navy in the Pacific.

Page, who held 75 patents on inventions in precision electronics, developed the first radar duplexer capable of using a single antenna for transmitting and receiving. He invented the monopulse tracking radar, which is still the preferred approach for precision tracking radars and for military applications. He also obtained the patent on the widely used plan position indicator (PPI) radar display, which provides the location and direction of a target on a maplike presentation that is easy to interpret. Page conceived and initiated the first successful demonstration of high-frequency over-the-horizon (HF OTH) radar, whose propagating waves are refracted by the Earth's ionosphere. The detection of ships, aircraft, and ballistic missiles was thereby extended out to about 3,200 km (2,000 miles), approximately 10 times the range of microwave radars, which are limited to the line of sight by the horizon.

Page successively served at the NRL as a physicist and head of the Radar Research Section (1938–45), superintendent of Radio Division III (1945–52), associate director of research in electronics (1952–57), and director of research (1957–66). He was the recipient of several national awards and the author of *The Origin of Radar* (1962).

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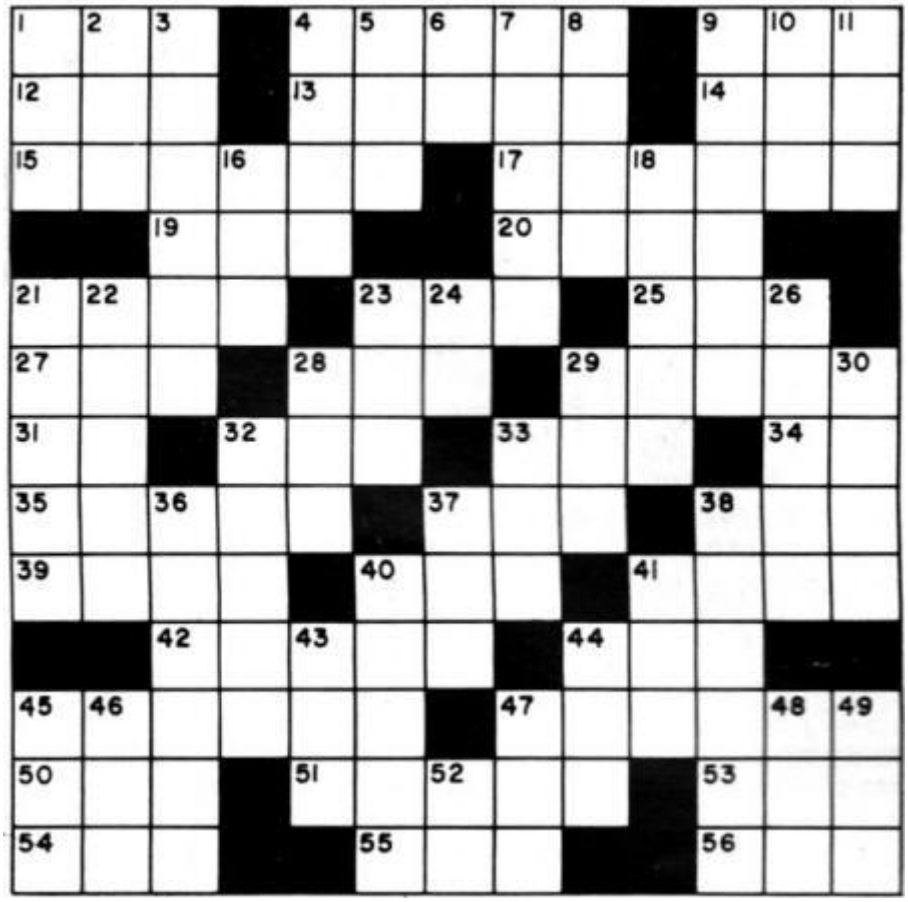

Across

1. Type of telegraphic key.
4. Bolt used to fasten shielded coils.
9. Motor speed (abbr.).
12. Literary collection.
13. Sheet on which controls are mounted.
14. Professional engineering society (abbr.).
15. Color code for #4.
17. Element found as graphite; widely used in electronics.
19. To consume.
20. Grip on a control shaft.
21. Two or more variable capacitors mounted on a single shaft.
23. System now replaced by C.G.S.
25. Radio distress signal.
27. Southern state (abbr.).

Down

1. Part of an antenna array.
2. One (Fr. fern.).
3. Crystal.
4. Luminous area on CR tube screen.
5. Animal foot.
6. Article.
7. Tape transports.
8. Spirit.
9. Microphone with moving conductor.
10. Antonym of "amateur" (slang).
11. Males.
16. Electronic delay.
18. Material used in soldering.
21. Greek letter.
22. Type of setscrew.
23. Wash floors.

28. Distortion in sound reproducing system.
29. Negative polarity.
31. One-thousandth of a liter (abbr.) .
32. Small visible mark on a radar or scope screen.
33. Type of jack.
34. 3.1416.
35. Sub-atomic particle.
37. Devotee of DX (abbr.).
38. Unit of power ratios.
39. Again.
40. Low-voltage incandescent lamp.
41. Tree-trunk covering.
42. Reconvene (said of Congress).
44. Identification Friend or Foe (abbr.).
45. Continuous tuner.
47. Low-frequency speaker.
50. Current-resistance-voltage (abbr.).
51. Electronic navigational aid.
53. Type of carbon mike worn on face.
54. Greek letter (pl.).
55. April 15th donation.
56. Stammering syllables.

24. One-thousand watts (abbr.).
26. 3000-30,000 mc. h.f. band.
28. Emerge victorious.
29. Stylus radius measurement unit.
30. Material used in wire covering.
31. Energy per unit time.
33. New Deal agency (abbr.).
36. Type of part arrangements in a circuit.
37. Receiver (familiar).
38. Device to improve speaker fidelity.
40. Lamp used to light a tuning dial.
41. You can't receive code without it (abbr.) .
43. Salvador, for short.
44. Charged particle.
45. Color code blue.
46. First transformer winding (abbr.) .
47. Material used in making old record "masters."
48. Voltage, current, resistance (abbr.) .
49. Speed (abbr.).
52. Egyptian sun god.

Riddles:

1. What is the centre of gravity?
2. I can rush, I can be hot, I can be cold, I can be hard, I can slip through anything. what am I ?
3. What is full of holes but still holds water?
4. I get answered even though I never ask a question. what am I ?
5. Many have heard it, but nobody has ever seen it. It will not speak back unless spoken to. What is it?

Think and answer

1.The nipkov disc is prototype..?

a) tv

b) telegraph

c) camera

d) turn table

2.ISO, UPC, and GS1 are the abbreviations of what?

a) communication systems

b) navigation systems

c) barcodes

d) IP addresses

3.which type of transmission uses the shortest waves?

a) GSM telephony

b) CB radio

c) VHF radio

d) satellite TV

4.what may happen to a lead battery when overcharged?

a) acid leak

b) polarization switch

c) explosion

d) sulfurization

5.which device converts electricity into acoustic energy?

a) microphone

b) headphone

c) amplifier

d) preamplifier

Answers

Crossword

Riddles

1.”v”-Gravity

2.water

3.Sponge

4.Telephone

5.Echo

Think And Answer

1.a) Tv

Explanation:

A Nipkow disk is a mechanical, rotating,geometrically operating image scanning device,patented in 1885 by paul Gottlieb Nipkow.This scanning disk was a fundamental component in mechanical television through the 1920s and 1930s.

2.c) Barcodes

Explanation:

A barcode is an optical,machine readable,representation of data;the data usually describes something about the object that carries the barcode .Initially ,barcodes were only scanned by special optical scanners called barcode readers.

3.d) Satellite Tv

Explanation:

The Ku band is the portion of the electromagnetic spectrum in the microwave range of frequencies from 12 to18 gigahertz (GHz) Ku band is primarily used for satellite communications,most notably for fixed and broadcast services,and for specific applications .

4.c) Explosion

Explanation:

Any lead acid battery system when overcharged will produce hydrogen gas by electrolysis of water.If the rate of overcharged is small,the vents of each cell allow the dissipated of the gas.A severe overcharged may produce a flammable concentration of hydrogen.

5.b) Headphone

Explanation:

Headphones are a pair of small loudspeakers drivers worn on or around the head over a user's ears.They are electroacoustic transducers,which covert an electrical signal to a corresponding sound.

List of Toppers:

Roll No:	Name	CGPA
17JG1A0498	SHAIK SHABANA SULTHANA	8.88
17JG1A0462	LANKA PAVANI	8.82
17JG1A0421	CHADA LAKSHMI KAVYA	8.77
17JG1A0472	MEDAPU REDDY KRANTHI	8.74
17JG1A04A8	TATA VENKATA SATYA SAI RASAGNA SNIGDHA	8.47
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17JG1A0477	NEMANI VYSHNAVI	8.40
17JG1A0418	BORA SANTHOSHI	8.37
17JG1A0486	PATNANA SOWMYA	8.36

Department activities:

Date & Time	Event name	Conducted by …
02/01/2021 3:00pm	Code C' Coding Competition by ECLATA Club	ECLATA Club
09-04-2021 11:00 AM	Webinar on "Unreal Engines" in association with CENTRE OF EXCELLENCE IN MARITIME & SHIPBUILDING (CEMS), Visakhapatnam	DEPT
10-07-2021 12:00PM-1:00PM	A Webinar on the topic "Key to Making Killer Presentations" in association with ICFAI Business School, Bangalore.	DEPT
19-08-2021 & 21-08-2021 11:00AM-1:00PM	Expert talk on "Overview on EMTL" by Prof.Dr.K.C.B Rao	ECLATA Club
18-09-2021 11:00AM-2:30PM	Webinar on "Modern Radar Systems & their Applications" by Dr.P. Radha Krishna, Outstanding Scientist & Director, (LRDE)DRDO, Bangalore.	IETE
25-09-2021 3:00PM-4:00PM	Technical Quiz by ECLATA Club	ECLATA Club
29-09-2021 3:30PM-5:00PM	TECHNICAL LECTURE ON “WIFI NETWORKS AND SDR” in association with CANDELA TECHNOLOGIES, VISAKAHAPATNAM	DEPT
01-10-2021 2:30 to 3:30 pm	ECLAT -A Club has organized an “Interaction Session on Placements and Higher Studies” by IV ECE to III ECE students.	ECLATA Club
05-10-2021	Guest lecture on “Time management” on the occasion of IEEE Day by Dr.R.K. Goswami, Principal, GVPCEW	IEEE
07-10-2021 2:30 PM-4:30 PM	Orientation lecture on “GATE preparation and its opportunities” by Mr. Vinay, Engineers Hub	DEPT
22-10-21,23-10-21, 29-10-21 & 30-10-21 2:30 to 5:00PM	BSNL internship lectures by Mr. Kranthi, JTO, BSNL, Visakhapatnam	DEPT
30-10-2021 3:00PM-4:00PM	Quiz on C Programming by ECLATA Club	ECLATA Club
30-10-2021 2:30PM to 4:30PM	Orientation session on Project domain areas, scope of the projects and opportunities of IV Year Projects to IV ECE students	DEPT
05-11-2021 & 09-12-21	Industrial visit to BSNL Switching exchange, Visakhapatnam as a part of internship	DEPT
13-11-2021 2:45 pm - 4.00 pm.	ECLAT -A Club has conducted cultural competition	ECLATA Club
04-12-2021 2:30 pm - 4.45 pm	Power Point Presentation (PPT`S) on "WIRELESS TECHNOLOGIES" by ECLATA Club	ECLATA Club
30-12-2021 2:30PM-5:00PM	Hardware Expo-2021 by ECLATA Club & IETE	ECLATA Club & IETE
03-01-2022 to 05-01- 2022 11.00AM - 1.00 PM & 3:00PM-5:00PM	A 3-Day National Workshop on "Recent Trends in Radar Signal Processing" sponsored by IETE.	IETE
01-04-2022 12:00PM - 2:00PM	Orientation Lecture on "Competitive Exams" by Mr. Jitendra Tiwari, Sr. Faculty, Made Easy to II ECE Students.	DEPT

Fig: 25-09-2021 3:00PM-4:00PM - Technical Quiz by ECLATA Club by - ECLATA Club

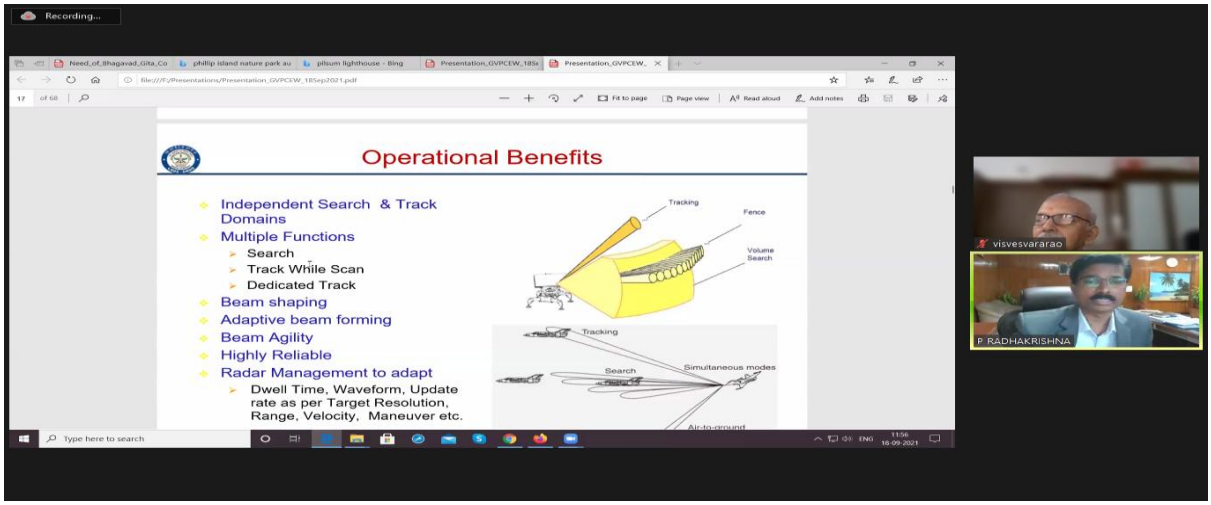

Fig: 18-09-2021 11:00AM-2:30PM - Webinar on "Modern Radar Systems & their Applications" by Dr.P. Radha Krishna, Outstanding Scientist & Director, (LRDE)DRDO, Bangalore. Conducted by IETE

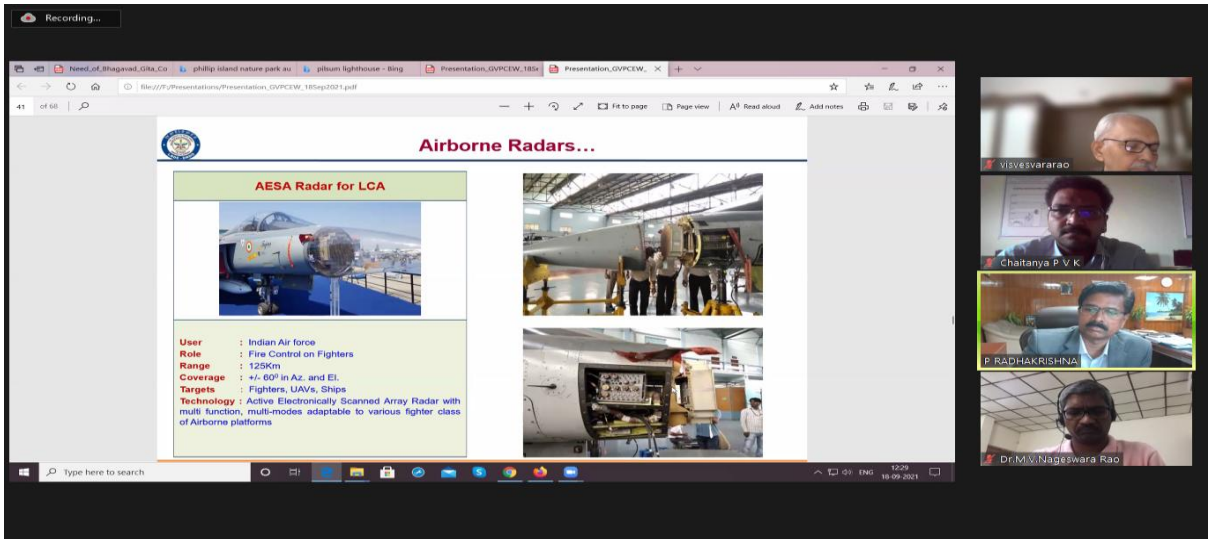

Fig: 18-09-2021 11:00AM-2:30PM - Webinar on "Modern Radar Systems & their Applications" by Dr.P. Radha Krishna, Outstanding Scientist & Director, (LRDE)DRDO, Bangalore. Conducted by IETE

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