Department of Electronics and Communication Engineering

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e-SRUSHTI

An Innovative Bucket...

TECHNICAL MAGAZINE

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CONTENTS

NARAYANA ENGINEERING COLLEGE :: NELLORE
(APROVED BY AICTE, NEW DELHI & PERMANENTLY AFFILIATED TO JNTU, ANANTHAPURAMU)

Vision of the Institute

To be one of the nation's premier Institutions for Technical and Management Education and a key contributor for technological and Socio-economic development of the nation.

Mission of the Institute

- To produce technically competent Engineers and Managers by maintaining high academic standards, world class infrastructure and core instructions.
- To enhance innovative skills and multi disciplinary approach of students through well experienced faculty and industry interactions.
- To inculcate global perspective and attitude of students to face real world challenges by developing leadership qualities, lifelong learning abilities and ethical values.

Vision of the Department

To produce technically competent and creative engineers who can cater to the industry and societal requirements in the field of Electronics & Communication Engineering

Mission of the Department

- To impart quality engineering education to students to enhance ability to pursue knowledge by providing core competency and state of the art infrastructure.
- To provide industry oriented learning for empowering and facilitating the learner through industry institute interaction and leadership qualities.
- To promote participation in research and extension activities for addressing the social needs by providing value based education along with life-long learning abilities.

Program Educational Objectives(PEOs)

PEO_1: Attain professional excellence or gain higher degree to face challenges posed by industry and society.

PEO_2: Address complex problems in a responsive and innovative manner.

PEO_3: Gain reputation by functioning effectively to address social and ethical responsibilities.

Program Specific Outcomes (PSOs)

PSO_1: Domain Specific Knowledge: Implement electronic systems related to Electronics Devices &Circuits, VLSI, Signal processing, Microcomputers, Embedded and Communication Systems to fulfill the solutions to real world challenges

PSO_2: Hardware Product Development: Apply the software and hardware tools in Analog and Digital Electronic circuit design to address complex Electronics and Communication engineering problems.

Program Outcomes(POs)

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

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

PO-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.

PO-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.

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

PO-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.

PO-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.

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

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

PO-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.

PO-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.

PO-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.

Professor Desk

Welcome to the Department of ECE at Narayana Engineering college, nellore.
This magazine will be covering activities conducted by e-SRUSHTI and technical articles written by students.

I am confident that all the faculty members and student community involved with this magazine have put their efforts in this in a way that the magazine both entertains and ignites the reader's mind. I would like to thank the editorial team members for bringing out this magazine regularly.. I express my considerable appreciation to all the authors of the articles in this magazine. These contributions have required a generous amount of time and effort. It is this willingness to share knowledge, concerns and special insights with fellow beings that has made this magazine possible.

Dr. G. Kannan
Professor,
Dept. of ECE.

Artificial Skin

Artificial skin is skin grown in a laboratory. It can be used as skin replacement for people who have suffered skin trauma, such as severe burns or skin diseases, or robotic applications. a skin work similar to that of the human skin and also it is embedded with several sensations or the sense of touch acting on the skin. This skin is already being stitched together. It consists of millions of embedded electronic measuring devices: thermostats, pressure gauges, pollution detectors, cameras, microphones, glucose sensors, EKGs, electronic holographs. This device would enhance the new technology which is emerging and would greatly increase the usefulness of robotic probes in areas where the human cannot venture.

Main objective of artificial skin is to sense heat, pressure, touch, airflow and whatever which human skin sense. It is replacement for prosthetic limbs and robotic arms. Artificial skin is skin grown in a laboratory. There are various names of artificial skin in biomedical field it is called as artificial skin, electronic skin, sensitive skin, synthetic skin, some fake skin.
Such different names are available but application is same it is skin replacement for people who have suffered skin trauma, such as severe burns or skin diseases, or robotic applications & so on. An artificial skin has also been recently demonstrated at the University of Cincinnati for in-vitro sweat simulation and testing, capable of skin-like texture, wetting, sweat pore-density, and sweat rates.
Fabrication of e-Skin:
U.S. and Chinese Scientists used zinc oxide vertical nano wires to generate sensitivity. According to experts, the artificial skin is "smarter and similar to human skin." It also offers greater sensitivity. To achieve greater sensitivity, researchers created a sort of flexible and transparent electronics sheet of about eight thousand transistors using vertical nanowires of zinc oxide. Each transistor can directly convert mechanical motion and touch into signals that are controlled electronically, the creators explained."Any mechanical movement, like the movement of an arm or fingers of a robot, can be converted into control signals.

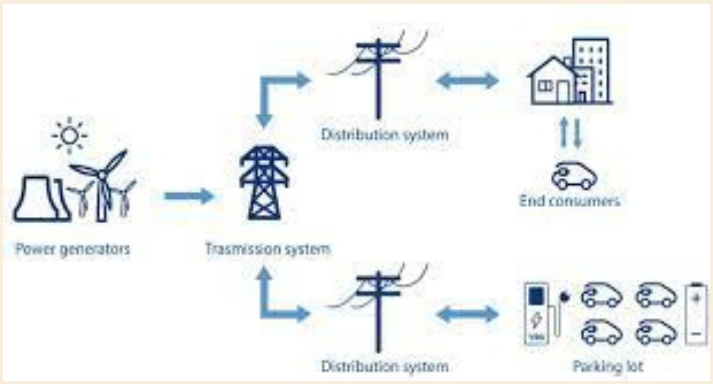
This technology "could make smarter artificial skin similar to human skin. It provides greater sensitivity and resolution. The system is based on piezoelectricity, a phenomenon that occurs when materials such as zinc oxide are pressed. Changes in the electrical polarization of the mass can be captured and translated into electrical signals thereby creating an artificial touch feeling.

Artificial Skin

B. VAMSI KRISHNA,
III E.C.E

Vehicle-To-Grid V2G

Electric drive vehicles can be thought of as mobile, self-contained, and-in the aggregate-highly reliable power resources. "Electric-drive vehicles" (EDVs) include three types: battery electric vehicles, the increasingly popular hybrids, and fuel-cell vehicles running on gasoline, natural gas, or hydrogen.All these vehicles have within them power electronics which generate clean, 60 Hz AC power, at power levels from 10kW (for the Honda Insight) to 100kW (for GM's EV1). When vehicle power is fed into the electric grid, we refer to it as "Vehicle-to-Grid" power, or V2G.With the popularization of electric vehicles and the construction of charging stations, the understanding of people to the electric vehicle and the changing station is not only confined to the transportation and the "gas station".The initial goal of V2G was to provide peak power, that is, the electric vehicle owners charging the vehicles in low load with lower price and discharging the vehicles in peak load with higher price. Then, the vehicle owners can get the profits from the V2G project. The functions of the vehicle in power grid were expanded, and the conclusion was get that benefit of providing peak power is significantly less than providing auxiliary services to the power grid . The V2G research also was carried out in some of the other countries such as Denmark, Britain and Germany, etc. The below figure schematically illustrates connections between vehicles and the electric power grid. Electricity flows one-way from generators through the grid to electricity users. from EDVs, or with battery EDVs, the flow is two ways. The control signal from the grid operator (labelled ISO, for Independent System Operator) could be a broadcast radio signal, or through a cell phone network, direct Internet connection, or power line carrier. In any case, the grid operator sends requests for power to a large number of vehicles. The signal may go directly to each individual vehicle, schematically in the upper right of Fig. , or to the office of a fleet operator, which in turn controls vehicles in a single parking lot, schematically shown in the lower right of Fig. , or through a third-party aggregator of dispersed individual vehicles' power (not shown). The grid operator also dispatches power from traditional central-station generators using a voice telephone call or a T1 line.



Vehicle-To-Grid System

D. MUNI RAHUL,
III E.C.E

Stratellite

Wireless communication is simply data communication without the use of landlines. This may involve cellular telephone, two-way radio, fixed wireless (broadband wireless), laser (freespace optics) or satellite communication systems. Mobile wireless technologies are going to act as glue towards bringing together the wired and wireless to shareSince from the beginning of wireless communications, there have been a number of developments in each generation. Considering the future generation of wireless communication i.e; 4G.

Stratellite is a brand name trademark of Sanswire for a future emissions-free, high-altitude stratospheric airship that provides a stationary communications platform for various types of wireless signals usually carried by communications towers or satellites. The Stratellite is a concept that has undergone several years of research and development, and is not yet commercially available; Sanswire, with its partner TAO Technologies, anticipates its current testing sequence to include the launch of a Stratellite into the stratosphere.

Stratallite: A "stratellite" is a high-altitude airship (HAA) "25 times larger than the Goodyear blimp" employed much like a satellite for remote sensing, navigation, and communications. Instead of being stationed on orbit, stratellites are positioned in the stratosphere approximately 13 miles above the Earth. This altitude places the airships above both commercial air traffic and weather effects but significantly lower than standard low earth orbits. From this height stratellites can service a 300,000-square-mile-area. The North American Aerospace Defense Command (NORAD) projects that eleven such airships could provide radar coverage of the entire maritime and southern borders of the United States.

Construction of Stratellites and distribute information seamlessly across each other's areas of reference. The initial Stratellite was 188 feet long, 60 feet wide and 42 feet high. It is provided with a new steering method which uses a hybrid electric system that drives large, slow-turning propellers. This gives the airship helicopter-like agility by being able to move both up and down, and side to side. The outside layer, or "envelope," is made out of a high-tech material called Spectra - a fabric used in bullet-proof vests and parts of space shuttles. Spectra contain fiber 10 times as strong as steel of the same weight and has the unique feature of being easy to cut but virtually impossible to tear.

The inide layer, made from a thin but strong polyester film called Mylar, is fitted inside the envelope and filled with a mixture of helium and air as helium is an inert gas and is therefore not flammable. With this design, the helium expands as the airship rises, forcing air out and lifting the airship.The cycle continues, allowing the airship to gain more and more altitude until the helium has expanded to fill the envelope completely. Because the pressure is so low inside the envelope, a puncture would only result in a very slow leak, taking a long time to totally deflate. projected to carry payloads as large as 4,000 pounds, and later models are expected to carry over 20,000 pounds of radars and other remote imaging equipment, navigational aids, and telecommunications relays. Stratellites are planned to remain on station for a year at a time and will cost a fifth as much as a comparable satellite.

Stratallite Technology & Advantages:

Stratellites are actually unmanned Kevlar balloons filled with helium. They use thin-film photovoltaic cells sprayed on their surfaces to generate electricity, which drives propellers that work with GPS technology to keep the stratellite positioned over one spot on the Earth's surface. Prototype airships are the second drawback is that satellites are in space, requiring expensive space launches, an additional level of regulation by national space authorities, and an orbital allotment by the International Telecommunications Union (ITU).

Stratellites remain in national airspace and are therefore not subject to these licensing and technology requirements. However, they do make use of space technology and, as stated above, are in development by at least one space industry firm.

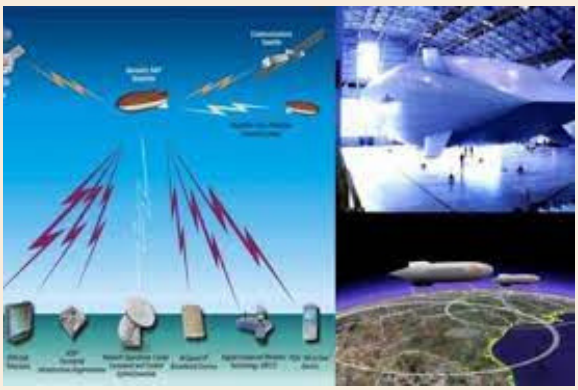
Applications it Enables:

Once a Stratellite network is in place, it will provide a national broadband wireless network that will provide voice, video, and broadband internet access to all parts of the country. By linking several Stratellites together they can provide a wireless broadband network that will cover

AirShip Stratallite System

thousands of miles. With a Stratellite network, subscribers will be able to sit in their homes and be connected on their laptops to the internet at high speed. If subscribers need to go to the office, across town, or even to another city, they can close their laptop and take off, reopening the laptop at their new destination and still be connected to the internet. This would allow subscribers the ease of not having to find local access numbers, tie up phone lines, deal with modem hassles, and more importantly, slow speeds. In addition to internet use, "proposed telecommunications uses include cellular, 3G/4G mobile, MMDS, fixed wireless telephony, HDTV, real-time surveillance and others.

Stratellites provide the required facilities of wireless communication more efficiently than the ordinary towers. The Stratellite will allow subscribers to easily communicate in 'both directions' using readily available wireless technology." They minimise the cost of communication. Stratellites present a mobile, low-cost, high-capacity alternative to satellite relays and cell towers. Once the defects of Stratellites have been overcome and become more reliable, they play a vital role in the future generation wireless communication.



Stratallite - Wireless Communication System

G. KUSHALARUN,
III E.C.E

Silent Flight

Silent Flight - New Drone is Powered by an Ionic Wind Requiring no Moving Parts.

Most drones today are noisy: The whine of motors and the hum of propellers produces an unavoidable din that instantly telegraphs their presence.By contrast, the small plane that flew across an indoor track on the MIT campus this fall was eerily silent.

Though its furthest flights were obviously powered, you could be forgiven for thinking it was some sort of trick. That's because the plane uses an entirely novel propulsion system, one without even a single moving part.

Researchers call it an "ionic wind," and the technology could offer a means of silently powering drones of the future, as well as being a potentially cleaner source of thrust for even larger aircraft.

Ionic Wind:

The craft generates thrust with a pair of wires carrying electric current, set one behind the other. The wire in front carries an electric charge of extremely high voltage - 40,000 volts in this case - and it's enough to knock electrons from nitrogen in the air, turning them into charged ions. The electric field generated between the set of wires then accelerates the ions toward the rear of the plane, and they bump into air molecules along the way, transferring energy to them and creating an air current. The force generated by that air current is what ultimately lets the plane fly.

It's similar to the ion drives that power some NASA spacecraft, and it was motivated, the authors say, by another sort of craft: The shuttles in Star Trekthat fly without obvious engines or noise, just a faint blue glow.

The technique was actually investigated as far back as the 1920s, says study co-author and MIT researcher Stephen Barrett, and picked up again in the 1960s, but the limited technology of the time meant that scientists concluded it would never be feasible as a means of propulsion. Some hobbyists have built small hovercraft-like designs using ionic winds, but that had been the extent of the technology's reach.

New Look At Old Technology:

Today, Barrett and his colleagues have taken advantage of advances in electronics and computer modeling systems to fine-tune and significantly scale down the components required to create ionic winds. They fit their design underneath the wings of a 5.5 pound fixed-wing drone with a sixteen-foot wingspan, and succeeded in flying almost 200 feet after a bungee-assisted launch.

The flight is the result of almost a decade of

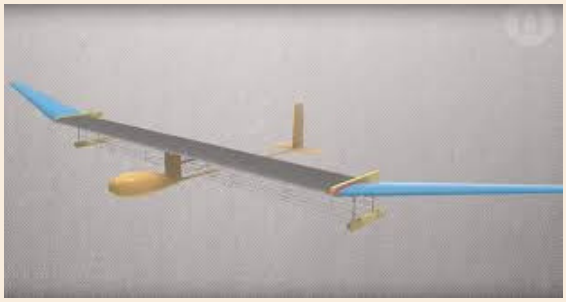
work on the concept, a project that saw the researchers dusting off and updating concepts from the 1960s to the point that powered flight was actually possible. It entailed vastly scaling down the converter that jumps the current up to a high voltage, as well as relying on new and more lightweight battery technology. The researchers also used computer modeling programs to help to squeeze every bit of efficiency from the system.

Work Ahead:

Achievements aside, though, the system is still far too inefficient for anything more than an extremely lightweight drone plane at the moment. Part of the reason is that ionic wind systems get more efficient at higher speeds, something the 11 mph speed limit of their prototype doesn't allow for. But this is just a proof-of-concept, the researchers emphasize, meant to show that ionic wind technology can indeed independently power an aircraft.

Powering commercial aircraft with ionic winds remains a more tenuous possibility. Propellers and jet engines are far more efficient than ionic winds right now, and the technology would need to advance significantly for it to become a viable option. Still, ionic winds could function as a secondary power source on aircraft once they're aloft, and they could be powered by solar panels. Barrett also sees applications for the technology in the realm of the very small.

"Solid state things tend to lend themselves to scaling down quite well," he said at a news conference Tuesday. "There does seem like there's the potential for creating extremely small flight vehicles that could serve purposes that previously haven't been imagined."



Noiseless Drone - Ionic Wind

V. SANTHI KUMARI,
III E.C.E

WI - FI Application

Wi-Fi could get much faster thanks to a proposed change in the wireless spectrum...

Whether we're sitting in a crowded Starbucks or in your busy home streaming Netflix, you want the Wi-Fi network to be fast. Earlier this week, the FCC suggested a change that could help make that happen: to use a new part of the wireless spectrum that they don't currently have access to.

Thinking of it like the congested highway we use to drive to work suddenly getting new lanes, or getting an entirely new highway to commute on—things hopefully start moving quicker. "It will give people faster Wi-Fi, basically," says Anthony Rowe, an associate professor of electrical and computer engineering at Carnegie Mellon University and a member of the institute's CyLab.

Right now, many routers work on two different frequencies—either 2.4 GHz or 5 Ghz. The 2.4 band (it's one small swath of frequencies in that neighborhood) has a reputation for traveling further, but offering slower speeds, mostly due to congestion and interference. The 5 Ghz band is known for not going quite as a far distance-wise, but providing faster speeds, so those episodes of The Good Place don't need to buffer; there's more bandwidth in what's actually three different frequency segments in that frequency region.

What the FCC proposed is opening up a big new part of the spectrum—the 6 GHz region—for Wi-Fi. It's not a done deal yet, but after a public commenting period and then another vote, it could be. Some of the primary opposition voices claim the new deal will favor large companies with licenses that could hurt smaller providers. All these radio waves, regardless of frequency, are travelling at the speed of light, so the real reason we could hopefully download the Bourne trilogy quickly before our next long plane flight isn't the exact frequency number—it's the bandwidth available. to use a new part of the wireless spectrum that they don't currently have access to.

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on—things hopefully start moving quicker. “It will give people faster Wi-Fi, basically,” says Anthony Rowe, an associate professor of electrical and computer engineering at Carnegie Mellon University and a member of the institute’s CyLab.

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Wi - Fi

SK. KHAJALIYAKHATH,
II E.C.E

Fastest Camera

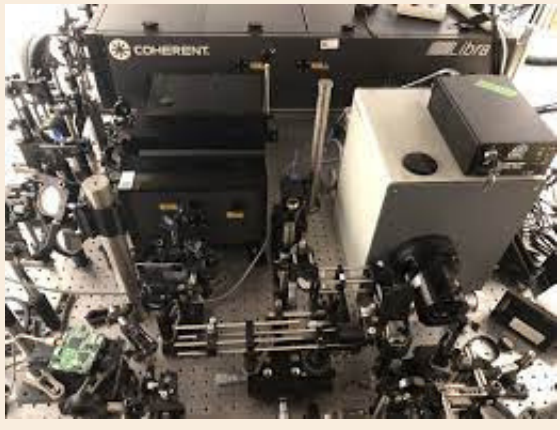
Fastest Camera - Lasers move at 10 Trillion frames per second...

Previously, the fastest video cameras in the world had framerates of one-one-hundred-billionth of a second. That was fast — A hundred-billionth of a second is just enough time for a beam of light to travel the length of a sesame seed. But it wasn't fast enough.

Researchers working with advanced lasers had developed a technique called "temporal focusing" where a laser pulse could be made to fire over incredibly short, compressed periods of time. The whole beam of light would rush out all at once, and researchers knew that temporally focused lasers behaved differently from lasers emitted over longer periods of time.

But the existing cameras were just too slow to study them. There were some ways to get around this problem in other ultra-fast exeriments. Researchers would sometimes run the same experiment over and over in front of the same, too-slow camera until it had collected enough different frames of action to string together into a single, complete movie. This wouldn't work for crashing a compressed laser into a surface like etched glass though; the researchers wanted to see what that looked like, but they knew it would look different each time. There was no way to string multiple experiments together into a single movie.

A new technology, singleshot 10-trillion-frame-per-second compressed ultrafast photography (T-CUP) had developed.One hundred times faster than the previous fastest recording method, T-CUP works by combining movie data with data from a still image.



Fastest Camera - (T-CUP)

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.

SD. ARSHAD AHMED,
II E.C.E

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.

Bullet Train

SK. SABINA,
II E.C.E

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

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 givesLua 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 #2 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.

Lua, in more detail:
The planter comes with a sub-irrigation water reservoir. It means less frequent watering and your plant gets all the water it needs.

- Lua uses 4 sensors to assist you in monitoring your plant's well-being: Water level sensor, light sensor, motion sensor and temperature sensor.

LUA - The Pet Plant

P. SUPRAJA,
II E.C.E

IOT Enable Inverter ACs With AI-Based Power Controller

Most inverter ACs can cool higher than their rated capacity. Due to this, when the ACs are switched on and temperature difference is high, these work beyond their rated capacity.

Energy-efficiency is extremely important, and India could become the playground for innovation in this area. In the energy-efficiency space, the amount of energy consumed for cooling is disproportionately high. Fifty to sixty per cent energy is consumed in controlling the environment (cooling or heating).

Due to power fluctuations in India, most people use voltage stabilizers with ACs. But these waste too much power and are also unreliable. A product is needed that can handle power fluctuations, does not use a stabilizer and works in true Indian conditions. It should also be able to handle extreme temperature conditions.

An inverter AC should provide fast cooling once switched on, with mini-mum energy consumption. It should provide rated cooling up to 50°C, operating at any voltage between 120V and 300V.

Bisquare Systems have developed AI-based inverter AC controllers for IDU and ODU that have moved intelligence from the outdoor unit to the indoor unit in the inverter AC. This has allowed them to implement a lot of functionalities. Controls are based on artificial intelligence (AI), machine learning and fuzzy logic instead of conventional PID controller.

This achieves almost thirty to forty per cent faster initial cooling, while consuming twenty to thirty per cent less energy. Since they did not change the basic thermodynamics of the AC, they could not improve it further. However, utili-sation is better with the latest control technologies. The company has also built-in smart home capabilities into the AC, which means it is inherently Internet of Things (IoT) enabled. It has an IoT integration layer into basic hardware, which enables adding a communica-tion interface. This allows the AC to collaborate with other ACs and IoT devices.

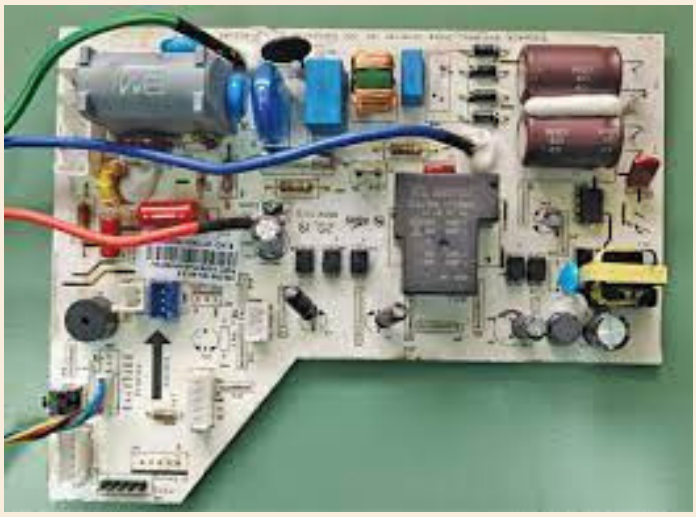
The product has gone through extensive operational, environmental and EMI testing. It has also been tested and approved by Voltas for production.

Most inverter ACs can cool higher than their rated capacity. Due to this, when the ACs are switched on and room temperature is high, these work beyond their rated capacity. So, a 1.5-ton inverter AC will cool like a 1.7- or 1.8-ton AC. However, such ACs consume more energy. This creates a problem during power cuts, when the ACs switch on again. As a result, they trip while using on power grid or a generator.

So, only fewer ACs can be used at a time. Bisquare controller enables the ACs to scale down the power requirement as per maximum power setting. When put in generator or backup mode, initially it does not take up high power. If there is IoT enablement, the ACs can talk to each other.

The warmer room AC can tell the cooler-room AC to not increase speed, and will increase its own speed and cool the room faster.

Another important feature built in into the product is slow ramp-up (surge). When recovering from a power shed, it lets the AC consume power very slowly. So, the grid will get loaded slowly and never be overloaded. Thus, the same grid can deliver 1.5 times the power.



Inverter AC - AI Based Power Control Systen

K.SRILAKSHMI,
II E.C.E

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 WirelessUSB offerings. It was maintained by the WiMedia 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) WiMedia Alliance's Ultra-WideBand (UWB) common radio platform, which is capable of sending 480 Mbit/s at distances up to 3 metres (9.8 ft) and 110 Mbit/s at up to 10 metres (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.

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.

Wireless USB

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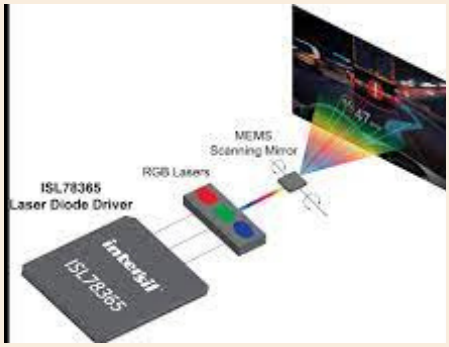
Laser Diode Display

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: fibre lasers, inter-cavity doubled lasers, external cavity doubled lasers, eVCSELs, 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.



Laser Diode Display System

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