ELECTROSPARK

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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INSTITUTE'S VISION

To emerge as a centre of excellence in technical education, offering best of the teaching and learning by creating ambience for advanced level of education and research to serve the society.

INSTITUTE'S MISSION

IM-1. *To create an ambience for advanced level of teaching and learning process.*

IM-2. *To generate new ideas by engaging in cutting-edge research and technology.*

IM-3. *To initiate collaborative projects which offer opportunities for long term interaction with industry and academia.*

IM-4. *To develop intellectual human potential for serving the society according to the regional, national and global needs.*

DEPARTMENT'S VISION

To aspire to become a department which can provide value-based quality education, foster research and innovation and to groom the students to be globally competent.

DEPARTMENT'S MISSION

DM-1. *To Create an outcome-based teaching learning process to increase the creativity and innovativeness of the students and to face the challenging world.*

DM-2. *To motivate students and promote research and development culture among students, so that they can choose it as an optional career.*

DM-3. *To provide ethical and value-based education by promoting activities addressing the societal needs Editorial board*

MESSAGE OF HOD, ECE

I, welcome you to the Department of Electronics & Communication Engineering and take you to introduce it. The department has highly experienced dedicated faculty members and well-equipped laboratories. The department recorded good no of placements in reputed software and electronics industries over the year. The student achievements are magnificent in terms of regularly winning prizes in competitions in reputed institutes like IITs & NITs.

MODERN TRENDS IN ELECTRONICS

Shauptik Dasgupta and Sourik Prakash Kabi (2nd Year, ECE)

ABSTRACT:-

At first a question arises in our mind that, **what is Engineering?**

So the term 'ENGINEERING' covers many field and many extensions & many skills. So in a nutshell Engineering is an occupation with extremely wide range.

Then another question arises that, **who are Engineers?** Engineers are Scientists, Inventors, Designers, Builders and great Thinkers.

After all this it specifically comes to our mind that, **what is Electronics and Communication Engineering?** Electronics and Communication Engineering utilizes non-linear and active electrical components (such as semi-conductor devices especially transistors, diodes & ICs) to design electronic circuits, devices, VLSI devices and their systems.

Now let's see the modern trends in Electronics which can change the life of normal people.

THEORY:-

Health care:-

The Anti-Slouch Screen

If you slump down when you're typing on an Ergo Sensor monitor by Philips, it'll suggest that you sit up straighter. To help office workers avoid achy backs and tired eyes, the device's built-in camera follows the position of your pupils to determine how you are sitting. Are you too close? Is your neck tilted too much? Algorithms crunch the raw data from the sensor and tell you how to adjust your body to achieve ergonomic correctness. The monitor can also inform you that it's time to stand up and take a break, and it will automatically power down when it senses that you've left

The Blood Test for Depression

This year, Eva Redei, a professor at Northwestern's Feinberg School of Medicine,published a paper that identified molecules in the blood that correlated to major depression in a small group of teenagers. Ridge Diagnostics has also started to roll out a test analyzing 10 biomarkers linked to depression in adults.

"Part of the reason there's a stigma for mental illness, including depression, is that people think it's only in their heads,"Redei says. "As long as there's no measurable, objective sign, we're going to stay in that mind-set of 'Just snap out of it.' " Blood tests will take mental illness out of the squishy realm of feelings. And as Lonna Williams, C.E.O. of Ridge Diagnostics, says, they'll help people understand "it's not their fault."

Security:-

A New FIREFIGHTER

You need a lot of water to put out a sizable blaze, and the chemicals used in fire extinguishers can be toxic (halons, the most effective chemical fire suppressant, create holes in the ozone layer). So the Defense Advanced Research Projects Agency at the Pentagon has developed a hand-held wand that snuffs out fires, without chemicals. According to the program's manager, Dr. Matt Goodman, an electric field destabilizes the flame's underlying structure rather than blanketing the fire to smother it. Eventually, the technology could be used to create escape routes or extinguish fires without damaging sensitive equipment nearby

IOT(Internet Of Things):-

IoT has evolved from the convergence of wireless technologies, microelectromechanical systems (MEMS), microservices and the internet. The convergence has helped tear down the silos between operational technology (OT) and information technology (IT), enabling unstructured machine-generated data to be analyzed for insights to drive improvements.

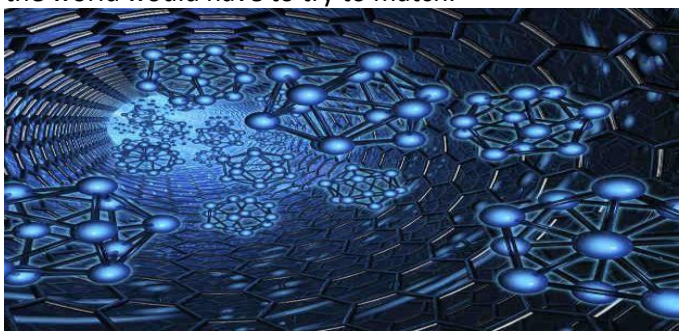
An IoT ecosystem consists of web-enabled smart devices that use embedded processors, sensors and communication hardware to collect, send and act on data they acquire from their environments. IoT devices share the sensor data they collect by connecting to an IoT gateway or other edge device where data is either sent to the cloud to be analyzed or analyzed locally. Sometimes, these devices communicate with other related devices and act on the information they get from one another.

Nano Technology:-

Bill Clinton gets some of the credit for the fifth materials science development on our list. He was the US president who announced the establishment of the National

Nanotechnology Initiative (NNI) in 2000, a US federal, multi-agency research program in nanoscale science and technology.

The NNI has had an immense impact. It cemented the importance and promise of a nascent, emerging field, establishing it immediately as the most exciting area in the whole of the physical sciences.
Nanotechnology simultaneously gained an identity, a vision, and a remarkable level of funding through the initiative. It also established a method of funding interdisciplinary science in such a way that the rest of the world would have to try to match.



Carbon nanotubes:-

Although a discovery normally attributed to Sumio Iijima of NEC, Japan in 1991, the observation of nanotubes of carbon had actually been made on previous occasions (see box: *A journey on the nanotube*). However, following on from the excitement of the discovery of C_{60} buckyballs in 1985 – a new form of carbon – Iijima's observations of new fullerene tubes aroused great interest immediately.Today, the remarkable, unique, and phenomenally promising properties of these nanoscale carbon structures have placed them right among the hottest topics

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Conclusion:-

Progress in many of the basic computing and information technologies has been rapid in recent years, and the committee does not expect the pace of change to slow down in the foreseeable future. While some technologies are reaching maturity now, many important technologies have enormous future potential. As more of the world's information is digitized and more people and things are networked, the economics of the digital, networked economy will become ever more important. This includes the ability to make copies of goods and services at almost zero cost and deliver them anywhere on the planet almost instantaneously. Furthermore, digitization of products, services, processes, and interactions makes it possible to measure and manage work with far more precision. Data-driven decision making and machine learning provide vast opportunities for improving productivity, efficiency, accuracy, and innovation.

MODERN TRENDS OF ELECTRONICS ENGINEERING

Taufikur Rahaman (Roll No.-16 E.C.E 2nd Year)

The era of electronics began with the invention of the transistor in 1947 and silicon-based semiconductor technology. Seven decades later, we are surrounded by electronic devices and, much as we try to deny it, we rely on them in our everyday lives. Since the time the "electronic revolution" hit the telecommunication industry, the competition in the field has exponentially increased leading to furious investment and innovation, helping to give rise to the digital economy. For many years silicon remained the only option in electronics. But recent developments in materials-engineering and nanotechnology have introduced new pathways for electronics.

While traditional silicon electronics will remain the main focus, alternative trends are emerging. These include:

1. **2-D electronics:**
2. **Organic electronics**
3. **Memristors**
4. **Molecular electronics**
5. **Spintronics**

According to the latest report Electrical and Electronic Manufacturing Market Briefing 2017, some of the top trends in the electronics industry in the coming five-year- forecast period include:

- **Product Design Outsourcing:** Original Equipment Manufacturers (OEMs) are increasingly moving product design and development processes to Electronic Manufacturing Service (EMS) partners. Product design, a part of the specialized design services market is being outsourced to reduce overall costs and shift from fixed costs to variable costs.

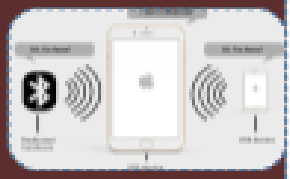
- **Robotics and Automation:** Many electronic equipment companies are using robotics and automation to improve plant efficiency and productivity. Sensors are being used in various machines to access invaluable data for improving efficiencies and reducing potential breakdowns.

- **Virtual Reality in Electronic Manufacturing:** Virtual reality technology is being adopted by electronic manufacturing companies to improve manufacturing efficiency. This technology in the electronic manufacturing industry is often referred to as digital design, simulation, and integration. Virtual reality technology enables companies to inspect design objects at all conceivable scales, thereby eliminating defects in the product in the design stage.

- **IoT (Internet of Things technology) Technology Driving Smart Household Appliances:** Household appliance manufacturers are integrating their products with the IoT technology to make customers lives comfortable and convenient. Internet of Things technology is the interconnectivity of physical objects and devices that are integrated with sensors and software that allow them to exchange and collect data. Major technologies enabling smart household appliances include Wi-Fi, Bluetooth Low Energy, micro server and micro-electromechanical systems. For instance, LG has created home chat, an app that enables the user to monitor their refrigerators, cookers, washing machines, and other devices from anywhere through their smart phones. The home chat technology was introduced by LG initially in South Korea and is moving to other global markets gradually.

- **Growing Demand for Smart TVs:** The demand for smart TVs is being driven by the rising consumer preference for built-in smart functions in personal devices, and increasing internet penetration. A smart TV combines the features of televisions and computers, and comprises a television set with integrated functions for internet use. Smart TV users are also offered direct access to streaming services such as Netflix and Amazon Prime Instant Video.

Modern Trends in Electronics



Some Glimpses of Our Near Future

- **INTERNET OF THINGS (IOT)-**

IoT is short for Internet of Things. The Internet of Things refers to the ever-growing network of physical objects that feature an IP address for Internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems .

USES OF IOT-

Smart home and city
Smart grids
Industrial Internet
Connected car.
Connected Health

EXAMPLE OF IOT--

-Smart Thermostats
-iBeacons
-Smart Gloves
-Smart Medical Gear

- **AUGMENTED REALITY**

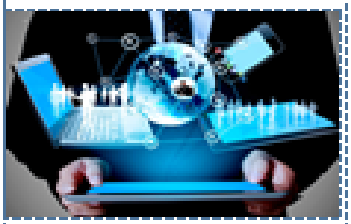
Augmented Reality (AR) is growing as one of the most touchs-after technologies today. To put it simply, AR works by displaying virtual images over real-world objects. The overlay is executed immediately with the input received from a camera or another input device like smart glasses.

USES OF AUGMENTED REALITY-

-Augmented reality enhanced gaming -headwear.
-Military Augmented Reality
-Medical Augmented Reality
-Visualizing Possibilities in AR
-Augmented Reality Changing Sports

SOME EXAMPLES-

-Google glass
-Pokemon GO



- **-CLOUD COMPUTING-**

The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.

USES OF CLOUD COMPUTING-

-Private cloud and hybrid cloud .
-Infrastructure as a service (IaaS) and platform as a service (PaaS) .
-Big data analytics .
-Backup.
-File Storage.

EXAMPLES OF CLOUD COMPUTING-

-Siri, Alexa and Google Assistant
-Microsoft Office 365 & Google Docs
-Dropbox, Google Drive & Amazon S3

- **VIRTUAL REALITY-**

Virtual reality (VR) is an interactive computer-generated experience taking place within a simulated environment, that incorporates mainly auditory and visual, but also other types of sensory feedback like haptic.

USES OF VIRTUAL REALITY-

-Military
-Sports
-Mental health
-Medical training
-Education

SOME EXAMPLES-

-VOLVO Reality
-Masterpoint 3D Spaces
-BetterCloud VR Recruitment

- **ARTIFICIAL INTELLIGENCE-**

Artificial Intelligence (AI) is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans.

USES OF ARTIFICIAL INTELLIGENCE-

-Chat bots
-Artificial Intelligence in ecommerce
-Human Resource Management
-AI in Healthcare
-Intelligent Cyber security
Streamlined Manufacturing with AI

EXAMPLES OF ARTIFICIAL INTELLIGENCE-

-Google's AI-powered predictions – Google Maps
--Robo-Readers
-Google Car
-Facebook Image Recognition

Presented By:
Spondita Ghosh
Suhesna Basu
3rd Sem, ECE

INTRODUCTION TO ORGANIC ELECTRONICS

Suprime Giri (1st Year, ECE)

Organic electronics, plastic electronics or polymer electronics, is a branch of electronics dealing with conductive polymers and conductive small molecules Called as 'organic' electronics as the polymers and small molecules are carbon-based Most polymer electronics are laminar electronics, a category that also includes transparent electronic package and paper based electronics Conductive polymers are lighter, more flexible, and less expensive than inorganic conductors. This makes them a desirable alternative in many applications.
Conventional Electronics are based on inorganic materials, e.g., Si, oxides. In people's mind, organic materials were not associated with electronics. Used as Plastic bags Organic materials Construction materials, Medicines X Electronics.

Organic Electronics In the past 20 years, people found organic materials could have amazing and unique electronic and photonic properties. So there born these exciting areas!!! Organic Light Organic Field Organic Emitting Diode Effect Transistor Photovoltaic (OLED) (OFET) (OPV) Flexible cell phone Ultra-thin OLED TV Plastic solar cell Flexible iPad.

In terms of performance and industrial development, organic molecules and polymers cannot yet compete with their inorganic counterparts. However, organic electronics have some advantages over conventional electronic materials. Low material and production costs, mechanical flexibility, adaptability of synthesis processes and biocompatibility make organic electronics a desirable choice for certain applications.

Commercially available high-tech products relying on organic semiconductors, such as curved television screens, displays for smartphones, coloured light sources and portable solar cells, demonstrate the industrial maturity of organic electronics. In fact, several high-tech companies, including LG Electronics and Samsung, have invested in cheap and high-performance organic-electronic devices.
With the consistent refinement of organic electronics, numerous application possibilities for everyday use will arise. It is expected that the organic electronics market will grow rapidly in the coming years.
The Future of Organic Electronics:
The Future of Organic electronics had some amazing developments in the past! In the next 10-20 years Organic electronics will form several major multi-billion $ industries. New exciting areas of Organic Electronics will be discovered! A trans-parent laptop Circuits made by printing Plastic solar cells covering everywhere Do you want to be part of these exciting industries and discoveries?

MODERN TRENDS IN ELECTRONICS ENGINEERING

SOMNATH CHATTERJEE and SOURAV KUNDU (ECE-2nd YEAR)

INTRODUCTION :
The era of electronics began with the invention of TRANSISTOR in 1947 and silicon-based semiconductor technology. Seven decades later, we are surrounded by electronic devices and,much as we try to deny it, we rely on them in our everyday lives.The performance of silicon-based devices has improved rapidly in the past few decades, mostly due to novel processing and patterning technologies, while nanotechnology has allowed for miniaturization and cost reduction. For many years silicon remained the only option in electronics. But recent developments in materials-engineering and nanotechnology have introduced new pathways for electronics. While traditional silicon electronics will remain the main focus,tons of alternative trends of modification & upgradation are emerging, morphing electronics into a new dimension
NEW INNOVATIONS :
Exploring Electronics Future With 2D Semiconductor
Atomically thin 2D semiconductors have been drawing attention for their superior physical properties over silicon semiconductors. But, 2D SEMICONDUCTORS are not the most appealing materials due to their structural instability and costly manufacturing process.To shed some light on these limitations, a research team has

suspended a 2d semiconductor on a dome-shaped nanostructure to produce a highly efficient semiconductor at a low cost. “Nanopatterned High-Frequency Supporting Structures Stably Eliminate Substrate Effects Imposed on Two-Dimensional Semiconductors”. 2D semiconductor materials have emerged as alternatives for silicon-based semiconductors because of their inherent flexibility, high transparency, and excellent carrier transport properties, which are the important characteristics for flexible electronics.
Despite their outstanding physical and chemical properties, they are oversensitive to their environment due to their extremely thin nature. Hence, any irregularities in the
supporting surface can affect the properties of 2D semiconductors and make it more difficult to produce reliable and well-performing devices.

Researchers 3D print prototype for 'bionic eye'
A team of researchers at the University of Minnesota have, for the first time, fully 3D printed an array of light receptors on a
hemispherical surface. This discovery marks a significant step toward creating a "bionic eye" that could someday help blind
people see or sighted people see better.
"Bionic eyes are usually thought of as science fiction, but now we are closer than ever using a multimaterial 3D printer," said Michael McAlpine, a co-author of the study and University of Minnesota Benjamin Mayhugh Associate Professor of Mechanical Engineering.Researchers started with a hemispherical glass dome to show how they could overcome the challenge of printing electronics on a curved surface. Using their custom-built 3D printer, they started with a base ink of silver particles. The dispensed ink stayed in place and dried uniformly instead of running down the curved surface. The researchers then used semiconducting polymer materials to print photodiodes, which convert light into electricity. The entire process takes about an hour.
McAlpine said the most surprising part of the process was the 25 percent efficiency in converting the light into electricity they achieved with the fully 3D-printed semiconductors."We have a long way to go to routinely print active electronics reliably, but our 3D-printed semiconductors are now starting to show that they could potentially rival the efficiency of semiconducting devices fabricated in microfabrication facilities," McAlpine said. "Plus, we can easily print a semiconducting device on a curved surface, and they can't."McAlpine and his team are known for integrating 3D printing, electronics, and biology on a single platform. They received international attention a few years ago for printing a "bionic ear." Since then, they have 3D printed life-like artificial organs for surgical practice, electronic fabric that could serve as "bionic skin," electronics directly on a moving hand, and cells and scaffolds that could help people living with spinal cord injuries regain some function.
Heat-conducting crystals could help computer chips keep their cool
Whisking heat away from the circuitry in a computer's innards to the outside environment is critical: Overheated computer chips can make programs run slower or freeze, shut the device down altogether or cause permanent damage.As consumers demand smaller, faster and more powerful electronic devices that draw more current and generate moreheat, the issue of heat management is reaching a bottleneck. With current technology, there's a limit to the amount of heat that can be dissipated from the inside out.Researchers at the University of Texas at Dallas and their collaborators at the University of Illinois at Urbana-Champaign and the University of Houston have created a potential solution, described in a study published online July 5 in the journal *Science*.Bing Lv (pronounced "love"), assistant professor of physics in the School of Natural Sciences and Mathematics
at UT Dallas, and his colleagues produced crystals of a semiconducting material called boron arsenide that have an extremely high thermal conductivity, a property that describes a material's ability to transport heat."Heat management is very important for industries that rely on computer chips and transistors," said Lv, a corresponding author of the study. "For high-powered, small electronics, we cannot use metal to dissipate heat because metal can cause a short circuit. We cannot apply cooling fans because those take up space.What we need is an inexpensive semiconductor that also disperses a lot of heat."Most of today's computer chips are made of the element silicon, a crystalline semiconducting material that does an adequate job of dissipating heat. But silicon, in combination with other cooling technology incorporated into devices, can handle only so much. Diamond has the highest known thermal conductivity, around 2,200 watts per meter-kelvin, compared to about 150 watts per meter-kelvin for silicon. Although diamond has been incorporated occasionally in demanding heat-dissipation applications, the cost of natural diamonds and structural defects in humanmade diamond films make the material impractical for widespread use in electronics

Switching with molecules for pioneering electro-optical devices

The development of new electronic technologies drives the incessant reduction of functional component sizes. In the context of an international collaborative effort, a team of physicists at the Technical University of Munich has successfully deployed a single molecule as a switching element for light signals."Switching with just a single molecule brings future electronics one step closer to the ultimate limit of miniaturization," says nanoscientist Joachim Reichert from the Physics Department of the Technical University of Munich.

Different structure -- different optical properties

The team initially developed a method that allowed them to create precise electrical contacts with molecules in strong optical fields and to control them using an applied voltage. At a potential difference of around one volt, the molecule changes its structure: It becomes flat, conductive and scatters light.This optical behavior, which differs depending on the structure of the molecule, is quite exciting for the researchers because the scattering activity -- Raman scattering, in this case -- can be both observed and, at the same time, switched on and off via an applied voltage.

Challenging technology

The researchers used molecules synthesized by teams based in Basel and Karlsruhe. The molecules can change their structure in specific ways when they are charged. They are arranged on a metal surface and contacted using the corner of a glass fragment with a very thin metal coating as a tip..This serves as an electrical contact, light source and light collector, all in one. The researchers used the fragment to direct laser light to the molecule and measure tiny spectroscopic signals that vary with the applied voltage. Contacting individual molecules electrically is extremely challenging from a technical point of view. The scientists have now successfully combined this procedure with single-molecule spectroscopy, allowing them to observe even the smallest structural changes in molecules with great precision.

Competition for Silicon

One goal of molecular electronics is to develop novel devices that can replace traditional silicon-based components using integrated and directly controllable molecules.Thanks to its tiny dimensions, this nanosystem is suitable for applications in optoelectronics, in which light needs to be switched using variations in electrical potential.

print electronics and cells printed directly on skin

In a groundbreaking new study, researchers at the University of Minnesota used a customized, low-cost 3D printer to print electronics on a real hand for the first time.The technology could be used by soldiers on the battlefield to print temporary sensors on their bodies to detect chemical or biological agents or solar cells to charge essential electronics.

We are excited about the potential of this new 3D-printing technology using a portable, lightweight printer costing less than $400," said Michael McAlpine, the study's lead author and the University of Minnesota Benjamin Mayhugh Associate Professor of Mechanical Engineering. "We imagine that a soldier could pull this printer out of a backpack and print a chemical sensor or other electronics they need, directly on the skin. It would be like a 'Swiss Army knife' of the future with everything they need all in one portable 3D printing tool." ne of the key innovations of the new 3D-printing technique is that this printer can adjust to small movements of the body during printing. Temporary markers are placed on the skin and the skin is scanned. The printer uses computer vision to adjust to movements in real-time. No matter how hard anyone would try to stay still when using the printer on the skin, a person moves slightly and every hand is different," McAlpine said. "This printer can track the hand using the markers and adjust in real-time to the movements and contours of the hand, so printing of the electronics keeps its circuit shape." Another unique feature of this 3D-printing technique is that it uses a specialized ink made of silver flakes that can cure and conduct at room temperature. This is different from other 3D-printing inks that need to cure at high temperatures (up to 100 degrees Celsius or 212 degrees Fahrenheit) and would burn the hand.To remove the electronics, the person can simply peel off the electronic device with tweezers or wash it off with water. In addition to electronics, the new 3D-printing technique paves the way for many other applications, including printing cells to help those with skin diseases.

Path to a new era of microelectronics

A new microchip technology capable of optically transferring data could solve a severe bottleneck in current devices by speeding data transfer and reducing energy onsumption by orders of magnitude, according to an article published in the April 19, 2018 issue of Nature.

Researchers from Boston University, Massachusetts Institute of Technology, the University of California Berkeley and University of Colorado Boulder have developed a method to fabricate silicon chips that can communicate with light and are no more expensive than current chip technology. The result is the culmination of a several-year-long project funded by the Defense Advanced Research Project Agency that was a close collaboration between teams led by Associate Professor Vladimir Stojanovic of UC Berkeley, Professor Rajeev Ram of MIT, and Assistant Professor Milos Popovic from Boston University and previously CU Boulder. They collaborated with a semiconductor manufacturing research team at the Colleges of Nanoscale Science and Engineering (CNSE) of the State University of New York at Albany.The electrical signaling bottleneck between current microelectronic chips has left light communication as one of the only options left for further technological progress. The traditional method of data transfer-electrical wires-has a limit on how fast and how far it can transfer data.
It also uses a lot of power and generates heat. With the relentless demand for higher performance and lower power in electronics, these limits have been reached. But with this new development, that bottleneck can be solved."Instead of a single wire carrying 10 to 100 gigabits per second, you can have a single optical fiber carrying 10 to 20 terabits per second -- so about a thousand times more in the same footprint," says Popovic.
"If you replace a wire with an optical fiber, there are two ways you win," he says. "First, with light, you can send data at much higher frequencies without significant loss of energy as there is with copper wiring. Second, with optics, you can use many different colors of light in one fiber and each one can carry a data channel. The fibers can also be packed more closely together than copper wires can without crosstalk." In past, progress to integrate a photonic capability onto state-of-the-art chips that are used in computers and smartphones was hindered by a manufacturing roadblock. Modern processors are enabled by highly developed industrial semiconductor manufacturing processes capable of stamping out a billion transistors that work together on one chip. But these manufacturing processes are finely tuned and designing an approach to include optical devices on chips while keeping the current electrical capabilities intact proved difficult.The first major success in overcoming this roadblock was in 2015 when the same group of researchers published another paper in *Nature* that solved this problem, but did so in a limited commercially relevant setting. The paper demonstrated the world's first microprocessor with a photonic data transfer capability and the approach to manufacturing it without changing the original manufacturing process-a concept the researchers have termed a zero-change technology. Ayar Labs, Inc., a startup that Ram, Popovic and Stojanovic co-founded, has recently partnered with major semiconductor industry manufacturer GlobalFoundries to commercialize this technology.
However, this previous approach was applicable to a small fraction of state-of-the-art microelectronic chips that did not include the most prevalent kind, which use a starting material referred to as bulk silicon.
In the new paper, the researchers present a manufacturing solution applicable to even the most commercially widespread chips based on bulk silicon, by introducing a set of new material layers in the photonic processing portion of the silicon chip. They demonstrate that
this change allows optical communication with no negative impact on electronics. By working with state-of-the-art semiconductor manufacturing researchers at CNSE Albany to develop this solution, the scientists ensured that any process that was developed could be
seamlessly inserted into current industry-level manufacturing.

CONCLUSION

ELECTRONICS as an Industry is expanding swiftly into many areas within TELECOMMUNICATION, Biotechnology, & Automation. Industries & Businesses rely on electronics technologybfor creating, manufacturing & maintaining industrial machinery & processes. Companies can reduce costs & enhance output by hirirng electronics technology experts to implement robotics , programming & automation
process. Electronics has the lion's share in Modern Science & Technology, anchoring it's roots deeper & firmer in day-to-day Modern lifestyle.Millions of technocrats & thousands of scientists with their tons of
ideas are striving each day,in new new ways to morph the definition of "MODERN" in an upgraded platform of ELECTRONICS .

RECENT TRENDS IN ELECTRONICS ENGINEERING

SMRITICA KUMARI (1st year, ECE)

Innovation is the key to success in the globalised economy of today with ever increasing pace of development in electronics. Nowadays,electronic engineers have become the catalyst for the change of the modern society. Their innovations and new techniques in recent trends in the respective discipline have transformed many engineers into global leaders.

No field in the history of mankind has evolved so rapidly as the field of electronics. There are some people who say that electronics has reached its saturation but there are some fields that are still evolving and new opportunities are still germinating.

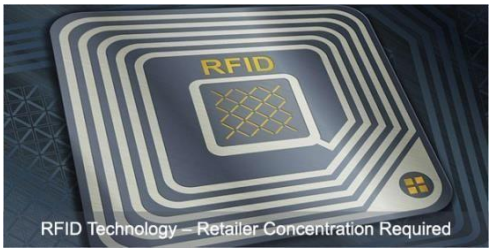
The era of electronics began with the invention of the transistor in 1947 and silicon-based semiconductor technology. Seven decades later, we are surrounded by electronic devices and, much as we try to deny it, we rely on them in our everyday lives.The performance of silicon-based devices has improved rapidly in the past few decades, mostly due to novel processing and patterning technologies, while nanotechnology has allowed for miniaturization and cost reduction.

For many years silicon remained the only option in electronics. But recent developments in materials-engineering and nanotechnology have introduced new pathways for electronics. While traditional silicon electronics will remain the main focus, alternative trends are emerging.Here are some of those new fields:-

1. Li-Fi- The Li-Fi stood for Light fidelity. What happens in this technology is that the traditional Wi-Fi, which uses radio waves for information propagation is replaced by a bunch of LED's that on-off, number of times in a second (these cycles goes unnoticed by the human eye) and supplying a digital signal to the mobile or other internet operating device. Benefit of this technology is that like radiowaves, the light doesn't cross the walls and hence, your neighbour couldn't hack your wi-fi.

2.RFID-

The RFID stood for Radio Frequency Identification. It is new world's substitute for Universal Product Code (UPC) Bar Code. RFID are generally Write once Read Many (WORM) devices. Imagine you go to a shopping mall, take the things you wanted and move out of the store. The RFID sends message to your bank and cost of product you bought is deducted from your account. So no more queue in shopping mall.



3.Outernet -

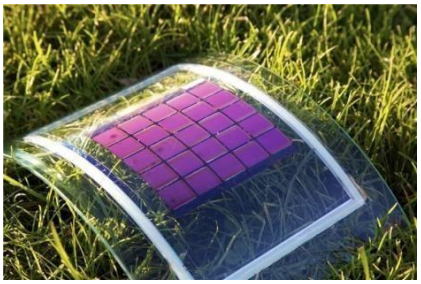
The outernet is a device that can be used to provide data connection to the remote areas. The device called lantern is used for receiving the data from satellites.

4. Surveillance Camera Control System -

This is the latest technology to provide the security in places like roads, shops and colleges to capture visuals for monitoring purpose. In case of robbery, the recorded video or visuals may provide some clues pertaining to the heist. Basically, these surveillance cameras are fixed devices, and therefore, 360 degree coverage is not possible with such systems. However, 270 degree coverage is possible with these cameras.

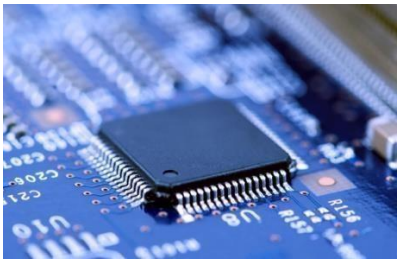
5.Plastic Solar cell technology –

The solar energy is the most readily available sources of renewable energy by which electricity is produced by the solar panels. The solar panel consisted array of solar photovoltaic cells that convert the sunlight into usable electricity. The solar panels placed on the roof of homes or free standing remote locations.



6. Nanotechnology in Electronics –

The nanotechnology is a one of the new technology in electronics, which is used in different application areas such as medicine and space technology. Nowadays, nano robots play an essential role in the field of Bio-Medicine, particularly for the treatment of cancer, cerebral Aneurysm, removal of kidney stones etc.



There are more technologies in the field of electronics yet to be developed in this modern world.

ELECTROSPARK

VOLUME- 2, ISSUE- 1, 2018-19

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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MESSAGE OF HOD, ECE

I, welcome you to the Department of Electronics & Communication Engineering and take you to introduce it. The department has highly experienced dedicated faculty members and well-equipped laboratories. The department recorded good no of placements in reputed software and electronics industries over the year. The student achievements are magnificent in terms of regularly winning prizes in competitions in reputed institutes like IITs & NITs.

ORGANIC ELECTRONICS

Satvik Srivastava (1st Year, ECE)

The development of conducting polymers and their applications resulted in another Nobel prize in 2000, this time in chemistry. Alan J. Heeger, Alan G. MacDiarmid and Hideki Shirakawa proved that plastic can conduct electricity.

Organic electronics is a field of materials science concerning the design, synthesis, characterization, and application of organic small molecules or polymers that show desirable electronic properties such as conductivity. Unlike conventional inorganic conductors and semiconductor, organic electronic materials are constructed from organic (carbon-based) small molecules or polymers using synthetic strategies developed in the context of organic and polymer chemistry.

One of the promised benefits of organic electronics is their potential low cost compared to traditional inorganic electronics. Attractive properties of polymeric conductors include their electrical conductivity that can be varied by the concentrations of dopants. Relative to metals, they have mechanical flexibility. Some have high thermal stability.

The earliest reported organic conductive material, polyaniline, was described by Henry Letheby in 1862. Work on other polymeric organic materials began in earnest in the 1960s, A high conductivity of 1 S/cm (S = Siemens) was reported in 1963 for a derivative of tetraiodopyrrole. In 1977, it was discovered that polyacetaline can be oxidised with halogens to produce conducting materials from either insulating or semiconducting materials. The 2000 Nobel Prize in Chemistry was awarded to Alan J. Heeger, Alan G. MacDiarmid, and Hideki Shirakava jointly for their work on conductive polymers. These and many other workers identified large families of electrically conducting polymers including polythiophene, polyphenylene sulfide, and others.

Conductive plastics have undergone development for applications in industry. In 1987, the first organic diode was produced at Eastman Kodak by Ching W. Tang and Steven Van Slyke.

Subsequent research developed multilayer polymers and the new field of plastic electronics and organic light-emitting diodes (OLED) research and device production grew rapidly.

Br6A, a next generation pure organic light emitting crystal family

An OLED (organic light-emitting diode) consists of a thin film of organic material that emits light under stimulation by an electric current. A typical OLED consists of an anode, a cathode, OLED organic material and a conductive layer.

Discovery of OLED

André Bernanose[9][10] was the first person to observe electroluminescence in organic materials, and Ching W. Tang, reported fabrication of an OLED device in 1987. The OLED device incorporated a double-layer structure motif consisting of separate hole transporting and electron-transporting layers, with light emission taking place in between the two layers. Their discovery opened a new era of current OLED research and device design.

Classification and current research

OLED organic materials can be divided into two major families: small-molecule-based and polymer-based. Small molecule OLEDs (SM-OLEDs) include organometallic chelates(Alq3), fluorescent and phosphorescent dyes, and conjugated dendrimers. Fluorescent dyes can be selected according to the desired range of emission wavelengths; compounds like perylene and rubrene are often used. Very recently, Dr. Kim J. et al. at University of Michigan reported a pure organic light emitting crystal, Br6A, by modifying its halogen bonding, they succeeded in tuning the phosphorescence to different wavelengths including green, blue and red. By modifying the structure of Br6A, scientists are attempting to achieve a next generation organic light emitting diode. Devices based on small molecules are usually fabricated by thermal evaporation under vacuum. While this method enables the formation of well-controlled homogeneous film; is hampered by high cost and limited scalability.

Polymer light-emitting diodes (PLEDs), similar to SM-OLED, emit light under an applied electric current. Polymer-based OLEDs are generally more efficient than SM-OLEDs requiring a comparatively lower amount of energy to produce the same luminescence. Common polymers used in PLEDs include derivatives of poly(p-phenylene vinylene) and polyfluorene. The emitted color can be tuned by substitution of different side chains onto the polymer backbone or modifying the stability of the polymer. In contrast to SM-OLEDs, polymer-based OLEDs cannot be fabricated through vacuum evaporation, and must instead be processed using solution-based techniques. Compared to thermal evaporation, solution based methods are more suited to creating films with large dimensions. Zhenan Bao. et al. at Stanford University reported a novel way to construct large-area organic semiconductor thin films using aligned single crystalline domains.

MODERN TRENDS ON ELECTRONICS ENGINEERING

SAHIL BHARDWAJ (E.C.E 2nd Year)

The term "Electronics and Communication Engineering" denotes a broad engineering field that covers sub fields such as analog electronics, digital electronics, consumer electronics, embedded systems, communication systems and power electronics. Electronics engineering deals with implementation of applications, principles and algorithms developed within many related fields. For example solid-state physics, radio engineering, telecommunications, control systems, signal processing, systems engineering, computer engineering, instrumentation engineering, electric power control, robotics, and many others

The era of electronics began with the invention of the transistor in 1947 and silicon-based semiconductor technology. Seven decades later, we are surrounded by electronic devices and, much as we try to deny it, we rely on them in our everyday lives. For many years silicon remained the only option in electronics. But recent developments in materials-engineering and nanotechnology have introduced new pathways for electronics. While traditional silicon electronics will remain the main focus, alternative trends are emerging.

These includes:

Robotics and Automation

Many electronic equipment companies are using robotics and automation to improve plant efficiency and productivity. Sensors are being used in various machines to access invaluable data for improving efficiencies and reducing potential breakdowns. For instance, according to a report by Boston Consulting Group (BCG) in 2016, 1.2 million industrial robots are expected to be deployed by 2025, while the electronic equipment is expected to reach $2.1 trillion by 2020 according to TBRC, thus indicating a rise in automation and robotics technology adoption to improve productivity and reduce production costs.

Virtual Reality in Electronic Manufacturing

Virtual reality technology is being adopted by electronic manufacturing companies to improve manufacturing efficiency. This technology in the electronic manufacturing industry is often referred to as digital design, simulation, and integration. Virtual reality technology enables companies to inspect design objects at all conceivable scales, thereby eliminating defects in the product in the design stage. Taking into account the growth rate of electronic equipment market globally, which is 5.2% according to TBRC, virtual reality has a big implementation scope in the forecast period.

IoT Technology Driving Smart Household Appliances

Household appliance manufacturers are integrating their products with the IoT technology to make customers lives comfortable and convenient. Internet of Things technology is the interconnectivity of physical objects and devices that are integrated with sensors and software that allow them to exchange and collect data. Major technologies enabling smart household appliances include Wi-Fi, Bluetooth Low Energy, micro server and micro-electromechanical systems.

Artificial intelligence (AI)

Artificial intelligence are software programs that mimic the way humans learn and solve complex problem. These systems are different from other applications which mainly process transactions and takes decisions which are explicitly programmed.

Rise of Level-3 autonomous vehicles

This year will even see the launch of Level-3 autonomous vehicle which will be able to fully take over the driver with precise autonomous technology. The Level-3 autonomous vehicles might even shape a new future for the autonomous driving industry.

3D printing

3D printing has the potential to bring more efficiency and sustainability in the manufacturing industry. 3D printing can improve major industries such as construction and healthcare for the better.

Drone deliveries

E-commerce giants such as Amazon are expected to launch its first drone deliveries in the UK. Walmart is also expected to deploy drone deliveries in the United States next year.

RESEARCHERS 3D PRINT PROTOTYPE FOR "BIONIC EYE"

SARIKA KUMARI PANDEY (E.C.E 2nd Year)

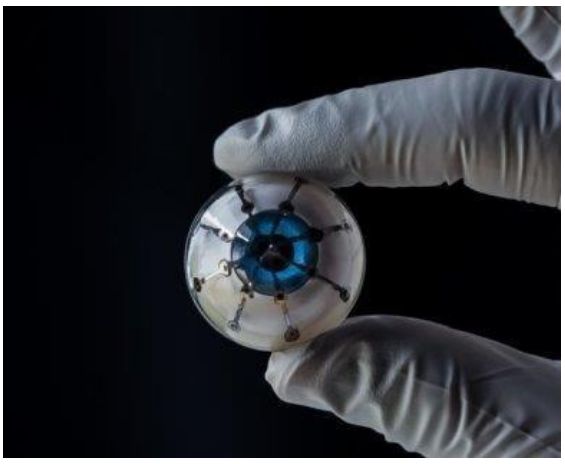
BIOLOGY, ELECTRONICS AND 3D PRINTING ON A SINGLE PLATFORM

The research of **BIONIC EYE** is conducted by Sir McAlpine and his team. His research team includes University of Minnesota mechanical engineering graduate student Ruitao Su, postdoctoral researchers Sung Hyun Park, Shuang-Zhuang Guo, Kaiyan Qiu, Daeha Joung, Fanben Meng, and undergraduate student Jaewoo Jeong.

The research is published on 28th of August'18 in ***Advanced Materials***, a peer-reviewed scientific journal covering materials science. The author also holds the patent for 3D-printed semiconducting devices.

WHAT IS BIONIC EYE?

"Bionic eyes are usually thought of as science fiction, but now we are closer than ever using a multimaterial 3D printer," said Michael McAlpine, a co-author of the study and University of Minnesota Benjamin Mayhugh Associate Professor of Mechanical Engineering.



HOW THE PRINTING IS DONE IN 3D WAY?

Researchers started with a hemispherical glass dome to show how they could overcome the challenge of printing electronics on a curved surface. Using their custom-built 3D printer, they started with a base ink of silver particles. The dispensed ink stayed in place and dried uniformly instead of running down the curved surface. The researchers then used semiconducting polymer materials to print photodiodes, which convert light into electricity. The entire process takes about an hour.

EFFICIENCY

McAlpine said the most surprising part of the process was the 25 percent efficiency in converting the light into electricity they achieved with the fully 3D-printed semiconductors.

ADVANTAGES OF 3D PRINTING

"We have a long way to go to routinely print active electronics reliably, but our 3D-printed semiconductors are now starting to show that they could:

(1) potentially rival the efficiency of semiconducting devices fabricated in microfabrication facilities," McAlpine said.

(2) "Plus, can easily print a semiconducting device on a curved surface, unlike conventional methods."

OTHER ACHIEVEMENTS OF SIR MCALPINE AND HIS TEAM

McAlpine and his team are known for integrating 3D printing, electronics, and biology on a single platform.

They received international attention a few years ago for printing a "bionic ear." Since then, they have 3D printed life-like artificial organs for surgical practice, electronic fabric that could serve as "bionic skin," electronics directly on a moving hand, and cells and scaffolds that could help people living with spinal cord injuries regain some function.

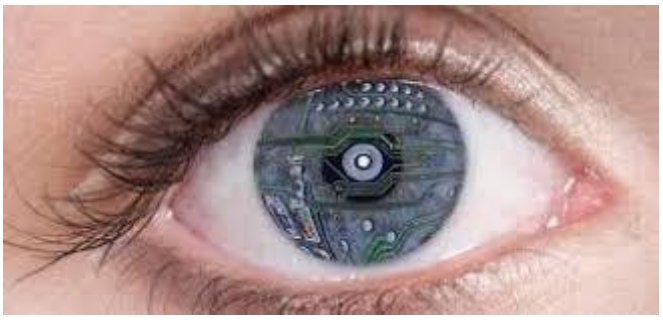
NEXT STEP TOWARDS THE RESEARCH

(1) Increase efficiency

McAlpine says the next steps are to create a prototype with more light receptors that are even more efficient.

(2) Implantation as a real eye

They'd also like to find a way to print on a soft hemispherical material that can be implanted into a real eye.



BIONIC EYE is an another step towards a future of electronic dependency.
Bionic eye will not only bless the blind people with sight but also help the less-sighted people see better. The future is going to be of course, a better place to live in.

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AUTOMATIC ROOM LIGHTING SYSTEM USING MICROCONTROLLER

SAMAPTI RUDRA (E.C.E 2nd Year)

ABSTRUCT –

The electronic device nowadays is rapidly taking its best position to ease the human complexity of living life. As per the concern of the human disabilities keeping counter of everything happening in and around the world we limit this project to you to increment the functioning of the visitors through the light controlling system which we wind up naming "Automatic light controller with visitors counter".

INTRODUCTION –

Automatic Room Lighting System is a microcontroller based project that automatically turns on or off the lights in a room. We often forget to switch off lights or fans when we leave a room. By using this system, we can intentionally forget about the lights as the system will automatically take care them. The digital world we are living in allows us to use different technologies to automatically perform certain tasks. The projects implement here is one such project where the microcontroller based system automatically controls the room lights.

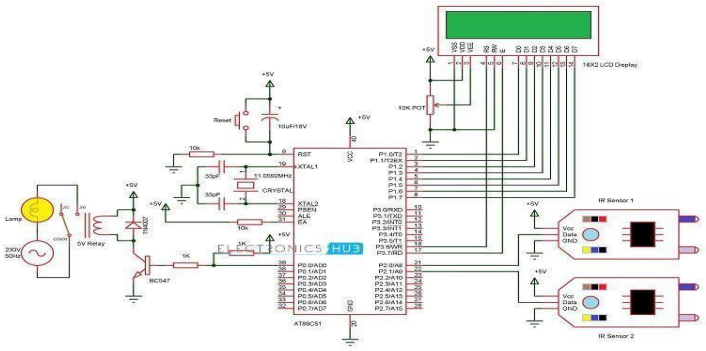
The aim of this project is to automatically turn on or off the lights in a room by detecting the human movement. Since the job of this circuit is to turn on the light when someone enters the room and turn off light when the last person leaves the room, the project has to internally count the number of visitors.

TABIE OF CONTENTS

- AT89C51 microcontroller
- 8051 development board
- 2X infrared sensors
- 16X2 LCD display
- 5V relay module
- LAMP
- Connecting wires
- Power supply

CIRCUIT DESCRIPTION

A 16 X 2 LCD Display, two IR Sensors and a 5V Relay Module must be connecting to the 8051 microcontroller. First, connect the 8 Data pins of the LCD to PORTI pins i.e.P.1.0 TO P.1.7.The 3 control pins of LCD i.e. RS, RW and E are connected to P3.6, GND and P3.7 pins respectively. A 10 KΩ Potentiometer is connected to contrast adjust pin of LCD i.e. its pin 3.



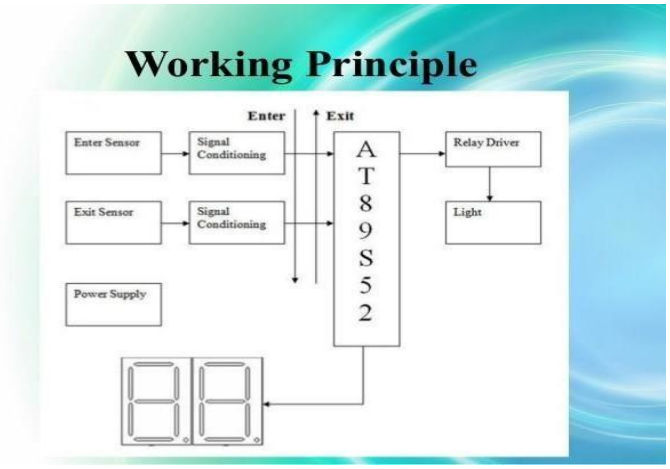
WORKING PRINCIPLE

In this project, an automatic room lighting system is developed using 8051 microcontroller. The working of the project is explained here. The main component of the project is IR Sensor and we have used two of them. The placement of the sensors is important as it will determine the functioning of the project.

Practically speaking, both the sensors must be placed on the either side of the door or entrance of the room. The sensor placed on the outside of the room is named as Sensor 1 and the sensor, which is placed on the inside is named Sensor 2.When a person tries to enter the room, Sensor 1 detects the person first and then Sensor 2. This action will indicate the 8051 Microcontroller that the person is entering the room.

Hence, the microcontroller will turn on the light and also increments the visitor counter to 1. If there are more visitor, the microcontroller will keep the light turned on and increments the visitor counter accordingly. When a person tries to leave the room, Sensor 2 detects the person first and then Sensor 1. This process will make the microcontroller to understand that a person is trying to leave the room and hence, it will decrement the count of visitors. The microcontroller will not turn off the light until the last person has left the room.

As the visitors start leaving the room, the visitor count will be decremented and when the last person leaves the room, the count be comes 0. During this point, the microcontroller understands that there is nobody in the room and turns OFF the light.



CONCLUSION

This project deals with the usage of the energy in this competitive world of electricity. This project is efficient enough to let someone know about the accuracy of the person entered and have taken the exit from the room This project saves more electric power than it seems more electric power than it seems and also collaborates the knowledge of electric and digital study. It not only teaches us about the functioning of the but also teaches us how we can preserve electricity even in the electricity based project.

RUPAM DASGUPTA (ECE 1ST YEAR)

Trends vs. Revolutions

In analyzing the last ninety years of unmanned flight we can discriminate between trends and revolutions in military pilotless aircraft.

In 1918 Charles Kettering developed a gyroscope-controlled flying machine that fell and exploded after the propeller turned a preset number of times. At first, the Army Signal Corps thought of using Kettering's Bug as a form of long-range artillery. Since then, pilotless aircraft have been used in a variety of contexts: the Army Air Forces ordered missiles during World War II, drones have been used for target practice since the 1930s, and remotely piloted vehicles (RPVs) were flown over Vietnam to gather intelligence. This wide variety of applications makes tracking the development of autonomous technologies difficult, since the idea is often reframed. For instance, the "drones" of the 1950s became the "remotely piloted vehicles" of the 1960s and 1970s and changed again into the "unmanned aerial vehicles" of today.

Terminology

The acronym UAV (unmanned aerial vehicle) refers to any reusable air vehicle that does not have a pilot on board. "Missile" refers to a onetime use vehicle with no pilot onboard. In this sense, the Kettering Bug is a missile, not a UAV. There are some programs that do not fit cleanly into either category, such as the craft used in Project Aphrodite in WWII. Project Aphrodite aircraft were technically reusable, since they were converted airplanes, but they were never used or intended as such after being repurposed.

"Pilotless aircraft" refers to such aircraft as well as to the broader category of any aircraft with no pilot on board.

Approach

Rather than appearing abruptly in a technological revolution, much of UAV development has been evolutionary, as can be shown by identifying clear, strong trends in thought and technology over time. Several trends have been behind the development of UAVs and missiles. Rather than being a new and revolutionary idea, pilotless aircraft are a tried and true branch of military research and development.

There are possible exceptions to the evolutionary development of pilotless aircraft. UAVs are a family of technologies that have revolutionary potential, but not necessarily due to their advertised characteristics of saving lives and increasing military success. This is not to say that UAVs do not save lives or increase success, but any improvements in these areas are the result of longstanding efforts, not revolutionary change.

Evolutionary Development

Evolutionary trends in pilotless aircraft need to be identified and put in context. When looking for trends, ideas are more important than technology because real change occurs when people behave differently, not when they behave similarly with different equipment. If UAVs are going to spark any revolutions, some break in continuous development must occur.

Unified Development:

Interwar Pilotless Aircraft

The U.S. military began research into missiles during the First World War, under the idea of the "flying bomb" or "aerial torpedo." The gyroscope-controlled bombs designed by Charles Kettering for the Army Signal Corps and by Elmer and Incorporating the idea into existing combat categories, the Army thought of the missiles as long-range artillery; with this, the confusion over what to call such weapons began. Abandoning autonomy for a few years, the military began conducting radio control experiments in the 1920s to achieve better accuracy for the Army's Messenger Aerial Torpedo and the Navy's Curtiss N-9. Both services lost interest in the programs after a few years, just as they had lost interest in the autonomous programs of the decade before. Radio-controlled aircraft re-emerged in the 1930s as target drones; thus, UAVs gained their first permanent foothold in the U.S. military. In 1938 the U.S. Navy began using UAVs, including the N2C-2 drone, for anti-aircraft gunnery practice. This new use of pilotless aircraft marks a shift in thinking about the platforms. Using their own pilots for target practice was clearly out of the question, so UAVs were developed to fill a role that could not be filled by manned aircraft.From this point onward, UAVs have filled roles that manned aircraft would not take, while missiles compete more directly with other weapons.

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INTRODUCTION TO ORGANIC ELECTRONICS

Kundan Sharma (1st Year, ECE)

Organic electronics, plastic electronics or polymer electronics,is a branch of electronics dealing with conductive polymers and conductive small molecules Called As 'organic' electronics as the polymers and small molecules are carbon-based Most polymer electronics are laminar electronics,a category that also includes transparent electronic package and paper based electronics Conductive polymers
are lighter, more flexible,and less expensive than inorganic conductors.This makes them a desirable alternative in many applications. *Conventional Electronics are based on inorganic materials, e.g., Si,oxides .In people's mind, organic materials were not associated with electronics. Used as*
Plastic bags Organic materials Construction materials, MedicinesX Electronics. Organic Electronics In the past 20 years, people found organic materials could have Amazing and unique electronic and photonic properties. So there born these exciting areas!!! Organic Light Organic Field Organic Emitting Diode Effect Transistor Photovoltaic (OLED)(OFET)(OPV) Flexible cell phone Ultra-thin OLED TV Plastic Solar cell Flexible iPad.

In terms of performance and industrial development ,organic molecules and Polymers cannot yet compete with their inorganic counter parts. However, organic Electronics haves ome advantages over conventional electronic materials. Low Material and production costs, mechanical flexibility, adaptability of synthesis Processes and biocompatibility make organice lectronics a desirable choice for Certain applications. Commercially available high-tech products relying on organic semiconductors, such As curved television screens, displays for smart phones, coloured light sources and Portable solar cells, demonstrate the industrial maturity of organic electronics. In Fact , several high-tech companies, including LG Electronics and Samsung, have Invested in cheap and high-performance organic-electronic devices. With the consistent refinement of organic electronics, numerous application Possibilities for everyday use will arise. It is expected that the organic electronics Market will grow rapidly in the coming years.

The Future of Organic Electronics:
The Future of Organic Electronic had some amazing developments in the past! In the next 10-20 years Organic electronics will form several major multi billion $ industries. New exciting are as of Organic Electronics Will be discovered! A trans-parent laptop Circuits made by printing Plastic solar cells covering everywhere Do you want to be part of these exciting industries and discoveries?

ARTIFICIAL NEURAL NETWORK FOR RECOGNITION AND MODELLING OF BRAIN WAVE SIGNALS

Mousumi Dhar & Prithiraj Nandan
ECE, Second Year Student

ABSTRACT
Improving life quality for disabled patients and overall improvement of human thought concentration especially individuals suffering from Autism and Alzheimer can be accomplished with the aid of Brainwave Computer Interface (BCI). In this paper, a Radial Basis Functions (RBF) Artificial Neural Network (ANN) is constructed and presented through the consideration of a noisy environment to simulate a BCI in real world applications. Artificial Neural Network can be used to recognise and model brainwave signals. The forecasting performance of different artificial neural network models, such as feed forward and recurrent neural networks, using both linear and nonlinear activation functions in the output neuron, are examined. As a result of analysis, it is found that artificial neural networks model the data successfully and all the models employed produce very accurate forecasts.

INTRODUCTION

"What is an artificial neural network?" is the first question that should be answered. Picton answered this question by separating the question into two parts. The first part is why it is called an artificial neural network. It is called an artificial neural network because it is a network of interconnected elements. These elements were inspired from studies of biological nervous systems. In other words, artificial neural networks are an attempt at creating machines that work in a similar way to the human brain by building these machines using components that behave like biological neurons. The second part is what an artificial neural network does. The function of an artificial neural network is to produce an output pattern when presented with an input pattern. Since artificial neural networks can model both the linear and the nonlinear structure of time series, they have attracted more and more attention from both academic researchers and industrial practitioners in recent years . Artificial neural networks have been widely used to model time series in various fields of applications, and used as a good alternative method for both linear and nonlinear time series forecasting.

Human to machine interaction is crucial for many human activities that require application of robots, computer devices, whose success in industry, military, and life highly relies on the way they communicate and interact with human. In medical research, Brain Computer Interface (BCI) had been implemented to allow people with disabilities to guide wheelchairs. The intention of moving something is generally known as cognitive thought in BCI, it becomes useful for severely paralysed people to move things around them. This technology is used to detect driver fatigue and driver Page _2 sleepiness. The Electroencephalography (EEG) is a well-known term in BCI research community. It allows the user to interact with a system through mental actions alone unlike traditional control procedures such as physical manipulation or verbal commands [4]. There are basically two techniques that are used to monitor the users' brain activities and these include invasive (cortically implanted electrodes) and non-invasive (EEG type) techniques. Invasive techniques usually provide more precise and accurate measurements.

BRAIN WAVE COMPUTER INTERFACE DEVICE

A prototype of two wheeler robot is implemented and experimented controlled by a thought of a human being [8]. The eye-blink and ocular movement components could be decomposed by independent component analysis (ICA) using the 14-channel signals measured by the headset [9]. Emoitv EEG Neuroheadset is utilised to sense and capture users EEG and EMG data, and Emotiv Control Panel Software is employed to interpret the facial expressions and mind states and also to convert it into its corresponding text acronym. Both visualisation and motor control methods were carried out and analysed in order to accurately control the robot [10]. Wolpaw and his colleagues train individuals to control their-wave amplitude for cursor control [12]. The recent studies on BCI and Neurofeedback have applied different stimulus and cognitive tasks. It includes imagination of 3D cube, imagination movement of both the hands and rest to move the cursor to their respective targets, playing snake gameplay, performing oddball task session, and word eye blink flashes images of Wheres Waldo. Brain wave acquisition were also collected from moving the cursor to their respective targets, watching video clips and doing video games.

SIGNAL RECOGNITION

In this section, the RBF network built to train and recognise the brain signals of the test sets are constructed. The network contains two procedures, a training phase and a test phase.

CONCLUSION

The success of artificial neural networks has been proved in various fields of application. Artificial neural networks consist of artificial neurons which imitate biological neurons. Due to the framework of this method, it could be appropriate to use this method for modeling waves produced by neurons in the brain.

A Radial Basis Functions (RBF) Artificial Neural Network (ANN) is constructed in this work to recognise brain signals. Recognition rates in the highest 70 percent were recorded.

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IOT ENABLED AIR POLLUTION METER USING DIGITAL DASHBOARD ON SMARTPHONE FOR VEHICLES.

MEGHA DEOGHARIA (E.C.E 2nd Year)

INTRODUCTION

Air pollution meter presented here is IOT enabled to monitor air quality on our smart phone. This project has been introduced keeping in mind the increasing pollution in cities nowadays. This meter uses blynk application i.e.an Internet of Things platform to control arduino and raspberry pi over the internet.

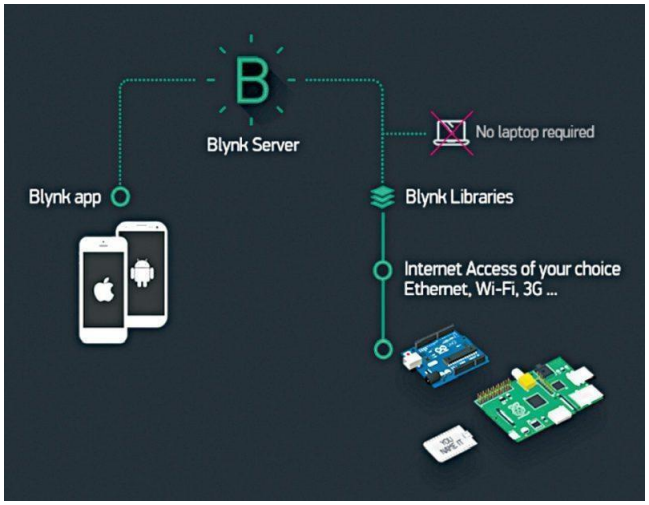
Blynk provides a digital dashboard on our smartphones that will display real time air quality readings for immediate surroundings.

Blynk can control hardware remotely .It can display sensor data, store and analyse things and visualize it. There three major components i.e. **Blynk app, Blynk server, Blynk libraries.**

Blynk app: It allowsyou to create amazing interfaces for your projects using various interfaces

Blynk server: It is responsible between all communication between the smart phone and hardware. Blynk can be used Blynk cloud or run it as private Blynk server. It can also be launched in Raspberry pi.

Blynk Libraries:The libraries enable communication with server and process all incoming and outgoing commands.



ANALYSIS

Implementation of this air pollution meter detects that the pollution is high or low because of combustion of fuel in vehicle. We are using Hypertext transfer protocol (HTTP), Message Queue Telemetry Transport protocol (MQTTP) for communicating and transferring dataand also assures that the data is not manipulated. For storing details IOT cloud is used. IOT cloud is Salesforce platform that is designed to store and process internet of things data.

Components:Sensors-PM2.5/PM10(SDS011),Gas sensor(MQ135),temperature and Humidity sensor(DHT11), smartphone and digital dashboard, Ethernet shield power supply, Additional alarm indication, raspberry or arduino.

System Architecture:

Our system contains Air Quality Sensor, RPI 3, IoT Cloud, Dashboard, Locking system and controlling. The air quality sensor is the MQX sensor which will sense the gas produced by the vehicles .It is the important part of the system. It will sense the pollution after 10kms of drive. The RPI 3 (Raspberry PI version 3) is used which is less in cost and have features like Bluetooth and Wi-Fi.It is an interface between the sensor and other things. It will intimate the driver as well as the owner of the vehicles which are generating pollution and the intimation will be send 2 times and 3rd time no intimation will be given and the starring will be locked by controlling and locking system and the details will be send to the RTO. The MQTT is lightweight messaging protocol which gives the 100% transmission of data with high speed. The IoT cloud is a Salesforce platform which stores large amount of data. It stores details of all vehicles and it will only pass the details of those vehicles which are generating gas above the threshold value to the RTO. HTTP (Hypertext Transfer) protocol is used to send the details from cloud to dashboard. RTO is using the dashboard which is an Android application used to display the details of vehicles which is send by IoT cloud.

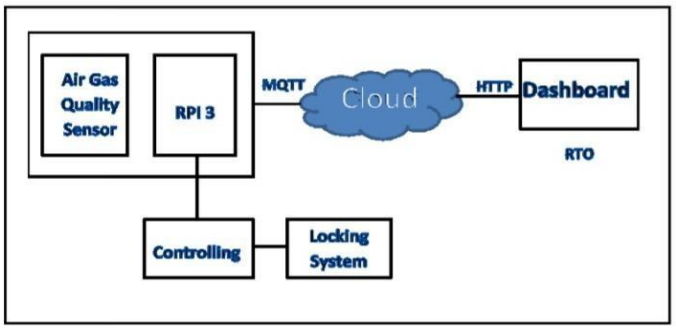


Fig :(a) System Architecture

FUTURE SCOPE

In this system we can add alcohol sensing and tracking system which makes the drive more secure. It will also detect the accidents which are nowadays a serious issue .We can also add GPS tracking to our system.

CONCLUSION

Implementation of air pollution detection in vehicles that is pollution is high or low because of combustion of fuel in vehicles can be used to keep a check on increasing air pollution in surrounding. Implementation of air pollution meter using raspberry pi and other components can provide additional features.

References: IOT Based Air Pollution Monitoring and Forecasting System", 2015 International Conference on Computer and Computational Sciences (ICCCS), pp. 257-260.

International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887 Volume 5 Issue X, October 2017- Available at www.ijraset.com

https://electronicsforum.com: "IOT enabled Air pollution meter" by Biswajit Das.

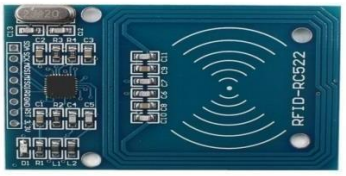
RFID: THE FUTURE

Divya Suman and Pragati Singh (ECE)

Radio frequency identification, or RFID, is a generic term for technologies that use radio waves to automatically identify people or objects. There are several methods of identification, but the most common is to store a serial number that identifies a person or object, and perhaps other information, on a microchip that is attached to an antenna (the chip and the antenna together are called an RFID transponder or an RFID tag). The antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can make use of it.

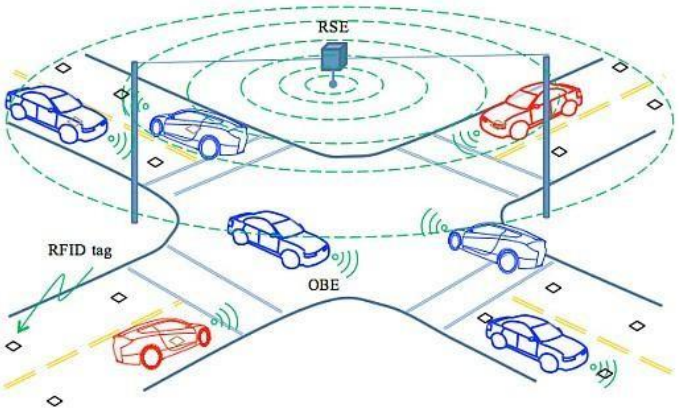
RFID LABELS

RFID is new world's substitute for Universal Product Code (UPC) bar code. RFID are generally write once read many (WORM) devices. Imagine you go to a shopping mall; take the things you wanted and move out of the store. The RFID sends message to your bank and cost of product you bought is deducted from your account. So no more queue in shopping mall.



RFID READER

RFID is a proven technology that's been around 1970s. Up to now, many companies have RFID systems. These investments are usually made in closed-loop systems that is, when a company is tracking goods that never its own control. That's because all existing RFID systems use proprietary technology, which means that if company A puts an RFID tag on a product, it can't be read by Company B unless they both use the same RFID system from the same vendor. But most companies don't have closed-loop systems, and many of the benefits of tracking items come from tracking them as they move from one company to another and even one country to another.



So, RFID will emerge as "**THE NEXT BIG THING**" in future.

"Technology makes it possible for people to gain control over everything, except over technology".

SMART QUILL

DIPANITA DAS (1st year ECE)

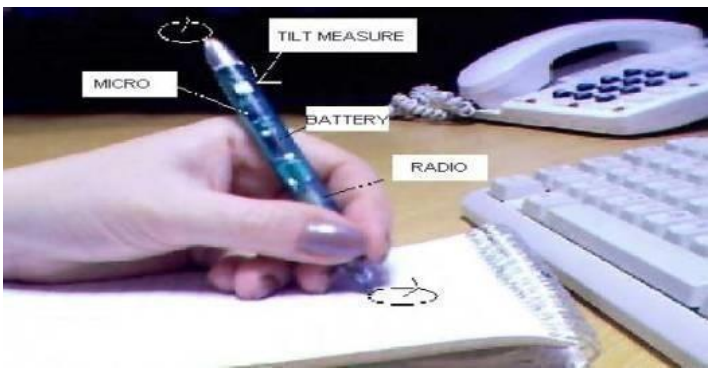
Abstract

Lyndsay Williams of Microsoft Research's Cambridge UK lab is the inventor of the Smartquill,a pen that can remember the words that it is used to write, and then transform them into computer text .

The prototype, called SmartQuil, has been developed by world-leading research laboratories run by BT (formerly British Telecom) at Martlesham, eastern England. It is claimed to be the biggest revolution in handwriting since the invention of the pen.

Your words of wisdom can also be uploaded to your PC through the "digital inkwell", while the files that you might want to view on the pen are downloaded to Smart Quill as well.

Working of Smart Quill



COMMUNICATION WITH OTHER DEVICES

SmartQuill models developed by BT laboratories communicated with the PC via a radio transmitter, but the current prototype hooks up to a PC via a cable and electronic docking station called an "inkwell." .The data stored in the memory is uploaded to the personal computer when it is placed in to a docking station. Future models could receive e-mails and pager messages via a wireless messaging system .This enables two-way wireless communication with other computing devices .

 MEMORY

SmartQuill has 4MB EEPROM memory. At a time, up to 10 pages of notes can be stored locally on the pen. SmartQuill works by measuring the pen's movements and matching them to the movements that produce letters and words programmed into its memory.

 APPLICATIONS

SmartQuill isn't all space-age. It contains an ink cartridge so that users can see what they write on paper. Hence a simple application of SmartQuill is that it write notes on paper. This information recorded in the pen is then downloaded to PC .

The information stored in the pen can be input to other devices such as mobile phones, printers ,modems,desktop computers etc for different applications.

 SmartQuill can be used for voice record and supports speech recognition. Voice record is made possible through ADPCM speech compression .

 ASSETS

 One of the major asset is that SmartQuill does not need a screen to work. This is possible through revolutionary "Spatial Sensing" system which uses semiconductor accelerometers.

Accelerometers senses pen/hand movement instead of shapes.

 The SmartQuill is also a 3D-mouse, when twisted in air in a certain way it enables scrolling of the screen. It also automatically detects left or right handed use.

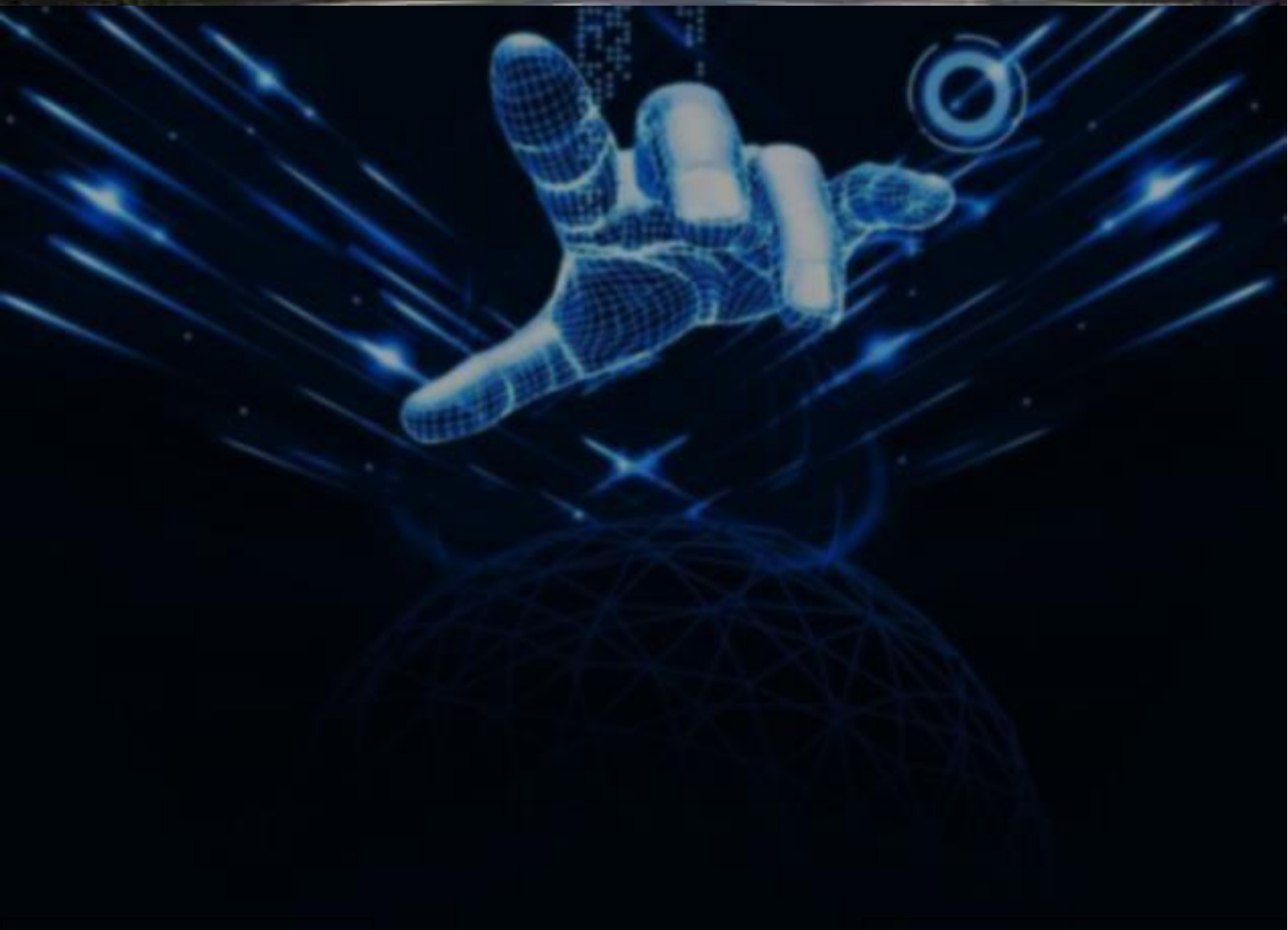
 CONCLUSION

The estimated cost of this futuristic pen is around $200.SmartQuill supports two factors: small size and convenient use. The future of SmartQuill ensures all computation power the user needs right inside the pen. Keyboards become so tiny you require needle-like fingers to operate them and screens that need constant cursor controls to read simple text.

ELECTROSPARK

VOLUME- 4, ISSUE- 1, 2020-21

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



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INSTITUTE'S VISION

To emerge as a centre of excellence in technical education, offering best of the teaching and learning by creating ambience for advanced level of education and research to serve the society.

INSTITUTE'S MISSION

IM-1. *To create an ambience for advanced level of teaching and learning process.*

IM-2. *To generate new ideas by engaging in cutting-edge research and technology.*

IM-3. *To initiate collaborative projects which offer opportunities for long term interaction with industry and academia.*

IM-4. *To develop intellectual human potential for serving the society according to the regional, national and global needs.*

DEPARTMENT'S VISION

To aspire to become a department which can provide value-based quality education, foster research and innovation and to groom the students to be globally competent.

DEPARTMENT'S MISSION

DM-1. *To Create an outcome-based teaching learning process to increase the creativity and innovativeness of the students and to face the challenging world.*

DM-2. *To motivate students and promote research and development culture among students, so that they can choose it as an optional career.*

DM-3. *To provide ethical and value-based education by promoting activities addressing the societal needs Editorial board*

MESSAGE OF HOD, ECE

I, welcome you to the Department of Electronics & Communication Engineering and take you to introduce it. The department has highly experienced dedicated faculty members and well-equipped laboratories. The department recorded good no of placements in reputed software and electronics industries over the year. The student achievements are magnificent in terms of regularly winning prizes in competitions in reputed institutes like IITs & NITs.

SOLAR TREE

ANURAG BISWAS (1st Year, ECE)

INTRODUCTION

Now a days with growing population and energy demand we should take a renewable option of energy source and also we should keep in mind that energy should not cause pollution and other natural hazards. In this case the solar energy is the best option for us. Our country India is a highly populated country so we should take the advantages of such an energy which requires a very less space to produce energy efficiently.

WHAT IS SOLAR TREE?

A solar tree is a decorative mean of producing solar energy and also electricity. It uses a no. of solar panels which forms a shape of a tree.

TREE Stands for

T= TREE GENERATING

R= RENEWABLE

E= ENERGY and

E= ELECTRICITY

This is like a tree in structure and solar panels are like the leaves of the tree which produces Energy & Electricity.

COMPONENTS OF SOLAR TREE-

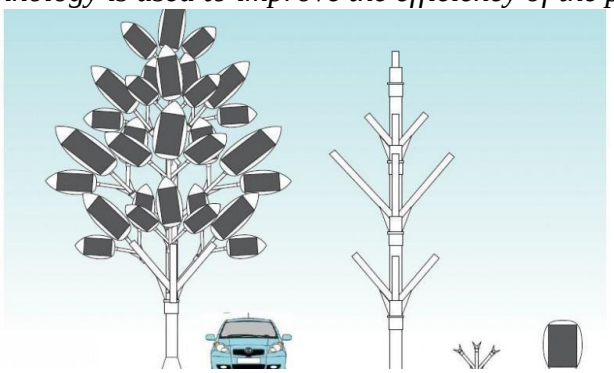
The solar tree consists of mainly five parts to design which are given below:-

1. SOLAR PANELS
2. LONG TOWER
3. LEDs
4. BATTERIES
5. STEMs FOR CONNECTING THE PANELS

SPIRALLING PHYLLATAXY

1. *It is a technique used in designing of solar tree.*
2. *It provides the way to help the lower panels from the shadow of upper ones, so that it can track maximum power from sun.*

4. *This technology is used to improve the efficiency of the plant.*



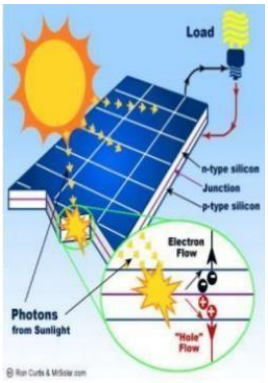
WHY WE CALLED IT AS SOLAR TREE ?

4. *Tree can produce their own food material by the process called **Photosynthesis.***
5. *Leaves are producing food material for human beings.*
6. *Likewise in solar tree solar plates are producing energy for the society.*

HOW SOLAR PANELS WORK ?

Photovoltaic cell converts sunlight into energy and this effect is known as photovoltaic effect.

4. *Solar cells essentially create electricity by converting photons of light into electrons.*
5. *Solar cell producing direct current, or DC, this DC current is converted to alternating current, or AC by using inverter.*



NEED OF SOLAR TREE

3. *<u>DUE TO LESS LAND REQUIREMENT :-</u> it require less land as compare to traditional PV system. So we require such a plant which can generate max. energy using minimum land.*
4. *<u>EFFICIENT ENERGY GENERATION :-</u> It can generate energy very efficiently as compare to traditional system.*

ADVANTAGES OF SOLAR PANEL

5. *Ecologically Friendly*
6. *Decreased Electrical Bill*
7. *Low Maintenance*
8. *Efficiency*

DISADVANTAGES OF USING SOLAR TREE

5. *Cost is very high.*
6. *May cause hazards to the birds and insects.*

WHY SHOULD INDIA NEED THE SOLAR TREEs ?

5. *India being a developing country and highly populated requires a power plant where maximum energy can be generated by using minimum land.*
6. *We must try to produce energy from sun by using solar tree in our country to increase our per capita land and fulfil the growing energy demand.*

CONCLUSION

9. *To fulfils the increase energy demand the people.*
10. *Saving of land, this project is very successful one.*
11. *This can be provide electricity without any power cut problem.*
12. *The extra energy can be provided to the grid.*

BIONIC CONTACT LENS

RUMELA BANERJEE (2nd year, ECE)

Bionic Contact Lenses are devices that, it is proposed by the manufacturers and developers,could provide a virtual display that could have a variety of uses from assisting the visually impaired to the video game industry. The device will have the form of a conventional contact lens with added bionics technology in the form of augmented reality with functional electronic circuits and infrared lights to create a virtual display allowing the viewer to see a computer generated display superimposed on the world outside.

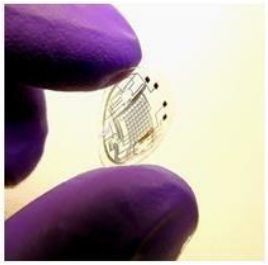


Fig. Prototype of the lenses

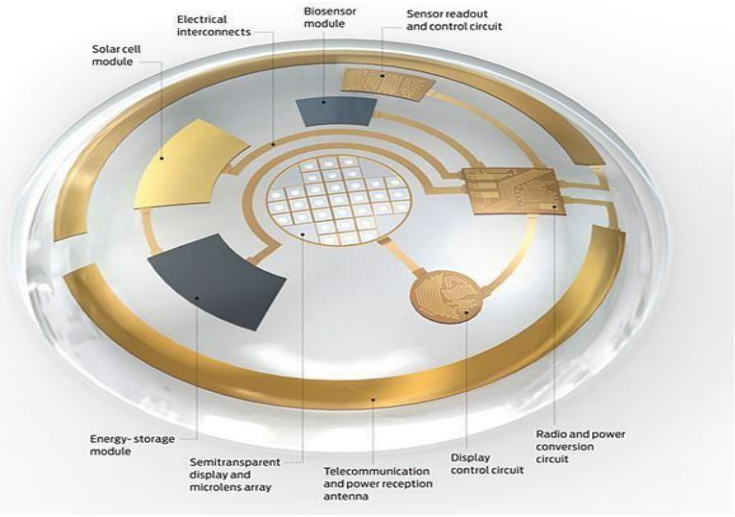
Fig. Pic while testing on animal's eye

Experimental versions of these devices have been demonstrated. The lens is expected to have more electronics capabilities on the areas where the eye does not see. Recent work augmented the contact lens with wi- Fi connectivity. In,2011 a functioning prototype with a wireless antenna and a single pixel display was developed .Previous prototypes proved that it is possible to create a biologically safe electronic lens, that will does not obstruct a person's view. Engineers have tested the finished lenses on rabbits for up to 20 minutes and the animals showed no problem. When thinking about the potential of emerging technologies, its often good to try and visualize the most extreme end point that we can think of where the technology would be fully matured.

The idea of smart contact lens is not as far away as we might think. The first problem that crops us is that how exactly do we power the electronics in a set of 'smart' contact lenses. As it turn out, we can use the energy of motion of kinetic energy .Every time the eye blinks we get some power. Now that we have the power problem solved .The components which are present in the lens are:- Antenna, Integrated circuit, Self-Assembly Techniques ,Chip, Light Emitting Diode(LED),Fresnel lenses ,Polymer substrates with electrical interconnects.

WORKING:-

Basically an antenna on the lens picks up radio frequency. The integrated circuit transforms and stores the energy .Chips harvest this energy and convert it into voltage that is necessary to power the LEDs .LEDs create an image, and Fresnel lenses are used to project the generated image on to the retina.



Bionic lens has fascinated mankind for a long time. Humans have often concluded up imaginations in numerous science fiction movies where characters like the :- Iron Man sees the world with data superimposed on his visual field – virtual captions that enhance the suit's scan of a scene and in numerous fiction stories.

Electronic contact lens as they are a lot secretive , less cumbersome, less bulky and undetectable to a third person. Human beings can beat blindness using this lens. Yes, its one of the amazing facts technically in the language of computer science our eyes are just a device .And this joint device send signal to our visual memory by our eyes. If any way we are successful in sending signals to the visual memory rather showing display to retina via lens. Hence we can beat the blindness in future.

Bionic contact lens will keep getting more advanced as technology gets better. The technology is simple and efficient method , helpful for lot of people. It may change lifestyle. This method will help in image processing.

ROBOTIC PROCESS AUTOMATION

AYUSHEE SHAW (1st year, ECE)

Robotic process automation (RPA) is the use of software with **artificial intelligence (AI)** and **machine learning** capabilities to handle high-volume, repeatable tasks that previously required humans to perform. These tasks can include queries, calculations and maintenance of records and transactions.

RPA technology, sometimes called a software robot or bot, mimics a human worker, logging into applications, entering data, calculating and completing tasks, and logging out.

RPA software isn't part of an organization's IT infrastructure. Instead, it sits on top of it, enabling a company to implement the technology quickly and efficiently -- all without changing the existing infrastructure and systems

The evolution of RPA

Although the term "robotic process automation" can be traced to the early 2000s, it had been developing for a number of years previously.

RPA evolved from three key technologies: **screen scraping**, workflow automation and artificial intelligence.

Screen scraping is the process of collecting screen display data from a legacy application so that the data can be displayed by a more modern **user interface**. The advantages of workflow automation software, which eliminates the need for manual data entry and increases order fulfilment rates, include increased speed, efficiency and accuracy. Lastly, artificial intelligence involves the ability of computer systems to perform tasks that normally require human intervention and intelligence.

Benefits of RPA

Robotic process automation technology can help organizations on their **digital transformation** journeys by:

Enabling better customer service

Ensuring business operations and processes comply with regulations and standards

Allowing processes to be completed much more rapidly

 Providing improved efficiency by digitizing and auditing process data

 Creating cost savings for manual and repetitive tasks

 Enabling employees to be more productive

Applications of RPA

Some of the top applications of RPA include:

 Customer service: RPA can help companies offer better customer service by automating contact centre tasks, including verifying e-signatures, uploading scanned documents and verifying information for automatic approvals or rejections.

 Accounting: Organizations can use RPA for general accounting, operational accounting, transactional reporting and budgeting.

 Financial services: Companies in the financial services industry can use RPA for foreign exchange payments, automating account openings and closings, managing audit requests and processing insurance claims.

 Healthcare: Medical organizations can use RPA for handling patient records, claims, customer support, account management, billing, reporting and analytics.

 Human resources: RPA can automate HR tasks, including on boarding and off boarding, updating employee information and timesheet submission processes.

 Supply chain management**:** RPA can be used for procurement, automating order processing and payments, monitoring inventory levels and tracking shipments.

ROBOTICS AND AUTOMATION

Arnab Roy (1st year, ECE)

What is Robotics and Automation

Robotics is a field of engineering that deal with design and application of robots and the use of computer for their manipulation and processing. Robots are used in industries for speeding up the manufacturing process. They are also used in the field of nuclear science, sea-exploration, servicing of transmission electric signals, designing of bio-medical equipments etc. Robotics requires the application of computer integrated manufacturing, mechanical engineering, electrical engineering, biological mechanics, software engineering.

Automation and Robotics Engineering is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. In the scope of industrialization, automation is a step beyond mechanization

Some future trends in Robotics and Automation

Robotic automation is a rapidly evolving technology. In just a few decades, industrial robots have become commonplace in factory settings across the world, and they only continue to gain popularity for their productivity and profitability.

Top Robotic Automation Trends

Robotics will continue to transform manufacturing in numerous ways, but there are 6 trends in robotic automation that will play a key role in the near future.

1. Adoption of Industrial Internet of Things (IIoT) Technology

Robots will increasingly deploy smart sensors at the edge of production to collect data previously inaccessible to manufacturers. This trend is currently underway and will lead to new levels of productivity and efficiency.

2. Industrial Cybersecurity as a Priority

As robots become more connected to internal systems for data collection, the cybersecurity risks increase. Manufacturers will be forced to address vulnerabilities in their processes and invest heavily in cybersecurity to ensure safe, reliable production.

3. Big Data Analysis Becomes a Competitive Differentiator

Robots will become a key source of information on the factory floor. The collection of data, however, is just one piece of the puzzle. Manufacturers will have to implement systems to organize and analyze all of this information in order to act on it.

4. Open Automation Architectures Will Be Implemented

As robotic automation gains widespread adoption, the need for open automation architectures grows. Large industry players will work with industry organizations to produce standards and open documentation that make robotic integration easier while improving product compatibility.

5. Virtual Solutions Will Invade Physical Processes

Virtual solutions will become an integral part of industrial robotics. One current growing application is the virtual representation of robotic systems for proof of concept and offline programming.

6. Collaborative Robots Will Continue to Grow in Popularity

Collaborative robots can work safely alongside humans and are often far cheaper than their industrial counterparts. As collaborative robots become more capable in tough industrial settings, they will see greater adoption by manufacturers with strict ROI requirements.Robotic automation has been a revolutionary technology in the manufacturing sector, but it's still poised to transform the industry over the next couple of years.

Spaces for Robotics and Automation

Many electronic equipment companies are using robotics and automation to improve plant efficiency and productivity. Sensors are being used in various machines to access invaluable data for improving efficiencies and reducing potential breakdowns. For instance, according to a report by Boston Consulting Group (BCG) in 2016, 1.2 million industrial robots are expected to be deployed by 2025, while the electronic equipment is expected to reach $2.1 trillion by 2020 according to TBRC, thus indicating a rise in automation and robotics technology adoption to improve productivity and reduce production costs.

The New Industrial Revolution : Advanced Robotic Manufacturing

The **manufacturing industry** in the U.S. is ripe for a new industrial revolution, and artificial intelligence and robotic automation are set to play a key role in that change. Because manufacturing is a major driving force in a nation's economic prosperity, it is especially important that small and medium-sized manufacturers pay close attention as these innovative technologies prepare to take center stage.

Government Support

Individuals in the public and private sectors realize that manufacturing is an area of critical national importance and they have come together to support, promote, and accelerate innovations in the sector. One of the areas of focus with increased research and development is in **advanced robotic manufacturing** (ARM).

ROBOTICS AND AUTOMATION

AKASH KUMBHAKAR (1ST YEAR, ECE)

Wearable devices such as activity trackers are best example of the **Internet of Things** such as electronics, software, sensors, and connectivity are effectors that enable objects to exchange data (including data quality) through the internet with a manufacturer, operator, and/or other connected devices, without requiring human intervention.

HISTORY: -

The history of wearable technology starts with the watch, which was worn by people to tell time, were created in the late 1600s but were worn mostly by women as bracelets. Over time, the watch become smaller and more precise. One early piece of widely adopted wearable technology was the calculator watch, which was introduced in the 1980s. In 2004, fashion design label **CuteCircuit** unveiled a Bluetooth-connected electronics called the HugShirt at the CyberArt Festival in Bilbao, Spain, where it won the Grand Prize at the festival. As such, it is also the first piece of Bluetooth-connected and internet-connected clothing. This product was included in **Time** magazine's "**Best Inventions of the Year**" special issue. In the following years smartwatches began to be released by major electronics companies. One of the first offerings was the Samsung Galaxy Gear which dropped in September 2013. Apple quickly followed suit with the Apple Watch in April 2015.

WEARABLE EVENTS :-

In 2018, many large Wearable Technology conferences are planned including the Wearable Technology conference 2018 EUROPE in Munich, Germany.[25] This conference has an agenda with many important role players in the future of Wearable Technology such as IBM and even FIFA. The Conference included discussion from a variety of speakers and company's tackling the future of Wearable Technology from use in sports to use in future fashion trends. Other examples of future technologies presented and discussed at this conference included technologies for stress relief, disease detection, smart eyewear, smart clothing, and even a form of an exoskeleton. This conference and the others planned provide a window into the next years and even decades to come in the field of Wearable Technology.

USAGE:-

Wearable tech gadgets are primarily used for any one of the following functions:

- As a fashion statement
- As a fitness tracker
- As a treatment for hearing impairments
- For remote treatment of speech and voice disorders such as those in patients with Parkinson's disease
- As a sport tracker
- To synchronize data and communication from other gadgets
- For specific health issue monitoring, such as stress management
- As a gauge for alertness and energy levels
- As navigation tools
- As media devices
- As communication gadgets

SOME WEARABLE GADGETS :-

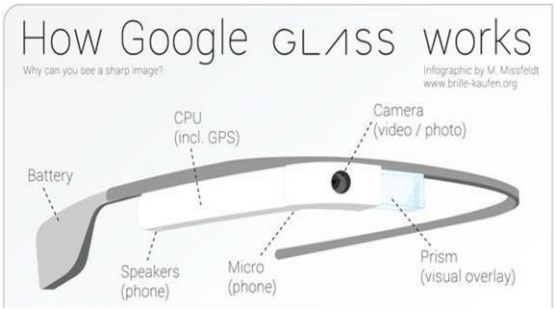
1. GOOGLE GLASSES -

What is Google Glasses???

- Google glass is termed as a wearable computer.
- It is developed by Google X Lab.
- Google glass display information in a smart phone-like hands -free format, that can interact with the internet via natural voice command.
- Google glass provide an experience known as augmented reality, where images are superimposed over what the user see in real life.

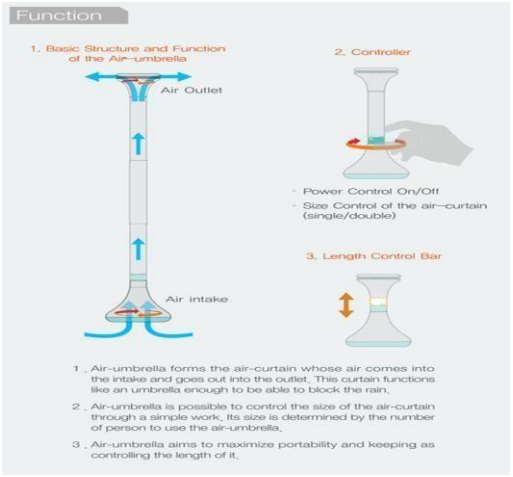
Technologies used.

- Wearable computing.
- Smart clothing.
- Eye tap technology.
- Android technology.
- 4G technology.



1. AIR UMBRELLA

the air umbrella,the concept removes theplastic top from the umbrella and replaces it with a wind shield. the design of the air umbrella calls for air to be sucked through the bottom,then shot out of the top in a pattern that mimics the standard canopy.



PROBLEMS OF WEARABLE DEVICES :-

- Battery Life--By far, the biggest problem for most wearable devices is the limited battery life.
- Google Glass' battery can run down in a little as 1.5 to 2 hours if you're shooting a lot of videos.
- Samsung's new smart watch can only last a day with regular use and will run out a lot sooner if you're doing a lot with it.
- A short battery life is always an issue in tech and this problem becomes more acute with a wearable device. If consumers have to take off their watch or glasses more than once a day to charge it, that's going to limit how often they're willing to use it. **In order for wearable tech to take off, we first need to see some real innovation in battery design.**
- Size - One side effect of adding in these advanced new features into watches and eyeglasses is that they need extra hardware to carry them out. **Manufactures have to figure out a way to either overcome the larger size with better aesthetics or reduce the size of these hardware components....** these products are bigger and chunkier than their normal counterparts-- and that's going to be a turn off for an average consumer.

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DEPARTMENT'S VISION

To emerge as a centre of excellence in technical education, offering best of the teaching and learning by creating ambience for advanced level of education and research to serve the society.

INSTITUTE VISION

To aspire to become a department which can provide value-based quality education, foster research and innovation and to groom the students to be globally competent.

INSTITUTE MISSION

IM-1. *To create an ambience for advanced level of teaching and learning process.*

IM-2. *To generate new ideas by engaging in cutting-edge research and technology.*

IM-3. *To initiate collaborative projects which offer opportunities for long term interaction with industry and academia.*

IM-4. *To develop intellectual human potential for serving the society according to the regional, national and global needs.*

DEPARTMENT'S MISSION

DM-1. *To Create an outcome-based teaching learning process to increase the creativity and innovativeness of the students and to face the challenging world.*

DM-2. *To motivate students and promote research and development culture among students, so that they can choose it as an optional career.*

DM-3. *To provide ethical and value-based education by promoting activities addressing the societal needs Editorial board*

MESSAGE OF HOD,ECE

I, welcome you to the Department of Electronics & Communication Engineering and take you to introduce it. The department has highly experienced dedicated faculty members and well-equipped laboratories. The department recorded good no of placements in reputed software and electronics industries over the year. The student achievements are magnificent in terms of regularly winning prizes in competitions in reputed institutes like IITs & NITs.

ARTICLES

INTRODUCTION TO ORGANIC ELECTRONICS

Kundan Sharma (3RD Year, ECE)

ABSTRACT

Improving life quality for disabled patients and overall improvement of human thought

Organic electronics, plastic electronics or polymer electronics, is a branch of electronicsdealingwithconductivepolymersandconductivesmallmoleculesCalledAs'organic'electronicsasthepolymersandsmallmoleculesarecarbon-basedMostpolymer electronics are laminar electronics, a category that also includestransparentelectronicpackageandpaperbasedelectronicsConductivepolymers arelighter,moreflexible,andlessexpensivethaninorganicconductors.Thismakesthem a desirable alternative in many applications. Conventional Electronics are based on inorganic materials, e.g., Si, oxides .In people's mind, organic materials were not associated with electronics. Used as

Plastic bags Organic materials Construction materials, MedicinesX Electronics. Organic Electronics In the past 20 years, people found organic materials could have Amazing and unique electronic and photonic properties. So there born these exciting areas!!! Organic Light Organic Field Organic Emitting Diode Effect Transistor Photovoltaic (OLED)(OFET)(OPV) Flexible cell phone Ultra-thin OLED TV Plastic Solar cell Flexible iPad.

In terms of performance and industrial development ,organic molecules andPolymers cannot yet compete with their inorganic counter parts. However, organicElectronics haves ome advantages over conventional electronic materials. LowMaterialand production costs,mechanicalflexibility,adaptability ofsynthesisProcessesandbiocompatibilitymakeorganicelectronicsadesirablechoiceforCertainapplications.Commerciallyavailablehigh-techproductsrelyingonorganicsemiconductors,suchAscurvedtelevision screens,displaysforsmartphones,colouredlightsourcesandPortablesolarcells,demonstratetheindustrialmaturityoforganicelectronics.InFact,severalhigh-techcompanies,includingLGElectronicsandSamsung,haveInvestedincheapandhigh-performanceorganic-electronicdevices.Withtheconsistentrefinementoforganicelectronics,numerousapplicationPossibilitiesforeverydayusewillarise.ItisexpectedthattheorganicelectronicsMarketwillgrowrapidlyinthecomingyears.

TheFutureofOrganicElectronics:

The Future of Organic Electronic had some amazing developments in the past! In the next 10-20 years Organic electronics will form several major multi billion $ industries. New exciting are as of Organic Electronics Will be discovered! A trans-parent laptop Circuits made by printing Plastic solar cells covering everywhere Do you want to be part of these exciting industries and discoveries?

ARTIFICIAL NEURAL NETWORK FOR RECOGNITION AND MODELLING OF BRAIN WAVE SIGNALS

Mousumi Dhar &Prithiraj Nandan
ECE, Second Year Student

INTRODUCTION

"What is an artificial neural network?" is the first question that should be answered. Pictonanswered this question by separating the question into two parts. The first part is why it is called anartificial neural network. It is called an artificial neural network because it is a network ofinterconnected elements. These elements were inspired from studies of biological nervous systems.In other words, artificial neural networks are an attempt at creating machines that work in a similarway to the human brain by building these machines using components that behave like biologicalneurons. The second part is what an artificial neural network does. The function of an artificial neural network is to produce an output pattern when presented with an input pattern.Since artificial neural networks can model both the linear and the nonlinear structure of time series,they have attracted more and more attention from both academic researchers and industrialpractitioners in recent years . Artificial neural networks have been widely used to model time seriesin various fields of applications, and used as a good alternative method for both linear and nonlineartime series forecasting.

Human to machine interaction is crucial for many human activities that require application ofrobots, computer devices, whose success in industry, military, and life highly relies on the way theycommunicate and interact with human. In medical research, Brain Computer Interface (BCI) hadbeen implemented to allow people with disabilities to guide wheelchairs. The intention of movingsomething is generally known as cognitive thought in BCI, it becomes useful for severely paralysedpeople to move things around them. This technology is used to detect driver fatigue and driverPage _2 sleepiness. The Electroencephalography (EEG) is a well-known term in BCI research community. Itallows the user to interact with a system through mental actions alone unlike traditional control procedures such as physical manipulation or verbal commands [4]. There are basically twotechniques that are used to monitor the users' brain activities and these include invasive (corticallyimplanted electrodes) and non-invasive (EEG type) techniques. Invasive techniques usually providemore precise and accurate measurements.

BRAIN WAVE COMPUTER INTERFACE DEVICE

A prototype of two wheeler robot is implemented and experimented controlled by a thought of ahuman being [8]. The eye-blink and ocular movement components could be decomposed byindependent component analysis (ICA) using the 14-channel signals measured by the headset [9].Emoitv EEG Neuroheadset is utilised to sense and capture users EEG and EMG data, and EmotivControl Panel Software is employed to interpret the facial expressions and mind states and also toconvert it into its corresponding text acronym. Both visualisation and motor control methods were carried out and analysed in order to accurately control the robot [10]. Wolpaw and his colleagues train individuals to control their-wave amplitude for cursor control [12]. The recentstudies on BCI and Neurofeedback have applied different stimulus and cognitive tasks. Itincludes imagination of 3D cube, imagination movement of both the hands and rest to move thecursor to their respective targets, playing snake gameplay, performing oddball task session, andword eye blink flashes images of Wheres Waldo. Brain wave acquisition were also collected frommoving the cursor to their respective targets, watching video clips and doing video games.

SIGNAL RECOGNITION

In this section, the RBF network built to train and recognise the brain signals of the test sets areconstructed. The network contains two procedures, a training phase and a test phase.

CONCLUSION

The success of artificial neural networks has been proved in various fields of application. Artificialneural networks consist of artificial neurons which imitate biological neurons. Due to the frameworkof this method, it could be appropriate to use this method for modeling waves produced by neuronsin the brain.

A Radial Basis Functions (RBF) Artificial Neural Network (ANN) is constructed in this work torecognise brain signals. Recognition rates in the highest 70 percent were recorded.

REFERENCE

1. Jalal Karam, Salah Al Majeed, Christofer N. Yalung, Lela Mirtskhulava; Neural Network for Recognition of Brain Wave Signals; International Journal of Enhanced Research in Science, Technology & Engineering ISSN: 2319-7463, Vol. 5 Issue 10, October-2016 ; Tbilisi State University, Department of Computer Sciences, Tbilisi, Georgia

2. CagdasHakanAladag, Erol Egrioglu, CemKadilar; Modeling Brain Wave Data By Using Artificial Neural Networks; Hacettepe Journal of Mathematics and Statistics Volume 39 (1) (2010), 81 – 88

IOT ENABLED AIR POLLUTION METER USING DIGITAL DASHBOARD ON SMARTPHONE FOR VEHICLES.

MEGHA DEOGHARIA(E.C.E 2nd Year)

INTRODUCTION

Air pollution meter presented here is IOT enabled to monitor air quality on our smart phone. This project has been introduced keeping in mind the increasing pollution in cities nowadays. This meter uses blynk application i.e.an Internet of Things platform to control arduino and raspberry pi over the internet.

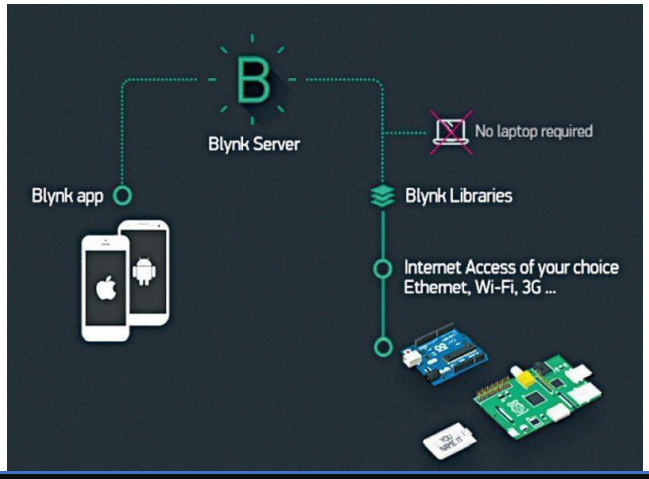
Blynk provides a digital dashboard on our smartphones that will display real time air quality readings for immediate surroundings.

Blynk can control hardware remotely .It can display sensor data, store and analyse things and visualize it. There three major components i.e.**Blynk app, Blynk server, Blynk libraries.**

Blynk app: It allowsyou to create amazing interfaces for your projects using various interfaces

Blynk server: It is responsible between all communication between the smart phone and hardware. Blynk can be used Blynk cloud or run it as private Blynk server. It can also be launched in Raspberry pi.

Blynk Libraries:The libraries enable communication with server and process all incoming and outgoing commands.



d s issue .We can also add GPS tracking to our system.

ANALYSIS

Implementation of this air pollution meter detects that the pollution is high or low because of combustion of fuel in vehicle. We are using Hypertext transfer protocol (HTTP), Message Queue Telemetry Transport protocol (MQTTP) for communicating and transferring dataand also assures that the data is not manipulated. For storing details IOT cloud is used. IOT cloud is Salesforce platform that is designed to store and process internet of things data.

Components:Sensors-PM2.5/PM10(SDS011),Gas sensor(MQ135),temperature and Humidity sensor(DHT11), smartphone and digital dashboard, Ethernet shield power supply, Additional alarm indication, raspberry or arduino.

System Architecture:

Our system contains Air Quality Sensor, RPI 3, IoT Cloud, Dashboard, Locking system and controlling. The air quality sensor is the MQX sensor which will sense the gas produced by the vehicles .It is the important part of the system. It will sense the pollution after 10kms of drive. The RPI 3 (Raspberry PI version 3) is used which is less in cost and have features like Bluetooth and Wi-Fi.It is an interface between the sensor and other things. It will intimate the driver as well as the owner of the vehicles which are generating pollution and the intimation will be send 2 times and 3rd time no intimation will be given and the starring will be locked by controlling and locking system and the details will be send to the RTO. The MQTT is lightweight messaging protocol which gives the 100% transmission of data with high speed. The IoT cloud is a Salesforce platform which stores large amount of data. It stores details of all vehicles and it will only pass the details of those vehicles which are generating gas above the threshold value to the RTO. HTTP (Hypertext Transfer) protocol is used to send the details from cloud to dashboard. RTO is using the dashboard which is an Android application used to display the details of vehicles which is send by IoT cloud.

Radio frequency identification, or RFID, is a generic term for technologies that use radio waves to automatically identify people or objects. There are several methods of identification, but the most common is to store a serial number that identifies a person or object, and perhaps other information, on a microchip that is attached to an antenna (the chip and the antenna together are called an RFID transponder or an RFID tag). The antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can make use of it.

RFID LABELS

): THE FUTURE

uman and Pragati Singh (ECE)

CONCLUSION

Implementation of air pollution detection in vehicles that is pollution is high or low because of combustion of fuel in vehicles can be used to keep a check on increasing air pollution around us. IOT and RFID are generally write once read many (WORM) devices. Imagine you go to a shopping mall, take the things you wanted and move out of the store. The RFID sends message to your bank and cost of product you bought is deducted from your account. So no more queue in shopping mall.

RFID READER

RFID is a proven technology that's been around 1970s. Up to now, many companies have RFID systems. These investments are usually made in closed-loop systems that is, when a company is tracking goods that never its own control. That's because all existing RFID systems use proprietary technology, which means that if company A puts an RFID tag on a product, it can't be read by Company B unless they both use the same RFID system from the same vendor. But most companies don't have closed-loop systems, and many of the benefits of tracking items come from tracking them as they move from one company to another and even one country to another.

References: IOT Based Air Pollution Monitoring and Forecasting System", 2015 International Conference on Computer and Computational Sciences (ICCCS), pp. 257-260.

International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887 Volume 5 Issue X, October 2017- Available at www.ijraset.com

https://electronicsforum.com: "IOT enabled Air pollution meter" by Biswajit Das.

So, RFID will emerge as **"THE NEXT BIG THING"**in future.

"Technology makes it possible for people to gain control over everything, except over technology".

SMART QUILL

DIPANITA DAS (1st year ECE)

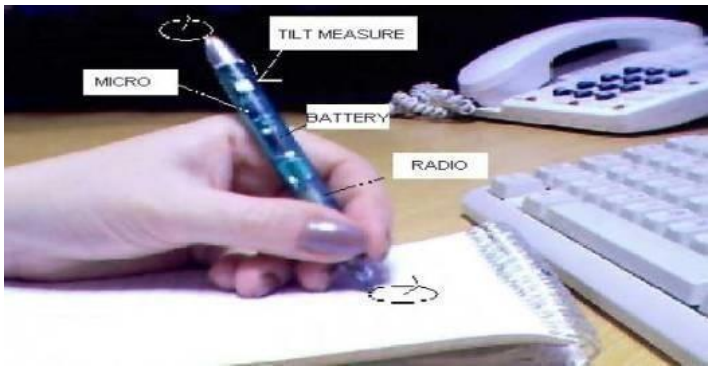
Abstract

Lyndsay Williams of Microsoft Research's Cambridge UK lab is the inventor of the Smartquill,a pen that can remember the words that it is used to write, and then transform them into computer text .

The prototype, called SmartQuil, has been developed by world-leading research laboratories run by BT (formerly British Telecom) at Martlesham, eastern England. It is claimed to be the biggest revolution in handwriting since the invention of the pen.

Your words of wisdom can also be uploaded to your PC through the "digital inkwell", while the files that you might want to view on the pen are downloaded to Smart Quill as well.

Working of Smart Quill



The information stored in the pen can be input to other devices such as mobile phones, printers ,modems,desktop computers etc for different applications.

□ SmartQuill can be used for voice record and supports speech recognition. Voice record is made possible through ADPCM speech compression .

□ **ASSETS**

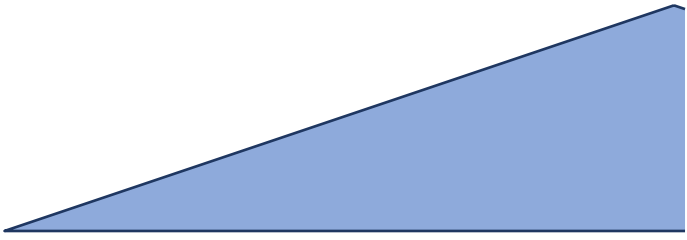
□ One of the major asset is that SmartQuill does not need a screen to work. This is possible through revolutionary "Spatial Sensing" system which uses semiconductor accelerometers.

Accelerometers senses pen/hand movement instead of shapes.

□ The SmartQuill is also a 3D-mouse, when twisted in air in a certain way it enables scrolling of the screen. It also automatically detects left or right handed use.

□ **CONCLUSION**

The estimated cost of this futuristic pen is around $200.SmartQuill supports two factors: small size and convenient use. The future of SmartQuill ensures all computation power the user needs right inside the pen. Keyboards become so tiny you require needle-like fingers to operate them and screens that need constant cursor controls to read simple text.



ELECTROSPARK

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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ARTICLES

SOLARTREE

ANURAGBISWAS(1st Year,ECE)

INTRODUCTION

Now a days with growing population and energy demand we should take a renewable option of energy source and also weshould keep in mind that energy should not causepollution and other natural hazards. In this case thesolarenergyisthebestoptionforus.OurcountryIndiaisahighlypopulatedcountrysoweshouldtakethe advantages of such an energy which requires a very less space to produce energy efficiently.

WHATISSOLARTREE?

Asolartreeisadecorativemeanofproducingsolarenergyandalsoelectricity.Itusesano.ofsolarpanels which forms a shape of a tree.

TREEStands for

T=TREE GENERATING

R= RENEWABLE

E= ENERGY and

E=ELECTRICITY

Thisislikeatreeinstructureandsolarpanelsarelikettheleavesofthetreewhichproduces Energy&Electricity.

COMPONENTS OFSOLARTREE-

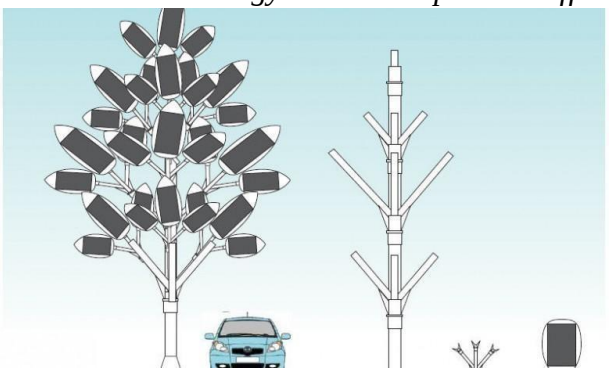
Thesolar treeconsists of mainlyfivepartsto design whicharegiven below:-

1. SOLARPANELS
2. LONGTOWER
3. LEDs
4. BATTERIES
5. STEMsFORCONNECTINGTHE PANELS

SPIRALLINGPHYLLATAXY

1. *Itisa techniqueused indesigning ofsolar tree.*
2. *Itprovidesthewaytohelpthelowerpanelsfromtheshadowofupperones,sothatitcantrackmaximum power from sun.*

4. *Thistechnology isused toimprovetheefficiencyoftheplant.*



WHY WE CALLED ITAS SOLARTREE ?

4. *Treecan producetheirown food materialbythe processcalled**Photosynthesis.***
5. *Leavesareproducing foodmaterial forhuman beings.*
6. *Likewisein solartreesolar platesareproducing energyfor the society.*

HOWSOLARPANELS WORK?

Photovoltaiccellconvertssunlightintoenergyandthiseffectisknownasphotovoltaic effect.

4. *Solarcellsessentiallycreateelectricitybyconvertingphotonsoflightinto electrons.*
5. *Solarcellproducingdirectcurrent,orDC,thisDCcurrent isconvertedtoalternatingcurrent,orACby using inverter.*

NEED OFSOLARTREE

3. *DUETOLESSLANDREQUIREMENT:-itrequirelesslandascomparetotraditionalPVsystem.Sowe require such a plant which can generate max. energy using minimum land.*
4. *EFFICIENTENERGYGENERATION:-Itcangenerateenergyveryefficientlyascomparetotraditional system.*

ADVANTAGESOFSOLAR PANEL

5. *EcologicallyFriendly*
6. *DecreasedElectricalBill*
7. *Low Maintenance*
8. *Efficiency*

DISADVANTAGESOFUSINGSOLARTREE

5. *Costisveryhigh.*
6. *Maycausehazards tothebirds and insects.*

WHYSHOULDINDIANEEDTHESOLARTREEs ?

5. *Indiabeingadevelopingcountryandhighlypopulatedrequiresapowerplantwheremaximumenergycan be generated by using minimum land.*
6. *Wemusttrytoproduceenergyfromsunbyusing solartreeinourcountryto increaseourpercapitaland and fulfil the growing energy demand.*

CONCLUSION

9. *Tofulfilstheincrease energydemandthepeople.*
10. *Savingofland,thisprojectisverysuccessfulone.*
11. *Thiscanbeprovideelectricitywithout anypowercut problem.*
12. *Theextra energycanbe provided tothegrid.*

BIONICCONTACTLENS

RUMELABANERJEE(2nd year, ECE)

BionicContact Lensesaredevicesthat,itisproposed by the manufacturers and developers,could provide a virtual display that could have a variety of uses from assisting the visuallyimpaired to the video game industry. The device will have the form of a conventional contact lens with added bionics technology in the form of augmented reality with functional electronic circuits and infrared lights to create a virtual display allowing the viewer to see a computer generated display superimposed on the world outside.

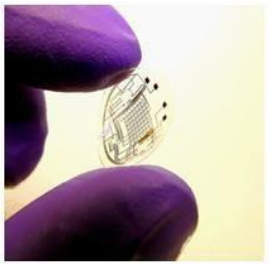


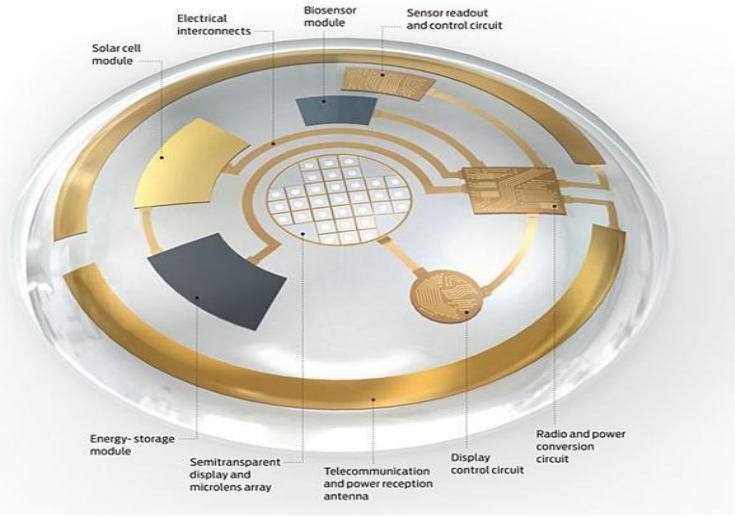
Fig. Prototype of the lenses

Fig. Pic while testing on animal's eye

Experimental versions of these devices have been demonstrated. The lens is expected to have more electronics capabilities on the areas where the eye does not see. Recent work augmented the contactlens withwi- Fi connectivity. In,2011 a functioning prototype with a wireless antenna and a single pixel display was developed .Previous prototypes proved that it is possible to create a biologically safe electronic lens, that will does not obstruct a person's view. Engineers have tested the finished lenseson rabbitsforupto20minutesandtheanimalsshowed no problem. When thinking about the potential ofemerging technologies, its often good to try and visualize the most extreme end point that we can think of where the technology would be fully matured.

The idea of smart contact lens is not as far away as we might think. The first problem that crops us isthat how exactly do we power the electronics in a set of 'smart' contact lenses. As it turn out, we can use the energy of motion of kinetic energy .Every time the eye blinks we get some power. Now that we have the power problem solved .The components which are present in the lens are:- Antenna, Integrated circuit, Self-Assembly Techniques ,Chip, Light Emitting Diode(LED),Fresnel lenses ,Polymer substrates with electrical interconnects.

WORKING:-



Bionic lens has fascinated mankind for a long time. Humans have often concluded up imaginations in numeroussciencefictionmovieswherecharacterslike the:-IronManseestheworldwithdatasuperimposed on his visualfield – virtual captions that enhance the suit's scan of a scene and in numerous fiction stories.

Electronic contact lens as they are a lot secretive , less cumbersome, less bulky and undetectable to a third person.Humanbeingscanbeatblindnessusingthislens. Yes, its one of the amazing facts technicallyin the language of computer science our eyes are just a device .Andthisjointdevicesendsignaltoourvisualmemory by our eyes. If any way we are successful in sending signals to the visual memory rather showing display to retina via lens. Hence we can beat the blindness in future.

Bionic contact lens will keep getting more advanced as technology gets better. The technology is simple and efficient method , helpful for lot of people. It may change lifestyle. This method will help in image processing.

ROBOTICPROCESSAUTOMATION

AYUSHEESHAW(1st year, ECE)

Roboticprocessautomation(RPA)istheuseofsoftware with **artificial intelligence (AI)** and **machine learning** capabilities to handle high-volume, repeatable tasks that previously required humans to perform. These tasks can includequeries, calculationsandmaintenanceofrecords and transactions.
RPA technology, sometimes called a software robot or bot,mimicsahumanworker,loggingintoapplications, entering data, calculating and completing tasks, and logging out.
RPA software isn't part of an organization's IT infrastructure.Instead,itsitsontopofit,enablinga company to implement the technology quickly and efficiently -- all without changing the existing infrastructure and systems

Theevolution ofRPA
Althoughtheterm"roboticprocessautomation"canbe traced to the early 2000s, it had been developing for a number of years previously.
RPAevolvedfromthreekeytechnologies:**screen**

advantages of workflow automation software, which eliminatestheneedformanualdataentryandincreases order fulfilment rates, include increased speed, efficiency and accuracy. Lastly, artificial intelligence involves the ability of computer systems to perform tasks that normally require human intervention and intelligence.

BenefitsofRPA
Robotic process automation technology can help organizationsontheir**digitaltransformation**journeys by:

Enablingbettercustomer service

Ensuringbusinessoperationsandprocessescomplywith regulations and standards

Allowingprocessesto be completed muchmore rapidly

 Providingimprovedefficiencybydigitizingand auditing process data

Creatingcostsavingsformanualandrepetitivetasks

Applicationsof RPA

Someofthe top applications of RPA include:

- **Customerservice:**RPAcanhelpcompaniesoffer better customer service byautomatingcontact centre tasks, including verifying e-signatures, uploading scanned documents and verifying information for automatic approvals or rejections.
- **Accounting:**OrganizationscanuseRPAfor general accounting, operational accounting, transactional reporting and budgeting.
- **Financial services:** Companies in the financial services industry can use RPA for foreign exchange payments,automatingaccountopeningsandclosings, managing audit requests and processing insurance claims.
- **Healthcare:**MedicalorganizationscanuseRPAfor handling patient records, claims, customer support, account management, billing, reporting and analytics.
- **Humanresources:**RPAcanautomateHRtasks, including on boarding and off boarding, updating employee information and timesheet submission processes.
- Supplychainmanagement**:**RPAcanbeusedfor procurement, automating order processing and payments,monitoringinventorylevelsandtracking shipments.

ROBOTICSANDTRENDS

Whatis Robotics and Automation

ArnabRoy(1st year, ECE)

Roboticsisafieldofengineeringthatdealwithdesign and application of robots and the use of computer for their manipulation and processing. Robots are used in industries for speeding up the manufacturing process. Theyare also used in the field of nuclear science, sea-exploration, servicing of transmission electric signals, designing of bio-medical equipments etc. Robotics requires the application of computer integrated manufacturing, mechanical engineering, electrical engineering, biological mechanics, software engineering.

Automation and Robotics Engineering is the use of control systems and information technologies to reducetheneedforhumanworkintheproductionof goods and services. In thescopeof industrialization, automation is a step beyond mechanization

Somefuturetrendsin Roboticsand Automation

Robotic automation is a rapidly evolving technology. In just a few decades, industrial robots have become commonplaceinfactorysettingsacrosstheworld,and they only continue to gain popularity for their productivity and profitability.

TopRoboticAutomationTrends

4. OpenAutomationArchitecturesWillBe Implemented

As robotic automation gains widespread adoption, the need for open automation architectures grows. Large industryplayerswillworkwithindustryorganizationsto produce standards and open documentation that make robotic integration easier while improving product compatibility.

5. VirtualSolutionsWillInvadePhysicalProcesses

Virtual solutions will become an integral part of industrial robotics. One current growing application is thevirtualrepresentationofroboticsystemsforproofof concept and offline programming.

6. CollaborativeRobotsWillContinuetoGrowin Popularity

Collaborative robots can work safely alongside humans and are often far cheaper than their industrial counterparts. As collaborative robots become more capableintoughindustrialsettings,theywillseegreater adoption by manufacturers with strict ROI requirements.Robotic automation has been a revolutionary technology in the manufacturing sector, butit'sstillpoisedtotransformtheindustryoverthe next couple of years.

SpacesforRoboticsand Automation

Many electronic equipment companies are using roboticsandautomationtoimproveplantefficiencyand productivity.Sensorsarebeingusedinvariousmachines to access invaluable data for improving efficiencies and reducing potential breakdowns. Forinstance, according to a report by Boston Consulting Group (BCG)in 2016, 1.2millionindustrialrobotsareexpectedtobedeployed by 2025, while the electronic equipment is expected to reach $2.1 trillion by 2020 according to TBRC, thus indicating a rise in automation and robotics technology adoption to improveproductivityand reduceproduction costs.

TheNewIndustrialRevolution:AdvancedRoboticMan ufacturing

The **manufacturing industry** in the U.S. is ripe for a newindustrialrevolution,andartificialintelligenceand robotic automation are set to play a key role in that change.Becausemanufacturingisamajordrivingforce in a nation's economic prosperity, it is especially important that small and medium-sized manufacturers pay close attention as these innovative technologies prepare to take center stage.

GovernmentSupport

Individualsinthepublicandprivatesectorsrealizethat manufacturingisanareaofcriticalnationalimportance and they have come together to support, promote, and accelerateinnovationsinthesector.Oneoftheareasof focus with increased research and development is in**advancedroboticmanufacturing**(ARM).

ROBOTICSANDAUTOMATION

AKASHKUMBHAKAR(1ST YEAR,ECE)

Wearabledevicessuchasactivitytrackersarebest example of the **Internet of Things**such as electronics,software,sensors, and connectivity are effectorsthatenableobjectstoexchangedata(including data quality) through the internet with a manufacturer, operator, and/or other connected devices, without requiring human intervention.

HISTORY: -

The history of wearable technology starts with the watch, which was worn by people to tell time, were created in the late 1600s but were worn mostly by women as bracelets. Over time, the watch become smaller and more precise. One early piece of widely adopted wearable technology was the calculator watch, which was introduced in the 1980s. In 2004, fashion design label **CuteCircuit**unveiled a Bluetooth-connected electronics called the HugShirt at the CyberArt Festival in Bilbao, Spain, where it won the Grand Prize at the festival. As such, it is also the first piece of Bluetooth-connected and internet-connected clothing.Thisproductwasincludedin**Time**magazine's "**Best Inventions of the Year**" special issue. In the following years smartwatches began to be released by major electronics companies. One of the first offerings was the Samsung Galaxy Gear which dropped in September 2013. Apple quickly followed suit with theAppleWatch in April 2015.

WEARABLEEVENTS:-

In 2018, many large Wearable Technology conferences are planned including the Wearable Technology conference2018EUROPEinMunich,Germany.[25]This conference has an agenda with many important role players in the future of Wearable Technology such as IBM and even FIFA. The Conference included discussion from a variety of speakers and company's tacklingthefutureof Wearable Technologyfrom usein sportsto useinfuturefashion trends.Otherexamples of for stress relief, disease detection, smart eyewear, smartclothing, and even a form of an exoskeleton. This conference and the others planned provide a window intothenextyearsandevendecadestocomeinthefield of Wearable Technology.

USAGE:-

Wearabletechgadgetsareprimarilyusedforanyoneof the following functions:

- Asafashion statement
- Asafitness tracker
- Asatreatment forhearingimpairments
- Forremotetreatmentofspeechandvoicedisorders such as those in patients with Parkinson's disease
- As asport tracker
- Tosynchronizedataandcommunicationfromother gadgets
- Forspecifichealthissuemonitoring,suchasstress management
- Asagauge foralertnessandenergylevels
- Asnavigationtools
- Asmedia devices
- As communication gadgets

SOMEWEARABLEGADGETS:-

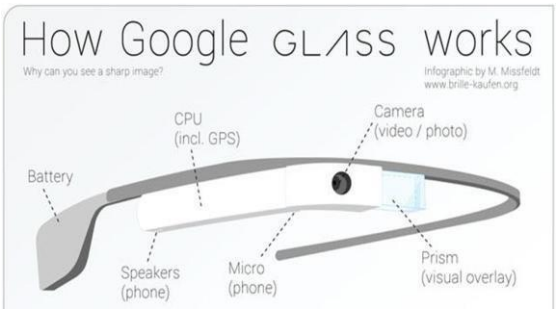
1. GOOGLEGLASSES-

WhatisGoogle Glasses???

- Googleglassistermedasawearable computer.
- It is developed byGoogleXLab.
- Googleglassdisplayinformationinasmartphone- like hands -free format, that can interact with the internet via natural voice command.
- Google glass provide an experience known as augmentedreality,whereimagesaresuperimposed over what the user see in real life.

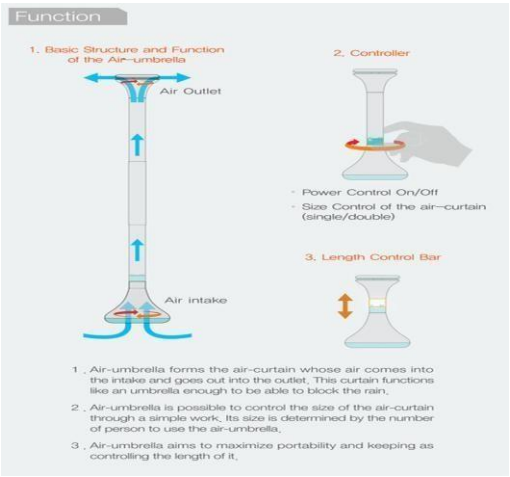
Technologiesused.

- Wearablecomputing.
- Smart clothing.
- Eyetaptechnology.
- Android technology.
- 4G technology.



1.AIRUMBRELLA

the air umbrella,the concept removes theplastic top fromtheumbrellaand replacesitwithawindshield. the design of the air umbrella calls for air to be suckedthroughthebottom,thenshotoutofthetopin a pattern that mimics the standard canopy.



PROBLEMSOFWEARABLEDEVICES:-

- BatteryLife--Byfar,thebiggestproblemformost wearable devices is the limited battery life.
- GoogleGlass'batterycanrundowninalittleas1.5 to 2 hours if you're shooting a lot of videos.
- Samsung'snewsmartwatchcanonlylastadaywith regular use and will run out a lot sooner if you're doing a lot with it.
- A short battery life is always an issue in tech and this problem becomes more acute with a wearable device.Ifconsumershavetotakeofftheirwatchor glasses more than once a day to charge it, that's goingtolimithowoftenthey'rewillingtouseit. **In orderforwearabletechtotakeoff,wefirstneed to see some real innovation in battery design.**
- Size - One side effect of adding in these advanced newfeaturesintowatchesandeyeglassesisthatthey need extra hardware to carry them out. **Manufactures have to figure out a way to either overcome the larger size with better aesthetics or reducethesizeofthesehardwarecomponents.** these products are bigger and chunkierthantheirnormalcounterparts--andthat's going to be a turn off for an average consumer.