Department of Electronics And Communication Engineering
E-SPARSH

Technical Magazine   **JUL - DEC 2022**

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INSTITUTION

Vision of the Institute:
To be a premier center of learning in Engineering and Management education that evolves the youth into dynamic professionals with a social commitment

Mission of the Institute:

M1: To provide quality teaching- learning practices in engineering and management education by imparting core instruction and state-of-the-art infrastructure.

M2: To engage the faculty and students in acquiring competency in emerging technologies and research activities through Industry Institute Interaction.

M3: To foster social commitment in learners by incorporating leadership skills and ethical values through value-based education

DEPARTMENT

Vision of the Department:
To produce technically competent and research oriented Electronics and Communication Engineers to meet the Industrial and Social requirements.

Mission of the Department:

M1: To impart quality technical education in the field of Electronics and Communication Engineering through state-of-the art facilities and effective teaching learning process.

M2: To enrich the faculty and students with research and consultancy skills through Industry-Interaction and Training in Emerging areas of Electronics and Communication Engineering.

M3: To develop lifelong learning, leadership qualities and ethical values in learners to meet the societal and industrial needs.

Program Educational Objectives (PEOs)

PEO-I : Graduates will have the capabilities to analyze, design and develop innovative solutions for the problems in the field of Electronics and Communication Engineering using core competencies.

PEO-II :Graduates will have the ability to engage themselves in research and lifelong learning to achieve professional excellence.

PEO-III : Graduates will have successful career with leadership qualities, ethics and good communication skills in Electronics and Communication Engineering and related fields.

ECE PBRVITS | DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Program Outcomes (POs)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO-1 : Graduates will be able to design and analyze Image Processing and communication systems concepts using appropriate tools.

PSO-2 : Graduates will be able to design and develop solutions for real world problems by applying the concepts of VLSI and Embedded systems.

DEPARTMENT PROFILE

The Department of Electronics and Communication Engineering (ECE) was established in the years 1998–99 with an intake of 60 and currently running with an intake of 360. It is 24 years old now and one of the most well-established departments in our Institution. It is also offering one post graduate programme with the specialization of VLSI Design with an intake of 30 students.

The Department is known for its esteemed faculty members who are renowned for their path-breaking contributions in the field of electronics and communications. It is well equipped with laboratories, audio-visual facilities and software tools such as MultiSim, ModelSim, Lab View, HFSS, MATLAB, and Xilinx.

We offer our students an excellent educational experience that combines intellectual rigor and cross-disciplinary breadth. The course contents are periodically updated to introduce new scientific and technological developments. Electronic design, communication technologies, hands-on programming, a research focus, and entrepreneurship skills are all part of our signature educational curriculum. The ECE domain is often regarded as a challenging culmination of hardware and software. Our curriculum focuses primarily on the knowledge and skills that emerging engineers need.

Electronics and Communication Engineering -ECE

PROFESSOR DESK

The Department of Electronics & Communication Engineering (ECE) has consistently maintained an exemplary academic record.

The greatest asset of the department is its highly motivated and learned faculty.

The available diversity of expertise of the faculty with the support of the other staff prepares the students to work in global multicultural environment. The graduates of the Electronics & Communication Stream have been selected by some of the world's leading corporations & as well as by most of the leading Indian counter parts.

I congratulate all my team members for their constant effort in creating the e-magazine, E-SPARSH. We are also thankful to our Management and Principal for their support and encouragement.

Dr. R. Sravanthi
Assoc. Professor & HOD, ECE.

1. UNDER WATER BULLET TRAIN

India's anticipated underwater bullet train is one step closer to completion. The Indian government has announced that it is in the process of purchasing 18 E5 series Shinkansen train sets from Japan for 70 billion rupees (approximately $964 million USD), the Economic Times reported. Before acquiring the trains, India will request Japanese train manufacturers to participate in a tender.

The first bullet train route will run between Mumbai and Ahmedabad, with the trains stopping at 12 stations along the way. "Each train will have 10 coaches and would be able to cruise at the speed of 350 km per hour," an official told the Economic Times. At these high speeds, the 315-mile-route will reduce the seven- to eight-hour journey down to two or three hours.

What makes this announcement particularly exciting is that, should the "proposed route map" get approved, travelers can expect to travel underwater for 13 of those miles - from Thane Creek to Virar - by way of a submerged corridor. According to the Economic Times, economy fares are estimated to cost around 3,000 rupees (about $41 USD), and first class will have amenities comparable to those offered by airlines.

In order to pay for the project, the Indian government is receiving a soft loan of 880 billion rupees (approximately $12 billion USD) — to be paid over 50 years with a 0.1% annual interest rate — from the Japanese International Cooperation Agency.

As part of the deal, Indian Railways is also building a local manufacturing plant for bullet trains, and the company will be "inviting bids" from companies like Japanese-based Kawasaki and Hitachi to construct an additional facility under the Make in India program.

Business Insider India reported that the company is facing resistance from landowners in Gujarat and Maharashtra, who are demanding government jobs and higher compensation. The National High Speed Rail Corporation hopes to resolve this issue and seal the deal by December 2018. Should this happen, construction may begin as soon as January 2019, with the project scheduled to be completed by the end of 2022.

MALISETTY TEJA SWAROOP
(19731A0460)

2. LUA-THE PET PLANT

Your plant has its needs but it can't communicate them to you. Lua turns your favorite plant into a spirited virtual pet! It's the perfect addition to your inner garden houseplants: its playful/cheerful/lively personality makes it the ideal plant companion. Lua has 5 senses:

Lua saves your greenery and makes you skip the hassle of an intricate setup: the free mobile app only requires an internet connection once for the download, and is T-CUP splits the image of the laser into two devices: a motion recorder and a camera that makes a single exposure of the scene. The movie camera captures the scene at the screaming edge of what's possible for it to see. The still camera makes a single, smeared shot of the laser's whole motion.

Then, a computer combines the data from the two cameras, using the smeared image from the still camera to fill in the gaps in the movie. Bullet Train then operational, even offline! Using Lua's app is literally as simple as scanning a QR code! LUA displays 15 different real - time animations - 6 animations are directly related to your plant's health and overall well-being, while the 9 others gives Lua and your plant, a spark of life.

6 Essential Animations:
Thirsty: When soil moisture drops under the defined threshold, you need to water your plant.
Sick: Too much water can kill your plant too; wait until Lua is thirsty to add water.
Vampire: After a few days Lua will turn into a vampire if exposure to light is not sufficient.
Squint: Too much exposure to light can harm your plant, when Lua is squinting it's looking for shade.
Cold: When the temperature drops. Lua will sneeze the day after.
Hot: Lua is too hot.

Other Animations:
Happy: Lua is back to normal.
Puzzled: Lua couldn't read your QR code.
Wink: You showed a QR code to Lua and it understood it.
Tired: Lua will go back to sleep when there's no movement in front of it.
Wake-up: When Lua senses a movement.
Grumpy: Random animation. If stretch goal is reached, Lua will look grumpy when there's a good chance of rain.
Tongue sticking out: Random animation.
Motion Tracking: Lua detects a movement and follows it with the eyes. If nothing happens, Lua will go back to sleep.

MEKALA RUPASRI
(19731A0461)

3. WIRELESS USB

Wireless USB (Universal Serial Bus) was a short-range, high-bandwidth wireless radio communication protocol created by the Wireless USB Promoter Group which intended to increase the availability of general USB based technologies. It was unrelated to Wi-Fi, and different from the Cypress Wireless USB offerings. It was maintained by the Wi Media Alliance which ceased operations in 2009. Wireless USB is sometimes abbreviated as "WUSB", although the USB Implementers Forum discouraged this practice and instead prefers to call the technology Certified Wireless USB to distinguish it from the competing UWB standard.

Wireless USB was based on the (now defunct) Wi Media Alliance's Ultra-Wide Band (UWB) common radio platform, which is capable of sending 480 Mbit/s at distances up to 3 meters (9.8 ft) and 110 Mbit/s at up to 10 meters (33 ft). It was designed to operate in the 3.1 to 10.6 GHz frequency range, although local regulatory policies may restrict the legal operating range in some countries.

TP-Link TL-WN725N @ Wireless USB Network Adapters Linux

Wireless USB works like standard USB (Universal Serial Bus), but without copper wire acting as the intermediary connector. Where the signals and information would normally be broadcast along copper wires, a wireless USB adaptor (either as part of a mouse, keyboard, or headphones) instead changes the signals into radio waves. The majority of wireless USB keyboards work on the 2.4 GHz radio frequency.

Many devices that use Wireless USB require a small transceiver in order to work with your computer. Typically, the transceiver plugs into a USB Type-A port (the rectangle kind) and communicates with the peripheral that way rather than using the Wi-Fi built into your computer. There are four main types of wireless USB devices you will encounter:
• Wireless mice
• Wireless keyboards
• Wireless headphones
• Wireless USB Hubs

Wireless headphones work a bit differently than wireless mice and keyboards due to the type of data they are transmitting. While wireless mice and keyboards broadcast what is essentially binary data, or a series of 1s and 0s, audio data is more complicated and thus requires more to decode. These tend to also work on the 2.4 GHz frequency and allow movement up to around 30 feet away from the receiver. Another type of device is a wireless USB hub. A wireless USB hub allows USB devices to be shared across the entire network. It does this by creating a USB to Wi-Fi bridge; in other words, it translates the signals from connected USB devices into a signal that all other devices on the network can read.

SHAIK JAVIDBASHA
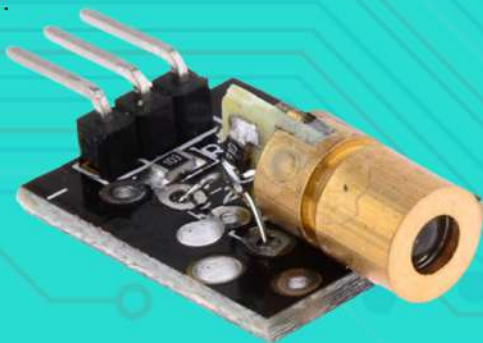**(19731A0472)**

4. LASER DIODE DISPLAY

Laser color television (laser TV), or laser color video display utilizes two or more individually modulated optical (laser) rays of different colors to produce a combined spot that is scanned and projected across the image plane by a polygon mirror system or less effectively by optoelectronic means to produce a color television display. The special case of one ray reduces the system to a monochromatic display as, for example, in black-and-white television. This principle applies to a display as well as to a (front or rear) projection technique with lasers (a laser projector).
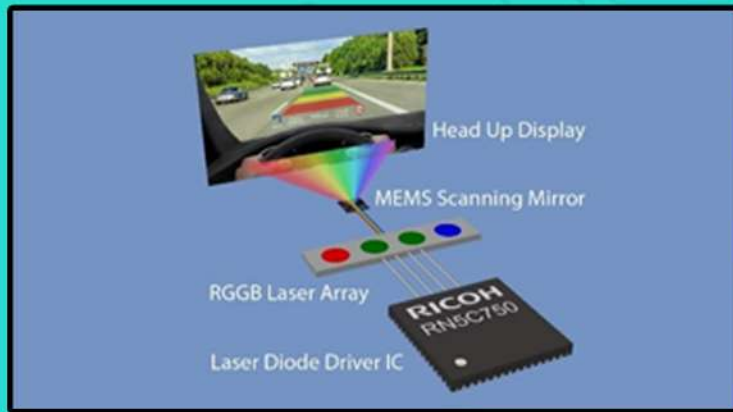
Lasers may become an ideal replacement for the UHP lamps which are currently in use in projection display devices such as rear-projection display devices such as rear-projection TV and front projectors. LG claims a lifetime of 25,000 hours for their laser projector, compared to 10,000 hours for a UHP. Current televisions are capable of displaying only 40% of the color gamut that humans can potentially perceive.

A laser TV requires lasers in three distinct wavelengths: red, green and blue. While red laser diodes are commercially available, there are no commercially available green laser diodes which can provide the required power at room temperature with an adequate lifetime. Instead, frequency doubling can be used to provide the green wavelengths.

Several types of lasers can be used as the frequency doubled sources: fiber lasers, inter-cavity doubled lasers, external cavity doubled lasers, VCSELs, and OPSLs (Optically Pumped Semiconductor Lasers). Among the inter-cavity doubled lasers, VCSELs have shown much promise and potential to be the basis for a mass-produced frequency doubled laser.

THIYYABINDU ADITYA
(19731A0482)

5. SNAKE ROBOT

It is a name given to a ROBOT which looks like snake in appearance and also move like it. Snake bot or snakeroot is a different type of DRONE. Snakes can coil, elongate and adjust their shape to fit into a variety of spaces. The robot follows the principle called as a "MASTER-SLAVE PRINCIPLE" where the head is a master and controls all other modules.

SNAKES are modular in nature i.e., the robot is made up of independent parts (or) modules which are connected to each other and the controlling head through links (imagine this like a train, where the cars are connected to the engine through links). By alternating their movements, snakes are able to tackle different terrains and inclinations effectively. It would be highly deployable if we could imitate such movements and flexibility to our robots. The arrays of functionalities are boundary less.

There are two qualities that all snake bots possess.

1. Their small cross-section to length ratio allows them to move into and maneuver through, tight spaces.

2. Their ability to change the shape of their body allows them to perform a wide range of behaviors, such as climbing stairs or tree trunks.

Additionally, many snake robots are constructed by chaining together a number of independent links. This redundancy makes them resistant to failure, because they can continue to operate even if parts of their body are destroyed. Properties such as high terrain ability, redundancy, and the possibility of complete sealing of the body of the robot very interesting.

The Israel Army uses Snake bots in assault and for detecting landmines and buried explosives. This is interesting as they have used Taser guns with these bots so that the rioter animal can be subdued in a non-fatal manner. Some snake bots snake bots possess the ability to dive are being sent to underwater for exploration. Snake bots can go under debris with required sensors and help track survivors who are in dire need rescue.

When researchers refer to how a Snake Bot moves they often refer to a specific gait, where a gait is just a periodic mode of locomotion. For example, sidewinding and lateral undulation are both gaits. Snake Bot gaits are often designed by investigating period changes to the shape of the robot. For example, a caterpillar moving by changing the shape of its body to match a sinusoidal wave. Similarly, Snake bot can move by adapting their shape to different periodic functions.

**A. SURYA PRAKASH REDDY
(19731A0447)**

6. ENERGY KITES

Now a day, there is abundant usage of electricity. The problems posed by electric energy generation from fossil sources include high costs due to large demand and limited resources, pollution and CO2 production, and the geopolitics of producer countries. These problems can be overcome by alternative sources that are renewable, cheap, easily available, and sustainable. However, current renewable technologies have limitations. So, many of them tried to find new methods of power generation using renewable resources.
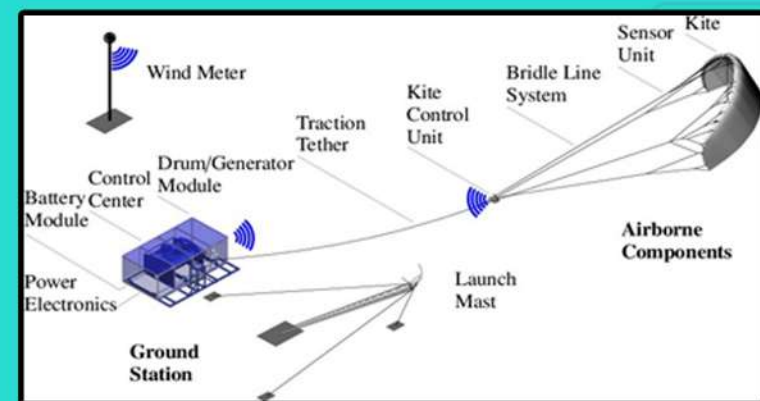
Out of all innovative ideas one major idea that's gaining great attention is airborne wind energy. Replacing, the traditional structure of wind turbine by Kites tethered to ground is the main idea behind airborne wind energy. Energy Kites is a revolutionary technique of power generation. With growing technological innovations & carbon footprints, energy at a cheaper rate with negligible greenhouse effect have become vital. It had become a leading energy source for many companies.

Developmental Status
1. The energy kite technology has got a boost towards commercialization after Kite Power Systems (KPS), a British start up, received an investment from three energy firms in 2016. The start-up has plan to build one of the world's first kite power stations using energy kite technology to be believed could collectively generate hundreds of megawatts of energy by 2030.
2. The technology is that the two kites are tethered to a spool and as they soar at speeds of around 100 miles per hour in figures of eight, they pull cables which turn the drum, rather like an unrolling spool of thread and thus generating electricity continuously as one kite descends and the other rises.

3. A Google X division company named Makani, Alameda, California (USA)- based Makani Technologies ran demonstration flights of its airborne wind turbines-which the company calls energy kites-in the North Sea, some 10 kilometers off the coast of Norway. The rotation of wide kite's rotors will drive the magnet motors/generators on board and thus producing electricity and transferring the same down the tether to be connected to an energy grid.

4. The idea behind the company's technology is to raise the altitude of the wind energy harvesting to hundreds of meters in the sky—where the winds are typically both stronger and more steady. Because a traditional wind mill reaching anywhere approaching these heights would be impractical. Recently, this 13-year old experiment in harnessing wind power using kites and modified gliders finally closes down but the technology behind it is open-sourced and is being passed on to others in the field.

**BASAM BINDU PRIYA
(19731A0450)**

7. AUTOMATIC RAILWAY GATE CONTROL

Automatic Railway Gate Control System is implemented to prevent accidents of the Traction System at Railway crossing levels. In general, a Railway gate is normally operated by a gate keeper as he receives the information. This is cheapest mode of transportation all over the world; therefore accidents are bound to happen due to carelessness. Therefore, if we implement automatic Railway control system may controls accident levels.

Automatic gate control system can be implemented using different Technologies such as GSM, Bluetooth and android. In this describes two GSM Technologies? Railway level- Crossing gate operation remotely by an android device. This system uses android application device for opening and closing the level crossing gate, remotely. This can operate by smart phone or Tablet which based on touch screen operation.
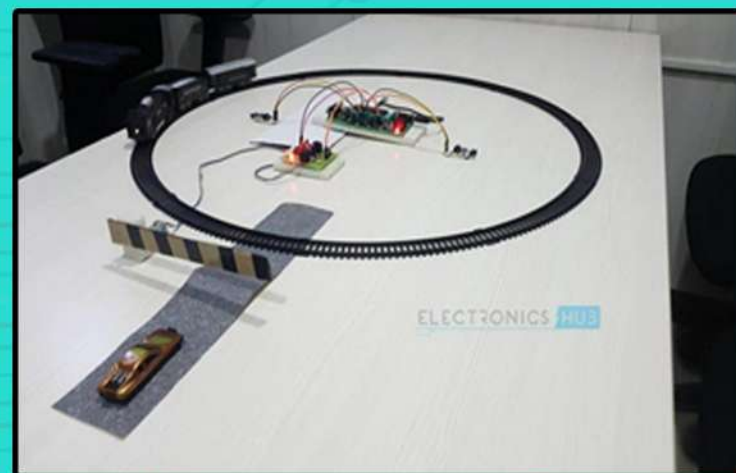
A Bluetooth device attached to control circuit at the receiver side; this receives these signals and sends them to the microcontroller that helps to operate including a buzzer for alerting the persons at the gate.So it can help easily to open or close.

When a driver sends an SMS 'open' to GSM modern and gate can be automatically opens. If 'close' gate can be closed helps by micro controller.

CH. VENKATA NIKHITHA
(20731A0409)

8. WATER JET MACHINES

Generally, we use water for our daily life usage. You can also use the water to cut the objects like camera or mobile phones and heavy metals. With the help of water jets we can do all the above works easily. Probably, these water jets are introduced in 1970's in United States. Firstly, these are used for cleaning purposes only. Later, it is evolved and merely used in industries. Water jet machining is a mechanical energy based non-traditional machining process. It involves the use of high velocity water jet to smoothly cut a soft work piece. During the process water kinetic energy is converted into pressure energy which induces a stress on work piece. The components of water jet are pump, intensifier, accumulator, control valve, flow regulator, nozzle, mixing tube, catchers.

Applications:
• In construction industry
• In printed circuit board design
• Wire stripping
• Food preparation
• Wood cutting
• River removal
• Paint removal

As of my conclusion, water jets are very useful in the industries but due to lack of knowledge and also the fear of taking risks these water jets are not yet implemented in many of the industries. If they do so it will be a revolution. In 1987, Ingersoll-Rand Waterjet Systems offered a 5-axis pure-water waterjet cutting system called the Robotic Waterjet System. The system was an overhead gantry design, similar in overall size to the HS-1000.
With recent advances in control and motion technology, 5-axis water jet cutting (abrasive and pure) has become a reality.

Where the normal axes on a water jet are named Y (back/-forth), X (left/right) and Z (up/down), a 5-axis system will typically add an A axis (angle from perpendicular) and C axis (rotation around the Z-axis). Depending on the cutting head, the maximum cutting angle for the A axis can be anywhere from 55, 60, or in some cases even 90 degrees from vertical. As such, 5-axis cutting opens up a wide range of applications that can be machined on a water jet cutting machine.

A 5-axis cutting head can be used to cut 4-axis parts, where the bottom surface geometries are shifted a certain amount to produce the appropriate angle and the Z-axis remains at one height. This can be useful for applications like weld preparation where a bevel angle needs to be cut on all sides of a part that will later be welded, or for taper compensation purposes where the kerf angle is transferred to the waste material – thus eliminating the taper commonly found on water jet-cut parts. A 5-axis head can cut parts where the Z-axis is also moving along with all the other axes. This full 5-axis cutting could be used for cutting contours on various surfaces of formed parts. Because of the angles that can be cut, part programs may need to have additional cuts to free the part from the sheet. Attempting to slide a complex part at a severe angle from a plate can be difficult without appropriate relief cuts.

CHAPPARAPU PRATHYUSHA
(20731A0410)

9. TECHNOLOGIES TAKING COMMUNICATION TO THE ABSOLUTE NEXT LEVEL

Technology in communications once is a necessity and now is a part of our life. speaking to distance, states, countries and galaxies to our amaze. Connecting people, computers, environment, machines now even objects! time has taken us so far in advancement. Here are some technologies, Defy Ing Disabilities - R-T Communication system for the disabled:

Communication system for the deaf and mute that helps convert sign language into text and equipped to speech.

The system consists of a gesture recognizer hand glove which converts gestures to electrical signals using flex sensors these signals are then processed using Arduino micro controller and a python based backend for the text to speech conversion. This invention is a clear examples of humans turning creator.

RISE OF HUMANOID BOTS:

The Artificial intelligence: objects, electronics, machines communicating to them robots being no more automated working on their own intelligence sounds impossible, complex but were made possible in the span.

IBM WATSON:

IBM supercomputer that combines artificial intelligence (AI) and sophisticated analytical software for optimal performance as a "question answering" machine. The Watson supercomputer processes at a rate of 80 teraflops . To replicate a high-functioning human's ability to answer questions, Watson accesses 90 servers with a combined data store of over 200 million pages of information, which it processes against six million logic rules. The device and its data are self-contained in a space that could accommodate 10 refrigerators.

SOPHIA THE ROBOT:

Sophia is a humanoid robot which is the first ever robot to gain a citizenship. Sophia uses artificial intelligence, visual data processing and facial recognition. Sophia also imitates human gestures and facial expressions and is able to make conversations. Sophia replicates era of evolution

J. VENKATA SATYA SAI VARSHINI
(20731A0426)

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10. EVER WIDENING CIRCLES OF VR IN HEALTH CARE

What if your surgeon told you that they've stood inside of a human heart? Your first instinct would probably be to tell them that they're crazy. That they're far too tall to be able to be inside of a human heart, that's just insane. But then you'll remember that technology is a thing. And that people are applying it in some really fascinating ways these days.

Here's where the virtual reality comes in… Next thing you know they're bringing in a headset. They put it over your eyes and suddenly you're staring at a human heart. The surgeon then shows you the issue, what they'll be doing to fix it, and why. You'll be able to walk through, first hand, what is and what will be happening to you or a loved one thanks to the virtual technology How would that make you feel? Really amazing feel that you might have never and ever experienced.

It's not only one of our most crucial organs, but also one of the most Aside from keeping that beat for years, even the process the heart goes through to form in utero leaves a lot of space for abnormality, and it happens a lot — every year about 40,000 people are born with congenital heart defects (CHDs) in the United States But it's a pretty difficult organ to study in action, considering the person needs to be on the table with their chest splayed open… which involves lot of procedure to be undergone by surgeons and risk for the individual operated upon.

Now without splaying the organs we can easily know the condition of heart and other vital organs of the body. And how do you go about explaining what's happening to the family members? How do the parents of the children born with heart defects even begin to try to understand an organ that doctors have spent years studying? Well, what about an interactive visual? It seems like the perfect home for our friend, virtual reality (VR). Pediatric cardiologists are utilizing VR at Lucile Packard Children's Hospital Stanford to make it easier to communicate and understand what's happening with these complicated CHDs, and the true benefits of bringing this technology into healthcare!

KUMMARI HEMALATHA
(20731A0427)

11. THE IMPACT OF USING ROBOTIC TECHNOLOGY

Now a day's Robotic technology is increasing at a fast rate, providing us with new technology that can assist automobile assembly and many other tasks. Robotic technology has changed the world around us and is continuing to impact the way we do things. The use of robots continues to change numerous aspects of our everyday life, such as health care, education and job satisfaction. Robots are growing to be a major part of the world economy. They help many ways to make our daily life easier and assist in producing more products. The use of Robotic technology has made an intermediate impact on the world in several ways. There are many types of robots in our day to day life such as,

BODY INDUSTRIAL ROBOTS:

First the industrial robot has help changed the industrial workplace. The industrial robots have enhanced the product quality and improved industrial operations. These robots, termed "industrial robots", were found almost exclusively in auto mobile manufacturing plants 20 years ago. But now these industrial robots are used in laboratories, research and development facilities… etc., manufacturing plants 20 years ago. But now these industrial robots are used in laboratories, research and development facilities…etc.

MILITARY ROBOTS:

Generally, military robots come in different shapes and sizes according to the military purposes. These military robots are used for bomb disposal, search and rescue missions and attack operations. These are also equipped with a camera to provide soldiers with the view of the battlefield and dangerous obstacles. These part in combat operations throughout the world.

MEDICAL ROBOTS:

The medical robot is helping to change the medical field, these are used to train surgeons, assist in difficult and precise surgical procedures and to assist patients in recovery. These robots are equipped with a computer integrated technology that contains a complex of programmed languages, controllers and advanced sensors. Although robots cannot actually check patients, they, give doctors the ability to have social interaction with each other by using a screen attached to the medical robot.

HUMANOID ROBOTS:

A humanoid robot is a robot with its overall appearance based on that of the human body. It is an autonomous robot because it can adapt to changes in its environment or itself and continue to reach its goal. These humanoid robots are currently being used as a research tool. The research in humanoid robotic technology is rising and will soon change the world. These can perform certain tasks on their own through voice commands from a human being.

KOMMI PALLAVI
(20731A0428)

12. ACTIVITY TRACKER

It is an advanced activity tracker housed in a classic watch designed for simplicity; it has no screen but shows your activity directly on the dial with its third hand. Withing's Move seamlessly tracks walking, running, sleeping, swimming and much more, plus features connected GPS to map your path.

It syncs with the free Health Mate app so you can view your trends and improve over time. Without any charging we can use up to 18 months so that you can enjoy and go the extra mile for walk. It is a water resistant up to 50 meters and fully customizable. By taking it to bed it will automatically track light and deep sleep cycles, duration, quality of sleep via the sleep score. The silent alarm feature is ready to wake you with gentle vibration.

I certainly have no problem with computer spreadsheets being mentioned. In fact, I think they should be mentioned, as long as we keep a realistic historical perspective on this. As 74 has detailed, using computer spreadsheets, or other computer assisted fitness record keeping, has been around since the 1980's, if not the late '70s. It is not new. The current tech is a refinement and integration of multiple already existing solutions to this space. The earlier devices I added were not necessarily marketed towards only serious exercisers. The range of devices I provided was, at the times mentioned, in the sub $100 to multi-hundred price range. The 2006/2007 device appears to be, and have been, in the $350 range. The bicycle computers were in the $50-$75 range in the early '90s, with more functionality/tracking? at the $150 level.

I had removed the references to Fitbit because the placement made it appear to me that there was undue weight provided to the company and their product(s). The statements implied that the company was the first in the marketplace with anything that would be considered an activity tracker, when they clearly were not. Basically, the way it was written when I got here had the existence of the term relying on that company's products when there were products already released in the marketplace (at least 2006, with fully integrated wireless reporting/tracking/planning) prior to the existence of that company (2007) let alone the introduction of their first product (2009).

I had removed the mention of Facebook from the lead because there did not appear to be any specific wearable device, nor any indication how any Facebook app was significantly separate from smartphone apps. Basically, I just did not see why it was specifically in the lead. Maybe something like "smartphone apps and integration with social media". Upon reflection, the integration with social media is actually quite important. The ability to share such information in social media is probably one of the things that is driving the product space. I'm not sure if that means mentioning specifically Facebook quite so predominantly, or just social media.

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13. AUDIO SPOTLIGHTING

Audio spot lighting is a very recent technology that creates focused beams of sound similar to light beams coming out of a flashlight. By 'shining' sound to one location, specific listeners can be targeted with sound without others nearby hearing it. It uses a combination of non-linear acoustics and some fancy mathematics for its working. But it is real and is fine to knock the socks of any conventional loud speaker.

This acoustic device comprises a speaker that fires inaudible ultrasound pulses with very small wavelength which act in a manner very similar to that of a narrow column. The ultra sound beam acts as an airborne speaker and as the air gradual distortion takes place in a predictable way due to the property of non-linearity of air.
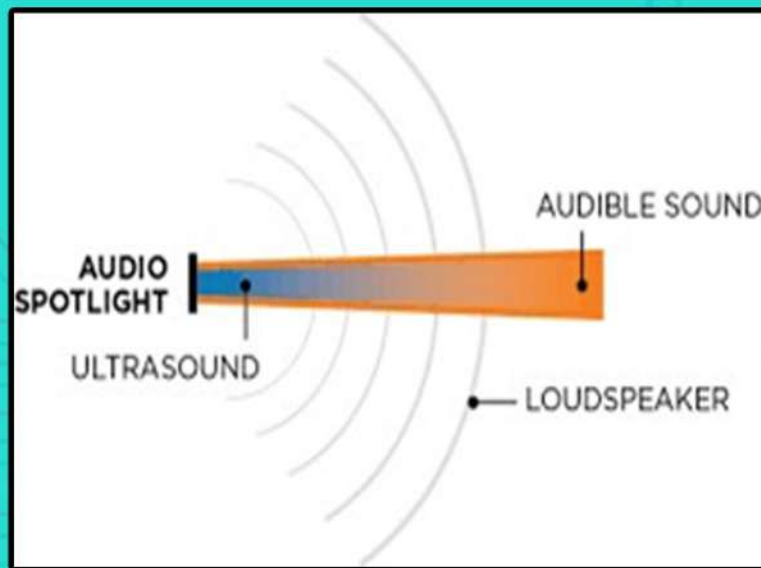
predictable way due to the property of non-linearity of air.

In the beginning the human voice or music is applied to the audio spotlight emitter device. The low frequency data is modulated to a high frequency ultrasonic level. Since the wave length of the ultrasonic frequency is small of the order of mm and beam angle is also small hence the sound beam will be narrow with small dispersion. When inaudible ultrasound pulses are fired into the air, it spontaneously converts the inaudible ultrasound into the audible sound tones, hence proved that as like water, sound propagation in air is non-linear.

So due to its non-linear property the air slightly alters the sound wave, the alteration in the original sound wave gives rise to a new sound wave within the ultrasonic wave. The new sound signal generated within ultrasonic wave will be corresponding to the original information signal with human audible frequency range. Since we can't hear the ultrasonic sound wave we hear only new sound wave which is formed due to the non-linearity of air.

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14. GERIATRIC CARE SYSTEM USING ELECTRONICALLY CONTROLLED AIR JACKET

The electronic Jacket is an acceleration-based system which detects the fall event by measuring the applied acceleration along the three axes. As acceleration is the most reliable information that can be used for detecting a fall, while other kinematic data, such as angular velocity, is less relevant. In addition to automated fall detection mechanism, the system also employs various novel techniques for mitigating the hazardous impact of a fall event. This product is designed as wearable jacket which consists of pressurized plastic air bags storing compressed air and a Solenoidal valve , which helps in mitigating the impact of a fall. Additionally, false detection switches are employed to overcome the issue of false trigger alarms caused by various day to day activities.

Advantages of E-Jacket for Fall Detection:

• The activity of the user is continuously monitored using an entity acceleration, which, when crosses a threshold value indicates that fall has been detected.
• The module also includes pressurized plastic bags which are filled with air pumped with the help of a solenoid valve arrangement. This arrangement helps in mitigating the harmful impact of fall and fall-related event.
• The system consists of a GPS module; it provides an accurate location of the user using which the user's location can be easily found.
• After the fall event, a request for help is sent to the caregivers who can provide the required medical assistance in time.
• The module is designed in the form of a wearable jacket which is best suited for both indoor and outdoor events.

Implementation of e-Jacket for fall detection is based on the principle of activity monitoring. Initially, the user will be wearing this system around his waist. The Electronic Jacket consists of a MEMS accelerometer (sensor) which keeps on monitoring the user's activity. Whenever the person falls down, the acceleration due to the mechanical movement of the body becomes greater than a given value. This change in acceleration is sensed by a sensor module. This sensor module will be continuously monitored by a Microcontroller.

During the event of a fall, the acceleration at the center of gravity of the user's body crosses a previously calibrated threshold value which in turn triggers the Microcontroller. The Microcontroller activates the solenoid valve and the pressurized plastic bags are filled with air. The air field pressurized plastic bags helps in reducing the impact of the fall and prevents any major injuries which could lead to serious health implications.

Additionally, the Microcontroller also triggers the GPS Module, which fetches the location of the user and sends it to the Microcontroller. The Microcontroller in turn provides appropriate control signals for the GSM Module to send a message to the doctor for the immediate medical assistance.

Process Flow:

The process of fall detection is comprised of the following four stages of operation.

a) Input stage – MEMS Accelerometer
b) Processing stage – Microcontroller
c) Trigger stage – Arrangement of pressurized plastic bags, miniaturized air pumps, solenoid valve.
d) Communication Stage – GSM Module and GPS Module.

OPERATION OF THE MOTE:

The Smart Dust mote is run by a microcontroller that not only determines the tasks performed by the mote, but controls power to the various components of the system to conserve energy. Periodically the microcontroller gets a reading from one of the sensors, which measure one of a number of physical or chemical stimuli such as temperature, ambient light, vibration, acceleration, or air pressure, processes the data, and stores it in memory. It also occasionally turns on the optical receiver to see if anyone is trying to communicate with it. This communication may include new programs or messages from other motes.

In response to a message or upon its own initiative the microcontroller will use the corner cube retro reflector or laser to transmit sensor data or a message to a base station or another mote. The primary constraint in the design of the Smart Dust motes is volume, which in turn puts a severe constraint on energy since we do not have much room for batteries or large solar cells. Thus, the motes must operate efficiently and conserve energy whenever possible. Most of the time, the majority of the mote is powered off with only a clock and a few timers running. When a timer expires, it powers up a part of the mote to carry out a job, then powers off.
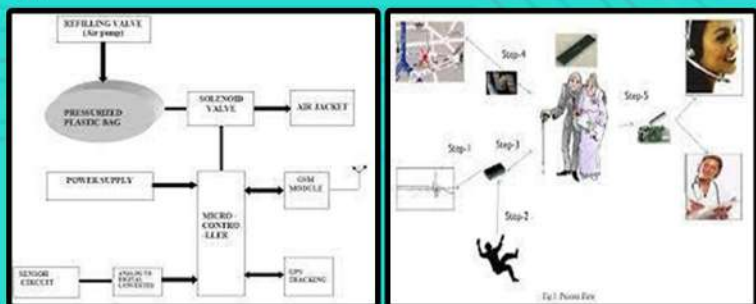
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15. NEW SPACE TIME 4-D CLOCK

Scientists have proposed to build the first ever 4D space-time crystal clocks that they claim will keep accurate time forever, even after the heat-death of the universe. This is the "wow" factor behind a device known as a "space-time crystal," a four- dimensional crystal that has periodic structure in time as well as space. Researcher Xiang Zhang from Berkeley Lab's Materials Sciences Division, who led this research, and his group, have come up with an experimental design to build a Crystal that is create both in space and time- a space-tiM9 Crystal.


However, there are also practical and important scientific reasons for constructing a space-time crystal. With such a 4- D crystal, scientists would have a new and more effective means to study how complex physical properties and behavior emerge from the collective interactions of large numbers of individual particles. "A space-time crystal could also be used to study phenomena in the quantum world, such as entanglement, in which an action on one particle impacts another particle even if the two particles are separated by vast distances", scientists said. Scientists from the US Department of Energy (D0E)'s Lawrence Berkeley

National Laboratory has proposed the experimental design of a space-time crystal based on an electric-field ion trap and the Coulomb repulsion of particles that carry the same electrical charge. The concept of a crystal that has discrete order in time was proposed earlier this year by Frank Wilczek, the Nobel Prize winning physicist at the Massachusetts Institute of Technology. While Wilczek mathematically proved that a time crystal can exist, how to physically realize such a time crystal was unclear.

SHAIK NAFREEN
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ELECTRONICS CROSS WORDS
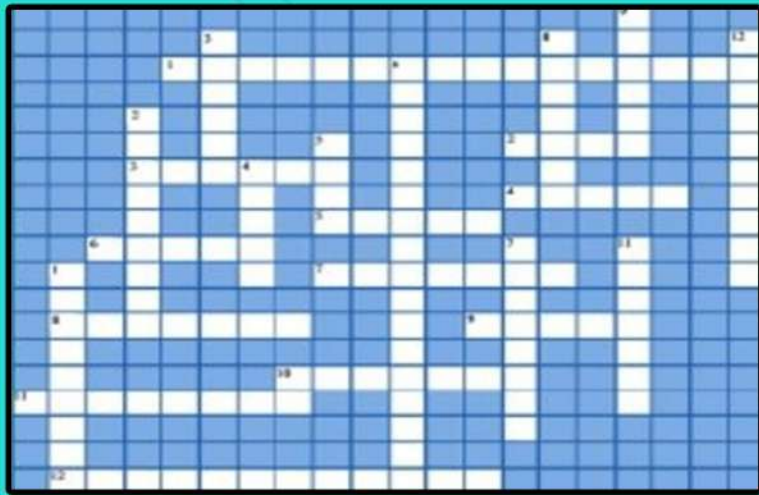
Across:
1. Two resistors connected together, across a power supply (9, 7)
2. Process used to remove unwanted copper from a PCB (4)
3. Color band used to indicate the number 7 (6)
4. Color band used to indicate the number 0 (5)
5. Connects the components together on a PCB (5)
6. A component which allows current to flow only in one direction (5)

Down:
1. Shape of the schematic symbol for a resistor (9)
2. Stores the charge (9)
3. Electrically joints components to a PCB (6)
4. Energy that allows the electronics to work (5)
5. Check the board works, after construction (4)
6. A chip / part with two rows of pins (10, 7)
7. Component with colored bands to determine its value (8)
8. Something that can only be true / false, 0 or 1(7)
9. Used to turn things on and off (6)
10. Letters used to mark commercial electronics sold in europe (2)
11. Measured across components such as batteries (7)
12. A component that acts like an electronic switch (10)
7. Makes a sound (7)
8. A collection of components, connected together (7)
9. The L in LED (5)
10. Flows through a circuit (7)
11. Electronics that works with real voltages (9)
12. Type of capacitor, which is polarized (12)

ERRAJONNALA KUMAR
(19731A04C1)

ELECTRONICS QUIZ

1. What kind of electronic magnetic waves does the typical TV remote use?
(a) Radio waves
(b) Infrared Radiation
(c) Ultraviolet
(d) Ultrasound

2. Which of the following electronic components is not headquartered in Japan?
(a) Toshiba corporation
(b) Sony corporation
(c) Samsung electronics
(d) Panasonic corporation

3. Which material is computer's processor made of?
(a) Single crystal ruby
(b) Single crystal silicon
(c) Silicon polycrystalline
(d) Pyrite crystal

4. Which device converts an acoustic wave into an electrical signal?
(a) Head pones
(b) Loudspeaker
(c) Microphone
(d) Amplifier

5. A cordless telephone using separate frequencies for transmission in base and portable units is known as
(a) duplex arrangement
(b) half duplex arrangement
(c) either (a) or (b)
(d) neither (a) nor (b)

6. For attenuation of high frequencies, should use
(a) shunt capacitance
(b) series capacitance
(c) inductance
(d) resistance

7. A Modem is classified as low speed if data rate handled is
(a) up to 100 bps   (b) up to 250 bps
(c) up to 400 bps   (d) up to 600 bps

8. VSB modulation is preferred in TV because
(a)it reduces the bandwidth requirement to half
(b)it avoids phase distortion at low frequencies
(c)it results in better reception
(d)none of the above

9. A woofer should be fed from the input through a
(a) low pass filter
(b) high pass filter
(c) band pass filter
(d) band stop filter

10. The color subcarrier and sidebands produced by its modulation with the chrominance signals are accommodated in the standard channel width by the process of
(a)frequency adjustment
(b)frequency interleaving
(c)frequency changing
(d)frequency amalgamation

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